

New York State Offshore Wind Master Plan

Cable Landfall Permitting Study



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New York State Offshore Wind Master Plan Cable Landfall Permitting Study

Final Report

Prepared for:

New York State Energy Research and Development Authority

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New York, New York

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Table of Contents

Notice	ii
List of Figures	vi
List of Tables	vii
Acronyms and Abbreviations	x
Summary	S-1
1 Introduction	1
1.1 Scope of Study	4
1.2 Objectives of the Study	5
1.3 Definition of Study Area	5
2 Methodology	8
2.1 Geospatial Data	8
2.2 Database Review	8
3 Summary of Desktop Analysis	10
3.1 Study Area 1: Long Island/Rockaway Peninsula	10
3.1.1 Land Cover	10
3.1.1.1 Shoreline/Nearshore Zone	10
3.1.1.2 Onshore Zone	12
3.1.2 Publicly Managed Lands, Public Places, and Government Properties	13
3.1.2.1 Shoreline/Nearshore Zone	14
3.1.2.2 Onshore Zone	15
3.1.3 Indigenous Nations Lands, Rights-of-Way, and Conservation Easements	17
3.1.3.1 Shoreline/Nearshore Zone	18
3.1.3.2 Onshore Zone	22
3.1.4 Municipal Jurisdictions	23
3.1.4.1 Shoreline/Nearshore Zone	23
3.1.4.2 Onshore Zone	24
3.1.5 Local Zoning	24
3.1.5.1 Shoreline/Nearshore Zone	25
3.1.5.2 Onshore Zone	26
3.1.6 Coastal Zone	28
3.1.6.1 Shoreline/Nearshore Zone	32
3.1.6.2 Onshore Zone	37
3.1.7 Marine Infrastructure and Uses	38

3.1.8	Threatened and Endangered Species	42
3.1.8.1	Shoreline/Nearshore Zone	44
3.1.8.2	Onshore Zone	53
3.1.9	Other Sensitive Habitats.....	53
3.1.9.1	Shoreline/Nearshore Zone	54
3.1.9.2	Onshore Zone	60
3.1.10	Wetlands, Surface Waters, and Floodplains.....	61
3.1.10.1	Shoreline/Nearshore Zone	63
3.1.10.2	Onshore Zone	68
3.1.11	Migratory Birds and Eagles.....	70
3.1.12	Sediment, Soil Types, and Steep Slopes	75
3.1.12.1	Shoreline/Nearshore Zone	75
3.1.12.2	Onshore Zone	79
3.1.13	Geologic Hazards.....	80
3.1.13.1	Shoreline/Nearshore Zone	81
3.1.13.2	Onshore Zone	82
3.1.14	Cultural and Historic Resources	82
3.1.14.1	Shoreline/Nearshore Zone	86
3.1.14.2	Onshore Zone	90
3.1.15	Areas of Contamination	90
3.1.15.1	Shoreline/Nearshore Zone	92
3.1.15.2	Onshore Zone	94
3.2	Study Area 2: Hudson and East River/New York City	95
3.2.1	Land Cover	95
3.2.1.1	Shoreline/Nearshore Zone	95
3.2.1.2	Onshore Zone	96
3.2.2	Publicly Managed Lands, Public Places, and Government Properties.....	98
3.2.2.1	Shoreline/Nearshore Zone	98
3.2.2.2	Onshore Zone	100
3.2.3	Indigenous Nations Lands, ROWs, and Conservation Easements.....	100
3.2.3.1	Shoreline/Nearshore Zone	100
3.2.3.2	Onshore Zone	105
3.2.4	Municipal Jurisdictions	106
3.2.4.1	Shoreline/Nearshore Zone	106
3.2.4.2	Onshore Zone	107

3.2.5	Local Zoning	107
3.2.5.1	Shoreline/Nearshore Zone	107
3.2.5.2	Onshore Zone	109
3.2.6	Coastal Zone	110
3.2.6.1	Shoreline/Nearshore Zone	110
3.2.6.2	Onshore Zone	114
3.2.7	Marine Infrastructure and Uses	115
3.2.8	Threatened and Endangered Species	119
3.2.8.1	Shoreline/Nearshore Zone	119
3.2.8.2	Onshore Zone	120
3.2.9	Other Sensitive Habitats	124
3.2.9.1	Shoreline/Nearshore Zone	124
3.2.9.2	Onshore Zone	126
3.2.10	Wetlands, Surface Waters, and Floodplains	127
3.2.10.1	Shoreline/Nearshore Zone	127
3.2.10.2	Onshore Zone	130
3.2.11	Migratory Birds and Eagles	133
3.2.12	Sediment, Soil Types, and Steep Slopes	133
3.2.12.1	Shoreline/Nearshore Zone	133
3.2.12.2	Onshore Zone	136
3.2.13	Geologic Hazards	138
3.2.13.1	Shoreline/Nearshore Zone	138
3.2.13.2	Onshore Zone	138
3.2.14	Cultural and Historic Resources	138
3.2.14.1	Shoreline/Nearshore Zone	138
3.2.14.2	Onshore Zone	141
3.2.15	Areas of Contamination	141
3.2.15.1	Shoreline/Nearshore Zone	141
3.2.15.2	Onshore Zone	145
4	Summary of Desktop Findings	147
4.1	Opportunities and Constraints	147
4.2	Summary Permit Matrix	157
5	Best Management Practices and Guidelines	166
5.1	Cable Landfall Siting	166
5.2	Resource-Specific Guidelines/BMPs	167

5.2.1	NLEB Protection Measures	170
5.3	Recommendations to Improve the Permitting Process.....	171
6	References	172
	Appendix A. Summary of GIS Metadata Used in Desktop Analysis	A-1
	Appendix B. Archaeological and Historic Site Summary Tables.....	B-1

List of Figures

Figure 1.	OSA and Cable Landfall Permitting Study Areas.....	3
Figure 2.	Cable Landfall Permitting Study Areas	7
Figure 3.	Landcover, Study Area 1: Long Island/Rockaway Peninsula.....	11
Figure 4.	Publicly Managed Lands, Public Places, and Government Properties, Study Area 1: Long Island/Rockaway Peninsula.....	16
Figure 5.	Indigenous Nations Lands, Rights-of-Way and Conservation Easements, Study Area 1: Long Island/Rockaway Peninsula.....	19
Figure 6.	Roadways and Municipal Boundaries, Study Area 1: Long Island/Rockaway Peninsula	20
Figure 7.	New York City Zoning, Study Area 1: Long Island/Rockaway Peninsula	27
Figure 8.	Coastal Resources, Study Area 1: Long Island/Rockaway Peninsula.....	33
Figure 9.	Shoreline Types, Study Area 1: Long Island/Rockaway Peninsula	34
Figure 10.	Marine Infrastructure and Uses, Study Area 1: Long Island/Rockaway Peninsula	40
Figure 11.	Shipping Density Study Areas 1 and 2	41
Figure 12.	Essential Fish Habitat Study Areas 1 and 2.....	58
Figure 13.	Wetland and Surface Waters, Study Area 1: Long Island/Rockaway Peninsula	64
Figure 14.	Floodplains, Study Area 1: Long Island/Rockaway Peninsula	67
Figure 15.	Shoreline/Nearshore Sediment Types, Study Areas 1 and 2.....	77
Figure 16.	Cultural Resources, Study Area 1: Long Island/Rockaway Peninsula	88
Figure 17.	Shipwrecks, Study Areas 1 and 2.....	89
Figure 18.	Areas of Contamination, Study Area 1: Long Island/Rockaway Peninsula	93
Figure 19.	Landcover, Study Area 2: Hudson and East River/NYC	97
Figure 20.	Publicly Managed Lands, Public Places, and Government Properties, Study Area 2: Hudson and East River/NYC.....	99
Figure 21.	Rights-of-Way and Conservation Easements, Study Area 2: Hudson and East River/NYC	103
Figure 22.	Roadways and Municipal Boundaries, Study Area 2: Hudson and East River/NYC	104
Figure 23.	New York City Zoning, Study Area 2: Hudson and East River/NYC.....	108
Figure 24.	Coastal Resources, Study Area 2: Hudson and East River/NYC.....	111

Figure 25. Shoreline Types, Study Area 2.....	113
Figure 26. Marine Infrastructure and Uses, Study Area 2: Hudson and East River/NYC	116
Figure 27. Wetlands and Surface Waters, Study Area 2: Hudson and East River/NYC.....	129
Figure 28. Floodplains, Study Area 2: Hudson and East River/NYC.....	131
Figure 29. Cultural Resources, Study Area 2: Hudson and East River/NYC.....	140
Figure 30. Areas of Contamination, Study Area 2: Hudson and East River/NYC.....	142
Figure 31. Hard Potential Constraints for Cable Landfall Sites, Study Area 1: Long Island/Rockaway Peninsula.....	164
Figure 32. Hard Potential Constraints for Cable Landfall Sites, Study Area 2: Hudson and East River/NYC	165

List of Tables

Table 1. Onshore Permitting Study Areas	6
Table 2. NLCD Land Cover Data for the Study Area 1 Shoreline/Nearshore Zone.....	12
Table 3. NLCD Land Cover Data for the Study Area 1 Onshore Zone.....	12
Table 4. Summary of Publicly Managed Lands, Public Places, and Government Properties in the Shoreline/Nearshore Zone of Study Area 1.....	14
Table 5. Summary of Publicly Managed Lands, Public Places, and Government Installations in the Onshore Zone of Study Area 1	17
Table 6. Overhead Transmission Lines in the Shoreline/Nearshore Zone of Study Area 1.....	21
Table 7. Overhead Electric Transmission Lines in the Onshore Zone of Study Area 1	23
Table 8. Municipalities within the Shoreline/Nearshore Zone of Study Area 1	24
Table 9. Municipalities within the Onshore Zone of Study Area 1	24
Table 10. New York City Zoning in the Shoreline/Nearshore Zone of Study Area 1	26
Table 11. Shoreline Type in the Shoreline/Nearshore Zone of Study Area 1	35
Table 12. LWRP Status and CEHA Permit Programs for Municipalities within the Shoreline/Nearshore Zone of Study Area 1	35
Table 13. Summary of Significant Coastal Fish and Wildlife Habitats in the Shoreline/Nearshore Zone of Study Area 1	36
Table 14. Shoreline Type in the Onshore Zone of Study Area 1.....	37
Table 15. Summary of Significant Coastal Fish and Wildlife Habitats in the Onshore Zone of Study Area 1.....	38
Table 16. Summary of Ocean Disposal Sites for Shoreline/Nearshore Zone of Study Area 1.....	42
Table 17. Federal and State Protected Species with the Potential to Occur within the Shoreline/Nearshore Zone of Study Area 1	48
Table 18. Piping Plover Survey Results	53
Table 19. Significant Natural Communities within the Shoreline/Nearshore Zone of Study Area 1.....	55
Table 20. Fish with Essential Fish Habitat within the Shoreline/Nearshore Zone of Study Area 1.....	56

Table 21. NOAA Trust Resources within Study Area 1.....	59
Table 22. Significant Natural Community in the Onshore Zone of Study Area 1	60
Table 23. Mapped Freshwater and Tidal Wetlands and Buffers within the Shoreline/Nearshore Zone of Study Area 1	65
Table 24. 100-Year Floodplains within the Shoreline/Nearshore Zone of Study Area 1.....	66
Table 25. Mapped Freshwater and Tidal Wetlands and Buffers within the Onshore Zone of Study Area 1.....	68
Table 26. 100-Year Floodplains within the Onshore Zone of Study Area 1.....	69
Table 27. Birds of Conservation Concern from Bird Conservation Region 30 that May Occur in Study Areas 1 and 2.....	71
Table 28. Sediment Types within the Shoreline/Nearshore Zone of Study Area 1.....	75
Table 29. Predominant Soil Types within the Shoreline/Nearshore Zone of Study Area 1.....	78
Table 30. Soil Types within the Onshore Zone of Study Area 1.....	79
Table 31. Site Classifications for State Remediation Sites	91
Table 32. Summary of State Remediation Program Sites in the Shoreline/Nearshore Zone of Study Area 1.....	92
Table 33. Superfund NPL Sites in the Onshore Zone of Study Area 1	94
Table 34. Summary of State Remediation Program Sites in the Onshore Zone of Study Area 1.....	95
Table 35. NLCD Land Cover Data for the Study Area 2 Shoreline/Nearshore Zone	95
Table 36. NLCD Land Cover Data for the Study Area 2 Onshore Zone.....	96
Table 37. Summary of Publicly Managed Lands, Public Places, and Government Properties in the Shoreline/Nearshore Zone of Study Area 2.....	98
Table 38. Summary of Publicly Managed Lands, Public Places, and Government Installations in the Onshore Zone of Study Area 2.....	100
Table 39. Overhead Transmission Lines in the Shoreline/Nearshore Zone of Study Area 2....	101
Table 40. Overhead Transmission Lines in the Onshore Zone of Study Area 2.....	105
Table 41. New York City Zoning Data in the Shoreline/Nearshore Zone of Study Area 2.....	109
Table 42. New York City Zoning Data in the Onshore Zone of Study Area 2.....	110
Table 43. Shoreline Type in the Shoreline/Nearshore Zone of Study Area 2.....	112
Table 44. Summary of Significant Coastal Fish and Wildlife Habitats in the Shoreline/Nearshore Zone of Study Area 2	114
Table 45. Shoreline Type in the Onshore Zone of Study Area 2.....	115
Table 46. Federal and State Protected Species with the Potential to Occur within the Shoreline/Nearshore Zone of Study Area 2	120
Table 47. State Protected Species with the Potential to Occur within the Onshore Zone of Study Area 2.....	123
Table 48. Significant Natural Communities within the Shoreline/Nearshore Zone of Study Area 2.....	124
Table 49. Fish and Essential Fish Habitat within the Shoreline/Nearshore Zone of Study Area 2 ^a	124
Table 50. Significant Natural Communities within the Onshore Zone of Study Area 2.....	127
Table 51. Mapped Freshwater and Tidal Wetlands and Buffers within the Shoreline/Nearshore Zone of Study Area 2	128

Table 52. 100-Year Floodplains within the Shoreline/Nearshore Zone of Study Area 2.....	130
Table 53. Mapped Freshwater and Tidal Wetlands and Buffers within the Onshore Zone of Study Area 2.....	132
Table 54. Onshore Zone 100-Year Floodplains in Study Area 2.....	133
Table 55. Sediment Types within the Shoreline/Nearshore Zone of Study Area 2.....	134
Table 56. Predominant Soil Types within the Shoreline/Nearshore Zone of Study Area 2.....	134
Table 57. Sediment Types within the Onshore Zone of Study Area 2.....	136
Table 58. Predominant Soil Types within the Onshore Zone of Study Area 2.....	137
Table 59. Summary of State Remediation Program Sites in the Shoreline/Nearshore Zone of Study Area 2.....	143
Table 60. Superfund NPL Sites in the Onshore Zone of Study Area 1	146
Table 61. Summary of State Remediation Program Sites in the Onshore Zone of Study Area 2.....	146
Table 62. Summary Constraint/Opportunity Matrix.....	149
Table 63. Potential Federal and New York State Requirements for Cable Landfall Site	158
Table 64. Summary of Shoreline/Nearshore and Onshore Permitting BMPs by Resource	167

Acronyms and Abbreviations

ACHP	Advisory Council for on Historic Preservation
AIS	Automatic Identification System
AoA	area of analysis
APE	area of potential effect
AWOIS	Automated Wrecks and Obstructions Information System
BCCs	birds of conservation concern
BCRs	Bird Conservation Regions
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BOEM	Bureau of Ocean Energy Management
BPC District	Special Battery Park City District
CEHA	Coastal Erosion Hazard Area
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP	Coastal Management Program
CONMAP	Continental Margin Mapping
CRIS	Cultural Resource Information System
CUSP	Continually Updated Shoreline Product
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DBH	diameter at breast height
DDT	Dichlorodiphenyltrichloroethane
DEC	New York State Department of Environmental Conservation
DOS	New York State Department of State
DOT	New York State Department of Transportation
DPS	distinct population segment
EA	Environmental Assessment
EFH	essential fish habitat
EIS	Environmental Impact Statement
ENC	Electronic Navigational Chart
EPA	U.S. Environmental Protection Agency
ERM	effects range median
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FRS	Facility Registry Service
GARFO	(NOAA Fisheries) Greater Atlantic Region Fisheries Office
GIS	geographic information systems

HARS	Historical Area Remediation Site
HDD	horizontal directional drilling
IPaC	Information for Planning and Consultation Conservation
kV	kilovolt
LWRP	Local Waterfront Revitalization Program
Master Plan	New York State Offshore Wind Master Plan
MBTA	Migratory Bird Treaty Act
NCED	National Conservation Easement Database
NEPA	National Environmental Policy Act
NFHL	National Flood Hazard Layer
NHD	National Hydrology Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NLEB	northern long-eared bat
NOAA Fisheries	NOAA Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPFA	natural protective feature areas
NPL	National Priorities List
NPMS	National Pipeline Mapping System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NYCRR	New York Codes, Rules and Regulations
NYPAD	New York Protected Areas Database
NYS	New York State
NYSERDA	New York State Energy Research and Development Authority
NYSHPA	New York State Historic Preservation Act
NYSM	New York State Museum
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OGS	New York State Office of General Services
OPRHP	New York State Office of Parks, Recreation and Historic Preservation
OSA	Offshore Study Area
PA	Programmatic Agreement
PAHs	polyaromatic hydrocarbons
PCBs	polychlorinated biphenyls
pga	peak ground acceleration

ppb	parts per billion
ppt	parts per thousand
REMAP	Regional Environmental Monitoring and Assessment Program
ROW	Right-of-way
SHPO	State Historic Preservation Office
SMIA	Significant Maritime and Industrial Areas
SNWA	Special Natural Waterfront Areas
SPDES	State Pollutant Discharge Elimination System
SSURGO	Soil Survey Geographic
STSSN	Sea Turtle Stranding and Salvage Network
Study	Cable Landfall Permitting Study
T&E	Threatened and Endangered
TCPs	traditional cultural properties
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Waterways Act	Waterfront Revitalization of Coastal Areas and Inland Waterways Act
WNS	white-nose syndrome
WRP	(New York City) Waterfront Revitalization Program

Summary

This Cable Landfall Permitting Study (Study) compiles information for consideration of potential cable landfall sites that could link an offshore wind farm to the New York State electric transmission system. The Study includes a characterization of existing nearshore and onshore resources, identifies potential areas of opportunities and constraints associated with future cable landfall sites, and presents an overview of the regulatory requirements for the various resources. This information is intended to provide a starting point for initiating site selection and routing processes, reduce the cost of future offshore wind projects, and facilitate onshore permit application processes. To characterize the existing environmental, physical, and social resources within the two identified study areas (see below), a desktop analysis of relevant geospatial data and online databases was completed.

The Cable Landfall Permitting Study focuses on two geographic study areas; Study Area 1: Long Island/Rockaway Peninsula, and Study Area 2: Hudson and East Rivers/New York City. Each study area was subdivided into a shoreline/nearshore zone and an onshore zone to facilitate a more detailed understanding of potential opportunities and constraints associated with the future siting of cable landfall sites and the routing of future onshore cables. The shoreline/nearshore zone extends a half-mile landward from the shoreline and 1,000 feet seaward from the shoreline. Areas extending landward of the shoreline/nearshore zone that encompass many of the potential substations (interconnection points) were designated as an onshore zone.

Potential constraints were qualified as being hard or soft. Hard constraints refer to resources that create potential avoidance areas due to the potential inability to mitigate impacts. Soft constraints refer to resources that can be mitigated, though that mitigation would typically add time or costs to the siting and permitting process. Because of the size of the study areas and the diversity of the resources within those study areas, some of the resources are associated with both hard and soft potential constraints as well as potential opportunities. Potential opportunities can generally be considered as areas not specifically identified as having a potential constraint.

While the overall number of resources presenting hard and soft potential constraints are the same for both study areas, the specific issues associated with each resource vary across each study area. For example, hardened/armored shorelines are far more prevalent in Study Area 2 than Study Area 1, the potential for both terrestrial and marine threatened and endangered species is much greater in Study Area 1 than Study Area 2, and sediment contamination is historically present in Study Area 2, but not Study Area 1. A high-level summary of each study area is presented in Table S-1, and the associated regulations and permits are summarized in Table S-2. Each resource was categorized by color, according to the following scheme:

Green	No specific constraint identified from findings of the desktop analysis
Yellow	Potential constraint identified from findings of the desktop analysis

Existing guidelines and best management practices from other offshore wind farm developments in the U.S. and Europe were reviewed with respect to those relevant for consideration by developers during onshore cable landfall siting, construction, and operation and are summarized in this Study.

Table S-1. Summary Constraint/Opportunity Matrix

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Study Area 1: Long Island/Rockaway Peninsula			
Land Cover	Land cover throughout Study Area 1 varies from undeveloped habitats such as forests and wetlands to developed areas with a range of intensities. Half of the shoreline/nearshore zone is characterized as open water. The onshore zone is more developed, with 72.4% of the zone categorized as developed land, the majority of which is low and medium intensity.	No specific constraints have been identified for land cover; refer to other resources (land ownership, coastal zone, zoning and planning, wetlands, and other sensitive nearshore habitats) for additional information regarding the cover types present in the Study Area and identified constraints and opportunities.	Constraints related to land cover could result in additional time needed to acquire permits, the use of construction methods to avoid sensitive nearshore habitats and wetlands, and the need for compliance with local planning and zoning requirements.
Publicly Managed Lands, Public Places, and Government Properties	<p>Within the shoreline/nearshore zone, 34,396 acres (19%) are designated as publicly managed lands, public places, and governmental properties. The largest is the Fire Island National Seashore, which comprises nearly 17,000 acres. A total of approximately 23,080 acres (15%) within the onshore zone are designated as publicly managed lands, public places, and governmental properties. High concentrations of these areas are located in the northeastern corner of the onshore zone and are associated with several pine barren state forests; others are located within the center of the zone, including Connetquot River State Park.</p> <p>The Fire Island National Seashore extends approximately 26 miles along the southern shoreline of the shoreline/nearshore zone, and the Gateway National Recreation Area spans approximately 4.4 miles of shoreline on the western end of the Rockaway Peninsula.</p>	The Fire Island National Seashore and the Gateway National Recreation Area present the largest constraints to siting a cable landfall site and would require an easement from the National Park Service; these areas would be considered hard constraints and are likely avoidance areas. Additionally, a petition for an easement for a cable to cross state-owned lands underwater would be required in order to traverse state-held lands in the nearshore. The latter is not considered a constraint but has been identified as an area requiring agency coordination.	The hard constraint related to the easement on National Seashore or National Park Service property is a separate and time-consuming process adding potentially a year or more to the schedule.
Indigenous Nations Lands, Rights-of-Way, and Conservation Easements	Land ownership in the shoreline/nearshore zone includes approximately 55 acres of the Poospatuck Indian Reservation in the easternmost portion of the zone. Conservation easements comprise 1.4 acres of this zone, and 34.6 miles of overhead electric transmission lines are located primarily in the western portion of the shoreline/nearshore zone. There are almost 210 miles of overhead electric transmission lines and 22.4 miles of underground electric transmission lines within the onshore zone. One gas pipeline traverses the shoreline/nearshore zone and terminates in Long Beach. Road networks provide access throughout Study Area 1, as do several major bridge crossings. Several branches of the Long Island Railroad cross the Study Area.	<p>Roadway, Long Island Railroad, and electric transmission line and gas pipeline rights-of-way may present an opportunity with respect to routing an onshore cable from a cable landfall site to a substation. There may be an opportunity for co-location within existing commuter rail corridors for overhead lines, if adequate space exists. Commercial rail lines for freight are a likely hard constraint due to the difficulty of obtaining access agreements, resulting in avoidance areas.</p> <p>The Poospatuck Indian Reservation would be considered a soft constraint due to the need for coordination and demonstration that impacts can be mitigated.</p>	<p>Existing rights-of-way may present an opportunity for routing an onshore cable as they would represent previously disturbed areas that are maintained for infrastructure purposes. However, commercial rail lines for freight are a likely hard constraint.</p> <p>Road network access must consider the use of parkways, which have visual and height restriction constraints that can limit access for construction vehicles, resulting in the need to carefully consider traffic plans during construction or factoring in a Special Hauling Permit.</p> <p>The Poospatuck Indian Reservation would require additional coordination and demonstration that impacts can be mitigated, which would likely add time to the siting process.</p>
Municipal Jurisdictions	The shoreline/nearshore zone is located within a portion of eight municipalities; the towns of Brookhaven, Hempstead, Islip, and Babylon comprise the majority of the shoreline/nearshore zone of Study Area 1. The onshore zone is located within a portion of nine municipalities; the towns of Islip, Brookhaven, and Babylon comprise the majority of the onshore zone of Study Area 1.	No specific constraints have been identified related to municipal boundaries. Refer to the discussions under Zoning, as well as Coastal Zone, for municipality-specific regulations.	Recognizing the number of municipalities an onshore cable may be crossing is an opportunity for informed outreach if taken advantage of early in the siting process. By conducting outreach, one may become aware of projects at the local level that state agencies may not have considered, which can ultimately inform the siting process.
Local Zoning	Digital spatial zoning data (i.e., GIS data) is available only for New York City, which comprises only 6.3% of Study Area 1, and is limited to the Rockaway Peninsula. Within the Rockaway Peninsula, a terminal utility facility similar to a cable landfall would be permitted as-of-right within 268.2 acres and would be specially permitted within 4,289 acres.	<p>Because a review of individual zoning maps for each municipality in the Study Area is outside the scope of this desktop analysis, the potential for constraints associated with the underlying zoning in much of the shoreline/nearshore or onshore zone has not been determined. If a cable landfall is not permitted as-of-right or specially permitted in a particular zoning district, potential avoidance areas would exist, creating a hard constraint.</p> <p>Along the Rockaway Peninsula where zoning data does exist, there are multiple areas that would present cable landfall site opportunities with respect to zoning, as a cable landfall would be allowed by special use permit in all residential districts.</p>	<p>The assumption of a cable landfall being allowed by special permit in a residential zoning district in New York City was based on a review of the zoning code with attention paid to the designation of "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines." This land use designation was the most applicable to a potential future cable landfall site.</p> <p>The unknowns are associated with variables such as time for local zoning process completion (e.g., 9-18 months for special use permit in New York City), and the potential for physical constraints at the cable landfall site due to potential variables such as setbacks outside of New York City and comprehensive plans that recommend future identified uses for a particular area.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
<p>Coastal Zone/Coastal Erosion Hazard Areas (CEHAs)</p>	<p>Approximately 93% of the shoreline/nearshore zone is within the designated NYS coastal zone, and the zone is also partially located within two communities with approved Local Waterfront Revitalization Programs (LWRPs). Approximately 7.8% of the onshore zone is within the designated NYS coastal zone, and less than 1% (608.6 acres) is located within the town of Smithtown, which has an approved LWRP. Significant coastal fish and wildlife habitats are located within Study Area 1 and include the Great South Bay and areas in the eastern half of the onshore zone.</p> <p>Approximately 202 miles of natural shoreline and 101 miles of hardened/armored shoreline exist within the shoreline/nearshore zone.</p> <p>CEHA mapping is currently being updated for the Study Area.</p>	<p>Demonstrating consistency with state and local coastal policies, including significant coastal fish and wildlife habitats, wetlands, historic and scenic resources, and recreational and public access areas, will require consideration of alternative construction techniques (e.g., HDD) and a limited construction workspace to show that impacts on the coastal zone can be minimized. This is not considered a constraint but will require additional engineering considerations.</p> <p>Consistency must also consider the larger footprint of the project, specifically the relationship between the cable landfall site and the associated cable routing from the offshore environment into state waters.</p> <p>Hardened/armored shorelines present a hard constraint for a cable landfall site.</p> <p>The potential presence of state-regulated CEHAs has been identified as a soft constraint due to the need to obtain a Coastal Erosion Management Permit, which requires that a determination be made concerning the impact of the project on properties listed on or eligible for listing on the New York State Register of Historic Places or the National Register of Historic Places (NRHP). Thus, the Coastal Erosion Management Permit will be dependent upon coordination with the State Historic Preservation Office (SHPO) and will be tied in with the overall consultation process described below for Cultural Resources. This will likely increase the permit review time but is not considered a hard constraint due to the minimal footprint associated with a cable landfall site and lack of change to the viewshed in the vicinity of the site. Additionally, this permit review process will require a demonstration of the resiliency of a future cable and associated infrastructure in the context of concerns related to sea level rise.</p>	<p>Refer to Figure 16 for generalized locations of NRHP-listed and eligible properties and districts to use in the siting process.</p> <p>The coastal zone review is holistic and is not limited to a future cable landfall site. Demonstrating that the landfall site location within the coastal zone has been sited considering all of the constraints related to all project components, both nearshore and offshore, would be required.</p> <p>As noted, because of the link to the SHPO review of the project, there may be additional review time associated with the Coastal Erosion Management Permit.</p>
<p>Marine Infrastructure and Uses</p>	<p>No shipping lanes/fairways or anchorage zones are located within the shoreline/nearshore zone. Multiple, small, maintained channels exist within the Great South Bay for use by recreational watercraft. Multiple cables and pipelines make landfall along the shoreline. Three small ocean disposal sites (spoil areas) are located within the western portion of the Great South Bay, and four are located just outside the seaward boundary of the shoreline/nearshore zone. These four are active dredged material disposal sites.</p>	<p>The existing cables and pipelines may need to be crossed by submarine export cables from the wind farm, which would require coordination with the owners of that infrastructure. Additionally, information regarding whether these cables are protected, buried, or surface laid would need to be obtained. The small channels maintained for use by boat owners/users would not be avoidance areas, but would require coordination with local boat ramp facilities and recreational boaters.</p> <p>The four active dredged material disposal sites located just outside the seaward boundary of the shoreline/nearshore zone would represent hard constraints due to additional engineering and construction considerations and costs associated with locating cables within these areas.</p>	<p>Coordination with local boat ramp facilities and recreational boaters would be required if a cable route were to intersect with one of the maintained channels within the Great South Bay. Coordination would also be required with owners of submarine cables and pipelines.</p> <p>Locating cables within the active dredged material disposal sites would require additional planning, which would result in increased time and costs, as well as the need for additional engineering and construction considerations.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Threatened and Endangered Species	<p>USFWS IPaC data indicates that one mammal (northern long-eared bat), three birds, and two flowering plant species listed under the federal ESA have the potential to occur within the shoreline/nearshore and onshore zones. Piping plover nesting pairs and fledges have been documented in 10 municipalities in Study Area 1; however, no USFWS-designated critical habitat occurs within Study Area 1. Historically, roseate terns were documented in the Great South Bay but were not recorded in 2015-2016 surveys. Red knot would utilize only migratory habitat in the shoreline/nearshore zone. The DEC database indicated 55 state-listed plant species that have the potential to occur in the shoreline/nearshore and onshore zones, two of which are protected at the federal level.</p> <p>No USFWS-designated critical habitat occurs within the Study Area 1. In the shoreline/nearshore zone, the towns of Brookhaven, Huntington, Islip, Riverhead, and Southampton have confirmed summer occurrences of the northern long-eared bat, a federally listed threatened species. The DEC and USFWS should be consulted if a potential cable landfall site is expected to lead to the removal of trees anywhere in Study Area 1. Coordination with the DEC and USFWS would be necessary to assess confirmed records of bat occurrences in the vicinity of the cable landfall site, and surveys to confirm the presence of the northern long-eared bat within an identified cable landfall site could be necessary. Consultation with the USFWS and DEC would also likely be necessary under NEPA to determine whether other listed species (e.g., piping plover and roseate tern) may be present within a cable landfall site in the shoreline/nearshore zone.</p> <p>Listed marine species also occur within the shoreline/nearshore zone, including the loggerhead, leatherback, Kemp's ridley, and green sea turtles and the Atlantic and shortnose sturgeon. Consultation with NOAA Fisheries would be necessary to determine whether these species may be present within a cable landing site.</p>	<p>Consultation with the USFWS, NOAA Fisheries, and DEC could be a lengthy process and, based on survey findings, may result in the exclusion of potential cable landfall sites due to documented habitat. The presence of individuals of threatened and endangered species does not necessarily constitute a hard constraint; rather, it presents an opportunity to mitigate impacts through coordination with the USFWS, NOAA Fisheries, and DEC and to consider alternative construction technologies and siting options.</p>	<p>The presence of threatened and endangered species or habitat would likely result in the need for additional time to complete agency consultation and field surveys, additional costs incurred through required surveys and analysis, as well as the identification of potential constraints at the cable landfall site. Additionally, there may be seasonal restrictions associated with these species that could impact the construction schedule.</p>
Other Sensitive Habitats	<p>A total of 32,265 acres of Significant Natural Communities are located within the shoreline/nearshore zone and generally overlap with mapped wetland areas and federally and state-protected lands. A total of 17,301 acres of Significant Natural Communities are located within the onshore zone; these largely overlap with state and locally protected areas. Eelgrass beds have been documented in the literature in the shoreline/nearshore zone in the Great South Bay, Hempstead Bay, South Oyster Bay, and Moriches Bay, but exact locations of these beds are not available.</p> <p>EFH has been identified for 41 species that may occur in the shoreline/nearshore zone, and consultation would be required with NOAA Fisheries regarding potential impacts. Ten NOAA Trust Resources have been identified and would be part of the EFH consultation process.</p>	<p>Siting a cable landfall site within areas of documented eelgrass beds or a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program) and may also require an easement for federally or state-owned lands. The locations of these nearshore ecological communities do not represent hard constraints if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Coordination with regulatory agencies would be necessary to mitigate impacts that cannot be avoided.</p> <p>Similarly, EFH and NOAA Trust Resources do not represent a hard constraint if engineering constraints are incorporated to avoid these resources.</p>	<p>If impacts on sensitive nearshore habitats are not avoided, additional time will be added to the agency review process, additional costs to mitigate impacts will result, and avoidance areas will be created, presenting physical constraints to landfall siting.</p>
Wetlands, Surface Waters, and Floodplains	<p>Based on USFWS NWI wetland and DEC freshwater and tidal wetland datasets, approximately 46.2% (82,028.8 acres) of the shoreline/nearshore zone consists of wetlands. Additionally, wetland buffers comprise 34.7% (62,638.7 acres) of the shoreline/nearshore zone. NHD data indicates that a total of 165 miles of streams and rivers and 642 acres of lakes and ponds are located within this zone. Based on FEMA data, approximately 29% of the shoreline/nearshore zone is located within the 100-year floodplain. Approximately 3.7% (5,880.9 acres) of the onshore zone consists of wetlands. Wetland buffers comprise 23.4% (36,999.5 acres) of the onshore zone. NHD data indicates that a total of 105.3 miles of streams and rivers, and 946.1 acres of lakes and ponds are located within the onshore zone. Approximately 2.5% of the onshore zone is located within the 100-year floodplain.</p>	<p>Permitting requirements would be triggered for location of a cable landfall site within a wetland and/or its buffer areas, as well as a river/stream. Locations of these resources do not represent a hard constraint, if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall site. DEC is becoming less accepting of wetland impacts and is looking at these coastal wetland areas because of resiliency and climate changes concerns and wants these areas to be protected.</p>	<p>If impacts on wetlands, specifically coastal wetlands, are not avoided, additional time will be added to the agency review process, additional costs associated with the mitigation of impacts will result, and avoidance areas will be created, representing physical constraints to siting a cable landfall site. The DEC prefers that ecologically significant coastal wetland areas are avoided and protected due to their concerns related to ecosystem resiliency and climate change.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Migratory Birds and Eagles	USFWS IPaC data indicates that 44 migratory birds of conservation concern may occur in Study Area 1, depending upon the season. Tree clearing may be limited during bird nesting season; specific windows would need to be determined through consultation with USFWS.	Seasonal windows for tree clearing are not considered a constraint and should be integrated into project planning and construction scheduling.	Unlike the importance of beach habitats for species such as the federally listed piping plover and roseate tern, migratory birds are more likely to be associated with forested habitats which, as indicated in Figure 3, are more prevalent in the inland areas of Study Area 1 and less prevalent in the nearshore zone. Thus, the incorporation of seasonal windows for tree clearing is not considered a constraint for construction.
Sediment, Soil Types, and Steep Slopes	Sand is the predominant (37%) sediment type in the shoreline/nearshore zone. No literature regarding historic contamination of sediment in the Great South Bay has been identified. Approximately 521.4 acres (0.6%) of the predominant soils within the shoreline/nearshore zone may have steep slopes, given their range of 3 to 15% slopes, and approximately 12,236 acres may have steep slopes in the onshore zone. These areas should be avoided.	Areas of steep slopes would be considered a hard constraint but can be avoided during the siting process. With sand being the most predominant sediment type, the lack of consolidated material should be a consideration for possible construction techniques.	Construction techniques such as HDD in a sandy environment will require a feasibility study for demonstration to the permitting agencies that a successful installation, particularly in sensitive nearshore environments, is possible without any high risk of inadvertent return of drilling mud.
Geological Hazards	No suspected or known active faults are located within the Study Area. A USGS Seismic Hazard Map indicates that Study Area 1 is located in an area with a 2% probability of exceedance of peak ground acceleration values in 50 years. The majority of Study Area 1 is located in an area that has a low landslide incidence. Approximately 1,077 acres of the northeastern tip of the onshore zone of Study Area 1 are located in a high susceptibility to landsliding and low incidence area. No constraints have been identified as the high susceptibility to landsliding area can be avoided as it is not in an area where a cable landfall site would be located.	No constraints identified; the area of high susceptibility to landsliding would be excluded from siting considerations due to its location in the northeastern tip of the onshore zone and outside of the shoreline/nearshore zone where landfall would be made.	N/A
Cultural and Historic Resources	There are a total of 106 previously recorded archaeological sites within the shoreline/nearshore zone of Study Area 1; eight are listed on the NRHP and five are eligible for listing. Much of the northern portion of the shoreline/nearshore zone has been identified as being sensitive for archaeological sites. Fifteen historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone. Six of these have been listed on the NRHP, and six additional districts have been determined to be eligible for listing. In the onshore zone, 37 previously recorded archaeological sites were identified; only one is listed on the NRHP and no others have been determined eligible for listing. Six historic districts were identified in the onshore zone; two have been listed on the NRHP, and two have been determined to be eligible for listing. Consultation with the SHPO will be required under NHPA in connection with any federal approvals, and Section 14.09 of the New York Parks, Recreation and Historic Preservation Law to the extent a state permit is required. It can be expected that more definitive evaluations of cultural resources would be undertaken as part of any required cultural resources investigations for a proposed cable landfall site.	<p>Within the shoreline/nearshore zone, a hard constraint would exist where avoidance areas are created due to the presence of shipwrecks and submerged resources such as historic settlements and settlements associated with indigenous peoples.</p> <p>Aboveground cultural resources would represent soft constraints, as BMPs can be employed and screening can be utilized during construction to minimize impacts on those resources.</p> <p>There is insufficient survey data at this time to provide concrete evidence of exact locations; surveys would be a likely component of agency consultation during the siting process.</p>	<p>Buffers would be required around the shipwrecks for cable routing purposes, creating minor avoidance areas.</p> <p>Cultural resource surveys to determine the potential for submerged resources would add both time and costs to the agency review process and may result in the identification of avoidance areas as these areas cannot be addressed with minor siting considerations such as the buffers discussed previously.</p>
Areas of Contamination	One NPL Superfund site is located within the shoreline/nearshore zone; it is located in the hamlet of Hewlett, within the town of Babylon. Additionally, 64 sites are included in the DEC brownfield and state Superfund programs, comprising approximately 925 acres. At 22 of these 64 sites, cleanup has been completed. For the remainder of the sites and the NPL Superfund site, cleanup is ongoing. In the onshore zone, there are five NPL Superfund sites and 111 sites included on the DEC brownfield and state Superfund program lists. At 61 of these sites, cleanup has been completed; cleanup is ongoing at the remainder.	<p>For those sites where cleanup is ongoing, they represent temporary avoidance areas/hard constraints until remediation is complete. Consideration of these areas should be included during the siting process.</p> <p>For NPL Superfund and DEC brownfield or Superfund sites where cleanup is completed, these may represent opportunities for siting a cable landfall site; however, they may represent soft constraints due to institutional controls that may limit excavation depths or other engineering controls.</p>	<p>Physical constraints to cable landfall sites would be created with Superfund and brownfield sites where cleanup is ongoing.</p> <p>For sites where cleanup is complete, it is assumed that a cable landfall would be an industrial use that would be consistent with identified land use controls for these sites. Any on-site management or future use of water or soil must be done in coordination with the EPA and/or DEC.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Study Area 2: Hudson and East River/NYC			
Land Use/Land Cover	Land cover throughout Study Area 2 is largely developed land, with small areas of wetlands and forested lands. Over half (58.6%) of the shoreline/nearshore zone is characterized as open water. The onshore zone is more developed due to highly developed New York City, with 60.1% of the zone categorized as high intensity developed land. No specific constraints have been identified; refer to other resources (wetlands, zoning and planning) for additional information.	No specific constraints have been identified related to land cover; refer to other resources (land ownership, coastal zone, zoning and planning) for additional information regarding the cover types present in the Study Area and identified constraints and opportunities.	Constraints related to land cover could result in additional time to acquire permits, the use of construction methods to avoid things such as sensitive nearshore habitats and wetlands, and the need for compliance with local planning and zoning requirements.
Publicly Managed Lands, Public Places, and Government Properties	17,443 acres (22%) are designated as publicly managed lands, public places, and governmental properties in the shoreline/nearshore zone. The largest is the Gateway National Recreation Area, which comprises just over 14,098 acres and comprises all of Jamaica Bay. A total of approximately 3,075 acres (5.1%) within the onshore zone are designated as publicly managed lands, public places, and governmental properties.	The Gateway National Recreation Area represents the largest constraint to siting a cable landfall and would require an easement from the National Park Service. Additionally, a petition for an easement for a cable to cross state-owned lands underwater would be required to traverse state-held lands. The latter is not considered a constraint but has been identified as an area requiring agency coordination.	The hard constraint related to the easement in National Recreational Area is a separate and time-consuming process, potentially adding a year or more to the schedule.
Indigenous Nations Lands, Rights-of-Way, and Conservation Easements	Land ownership in the shoreline/nearshore zone is a mix of locally, state-, and federally owned lands. Conservation easements comprise 7.2 acres of this zone, and 90.3 miles of electric transmission lines are located within the shoreline/nearshore zone, the majority of which is underground (61.5 miles). Additionally, 23.3 miles of natural gas pipeline are located within this zone. The onshore zone contains 1.5 acres of conservation easements, and 138.5 miles of electric transmission lines, the majority of which are underground (100 miles). There are also 37.3 miles of pipeline within this zone. Road networks provide access throughout Study Area 2, as do major several major bridge crossings. Multiple lines of the New York Subway and two branches of the Long Island Railroad cross the Study Area. Refer to the discussion on Publicly Managed Lands regarding the need for an easement for a cable to cross state-owned lands underwater. Roadway, rail, and electric transmission line rights-of-way may present an opportunity with respect to routing an onshore cable from the cable landfall site to a substation.	Roadway, Long Island Railroad, electric transmission line, and gas pipeline rights-of-way may present an opportunity with respect to routing an onshore cable from the cable landfall site to a substation. Commercial rail lines for freight are a likely hard constraint due to the difficulty of obtaining access agreements, resulting in avoidance areas.	Existing rights-of-way may present an opportunity for routing an onshore cable as they would represent previously disturbed areas that are maintained for infrastructure purposes. However, commercial rail lines for freight are a likely hard constraint.
Municipal Jurisdictions	The majority of the shoreline/nearshore zone is located within New York City (77,148 acres), and only a small portion (2,075 acres) at the northern tip of the zone is located in Yonkers. Similarly, the majority of the onshore zone is located within New York City (55,404 acres), and a small portion is located in Yonkers (4,401 acres).	No constraints have been identified that are specific to municipal boundaries. Refer to the discussions under Zoning, as well as Coastal Zone, for municipality-specific regulations.	Consulting with the municipalities that an onshore cable may be crossing is an opportunity for informed outreach if this is taken advantage of early in the siting process. By doing such outreach, one may become aware of projects at the local level that state agencies may not have considered, which can ultimately inform the siting process.
Local Zoning	The majority of the shoreline/nearshore zone is covered by New York City zoning (92%); the remainder is located in Yonkers, for which no digital spatial zoning data is available. A terminal utility facility similar to a cable landfall would be permitted as-of-right in 7,562 acres and would be specially permitted in 14,993 acres.	Based on the zoning data available, a cable landfall would be permitted or specially permitted in over 15,000 acres of the shoreline/nearshore zone; these areas represent opportunities for cable landfall sites. Additionally, it is assumed that, because electric substations are a permitted use in manufacturing districts, a cable landfall would also be considered a permitted use. These areas would add another 6,408 acres to the available area for a cable landfall site from a zoning standpoint. Because a review of individual zoning maps for each municipality in the Study Area is outside the scope of this desktop analysis, the potential for constraints associated with underlying zoning in the Battery Park district is unknown. Because a review of individual zoning maps for Yonkers is outside the scope of this desktop analysis, the zoning associated with the northern tip of the nearshore zone in Yonkers has not been determined. If a cable landfall is not permitted as-of-right or specially permitted in a particular zoning district, avoidance areas would exist, creating a hard constraint.	The assumption of a cable landfall being specially permitted in a residential zoning district was based on a review of the zoning code with attention to the designation of "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines." This land use designation was the most applicable to a cable landfall site. These unknowns are associated with variables such as time required for local zoning process completion and the potential for physical landfall constraints due to potential variables such as setbacks and future identified uses for a particular area.

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Coastal Zone	<p>Approximately 91% of the shoreline/nearshore zone is within the designated NYS coastal zone, and within the boundary of the New York City WRP. Approximately 8.5% of the onshore zone is within the designated NYS coastal zone, and 92.6% is located within the boundary of the New York City WRP. Both zones are located within SNWAs and SMAs as designated by the WRP. Significant coastal fish and wildlife habitats are within Study Area 2 and include Jamaica Bay, Lower Hudson Beach, North and South Brother Islands in the nearshore, and Meadow and Willow Lakes in the onshore zone.</p> <p>Approximately 50 miles of natural shoreline and 121 miles of hardened/armored shoreline exists within the shoreline/nearshore zone.</p> <p>CEHA mapping is currently being updated for the Study Area.</p>	<p>Demonstrating consistency with state and New York City coastal policies, including significant coastal fish and wildlife habitats, wetlands, historic and scenic resources, and SNWAs, will require consideration of alternative construction techniques (e.g., HDD) and a limited construction workspace to show that impacts on the coastal zone can be minimized. This is not considered a constraint but will require additional engineering considerations.</p> <p>Consistency must also consider the overall footprint of the project, specifically the relationship between the cable landfall site and submarine cable route from the offshore wind farm into state waters.</p> <p>Hardened/armored shorelines present a hard constraint for a cable landfall site.</p> <p>Based on Coastal Erosion Management Permit requirements, the potential presence of CEHAs has been identified as a constraint due to the need to include a Structural/Archaeological Assessment Form, which requires that a determination be made concerning the impact of the project on properties listed on or eligible for listing on the State or National Register of Historic Places. Thus, the Coastal Erosion Management Permit will be dependent upon coordination with the SHPO and will be tied in with the overall consultation process described below for Cultural Resources. This will likely increase the permit review time but is not considered a hard constraint, due to the minimal footprint associated with a cable landfall site and lack of change to the viewshed in the vicinity of the site. Additionally, this permit review process will require a demonstration of the resiliency of a future cable and associated infrastructure in the context of concerns related to sea level rise.</p>	<p>Refer to Figure 29 for generalized locations of NRHP-listed and eligible properties and districts to use in the siting process.</p> <p>The coastal zone review is holistic and is not limited to a future cable landfall site. Demonstrating that the cable landfall site within the coastal zone has been sited considering all of the constraints related to all project components, associated with both nearshore and offshore, would be required.</p> <p>As noted, because of the link to the SHPO review of the project, there may be additional review time associated with the Coastal Erosion Management Permit.</p>
Marine Infrastructure and Uses	<p>One proposed submarine pipeline bisects the southern portion of the shoreline/nearshore zone, and just south of the zone, one pipeline and one submarine cable run east-west. A portion of two federally maintained navigation channels—Ambrose Channel and Chapel Hill North Channel—are located within the shoreline/nearshore zone along with smaller maintained channels in the East River. The Ambrose and Chapel Hill North channels are heavily used by shipping vessels, as are the Hudson River and East River. A portion of one anchorage area is located within the southwestern corner of the shoreline/nearshore zone, and one discontinued ocean disposal site is located along the eastern shoreline of the Hudson River in the northern part of the shoreline/nearshore zone. A Historical Area Remediation Site (HARS) is located approximately 5 miles southeast of Study Area 2.</p>	<p>The existing cables and pipelines would be crossed by export cables from the wind farm, which would require coordination with the owners of the existing infrastructure. Additionally, information regarding whether these cables are protected would need to be obtained.</p> <p>The location of the federally maintained navigation channels and the anchorage area represent potential hard constraints due to the review and approval required by the US Coast Guard and USACE. These translate into additional planning time and costs as well as engineering considerations. Additionally, the HARS represents a hard constraint; though outside the study area, consideration of its location must be included for cable routing.</p>	<p>Coordination would be required with the owners of submarine pipelines and cables. Crossing of the Ambrose Channel would require additional US Coast Guard and USACE coordination on both burial depth requirements and interaction with shipping traffic during construction. The Ambrose Channel should be avoided, if feasible, for cable routing. If avoidance is not possible, coordination will be required as indicated previously.</p> <p>Additional engineering and construction considerations would be required for routing a cable through the channels and anchorage area, resulting in increased costs associated with additional planning and construction vessel types.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Threatened and Endangered Species	<p>USFWS IPaC data indicate that two mammals (northern long-eared and Indiana bats), three birds, and one flowering plant species listed under the federal ESA have the potential to occur within the shoreline/nearshore and onshore zones. No USFWS-designated critical habitat for these species occurs within Study Area 2. Nesting habitat for the piping plover and roseate tern has the potential to occur within Jamaica Bay and the small islands within that system. The DEC database indicated 17 state-listed plant species have the potential to occur in the shoreline/nearshore and onshore zones. No USFWS-designated critical habitat for these species occurs within Study Area 2. Coordination with the DEC and USFWS would be necessary to assess confirmed records for bat occurrences in the vicinity of a cable landfall site. Consultation with the USFWS and DEC would likely be necessary under NEPA/ESA to determine whether other listed species (e.g., piping plover and roseate tern) may be present within a cable landfall site.</p> <p>Listed marine species also occur within the shoreline/nearshore zone, including the loggerhead sea turtle, Atlantic surgeon, and shortnose sturgeon. Atlantic sturgeon has designated critical habitat in the Hudson River. Consultation with NOAA Fisheries would be necessary to determine whether any of these species may be present within a cable landing site.</p>	<p>Consultation with the USFWS, NOAA Fisheries, and DEC may be a lengthy process and, based on survey findings, may result in the exclusion of potential cable landfall sites due to documented habitat. The presence of threatened and endangered species does not constitute a hard constraint; rather, it presents an opportunity to mitigate impacts through coordination with the USFWS, NOAA Fisheries, and DEC and consideration of alternative construction technologies and siting options.</p>	<p>The presence of threatened and endangered species will likely be associated with additional time due to the need to complete agency consultation and field surveys, additional costs incurred through required surveys and analysis, and the identification of potential constraints (avoidance areas) at the cable landfall site. Additionally, there may be seasonal restrictions associated with these species that could impact the construction schedule.</p>
Other Sensitive Habitats	<p>Eelgrass beds have not been historically documented in Jamaica Bay or other portions of the shoreline/nearshore zone. A total of 10,367.5 acres of Significant Natural Communities—tidal wetlands—is located within the shoreline/nearshore zone and generally overlap with DEC tidal wetlands. A total of 307.8 acres of Significant Natural Communities is located within the onshore zone; these overlap with state- and locally protected areas. Siting a cable landfall site within a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program).</p> <p>EFH has been identified for 29 species that may occur within the shoreline/nearshore zone, and consultation would be required with NOAA Fisheries regarding potential impacts. Ten NOAA Trust Resources have also been identified and would be part of the EFH consultation process.</p>	<p>Siting a cable landfall site within a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program) and may also require an easement for crossing federally or state-owned lands. The locations of these nearshore ecological communities do not represent hard constraints if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Coordination with regulatory agencies would be necessary to mitigate impacts that cannot be avoided.</p> <p>Similarly, EFH and NOAA Trust Resources do not represent a hard constraint if engineering constraints are incorporated to avoid these resources.</p>	<p>If impacts on sensitive nearshore habitats are not avoided, additional time will be added to the agency review process, additional costs to mitigate impacts will result, and avoidance areas will be created, presenting physical constraints to siting a cable landfall.</p>
Wetlands, Surface Waters, and Floodplains	<p>Based on USFWS NWI wetland and DEC freshwater and tidal wetland datasets, approximately 39.9% (31,649 acres) of the shoreline/nearshore zone consists of wetlands. Additionally, wetland buffers comprise 34% (26,136 acres) of the shoreline/nearshore zone. NHD data indicates that a total of 1.8 miles of streams and rivers and 57.2 acres of lakes and ponds are located within this zone. Based on FEMA data, approximately 27.8% of the shoreline/nearshore zone is located within the 100-year floodplain. Approximately 1.5% (915 acres) of the onshore zone consists of wetlands. Wetland buffers comprise 21.4% (13,084 acres) of the onshore zone. NHD data indicate that a total of 5 miles of streams and rivers and 341.5 acres of lakes and ponds are located within the onshore zone. Approximately 2.9% of the onshore zone is located within the 100-year floodplain.</p>	<p>Permitting requirements would be triggered by siting a cable landfall within a wetland and/or its buffer areas, or within a river/stream. The locations of these resources do not represent a hard constraint if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Because of resiliency and climate changes concerns, the DEC is becoming less accepting of wetland impacts and wants to protect coastal wetland areas.</p>	<p>If impacts on wetlands, specifically coastal wetlands, are not avoided, additional time will be added to the agency review process, additional costs associated with the mitigation of impacts will result, and avoidance areas will be created, representing physical constraints to siting a cable landfall. The DEC prefers that ecologically significant coastal wetland areas be avoided and protected due to their concerns regarding ecosystem resiliency and climate change.</p>
Migratory Birds and Eagles	<p>USFWS IPaC data indicates that 44 migratory birds of conservation concern may occur in Study Area 2, depending on the season. Tree clearing may be limited during bird nesting season; specific windows would need to be determined through consultation with USFWS.</p>	<p>Seasonal windows for tree clearing are not considered a constraint and should be integrated into project planning and construction scheduling.</p>	<p>Unlike the importance of island and beach habitats for species such as the federally listed piping plover and roseate tern, migratory birds are more likely to be associated with forested habitats which, as indicated in Figure 19, are very limited throughout Study Area 2 as a whole; however, there are some forested habitats within the nearshore zone adjacent to Floyd Bennett Field. Thus, the incorporation of seasonal windows for tree clearing is not considered a constraint for construction.</p>

Table S-1 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Sediment, Soil Types, and Steep Slopes	<p>Sand is the predominant (15.8%) sediment type in the shoreline/nearshore zone.</p> <p>Approximately 593.5 acres (1.9%) of the predominant soils within the shoreline/nearshore zone may have steep slopes (180 acres may not exceed 10% slopes throughout as the soil type ranges from 0-15% slopes) and approximately 2,505 acres may have steep slopes in the onshore zone. These areas should be avoided.</p>	<p>Areas of steep slopes would be considered a hard constraint but can be avoided during the siting process. With sand being the most predominant sediment type, the lack of consolidated material should be a consideration for possible construction techniques.</p>	<p>Construction techniques such as HDD in a sandy environment will require a feasibility study for demonstration to the permitting agencies that a successful installation, particularly in sensitive nearshore environments, is possible without significant erosion or sedimentation impacts.</p>
Geological Hazards	<p>No suspected or known active faults are located within this Study Area. A USGS Seismic Hazard Map indicates that Study Area 2 is located in an area with a 2% probability of exceedance of peak ground acceleration values in 50 years. Study Area 2 is located in an area that has a low landslide incidence. No constraints have been identified.</p>	<p>No constraints identified.</p>	<p>N/A</p>
Cultural and Historic Resources	<p>There are a total of 168 previously recorded archaeological sites within the shoreline/nearshore zone of Study Area 2; 10 are listed on the NRHP and 19 are eligible for listing. Much of the southern and western portions of the shoreline/nearshore zone in Brooklyn has been identified as being sensitive for archaeological sites. Twenty-five historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone. Ten of these have been listed on the NRHP and 11 additional districts have been determined eligible for listing. In the onshore zone, 12 previously recorded archaeological sites were identified; only one is listed on the NRHP and three have been determined eligible for listing. Sixty-nine historic districts were identified in the onshore zone; 53 have been listed and 12 have been determined to be eligible for listing. Consultation with the SHPO will be required under NEPA in connection with any federal approvals, and under Section 14.09 of the New York Parks, Recreation and Historic Preservation Law to the extent a State permit is required. It can be expected that more definitive evaluations of cultural resources would be undertaken as part of any required cultural resources investigation for a proposed cable landfall site.</p>	<p>Within the nearshore zone, a hard constraint would exist where avoidance areas are created due to the presence of a shipwreck and submerged resources such as historic settlements and settlements associated with indigenous peoples.</p> <p>Aboveground cultural resources would represent soft constraints, as BMPs can be employed and screening can be utilized during construction to minimize potential impacts on such resources.</p> <p>There is insufficient survey data at this time to provide concrete evidence of exact locations; surveys would be a likely component of agency consultation during the siting process.</p>	<p>Buffers would be required around the shipwreck for cable routing purposes, creating minor avoidance areas.</p> <p>Cultural resource surveys to determine the potential for submerged resources would add both time and costs to the agency review process and may result in the identification of avoidance areas as these areas cannot be addressed with minor siting considerations such as the buffers discussed above.</p>
Areas of Contamination	<p>One NPL Superfund site in Brooklyn is located within the shoreline/nearshore zone. Additionally, 418 sites are included in the DEC brownfield and state Superfund programs, comprising approximately 7,905 acres. At 130 of these 418 sites, cleanup has been completed. For the remainder of the sites and the NPL Superfund site, cleanup is ongoing, and those sites represent temporary avoidance areas/constraints, at least until remediation is complete. In the onshore zone, there are two NPL Superfund sites, and 273 sites are included on the DEC brownfield and state Superfund program lists. At 101 of these sites, cleanup has been completed; cleanup is ongoing at the remainder.</p> <p>Historic sediment contamination has been documented in portions of the shoreline/nearshore zone, including the Upper and Lower Bays, Hudson River, East River, and Jamaica Bay.</p>	<p>For those sites where cleanup is ongoing, these represent temporary avoidance areas/constraints until remediation is complete. Consideration of these areas should be made during the siting process.</p> <p>For NPL Superfund and DEC brownfield and Superfund sites where cleanup is completed, these may represent opportunities for siting a cable landfall; however, they may represent soft constraints due to institutional controls that may limit excavation depths or other engineering controls.</p> <p>Sediment contamination is considered a soft constraint as it would require additional engineering considerations (e.g., the application of burial techniques with minimized sediment suspension) to minimize potential impacts.</p>	<p>Physical constraints to construction at a cable landfall would be present at Superfund and brownfield sites where cleanup is ongoing.</p> <p>For sites where cleanup is complete, it is assumed that a cable landfall would be an industrial use that would be consistent with identified land use controls for these sites. Any on-site management or future use of water or soil must be done in coordination with the EPA and DEC.</p> <p>The use of specialized burial techniques may result in increased costs and added time.</p>

Table S- 2. Potential Federal and New York State Requirements for Cable Landfall Site

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations Federal	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
BOEM or other federal permitting agency	NHPA Section 106 Review. Evaluate project effects on historic properties through federal Lead Agency in consultation with State Historic Preservation Officer (SHPO), federally recognized Indian tribes, and consulting parties.	Federal “undertaking” triggers Section 106 review.	<ul style="list-style-type: none"> National Historic Preservation Act of 1966, as amended; 54 U.S.C. 300101 et seq., regulations 36 CFR Part 800. Section 106, 54 U.S.C. § 306108, regulations - 36 CFR Part 800. 	<ul style="list-style-type: none"> Determine likelihood of effect on properties that are listed on the National Register of Historic Places (NRHP) or that are eligible for listing on the NRHP. If adverse effects are identified, identify measures to avoid, minimize, or mitigate such effects. Obtain concurrence/comments from SHPO and/or the Tribal Historic Preservation Officer (THPO). 	Highly variable; dependent on the federal undertaking, presence of properties listed or eligible for listing on the NRHP, potential for adverse effects, and need for and participation in development of Memorandum of Agreement or Programmatic Agreement to address adverse effects.
National Park Service	Right-of-Way	Required for utilities to pass over, across or through a National Park System, which includes areas of land and water administered by the National Park Service.	<ul style="list-style-type: none"> 54 U.S.C. 100902(a). 54 U.S.C. 100902(b). 	<ul style="list-style-type: none"> Meet with NPS staff to discuss project before submitting application. Applications include the necessary NEPA/NHPA Section 106 compliance 	Applications take between six months and one year to process.
U.S. Army Corps of Engineers (USACE), New York District	Individual Permits	Required for dredge, fill, and other work in federally regulated waters, with some exceptions for which Nationwide Permits can provide coverage.	<ul style="list-style-type: none"> Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 403, regulations 33 CFR Part 322 Section 404 of the Clean Water Act of 1972, 33 U.S.C. § 1344 Section 103 of the Marine Protection, Research, and Sanctuaries Act, 33 U.S.C. § 1413, regulations 33 CFR 324.1 et seq. USACE general policies and permit regulations, 33 CFR Part 320; 33 CFR Part 325^a 	<ul style="list-style-type: none"> Pre-application consultation recommended for larger projects. Joint Permit Application form and all required information, including: <ol style="list-style-type: none"> Description of overall activity or project. Indicate whether discharge of dredged or fill material is involved and provide details on volume of fill, pollution controls, and erosion controls. Description of effects on the aquatic environment, alternatives available to accomplish the project purpose, measures for reducing the impacts of the project. Site plan, cross-sectional plan. Application also must be submitted to the DEC for issuance of a Clean Water Act Section 401 Water Quality Certification, which must be granted before the USACE can issue a permit. See state-specific section for more details. 	<ul style="list-style-type: none"> Individual Permits require a 30-day Public Notice, following a completeness determination after submittal. On average, individual permit decisions are made within six to nine months from receipt of a complete application.
U.S. Fish and Wildlife Service (USFWS), New York Field Office, and NOAA Fisheries	Endangered Species Act (ESA) – Section 7 Consultation Process	<p>Actions potentially impacting federally threatened and endangered (T&E) species, i.e., “take,” or resulting in the destruction or adverse modification of the critical habitat of such species.</p> <p>ESA Section 7 applies if a federal action is required for the project.</p>	ESA Section 7	<ul style="list-style-type: none"> Section 7 consultation. Species and habitat-specific surveys as needed. Biological Assessment to identify any T&E species likely to be affected by the federal action. Scientific permit for studies if adverse effects are anticipated. 	Varies. Concurrence with a “Not Likely to Adversely Affect” determination is likely to take 30 to 60 days. However, determinations that project impacts may affect T&E species can drive agency review time to six months or more and require additional data collection, consultation, and permitting.
USFWS, Region 5 Permit Office	Migratory Bird Treaty Act (MBTA) review	Incidental “take” of a migratory bird species (voluntary or otherwise) listed under the Act.	MBTA (16 U.S.C. 703-712), listed migratory birds, 50 CFR § 10.13, regulations 40 CFR Parts 13 (General Permit Procedures) and 21 (Migratory Bird Permits).	<ul style="list-style-type: none"> There is no “incidental take” permit under the MBTA; it is simply prohibited. However, USFWS provides voluntary guidance to help reduce incidental take. Informal consultation with the USFWS during project development phase can build support for potential future USFWS enforcement. Informal consultation regarding the proposed project and its location. 	Currently, no incidental permit under the MBTA is available. Consultation with the USFWS and appropriate planning can minimize potential impacts on migratory birds.

Table notes are at the end of the table.

Table S-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
USFWS, Region 5 Permit Office	Permit for the removal or relocation of an eagle nest and permit for eagle take that is associated with, but not the purpose of, an activity	Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. Activities with the potential to take any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof. Seasonal construction windows and buffer zones are required around nesting eagle nests.	Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), regulations 50 CFR Part 22	<ul style="list-style-type: none"> • Applicant must propose and implement practical measures to minimize potential impacts from their activity. • For an eagle nest take permit, fill out application form, including why the nest must be taken and details of the type of nest to be taken. • For a non-purposeful take permit for bald eagles, applicant must be prepared to: <ol style="list-style-type: none"> a) Identify the specific activities that will result in take. b) Quantify impacts on eagles. c) Develop and document avoidance and minimization procedures. d) Develop a monitoring and reporting program. e) Provide compensatory mitigation, if necessary. 	Varies. Obtaining an eagle take permit requires agency consultation on bald or golden eagles.
State					
Department of State (DOS), Office of Planning and Development	Coastal Zone Management Program Federal Consistency Certification	Federal actions (including those requiring federal permits/approvals) that affect any use or natural resource of the coastal zone must be certified as consistent with the policies of a State's federally approved coastal zone program. In New York, the coastal policies are those in the New York Coastal Management Program (NYCMP) and any applicable Local Waterfront Revitalization Programs (LWRP).	<ul style="list-style-type: none"> • Coastal Zone Management Act (CZMA) 16 U.S.C 1451 et seq. • State Executive Law Article 42, § 910 et seq 15 CFR Parts 923 and 930. • 19 NYCRR Part 600. 	Federal consistency assessment form (FCAF), including written analysis of the activity's consistency with state and applicable local coastal policies. Application must include: <ul style="list-style-type: none"> - Copy of the completed federal permit application and supporting documentation. - Copies of applications submitted to involved state agencies. - All documentation submitted to siting board if facility subject to Articles VII or C of the New York State Public Service Law. 	For most activities, DOS's review and decision are completed within one to two months of receipt of a completed consistency certification and all necessary information. In some instances, especially for those activities that are more complicated, involve more coordinated public and interagency reviews, or are the subject of an environmental impact statement, DOS's review and decision may take up to three to six months and is contingent on the availability of the NEPA document for review (DOS 2017) .
Department of Public Service, Public Service Commission (PSC)	Certificate of Environmental Compatibility and Public Need under Article VII	Construction and operation of a major utility transmission facility. Siting of major utility transmission facilities in New York is under the jurisdiction of the PSC. "Major" electrical transmission facilities are defined as lines with a design capacity of 100 kV or more extending for at least 10 miles, or 125 kV and over, extending a distance of one mile or more. Note: This certificate is not required specifically for the cable landfall but for other project components (i.e., onshore cable connection and submarine export cable).	<ul style="list-style-type: none"> • New York State Public Service Law, Article VII, § 120 et seq. • 16 NYCRR Parts 85-88. 	Applicant must demonstrate compliance with the substantive requirements of all applicable state and local approvals. Application must include: <ul style="list-style-type: none"> - Location of line and ROW. - Description of transmission facility. - Summary of studies of environmental impact. - Statement of need for the facility. - Description and analysis of reasonable alternate routes. - Any other relevant information. 	An applicant must publish a newspaper notice of its intent to file an Article VII application at least once per week in the two weeks prior to filing in all areas throughout which the facility would pass. Generally takes the PSC 30 days after an application is submitted to determine whether the application is in compliance with filing requirements. Once an application is deemed compliant, a public statement hearing must be held within 60 to 90 days. Evidentiary hearings follow before a final decision is issued.

Table notes are at the end of the table.

Table S-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
Office of General Services (OGS)	State Submerged Lands Easement	The title to the bed of numerous bodies of water is held in trust for the People of the State of New York under the jurisdiction of the OGS. Structures, including fill, located in, on, or above state-owned lands underwater require a license, grant, or easement from the OGS. Pipelines, cables, docks, wharves, moorings, and permanent structures, including wind turbines and cables, require an easement.	<ul style="list-style-type: none"> • New York Public Lands Law, Article 2, Section 3. • 9 NYCRR Part 270 & 271. 	<p>The OGS requires a completed application for use of land underwater, which includes:</p> <ul style="list-style-type: none"> • Petition for an easement. • Plan and profile showing proposed work/structure. • Survey showing lands applied for, including desired width of proposed easement. • Certified copy of deed(s) of applicant's adjacent upland or consent of owner of such adjacent upland with a certified copy of the deed(s). • Copy of adjoining shorefront deed(s) and tax map section. • Duplicate copy of permit/letter issued by the USACE. • Completed Environmental Assessment Form (EAF), if applicable, and other evidence of compliance with the State Environmental Quality Act (SEQR). • Affidavits of service of notice of application. 	<p>Notice of application must be served to the city/town/village in which the land is located and to the owners of adjacent properties; this notice must be made 20 days before the application is submitted.</p> <p>The OGS may determine that additional public notice is required and may require the applicant to post additional public notices, adding up to 40 additional days to the review process.</p>
Department of Environmental Conservation (DEC)	Coastal Erosion Management Permit	The construction or placement of a structure, or any action or use of land that materially alters the condition of land, including grading, excavating, dumping, mining, dredging, filling or any disturbance of soil, within a CEHA, is a regulated activity requiring a coastal erosion management permit.	<ul style="list-style-type: none"> • ECL Article 34 Coastal Erosion Hazard Areas. • 6 NYCRR Part 505. 	Application includes Joint Permit Application, locational map, EAF, Structural/Archaeological Assessment Form (SAAF), and other applicable items as indicated on the checklist (DEC 2017a).	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete. ^d Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Water Quality Certification (WQC) under Section 401 of the Clean Water Act (CWA)	State WQC is required for projects that require a USACE Section 404 Clean Water Act Permit. A project may be eligible for coverage under the DEC's Blanket WQC (effective 3/7/17) if it is authorized by a NWP.	<ul style="list-style-type: none"> • U.S. Clean Water Act Section 401, 33 U.S.C. 13411. • 6 NYCRR Part 608 and 621. 	Joint Permit Application form can be used to streamline application process.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15-30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Article 15 - Protection of Waters Permit - Excavation or Placement of Fill in Navigable Water and Their Adjacent and Contiguous Wetlands Permit	Installation of transmission cables within New York State waters are subject to Article 15 jurisdiction under the New York Protection of Waters Regulatory Program for the excavation or placement of fill and could be needed for disturbance of the bed or banks of a protected stream or other watercourse.	<ul style="list-style-type: none"> • ECL Title 15, Article 15, (water resources), and Article 70 (uniform procedures). • 6 NYCRR Part 608 and 621 (uniform procedures). 	Joint Permit Application, along with project plans, photos, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.

Table notes are at the end of the table.

Table S-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
DEC	Tidal Wetlands Permit	Certain activities within and adjacent to tidal wetlands are regulated under the Tidal Wetlands Act. Adjacent areas extend up to 300 feet inland from the wetland boundary (up to 150 feet inland within New York City).	<ul style="list-style-type: none"> • ECL Article 25 New York Tidal Wetlands Act. • 6 NYCRR Part 661. 	Joint Permit Application along with project plans, photographs, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Freshwater Wetlands Permit	This law provides for regulation of certain activities that could adversely affect freshwater wetlands of 5 hectares (12.4 acres) or more as well as smaller wetlands identified as having an unusually significant local value. Activities that occur within 30.5 meters (100 feet) of the wetland boundary are also regulated.	<ul style="list-style-type: none"> • ECL Article 24 New York Freshwater Wetlands Act. • 6 NYCRR Parts 663, 664, 665. 	Joint Permit Application, along with project plans, photographs, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 days. If no public hearing is held, DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity	Pursuant to Section 402 of the CWA, stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program. New York's SPDES program (ECL Article 17, Title 8) is a NPDES-approved program. Permit coverage is required for construction activities involving soil disturbances of 1 or more acres.	<ul style="list-style-type: none"> • ECL Article 17. • 6 NYCRR Part 750. 	To obtain permit coverage, a Stormwater Pollution Prevention Plan (SWPPP) must be prepared in accordance with all permit requirements, and then a Notice of Intent (NOI) must be submitted in order to be authorized to discharge under the permit.	An applicant that has satisfied the general permit requirements, including a SWPPP, will be authorized to discharge stormwater from their construction activity within 5 business days from the date the DEC receives a completed electronic version of the NOI for construction activities with a SWPPP that has been prepared in conformance with the design and performance criteria stipulated in the permit (DEC 2015). Notice of incomplete application suspends the agency review until a suitable response is provided.

Table notes are at the end of the table.

Table S-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
DEC/ Natural Heritage Program	State-listed threatened/endangered species consultation and incidental take permits	Actions potentially impacting state-listed T&E species. The applicant can ask the DEC to make a determination as to whether the proposed activity is likely to result in the take of any listed species.	<ul style="list-style-type: none"> ECL 11-0535. 6 NYCRR Part 182. 	<p>The potential impacts of the proposed project's construction and operation with respect to species listed in New York State as endangered, threatened, or species of concern are examined as part of this consultation. Consultation should be with the Division of Fish, Wildlife, and Marine Resources – Bureau of Marine Resources on State Shellfish and Marine Fish Habitat; Rare, Threatened and Endangered Marine Species.</p> <p>Additionally, for listed bats, consultation should be with the DEC Region 1 (or in NYC, Region 2) Wildlife staff. If seasonal restrictions on tree clearing cannot be met, an incidental take permit may be required. In that instance, the applicant will have to identify mitigation that leads to net conservation benefit, and the length (Jones 2017).</p> <p>An application for an incidental take permit includes:</p> <ul style="list-style-type: none"> Completed application. Applicant information. Detailed description of the proposed activity, location, species at issue, nature and expected extent of the take, and impacts on species. Analysis of whether the permit would jeopardize the continued existence of the population of the species. Description of efforts to modify the activity to minimize or avoid the taking. Mitigation plan. Implementation agreement. Certification statement. 	The DEC typically responds within 30 days of receiving a request for a determination, to convey that determination, request additional information, or request an extension.
Office of Parks, Recreation, and Historic Preservation (OPRHP)	Section 106 Consultation under the National Historic Preservation Act (NHPA), and Section 14.09 of the New York State Historic Preservation Office (SHPO) Historic Preservation Act	Projects with any associated federal or state permitting requirements must consider the effect of the project on cultural resources.	<ul style="list-style-type: none"> NHPA, 54 U.S.C. 300101 et seq. Parks, Recreation and Historic Preservation Law, Article 14. 	The SHPO will require an architectural study to identify National Register sites, state register sites, and other sensitive historical, cultural, and traditional sites within an Area of Potential Effects (APE) from the project. The SHPO Archaeologist will also require archaeological studies to identify potentially significant sites.	Highly variable; dependent on potential resources, project impacts, and significance of any findings.
Department of Transportation (DOT)	Highway Work Permit for Utility Work	Any utility work—including construction and installation—in state highway right-of-way. The interconnection from the landfall site to a substation would be the trigger.	New York Highway Law Article 3, § 52	PERM 32 application form, including work plans, a traffic maintenance plan, and supporting documents (e.g., insurance certificates).	Permitting timeframes vary by DOT region and can range from 14 to 90 days.
DOT	Special Hauling Permits	Vehicles/loads that exceed the legal dimensions or weights specified in Section 385 of the NYS Vehicle and Traffic Law.	New York State Vehicle and Traffic Law § 385	PERM 39 application form, including carrier information, vehicle information (i.e., vehicle dimensions and load information), trip information (i.e. start date, permit type, routes).	Permitting timeframes vary by DOT region and may range from 14 to 90 days.
New York State Museum	State Lands Permit	Activities that have the potential to disturb archaeological or paleontological resources on state lands, which include submerged lands under state waters.	Section 233 of the New York State Education Law	Permit application requires site details, detailed plans, conservation information, maps/charts, and project timeframe.	Typical review and approval process takes about 45 days if all the necessary information is available.

Table notes are at the end of the table.

Table S-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
Local					
New York City Department of City Planning	New York City Waterfront Revitalization Program Consistency (coordinated with DOS for CZMA review)	WRP review is required for any project located within the Coastal Zone boundary and which also requires a federal agency permit/authorization.	New York State's Waterfront Revitalization of Coastal Areas and Inland Waterways Act	A WRP Consistency Assessment Form, which includes a policy assessment, must be completed and submitted.	Review is coordinated with DOS. See above under DOS for timeframe.
New York City Board of Standards and Appeals (BSA)	Special Permit	Required for a cable landfall in a zone where "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines" are not permitted as-of-right. Depending on the size and the zoning district, electric substations can be allowed as-of-right or specially permitted.	New York Zoning Resolution	Applications for conditional use permits must follow the Board of Standards and Appeals process outlined in the instructions for completing the "BZ" application, which are available online at: http://www1.nyc.gov/site/bsa/applications/forms-and-instructions.page .	<p>Applicant must provide a copy of the BZ application form and attachments to the affected Community Board or Borough Board, City Councilmember, and Borough President, as well as to the City Department of Buildings administrative official and the City Planning Commission before or within three business days of filing the application.</p> <p>A public hearing may be held by the affected community board within 60 days of receipt of the BZ application, or the affected community may waive the right to hold such a meeting and submit written recommendations. Within 30 days of receipt of a BZ application, or after an affected community board has waived a public hearing, the affected borough board may hold a public hearing and submit a written recommendation or may waive the hearing. After receipt of recommendations or waivers, or the expiration of the time period for review, the Board of Standards and Appeals will hold a public hearing on the application and make a decision. Once the application is deemed complete, the board will provide the hearing notice and related forms to the applicant at least 30 days before the first scheduled hearing date. Note: Depending on the cable landfall location, review by BSA may be coordinated on coastal issues with DOS and other agencies.</p>

Note:

^a The placement of a submarine cable on the seabed is considered a structure under the regulations for implementing Section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR 322.2(b)) and not a loss of waters of the United States subject to the 0.5-acre limit in Nationwide Permit 12.

1 Introduction

This Cable Landfall Permitting Study (Study) is one of a collection of studies prepared on behalf of New York State in support of the New York State Offshore Wind Master Plan (Master Plan). These studies provide information on a variety of potential environmental, social, economic, regulatory, and infrastructure-related issues associated with the planning for future offshore wind energy development off the coast of the State. When the State embarked on these studies, it began by looking at a study area identified by the New York State Department of State (DOS) in its two-year Offshore Atlantic Ocean Study (DOS 2013). This study area, referred to as the “offshore study area (OSA),” is a 16,740-square-mile (43,356-square-kilometer) area of the Atlantic Ocean extending from New York City and the south shore of Long Island to beyond the continental shelf break and slope into oceanic waters to an approximate maximum depth of 2,500 meters (Figure 1). The OSA was a starting point for examining where turbines may best be located, and the area potentially impacted. Each of the State’s individual studies ultimately focused on a geographic Area of Analysis (AoA) that was unique to that respective study. The AoA for this Study is referred to as Study Area 1 and Study Area 2 and is described below in Section 1.3.

The State envisions that its collection of studies will form a knowledge base for the area off the coast of New York that will serve a number of purposes, including (1) informing the preliminary identification of an area for the potential locating of offshore wind energy areas that was submitted to the Bureau of Ocean Energy Management (BOEM) on October 2, 2017 for consideration and further analysis; (2) providing current information about potential environmental and social sensitivities, economic and practical considerations, and regulatory requirements associated with any future offshore wind energy development; (3) identifying measures that could be considered or implemented with offshore wind projects to avoid or mitigate potential risks involving other uses and/or resources; and (4) informing the preparation of a Master Plan to articulate New York State’s vision of future offshore wind development. The Master Plan identifies the potential future wind energy areas that have been submitted for BOEM’s consideration, discusses the State’s goal of encouraging the development of 2,400 megawatts (MW) of wind energy off the New York coast by 2030, and sets forth suggested guidelines and best management practices (BMPs) that the State will encourage to be incorporated into future offshore wind energy development.

Each of the studies was prepared in support of the larger effort and was shared for comment with federal and State agencies, Indigenous Nations, and relevant stakeholders, including non-governmental

organizations and commercial entities, as appropriate. The State addressed comments and incorporated feedback received into the studies. Feedback from these entities helped to strengthen the quality of the studies, and also helped to ensure that these work products will be of assistance to developers of proposed offshore wind projects in the future. A summary of the comments and issues identified by these external parties is included in the *Outreach Engagement Summary*, which is appended to the Master Plan.

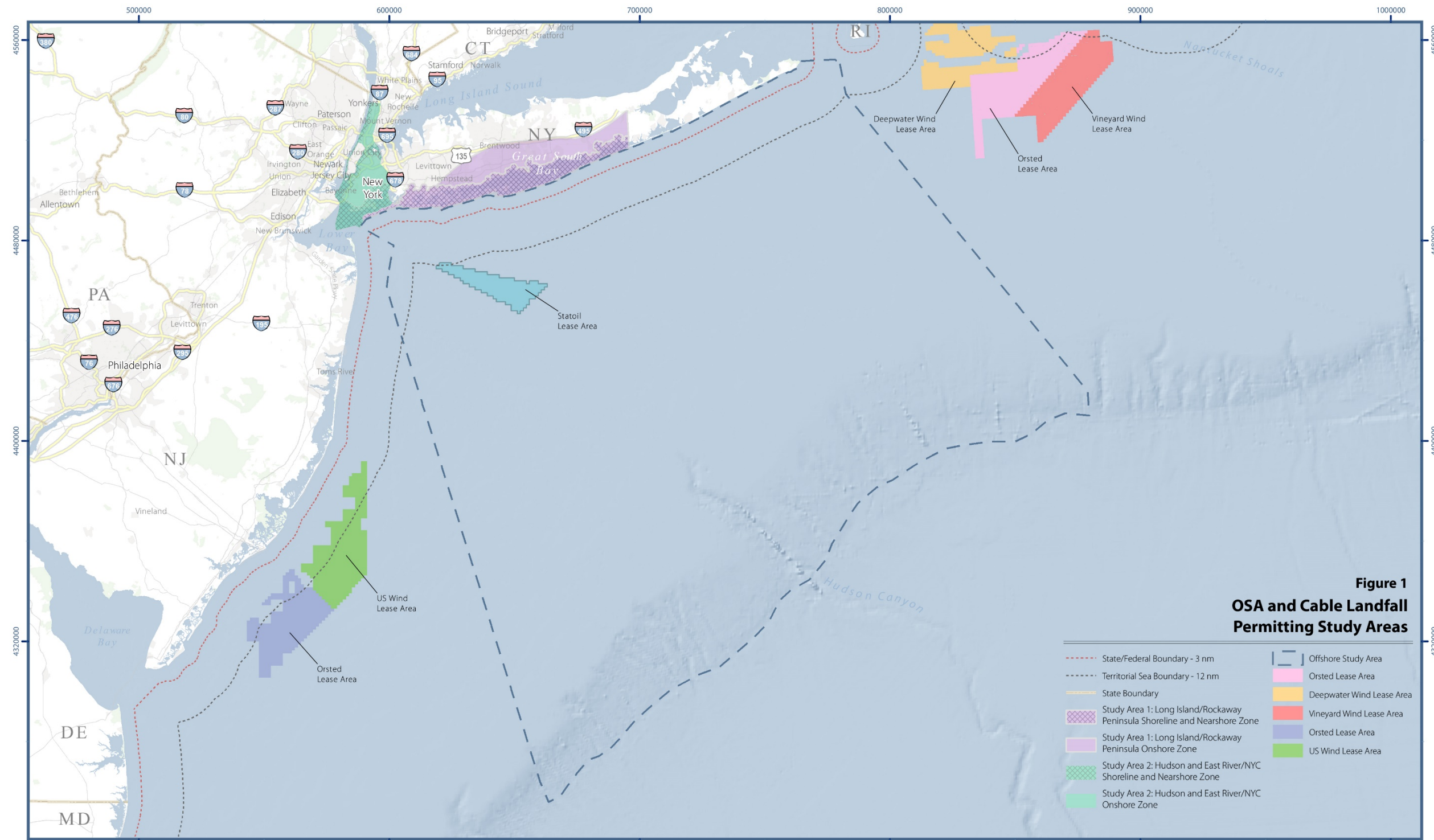
The Energy Policy Act of 2005 amended Section 8 of the Outer Continental Shelf Lands Act (OCSLA) to give BOEM the authority to identify offshore wind development sites within the Outer Continental Shelf (OCS) and to issue leases on the OCS for activities that are not otherwise authorized by the OCSLA, including wind farms. The State recognizes that all development in the OCS is subject to review processes and decision-making by BOEM and other federal and State agencies. Neither this collection of studies nor the State's Master Plan commit the State or any other agency or entity to any specific course of action with respect to offshore wind energy development. Rather, the State's intent is to facilitate the principled planning of future offshore development off the New York coast, provide a resource for the various stakeholders, and encourage the achievement of the State's offshore wind energy goals.

Because BOEM will be the lead agency for offshore wind farms in federal waters, BOEM will, in consultation with other agencies and stakeholders, oversee the required National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq., process for any such proposed offshore wind projects, which would include the assessment of onshore and nearshore resources like those discussed in this study. NEPA requires that prior to making permitting decisions, federal agencies assess the environmental effects of their own activities and development projects, and activities by others that require federal licenses or permits. Federal agencies do this by preparing documents that address the environmental consequences, if any, of the proposed action. An environmental assessment (EA) under NEPA contains an analysis for determining whether the impacts of the action will be significant. If significant, an environmental impact statement (EIS) is prepared and issued by the agency. If not significant, a finding of no significant impact (FONSI) is issued, which effectively ends the agency's NEPA obligations for that project. NEPA requires opportunities for public participation in the environmental impact review process (40 CFR 1500-1508).

NEPA also established the Council on Environmental Quality (CEQ). The CEQ, within the Executive Office of the President, promulgates guidelines for implementing NEPA procedures that apply to all federal agencies. Federal agencies are also free to create their own additional regulations. CEQ reviews and approves federal agency NEPA procedures (40 CFR 1500-1508).

Figure 1. OSA and Cable Landfall Permitting Study Areas

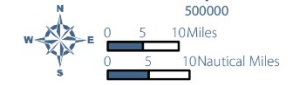
Source: BOEM 2016c; ESRI 2010



**Figure 1
OSA and Cable Landfall
Permitting Study Areas**

- - - State/Federal Boundary - 3 nm
- - - Territorial Sea Boundary - 12 nm
- State Boundary
- ▨ Study Area 1: Long Island/Rockaway Peninsula Shoreline and Nearshore Zone
- ▨ Study Area 1: Long Island/Rockaway Peninsula Onshore Zone
- ▨ Study Area 2: Hudson and East River/NYC Shoreline and Nearshore Zone
- ▨ Study Area 2: Hudson and East River/NYC Onshore Zone
- ▭ Offshore Study Area
- ▭ Orsted Lease Area
- ▭ Deepwater Wind Lease Area
- ▭ Vineyard Wind Lease Area
- ▭ Orsted Lease Area
- ▭ US Wind Lease Area

Source: BOEM 2016c; ESRI 2010.
Service Layer Credits: USGS,NGA,NASA,CGIAR,GEBCON, Robinson,NCEAS,NLS,OSNMA,Geodatatystrelsen and the GIS User Community



Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator (Map border grid is in meters UTM zone 18N)
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For offshore wind farms in federal waters, environmental consultations are required for two phases of the development process—the site assessment and leasing phase and the construction and operations phase. Site assessment and leasing activities would likely require an EA. For construction and operations activities, an EIS would likely be required (NYSERDA 2015).

1.1 Scope of Study

The Cable Landfall Permitting Study provides information that will be useful during consideration of cable landfall sites linking a future offshore wind farm to the New York State electric transmission system. This study was prepared in support of the Offshore Wind Master Plan. As indicated in the *Blueprint for the New York State Offshore Wind Master Plan*, the early development and permitting stage for an offshore wind farm can result in substantial costs. In particular, nearshore (i.e., from the shoreline, half a mile landward and 1,000 feet seaward) and onshore (i.e., landward of the nearshore zone) constraints can limit siting opportunities and influence the permitting process associated with offshore construction and operations of a wind farm. (Refer to Section 1.3 for additional details regarding the terms “nearshore” and “onshore”.) When evaluating cable landfall sites and onshore cable routes, future developers and permitting agencies will need to consider the potential presence of sensitive coastal, biological, geological, and cultural resources; availability of existing infrastructure; and existing land uses. The results of this desktop Study address these considerations at a summary level and compiles information about the nearshore and onshore environments as it pertains to opportunities and constraints associated with siting potential cable landfall sites. In so doing, this Study will help to reduce development costs.

Section 1 provides an introduction to the scope and objectives of the Study, and a definition of the study area. Section 2 provides an overview of the methodology employed in the Study and Section 3 presents a detailed summary of the findings for each resource area. Each resource area is discussed in terms of regulatory framework and desktop analysis results. Section 4 provides a summary resource matrix, which includes potential opportunities or constraints with respect to future siting of the cable landfall sites, along with associated summary figures. Section 4 also provides a comprehensive table of permits that may be applicable to construction and operation of the cable landfall. Section 5 presents a suite of guidelines and BMPs that should be considered during siting and construction of a cable landfall site. Lastly, Section 6 provides references for the materials used to develop this Study.

1.2 Objectives of the Study

The principal objectives of this Study are to:

1. Characterize the existing onshore and nearshore areas to determine areas of potential opportunity and constraints associated with siting future cable landfall sites.
2. Provide a framework for a future onshore and nearshore permitting process for each of the study areas that outlines regulatory requirements and potential resource issues of concern.
3. Identify guidelines and BMPs that should be considered during siting and construction of a cable landfall site.
4. Identify recommendations to improve the permitting process for offshore wind energy development in New York State.

The results of this Study provide a preliminary analysis of the potential onshore and nearshore opportunities and environmental, physical, and social constraints to be considered when siting future cable landfall sites. This Study is intended to provide a baseline for initiating site selection and routing processes, reduce project planning costs, and facilitate future onshore permit application processes.

1.3 Definition of Study Area

The AoA for the Cable Landfall Permitting Study consists of two geographic study areas as shown in Figure 2:

1. Study Area 1: Long Island/Rockaway Peninsula.
2. Study Area 2: Hudson and East Rivers/New York City.

The definition of the study areas took into consideration the following general factors:

- Locations of existing substations, which were identified by New York State and then narrowed down based on cost and accessibility considerations.
- Recognition that, given existing transmission system infrastructure, a cable landfall site in New York from the OSA would most likely be targeted on the southeastern shore on Long Island and New York City due to the cost-prohibitive nature of bringing a cable in through Block Island and into Long Island Sound.
- Exclusion of Manhattan due to recognition of the limited substations (only one) within Manhattan proper and the highly developed nature of the shoreline in Manhattan.
- Exclusion of the eastern third of Long Island east of Riverhead due to the lack of existing substations; for similar reasons, the northwestern portion of Long Island was excluded.
- Exclusion of Staten Island due to a lack of existing substations.
- Security requirements for John F. Kennedy and LaGuardia airports, which would preclude landfall sites.

- The Upper and Lower Bays were included to allow for a consideration of possible routes that a cable may take if a landfall location is selected along the Hudson or East Rivers or within Yonkers.

Each study area was subdivided into a shoreline/nearshore zone and an onshore zone to facilitate a more detailed understanding of potential opportunities and constraints associated with siting cable landfall sites and routing onshore cable. The shoreline/nearshore zone extends a half-mile landward from the National Oceanic and Atmospheric Administration (NOAA) delineated shoreline and 1,000 feet seaward from the shoreline. Areas extending landward of the shoreline/nearshore zone that encompass many of the potential substations (interconnection points) were designated as an onshore zone. As a result, the four subareas identified in Table 1 have been assessed throughout this study; the acreage totals listed below are inclusive of land and water components of each zone.

Table 1. Onshore Permitting Study Areas

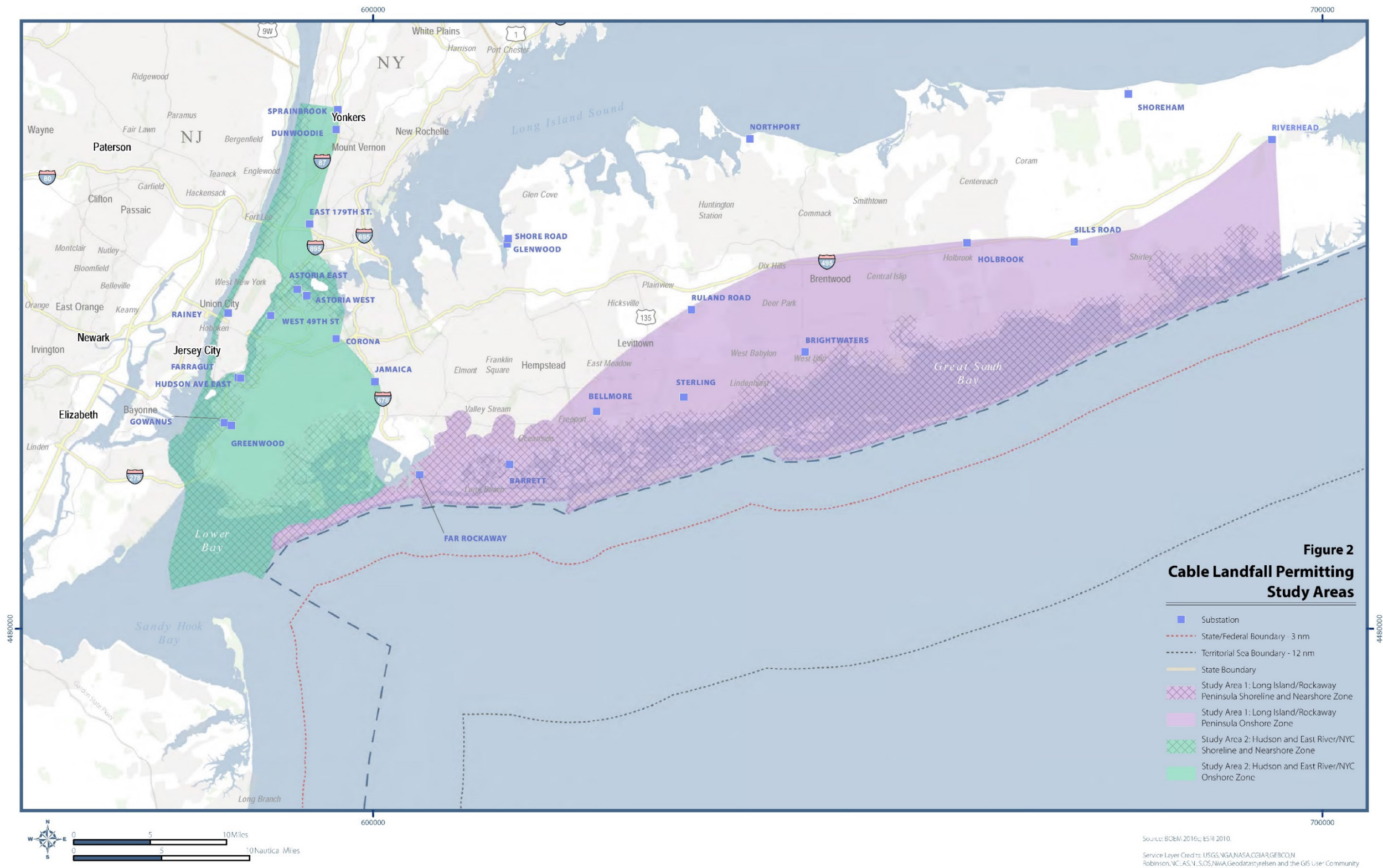
Study Area/Zone	Total Acreage
Study Area 1: Long Island/Rockaway Peninsula Shoreline/Nearshore Zone	180,701 acres
Study Area 1: Long Island/Rockaway Peninsula Onshore Zone	158,404 acres
Study Area 2: Hudson and East River/NYC Shoreline/Nearshore Zone	79,223 acres
Study Area 2: Hudson and East River/NYC Onshore Zone	59,805 acres

The following potential environmental, physical, and social resources are included in this Study and have been preliminarily assessed for each study area:

- Land cover.
- Publicly managed lands, public places, and government properties.
- Indigenous Nations lands, rights-of-way, and conservation easements.
- Municipal jurisdictions.
- Local zoning.
- Coastal zone.
- Marine infrastructure and uses.
- Threatened and endangered (T&E) species.
- Other sensitive habitats (i.e., Significant Natural Communities, eelgrass, essential fish habitat [EFH], and NOAA Trust Resources).
- Wetlands, surface waters, and floodplains.
- Migratory birds and eagles.
- Sediment, soil types, and steep slopes.
- Geologic hazards.
- Cultural and historic resources.
- Potential areas of contamination.

Figure 2. Cable Landfall Permitting Study Areas

Source: BOEM 2016c; ESRI 2010



**Figure 2
Cable Landfall Permitting
Study Areas**

Source: BOEM 2016c; ESRI 2010.
Service Layer Credits: USGS, NGA, NASA, CGIAR, GEBCO, Robinson, VCI, AS, VLS, OS, NWA, Geodatas, relsen and the GIS User Community

Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator (Map border grid is in meters UTM zone 18N)
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2 Methodology

To characterize the existing environmental, physical, and social resources within the shoreline/nearshore and onshore zones of both study areas, a desktop analysis of relevant and available geospatial data and online databases was completed. The desktop analysis focused on the shoreline/nearshore zone to provide a better understanding of potential cable landfall sites and to take into account the potential environmental, physical, and social resources, as well as the regulatory sensitivities of these shoreline/nearshore environments. The onshore zone was addressed in a more general manner to provide some background on the areas that would be involved in routing onshore cables, as it is the potential landfall locations that are the focus of this study.

2.1 Geospatial Data

To prepare this report, publicly available geospatial data were obtained and reviewed from a variety of federal, state, and local agency databases and websites. These data were used to identify and characterize environmental, physical, and social resources in the study areas through a desktop analysis using geographic information systems (GIS). Refer to Appendix A for a detailed summary of these geospatial data sources, including metadata.

2.2 Database Review

In addition to utilizing publicly available geospatial data in GIS, several resource-specific public databases were accessed and used to obtain information on resources located within the study areas where GIS data were not available. These included the following:

- **U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC):** A project planning tool that provides listed species, critical habitat information, and data on other resources (e.g., wetlands, wildlife refuges) for a user-defined location.
- **Department of Environmental Conservation (DEC) Nature Explorer:** An online tool for researching rare/sensitive animal and plant species and habitats in a specific area of interest.
- **Office of Parks, Recreation, and Historic Preservation (OPRHP) Cultural Resource Information System (CRIS):** A GIS program that provides access to historic and cultural resource databases and digitized paper records within a user-defined area.
- **NOAA Office of Coast Survey Wrecks and Obstructions Database:** A database that provides information on the identified submerged wrecks and obstructions within the U.S. maritime boundaries.

- **National Pipeline Mapping System (NPMS) Online Viewer:** A web-based map viewer that enables a user to review pipeline data one county at a time. NPMS pipeline data consists of gas pipelines and hazardous liquid pipelines jurisdictional to the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration. Data are available only for online viewing and cannot be downloaded.
- **NOAA Marine Fisheries Service (NOAA Fisheries) EFH Mapper:** A web-based map viewer that includes spatial representations of fish species with designated EFH, as well as their associated life-stages, important habitats, habitat areas of particular concern, and EFH areas protected from fishing. The mapper also provides links to supporting materials such as fishery management plans and downloadable GIS data.

3 Summary of Desktop Analysis

Section 3 summarizes the findings of the desktop analysis for each resource, organized by study area. Section 3.1 addresses Study Area 1: Long Island/Rockaway Peninsula. Section 3.2 addresses Study Area 2: Hudson and East River/NYC. The discussions for each resource are presented in the subsequent sections in the following order:

- Regulatory Framework: This includes identification of all pertinent regulations and associated permits and approvals that may be applicable.
- Results of Desktop Analysis: The discussion of results includes the location and spatial extent of identified physical and environmental resources and a characterization of those resources (e.g., wetland, soil, vegetation type, description of land uses). Results are presented for the two components of each study area: shoreline/nearshore zone and onshore zone, where applicable.

3.1 Study Area 1: Long Island/Rockaway Peninsula

3.1.1 Land Cover

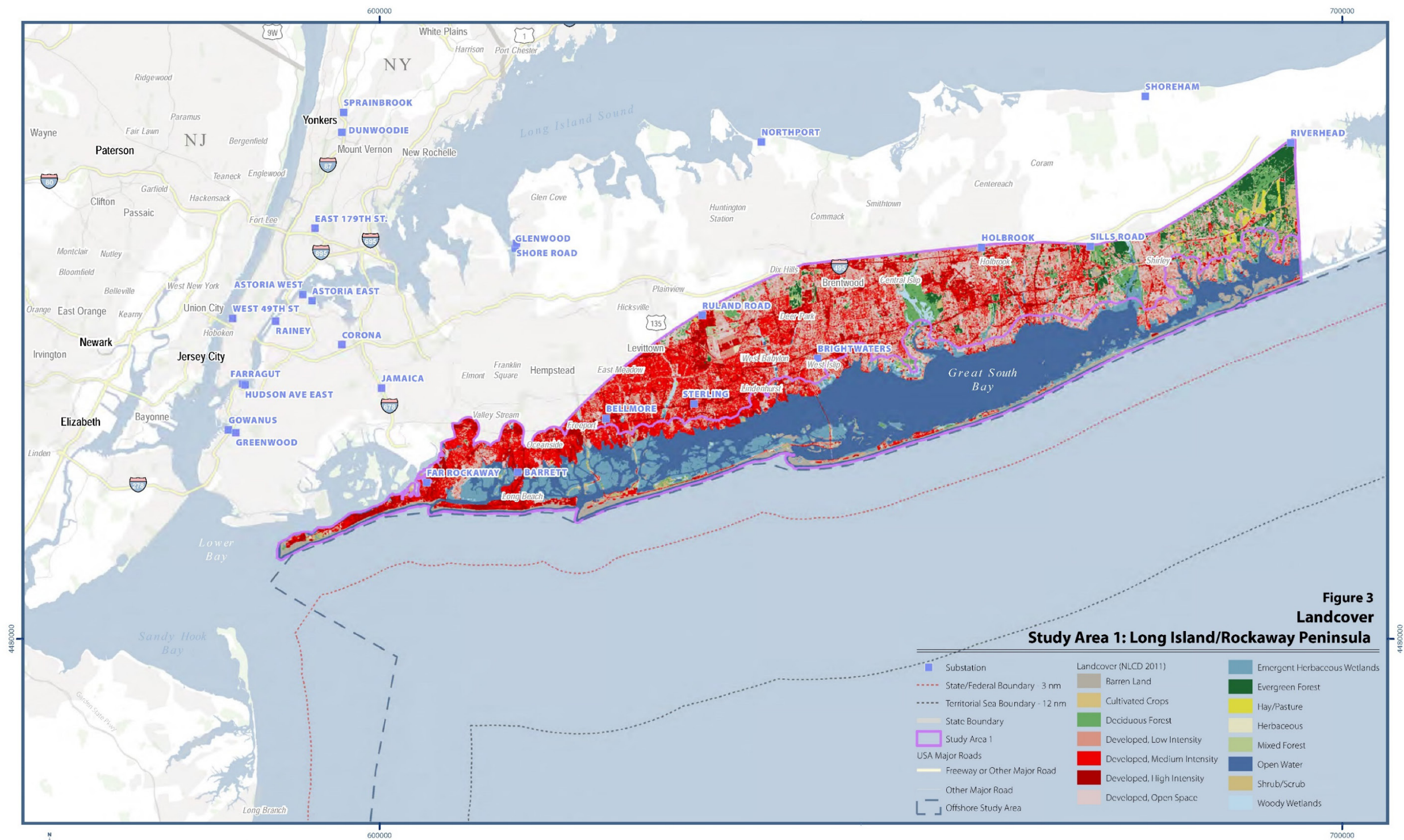
There is no regulatory framework specific to land cover. Relevant regulations pertaining to land use and zoning for developed land are discussed in Section 3.1.5, and regulations pertaining to wetlands are discussed in Section 3.1.10.

3.1.1.1 Shoreline/Nearshore Zone

According to 2011 National Land Cover Dataset (NLCD) data, approximately 50% of the shoreline/nearshore zone is categorized as open water, 12.3% is categorized as emergent herbaceous wetlands, and 11.4% is categorized as medium-intensity developed land (see Table 2 and Figure 3; USGS 2014a). Medium-intensity developed land is largely concentrated in the westernmost portion of the zone, including the Rockaway Peninsula and Long Island, as well as the hamlets of Woodmere and Oceanside. The remainder of the shoreline/nearshore zone is categorized as low intensity developed land (7.6%), barren land (5.1%), developed open space (4.9%), high intensity developed land (4.4%), and a variety of forested, vegetative, and wetland cover types in small proportions (3.7% of the zone; see Table 2). The locations of the various land cover types are shown in Figure 3.

Figure 3. Landcover, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; USGS 2014a



**Figure 3
Landcover**

Study Area 1: Long Island/Rockaway Peninsula

- Substation
 - - - State/Federal Boundary - 3 nm
 - - - Territorial Sea Boundary - 12 nm
 - State Boundary
 - ▭ Study Area 1
 - USA Major Roads
 - Freeway or Other Major Road
 - Other Major Road
 - ▭ Offshore Study Area
- | | |
|-------------------------------|--------------------------------|
| ■ Landcover (NLCD 2011) | ■ Emergent Herbaceous Wetlands |
| ■ Barren Land | ■ Evergreen Forest |
| ■ Cultivated Crops | ■ Hay/Pasture |
| ■ Deciduous Forest | ■ Herbaceous |
| ■ Developed, Low Intensity | ■ Mixed Forest |
| ■ Developed, Medium Intensity | ■ Open Water |
| ■ Developed, High Intensity | ■ Shrub/Scrub |
| ■ Developed, Open Space | ■ Woody Wetlands |

Source: BOEM 2016c; ESRI 2010; USGS 2014a
 Service Layer Credits: USGS/NASA/NOAA/BOEM/BOEN/Robinson/WCLAS/NLSD/NMA/Geostatsystems and the GIS User Community



Coordinate System: NAD_1983_UTM_Zone_18N Projection: Transverse_Mercator (Map border grid is in meters UTM zone 18N)
 Path: M:\New_York_City\NYSEEDA\Offshore\Waps\MXD\Masterplan\Figures\6_Onshore_Permitting\Fig3_Land_Cover_Study_Area_1_11x17.mxd 11/28/2017

Table 2. NLCD Land Cover Data for the Study Area 1 Shoreline/Nearshore Zone*Source: USGS 2014a*

Cover Type	Acreage	Percentage
Open Water	91,283	50.5
Emergent Herbaceous Wetlands	22,229	12.3
Developed, Medium Intensity	20,540	11.4
Developed, Low Intensity	13,744	7.6
Barren Land	9,194	5.1
Developed, Open Space	8,845	4.9
Developed, High Intensity	7,998	4.4
Deciduous Forest	2,415	1.3
Woody Wetlands	1,528	0.9
Shrub/Scrub	1,342	0.7
Herbaceous	426.1	0.2
Hay/Pasture	423	0.2
Evergreen Forest	295.1	0.2
Cultivated Crops	261.3	0.1
Mixed Forest	178	0.1

3.1.1.2 Onshore Zone

According to 2011 NLCD data, the majority (72.4%) of the onshore zone is categorized as developed land: 26.8% is low-intensity developed land, 26.8% is medium-intensity developed land, and 18.8% is developed open space (see Table 3 and Figure 3; USGS 2014a). The northeastern portion of the zone contains the largest area of undeveloped land (see Figure 3). The remaining 27.6% of the onshore zone is a mix of agricultural, water/wetlands, and forested and vegetative cover, with just under 7% developed with high intensity.

Table 3. NLCD Land Cover Data for the Study Area 1 Onshore Zone*Source: USGS 2014a*

Cover Type	Acres	Percentage
Developed, Low Intensity	42,499	26.8
Developed, Medium Intensity	42,418	26.8
Developed, Open Space	29,743	18.8
Deciduous Forest	11,323	7.1
Developed, High Intensity	10,785	6.8
Evergreen Forest	10,193	6.4
Mixed Forest	2,851	1.8
Woody Wetlands	2,417	1.5

Table 3 continued

Cover Type	Acres	Percentage
Hay/Pasture	1,593	1
Emergent Herbaceous Wetlands	1,489	0.9
Shrub/Scrub	1,159	0.7
Cultivated Crops	746.2	0.5
Barren Land	476.5	0.3
Herbaceous	325.9	0.2
Open Water	385.4	0.2

3.1.2 Publicly Managed Lands, Public Places, and Government Properties

A third party must obtain a right-of-way (ROW) permit before it can install a utility (e.g., a cable landfall) over, under, or through an area owned or controlled by the National Park Service (NPS), as per 54 U.S.C. 100902. (Refer to the summary permit matrix in Section 4.2 for additional details regarding this permitting process.) An underwater cable running through state-owned lands requires an easement from the Office of General Services (OGS), Bureau of Land Management for the use of land underwater, pursuant to the Public Lands Law. (Refer to the permit matrix in Section 4.2 for additional details regarding the application process.) Local/county governments may require similar easements for a cable to pass through; consultation with pertinent governments would be required during any future onshore cable siting process.

In addition to the publicly managed lands, public places, and government properties within Study Area 1, there may also be Dongan Patents scattered across the municipalities in southern Long Island. These patents refer to patents granted to various municipalities by Governor Thomas Dongan in the late 1680s. The patents set up town trustees as the governing body with the mission of managing common lands, including waterways. Under this authorization, town trustees had the right to preserve land for common use; this authority has been upheld in recent times (Drumm 2011; Town of Brookhaven 2017). It is outside the scope of this Study to identify where Dongan Patents may exist in each municipality; however, this Study acknowledges that these may be present within Study Area 1.

Federal, State, county, and local parks; conservation lands; airports; and government properties were identified for Study Area 1 based on a review of the New York Protected Areas Database (NYPAD 2013). The results are summarized below.

3.1.2.1 Shoreline/Nearshore Zone

Table 4 summarizes the results of the desktop analysis for the shoreline/nearshore zone within Study Area 1. The table indicates that a total of approximately 34,396 acres are designated as publicly managed lands, public places, and government properties. These lands comprise approximately 19% of the total shoreline/nearshore zone and includes such diverse areas as Fire Island National Seashore, which comprises nearly 17,000 acres and approximately 26 miles along the southern shore of the shoreline/nearshore zone, state/county/local parks, an airport, and a U.S. Coast Guard station. The locations of these lands are indicated in Figure 4. The Gateway National Recreation Area is located along the western end of the Rockaway Peninsula, and spans approximately 4.4 miles of shoreline. Fire Island National Seashore and Gateway National Recreation Area present the largest potential constraints to siting a cable landfall within this zone due to their size, and siting a cable landfall on those properties would require an easement from the NPS. Over 8,000 acres of State-owned lands exist within the zone, including tidal wetlands and State parks. Constraints pertaining to DEC wetlands are discussed in Section 3.1.10. Multiple state-owned tidal wetland conservation areas are located along the north shore of the Great South Bay (see Figure 4).

Table 4. Summary of Publicly Managed Lands, Public Places, and Government Properties in the Shoreline/Nearshore Zone of Study Area 1

Sources: NYPAD 2013; DEC 2017a

Place Name	Acres	Percentage of Zone
Federal Lands		
Fire Island National Seashore	16,964	9.4
Gateway National Recreational Area	2,038	1.1
Lido Beach National Wildlife Management Area	23.9	<0.1
Seatuck National Wildlife Refuge	191.3	0.1
Wertheim National Wildlife Refuge	622	0.3
Total	19,839	11
State Lands		
Natural Resource Area (DEC)	10.4	<0.1
State Park	6,914	3.8
State Protected Area	36.2	<0.1
State Waterway Access (DEC) ^a	16.5	<0.01
State Conservation Area	158.5	0.1
State Tidal Wetland Area (DEC)	1,230	0.7
Total	8,366	4.8

Table notes are on the next page

Table 4 continued

Place Name	Acres	Percentage of Zone
Local/County Lands		
County Park	1,295	0.7
County Recreation Area	85.1	<0.1
Local Conservation Area	119	<0.1
Local/Municipal Park	4,570	2.5
Local Protected Area	40.4	<0.1
Local Resource Management Area	15.3	<0.01
Total	6,125	3.5
Airports		
Spadaro Airport	14.2	< 0.1
Government Properties		
US Coast Guard Station	51.4	< 0.1
Overall Total	34,395.6	

a Waterway access sites provide public access to various waterbodies and are associated with boat ramp/boat launch facilities. They include the Moriches Bay Marine Waterway Access and the Oceanside Landing Waterway Access Site.

3.1.2.2 Onshore Zone

Table 5 summarizes the results of the desktop analysis for the onshore zone within Study Area 1. A total of approximately 23,080 acres (15%) within the onshore zone are designated as publicly managed lands, public places, and government properties. The locations of these lands are indicated in Figure 4. These range from the two National Wildlife Refuges to State/county/local parks, multiple airports, and a military reservation. Publicly managed State lands comprise over 10,000 acres within the onshore zone. A large concentration of State-owned land is located in the northeastern corner of the onshore zone associated with several pine barrens state forests (see Figure 4). Additionally, another large concentration of State-owned lands is located near the center of the onshore zone, which correspond to the Connetquot River State Park and the Bayard Cutting Arboretum State Park, along with adjacent locally and county-owned parks (see Figure 4).

Table 5. Summary of Publicly Managed Lands, Public Places, and Government Installations in the Onshore Zone of Study Area 1

Sources: NYPAD 2013; DEC 2017a

Place Name	Acres	Percentage of Zone
Federal Lands		
Fire Island National Seashore	52.7	<0.1
Seatuck National Wildlife Refuge	23.2	<0.1
Wertheim National Wildlife Refuge	1,758	1.1
Long Island National Cemetery	347.8	0.2
Total	2,182	1.5
State Lands		
State Preserve (DEC)	806.3	0.5
State Park	5,268	3.3
State Forest (DEC)	1,582	1.0
State Conservation Area	1,702	1.1
State Wildlife Management Area	647.9	0.4
State Tidal Wetland	3.9	<0.1
Total	10,010	6.3
Local/County Lands		
County Park	1,139	0.7
County Recreation Area	762.4	0.5
Local Conservation Area	2,208	1.4
Local/Municipal Park	2,023	1.3
Local Protected Area	915.1	0.6
Local Resource Management Area	1,365	0.9
Total	8,413	5.4
Airports		
Brookhaven Airport	635.6	0.4
Long Island MacArthur Airport	1,198	0.8
Republic Airport	625.4	0.4
Spadaro Airport	6.9	<0.01
Total	2,466	1.6
Government Properties		
U.S. Army Reserve Center	8.6	--
Total	8.6	< 0.1
Overall Total	23,080	

3.1.3 Indigenous Nations Lands, Rights-of-Way, and Conservation Easements

The New York Highway Law (Article 3, Section 52) requires a Highway Work Permit for Utility Work from the Department of Transportation (DOT) for any utility work in a State highway ROW. In addition,

use of the ROWs of state parkways and causeways would require express approval from DOT under the Accommodation Plan for Longitudinal Use of Freeway Right-of-way by Utilities. Refer to the summary permit matrix in Section 4.2 for additional details regarding the permitting process.

It should be noted that any use of the ROWs of parkways and causeways (DOT limited access freeways) would require express approval from DOT under the Accommodation Plan for Longitudinal Use of Freeway Right-of-way by Utilities. Additionally, there are restrictions on the use of commercial vehicles, trucks, and tractor trailers on downstate New York parkways. These include Meadowbrook State Parkway, Wantagh Parkway, Ocean Parkway, Robert Moses Causeway, and Loop Parkway (NYCDOT n.d.). Commercial vehicles, trucks, and tractor trailers can travel on the parkways indicated above south of Sunrise Highway/Marigold as long as the following conditions are met: vehicles must be less than 8 feet wide, less than 13 feet high, and less than 50 feet long. Additionally, the vehicles can carry no more than 22,400 pounds on any exit (Melik 2017). If these conditions are exceeded, a Special Hauling Permit would be required.

There are no other specific regulations, permits or approvals pertaining to land access from land owners other than those discussed above and in Section 3.1.2. Specific conditions of individual easement holders' conditions and requirements would require review with the easement holder to determine compatibility with a cable landfall.

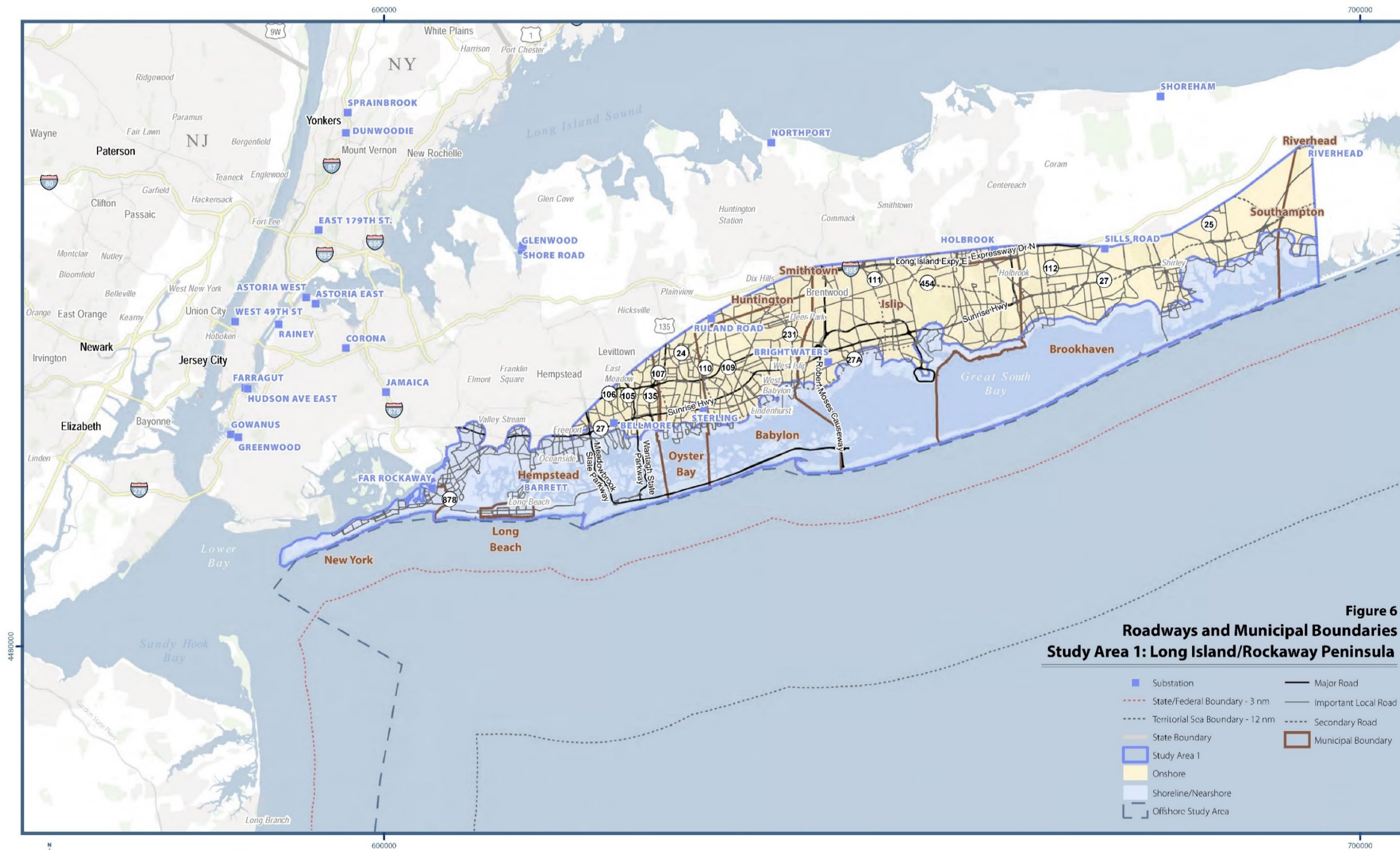
3.1.3.1 Shoreline/Nearshore Zone

Indigenous Nations Lands. In addition to the local, State, and federal lands identified in Table 4 above, 55.1 acres of the Poospatuck Indian Reservation are located within the shoreline/nearshore zone (NYS OCSCIC 2010). It is located in the easternmost portion of the zone, near Mastic, New York (see Figure 5). The Shinnecock Indian Reservation, located along the southern shoreline of Long Island, is east of and outside Study Area 1.

Roadway ROWs. While the shoreline/nearshore zone of Study Area 1 does not include any freeways, there are over 389 miles of road network, ranging from important local roads to major roads. Major roads provide north-south connections from inland Long Island to Long Beach, Jones Beach, and other areas south of South Oyster Bay (see Figure 6). These correspond to the major bridge crossings: Meadowbrook State Parkway, Wantagh State Parkway, and Robert Moses Causeway. The ROWs associated with some of these roads may present opportunities with respect to routing an onshore cable from a cable landfall site to a substation.

Figure 6. Roadways and Municipal Boundaries, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010



Coordinate System: NAD 1983 UTM Zone 18N Projection: Transverse Mercator (Warp border: grid is in meters UTM zone 18N)
 Path: M:\New York City\NSLRDA Offshore\maps\WCD\Masterplan figures\6 Onshore Terrestrial\High Roadways Municipal Boundaries Study Area 1 1x17.mxd 11/28/2017

Source: BOEM 2016c; ESRI 2010.
 Service Layer Credits: USGS, NGA, NASA, CGIAR, GEBCO, N Robinson, NC, AS, V, S, OS, NWA, Geodatasystem and the GIS User Community

Electric Transmission ROWs. According to the geospatial data from the Platts Transmission Line Database, 34.6 miles of overhead electric transmission lines are located within the shoreline/nearshore zone (Platts 2009). These lines are summarized in Table 6, and their locations are indicated in Figure 5. The electric transmission lines are primarily located within the western portion of the shoreline/nearshore zone, west of Bellmore, New York. Electric transmission line ROWs may present an opportunity with respect to routing an onshore cable from the cable landfall site to a substation.

Refer to Section 3.1.7 for a discussion of submarine cables.

Table 6. Overhead Transmission Lines in the Shoreline/Nearshore Zone of Study Area 1

Source: Platts 2009

Owner	Capacity	Total Length (miles)
Long Island Power Authority	115 kV – 161 kV	11
	345 kV – 450 kV	7.4
	Below 100 kV	1.7
Total		20.1
Unknown	Below 100 kV	14.5
Overall Total		34.6

Gas Pipeline ROWs. According to the NPMS public map viewer, one gas pipeline is located within the shoreline/onshore zone (USDOT 2017). This pipeline is located between Route 27 near Rockville Centre (Babylon) and the shoreline in Long Beach, due south of the Island Park Long Beach rail station. Associated spatial data is not available for mapping existing pipelines included in the public map viewer; therefore, the general location of this pipeline is identified only here in the text. Spatial data is available only to government officials and pipeline operators (PHMSA 2017). (Refer to Section 3.1.7 for discussion of submarine cables and pipelines.)

Railroad ROWs. A portion of the Long Island Railroad, Long Beach and Far Rockaway branches, are located within the shoreline/nearshore zone (see Figure 5). The ROWs associated with these branches may present an opportunity with respect to routing an onshore cable from the landfall site to a substation.

Conservation Easements. The National Conservation Easement Database (NCED) indicated that two federal conservation easements are located in the shoreline/nearshore zone; these easements total 1.4 acres of land. One is a permanent NPS easement totaling 1.2 acres on the Rockaway Peninsula, and the other is a USFWS easement totaling approximately 0.2 acres associated with the Wertheim National Wildlife Refuge (see Figure 5; NCED 2012).

3.1.3.2 Onshore Zone

Indigenous Nations Lands. No Indigenous Nations lands are located within the onshore zone of Study Area 1.

Roadway ROWs. Within the onshore zone of Study Area 1, there are approximately 1,177 miles of road network, ranging from freeways to local connecting roads. Freeways include the Long Island Expressway (I-495). Major roads include the Expressway Drive, Heckscher State Parkway, Meadowbrook Parkway, Robert Moses Causeway, Seaford Oyster Bay Expressway, Sunrise Highway, and Wantagh Parkway. These roadways crisscross the onshore zone, primarily from north-south and east-west. It should be noted that any use of the ROWs of parkways and causeways (DOT limited access freeways) would require express approval from DOT under the Accommodation Plan for Longitudinal Use of Freeway Right-of-way by Utilities, and certain restrictions would apply regarding size and weight of commercial vehicles as discussed in Section 3.1.2.1. Local roads provide localized access around the onshore zone (see Figure 6). The ROWs associated with some of these roads may present opportunities with respect to routing a future onshore cable from a cable landfall site to a substation.

Electric Transmission ROWs. A total of 232.1 miles of electric transmission lines are located within the onshore zone: 209.7 miles are overhead electric transmission lines, and 22.4 miles are underground electric transmission lines (Platts 2009). A below-ground 100-kilovolt (kV) line extends along the entire length of the onshore zone, paralleling the Long Island Railroad mainline railroad tracks (see Figure 5). These lines are summarized in Table 7, and their locations are indicated in Figure 5. Transmission line ROWs may present an opportunity with respect to routing an onshore cable from a future cable landfall site to a substation.

Table 7. Overhead Electric Transmission Lines in the Onshore Zone of Study Area 1

Source: Platts 2009

Owner	Capacity/Type	Total Length (miles)
Long Island Power Authority	115 kV – 161 kV overhead	23.4
	115 kV – 161 kV underground	22.4
	345 kV – 450 kV	29.8
	Below 100 kV	3.4
Total		66.6
Unknown	Below 100 kV	153.1
Overall Total		232.1

Gas Pipeline ROWs. According to the NPMS public map viewer (PHMSA 2017), multiple gas pipelines are located in the onshore zone. Several pipelines are located near Westbury, New York, and run in multiple directions: north-south between Westbury and Merrick, east-west between Elmont and Central Islip, and as a spoke from Westbury southwest to Rockville Centre in Babylon. Additionally, a lengthy gas pipeline runs parallel to the Long Island Expressway, as does a hazardous liquid pipeline (PHMSA 2017).

Railroad ROWs. Several branches of the Long Island Railroad run through the onshore zone, including the Mainline, Montauk Branch, Central Branch, West Hempstead Branch, and the Far Rockaway Branch (see Figure 5). The ROWs associated with these branches may present an opportunity for routing a future onshore cable.

Conservation Easements. The NCED indicated that two conservation easements are located in the onshore zone, totaling 5.8 acres of land. One is a 5.1-acre easement near East Massapequa held by the North Shore Land Alliance, and the other is a 0.7-acre easement held by the USFWS and associated with the Wertheim National Wildlife Refuge (see Figure 5; NCED 2012).

3.1.4 Municipal Jurisdictions

Specific municipal regulations are discussed under pertinent resources.

3.1.4.1 Shoreline/Nearshore Zone

The shoreline/nearshore zone is located within a portion of eight municipalities, as indicated in Table 8 and in Figure 6. The towns of Brookhaven, Hempstead, Islip, and Babylon comprise the majority of the shoreline/nearshore zone of Study Area 1.

Table 8. Municipalities within the Shoreline/Nearshore Zone of Study Area 1

Municipality	Acreage	Percentage of Zone
Town of Brookhaven	58,356	32.3
Town of Hempstead	45,317	25
Town of Islip	32,881	18.2
Town of Babylon	21,437	11.9
Town of Oyster Bay	8,220	4.5
City of New York	7,416	4.1
Town of Southampton	5,371	3
City of Long Beach	1,702	0.9

3.1.4.2 Onshore Zone

The onshore zone is located within a portion of nine municipalities, as indicated in Table 9 and on Figure 6. The towns of Islip, Brookhaven, and Babylon comprise the majority of the onshore zone of Study Area 1.

Table 9. Municipalities within the Onshore Zone of Study Area 1

Municipality	Acreage	Percentage of Zone
Town of Islip	51,550	32.5
Town of Brookhaven	48,163	30.4
Town of Babylon	25,269	16
Town of Oster Bay	10,294	6.5
Town of Hempstead	10,193	6.4
Town of Southampton	6,793	4.3
Town of Huntington	5,525	3.5
Town of Smithtown	611	0.4
Town of Riverhead	5.8	< 0.1

3.1.5 Local Zoning

Study Area 1 falls within the boundaries of multiple municipalities; however, only New York City zoning data is available in GIS format. A review of zoning maps for each municipality in the study area is outside the scope of this Study, given its focus as a desktop analysis of readily available digital data. A description of applicable zoning regulations is provided below. It should be noted that other municipalities have local zoning laws and may have jurisdiction over landfall locations and other onshore development.

3.1.5.1 Shoreline/Nearshore Zone

New York City Zoning. Spatial zoning data (i.e., GIS data) was available only for the portion of Study Area 1 located within New York City (i.e., Rockaway Peninsula); it was not available for the other Long Island cities and towns listed in Table 8. A total of approximately 5,219.6 acres of the shoreline/nearshore zone are located in the Rockaway Peninsula; therefore, New York City zoning covers only 6.3% of the total shoreline/nearshore zone of Study Area 1.

New York City zoning regulations that may apply to a future cable landfall site were assessed using the land use designation “terminal facilities at river crossings for access to electric, gas, or steam lines.” This land use designation was determined to be the most applicable to a cable landfall, which would consist of a buried cable and manhole. (Note: This Study acknowledges the limits of the use of the “terminal facility” as it refers specifically to river crossings.) These terminal facilities are specially permitted in residential districts R1, R2, R3, R4, R5, R6, R7, R8, R9, and R10 and require a special use permit from the New York City Board of Standards and Appeals (City of New York Zoning Resolution §22-21). Terminal facilities are permitted as-of-right in commercial districts C1, C2, C4, C5, C6 (with the exception of the C6-1A District, where they are not permitted), and C8 (City of New York Zoning Resolution §32-15). Additionally, terminal facilities are also permitted as-of-right in manufacturing districts M1, M2, and M3 (City of New York Zoning Resolution Appendix A, Index of Uses). Terminal facilities are considered a water-dependent use and are permitted in waterfront blocks in accordance with applicable underlying district regulations (City of New York Zoning Resolution §62-211).

Offshore wind project developers interested in siting terminal facilities in the Special Battery Park City District (BPC District) should schedule an informational meeting with the applicable borough office to understand what requirements may apply. Uses that are permitted as-of-right and comply with zoning regulations for the particular district are required to obtain a building permit from the New York City Department of Buildings. Permit applications and construction plans must be filed with the department by a New York State-licensed Professional Engineer or Registered Architect. The Department of Buildings must approve construction plans, and permits must be filed and pulled before construction work begins. Once work is completed, final inspections by the Department of Buildings and/or trade self-certification are required (New York City Buildings 2016).

Table 10 summarizes the zoning districts in the Study Area 1 shoreline/nearshore zone in New York City and they are depicted in Figure 7. Based on the Zoning Resolution review discussed above, terminal facilities associated with offshore wind development would be permitted as-of-right in approximately 268.2 acres, or 5.1% of the Study Area 1 shoreline/nearshore zone in New York City, and specially permitted in 4,289.8 acres, or 82% of this zone in New York City. However, it is recommended that the Department of City Planning be contacted to confirm the land use designation for a cable landfall and its compatibility with local zoning.

Table 10. New York City Zoning in the Shoreline/Nearshore Zone of Study Area 1

Source: New York City Department of City Planning 2017

Zoning District	Permitted or Special Use^a	Acres^b
R1	Specially permitted	204.8
R2	Specially permitted	454.1
R3	Specially permitted	270.2
R4	Specially permitted	2,423.4
R5	Specially permitted	518.1
R6	Specially permitted	401.7
R7	Specially permitted	17.5
C3	Permitted as-of-right	12.9
C4	Permitted as-of-right	76.4
C8	Permitted as-of-right	42.6
M1	Permitted as-of-right	103.1
M2	Permitted as-of-right	13
M3	Permitted as-of-right	20.2
Park	Unknown	661.5
Total		5,219.5

Notes:

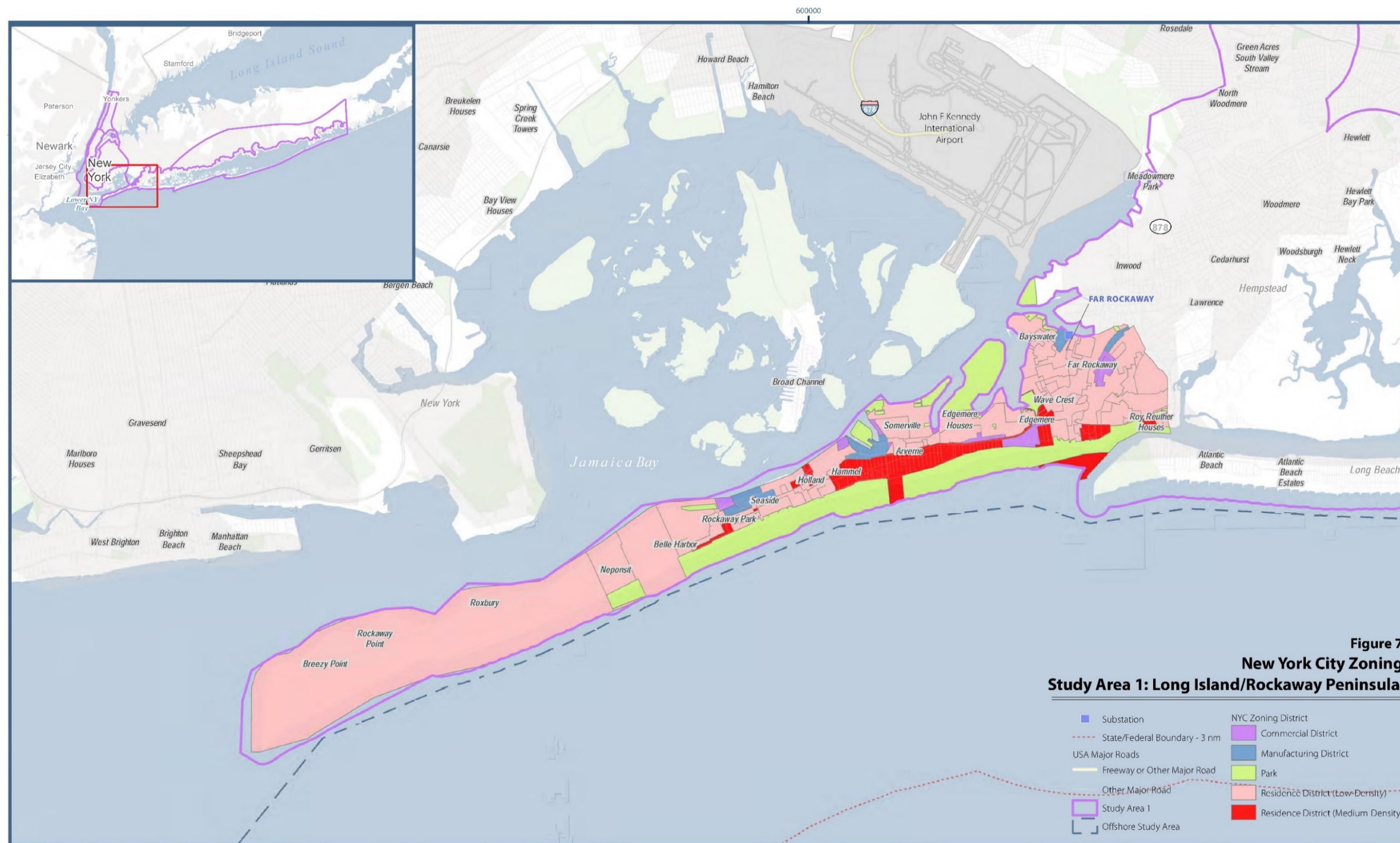
- ^a Based on “terminal facility.”
- ^b Acreage may not sum due to rounding.

3.1.5.2 Onshore Zone

Zoning. In the Study Area 1 onshore zone, spatial zoning data was not available for the cities and towns listed in Table 9. A review of zoning maps for each municipality in the study area is outside the scope of this Study, given its focus as a desktop analysis of readily available digital data.

Figure 7. New York City Zoning, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; New York City Department of City Planning 2017



Coordinate System: NAD_1983_UTM_Zone_18N Projection: Transverse_Mercator (Map border grid is in meters UTM zone 18N)
 Path: \\New_York_City\NYC\IDA_Offshore\Maps\WMD\Mas.crolan_figures\6_Offshore_Permitting\Fig7_zoning_Study_Area_1_11x17.mxd 11/28/2017

Source: BOEM 2016c; ESRI 2010; New York City Department of City Planning 2017.
 Service Layer Credits: USGS, NASA, ESA, NOAA, NCEAS, NLS, O&M, NOAA, Geodatasystem and the GIS User Community

3.1.6 Coastal Zone

Coastal Consistency. Congress passed the federal Coastal Zone Management Act (CZMA) in 1972 to encourage the appropriate development and protection of the nation's coastal and shoreline resources (16 U.S.C. 33 §§1451-1465). The CZMA gives states the primary role in managing these areas. To assume this role, each state develops a coastal zone management plan that describes the State's coastal resources and how these resources are to be managed. The federally approved New York State Coastal Management Program (CMP), administered by the DOS, delineates the State's coastal zone and establishes 44 coastal policies that guide coastal management actions. The Waterfront Revitalization of Coastal Areas and Inland Waterways Act (Waterways Act) establishes DOS as the state agency responsible for implementing the CMP.

Pursuant to 15 CFR Part 930, the DOS reviews federal activities, such as those involving federal direct actions, permitting, and financial assistance to state and local governments, within or affecting the coastal zone to ensure they are conducted in a manner consistent with the enforceable policies of the CMP. Federal activities are evaluated to determine reasonably foreseeable direct or indirect effects on the State's coastal uses or resources, whether performed by or on behalf of a federal agency in the exercise of its statutory responsibilities, and whether proposed inside or outside of the coastal zone. For example, this can include reviewing activities such as construction and operation of an offshore wind farm located beyond the 3-nautical mile boundary of the State's waters if the offshore activity has reasonably foreseeable effects on the State's coastal zone. Cable landing sites linking an offshore wind farm to the New York State electric transmission system would have reasonably foreseeable effects on the State's coastal zone. Therefore, in this example, the DOS would likely review activities associated with construction, operation, and decommissioning the offshore wind farm and transmission cables, as well as review any nearshore and onshore effects resulting from cable siting and construction. Likewise, the DOS may review exploration, development, and production activities on the OCS with reasonably foreseeable effects on the State's coastal uses and resources.

The Waterways Act also authorizes local governments to prepare and adopt a Local Waterfront Revitalization Program (LWRP), which provides a more detailed implementation of the State's CMP. A LWRP refers to both a planning document prepared by a community and the program established to implement the plan. The Program may be comprehensive and address all issues that affect a community's entire waterfront, or it may address the most critical issues facing a significant portion of its waterfront. LWRP approval is a three-tiered process involving adoption by the municipality, approval by the DOS Secretary of State pursuant to the Waterways Act, and, for municipalities within the State's coastal area,

concurrence by the NOAA Office of Ocean and Coastal Management on its incorporation into the CMP. State permitting, funding, and direct actions, as defined at 19 New York Codes, Rules and Regulations (NYCRR) Part 600, must be consistent with an approved LWRP. Within federally defined coastal areas, the activities of federal agencies are also required to be consistent with an approved LWRP (DOS 2017a).

New York City adopted the Waterfront Revitalization Program (WRP) to encourage the revitalization of waterfront areas. The WRP, administered by the New York City Department of City Planning, is the city's primary coastal zone management tool and seeks to maximize the benefits from economic development, environmental conservation, and public use of the waterfront, while minimizing any potential conflicts among these objectives (New York City Department of City Planning 2016a). The WRP delineates the City's coastal zone and establishes 10 local coastal policies for the development and use of waterfront areas within the City's coastal zone. The policies are thus the basis for federal, state, and local consistency determinations for activities affecting the coastal zone in New York City.

The WRP also includes five types of special area designations: the Special Natural Waterfront Areas (SNWA), the Significant Maritime and Industrial Areas (SMIA), the Arthur Kill Ecologically Sensitive Maritime and Industrial Area, the Priority Marine Activity Zones, and the Recognized Ecological Complexes. Within these areas, a specific policy in the WRP may be prioritized over other policies based upon its relevance to the project type and where the project is located (New York City Department of City Planning 2016a). For example, policies promoting public access and habitat protection are less relevant along the working waterfront than they are in the public or natural waterfront areas.

The *New York City Comprehensive Waterfront Plan* designates three SNWAs because of their large concentrations of important natural coastal features (e.g., wetlands and fish and wildlife habitat) and significant open space (New York City Department of City Planning 2016a). The special coastal features that comprise each SNWA are protected under several regulatory programs, such as those pertaining to Significant Coastal Fish and Wildlife Habitats, Erosion Hazard Areas, and Tidal and Freshwater Wetlands. Under the WRP, SNWAs are included under Policy 4: Protect and restore the quality and function of ecological systems within the New York City coastal area. This policy focuses on protecting and restoring the coastal ecosystem, and as indicated in the New York City WRP, fragmentation or loss of habitat areas within the SNWAs should be avoided and could be the basis for a determination of inconsistency with the WRP (New York City Department of City Planning 2016a).

The WRP also recognizes working waterfronts with a designation of SMIA's. Seven such areas have been designated, and within these areas, the WRP goals are to support industrial and maritime activity (New York City Department of City Planning 2016a).

In addition to New York City, there are two other approved LWRPs within Study Area 1. The village of Ocean Beach (an incorporated village within the town of Islip) has an approved LWRP. The village of Ocean Beach's LWRP has 13 local policies that include a general policy, and specific policies covering economic development, waterfront natural resources, general environmental, and recreation and cultural resources (Cashin Associates 2010). The town of Smithtown's LWRP has 44 coastal policies which mirror the State's (Town of Smithtown 1989).

Notably, the majority of Study Area 1 is located within the South Shore Estuary Reserve. This reserve is comprised of a series of shallow interconnected bays, streams, and wetlands along Long Island's south shore that extend more than 70 miles from the town of Hempstead in Nassau County to Shinnecock Bay in Suffolk County. The Comprehensive Management Plan for the reserve was developed in 2001 to manage the resources of this complex system as a single, integrated estuary. While the South Shore Estuary Reserve does not have an approved LWRP, data and insights from the Comprehensive Management Plan are used to inform DOS' consistency reviews.

Regulatory Summary. Federal and state actions affecting the coastal zone are reviewed to assess the consistency of a proposed activity or project with the policies set forth in the CMP and applicable LWRPs. In accordance with federal regulations, federal agency activities and development projects, activities requiring federal licenses or permits, and activities requiring federal financial assistance within the coastal zone, and OCS plans that occur within or have reasonably foreseeable effects on the coastal zone, must be reviewed for consistency with the CMP and any applicable LWRP. An offshore wind project—including the cable landfall site—would likely be subject to evaluation for consistency with state coastal policies, as any cable landfall site is assumed to be located within the designated New York State coastal zone, and depending upon the specific cable landfall site, may be subject to consistency review with respect to local policies. Refer to the permit matrix in Section 4.2 for a summary of the consistency review process.

Significant Coastal Fish and Wildlife Habitats. Based on specific criteria as defined by the CMP, the DOS has designated some coastal habitats as Significant Coastal Fish and Wildlife Habitats. These criteria are as follows (DEC 1984):

- Habitat type not common in the State or coastal region.
- Rare or endangered species.
- Commercial, recreational, or educational value.
- Essential to survival.
- Difficult to replace.

These habitats are specifically addressed under Policy 7 of the CMP: Significant coastal fish and wildlife habitats will be protected, preserved, and where practical, restored as to maintain their viability as habitats. Under this policy, “in order to protect and preserve a significant habitat, land and water uses or development shall not be undertaken if such actions destroy or significantly impair the viability of an area as a habitat.” This policy would apply to the construction and operation of a cable landfall site within the coastal zone.

Coastal Erosion Hazard Areas. Under the Coastal Erosion Hazard Areas Law (6 NYCRR Part 505), the DEC is authorized to identify and map coastal erosion hazard areas (CEHAs) in New York and to prohibit or control certain regulated activities or land disturbance within those CEHAs. Mapped CEHAs include lands along the Atlantic Ocean, Long Island Sound, East River, and Hudson River south of the federal dam in Troy, New York (DEC 2017b). The Coastal Erosion Management Permit Program requires a permit for the construction or placement of any structure, or for activities such as grading, excavating, and dredging, within a CEHA. Eighty-six coastal communities fall under CEHA jurisdiction, and under the Coastal Erosion Hazard Areas Law, local communities can administer their own CEHA program as certified communities, or they can be part of the State’s program, which is administered by the DEC.

In mapping a CEHA, two specific areas are mapped. Natural protective feature areas (NPFAs) are mapped first by identifying the most landward natural protective feature (beach, dune, or bluff), and then the following distances are used to determine the landward limit of the NPFA (DEC 2017c):

- Dunes: 25 feet from the landward toe of the dune.
- Bluffs: 25 feet from the peak of the bluff.
- Beaches: 100 feet landward from the line of permanent vegetation.

Many activities are prohibited within NFPAs unless a variance is granted, which would be subject to stricter permitting standards. Structural hazard areas are the areas located landward of the NPFA and have shorelines receding at the long-term average annual recession rate of 1 foot or more per year.

CEHA mapping is not available online with the exception of outdated maps (1988) for Brooklyn and Queens; it can be requested from regional DEC offices and at local building departments of certified communities (DEC 2017c). CEHA maps are currently being evaluated and revised by the DEC, and the revised maps are not expected to be publicly available for more than a year (Chiebus 2017).

Regulatory Summary. If a proposed location is within a mapped CEHA, a CEHA permit would be required for a future cable landfall. Refer to the permit matrix in Section 4.2 for details regarding permit application requirements.

3.1.6.1 Shoreline/Nearshore Zone

Approximately 93%, or 167,850 acres, of the shoreline/nearshore zone is within the designated New York State coastal zone (DOS 2016). Additionally, the zone is partially located within two communities with LWRPs: New York City (7,417 acres) and the village of Ocean Beach (91.6 acres), which is located in the southern part of the town of Islip (DOS 2015). The shoreline/nearshore zone is located within New York City's designated Jamaica Bay SNWA (see Figure 8).

Shoreline Type. Based on an analysis of NOAA's Continually Updated Shoreline Product (CUSP), the shoreline type in the shoreline/nearshore zone ranges from natural to hardened/armored (see Table 11 and Figure 9). The length of natural shoreline throughout the shoreline/nearshore zone is double that of hardened/armored shoreline (NOAA Geodetic Survey 2017). Hardened/armored shorelines include breakwaters, groins, jettys, bulkheads, and other similar types of shorelines. It should be noted that the NOAA CUSP dataset did not cover the shoreline throughout the zone. Areas in Long Beach, Babylon, and Hempsted along the outer barrier islands and along the northern shore of Great South Bay from Meadowbrook Parkway east to the eastern limit of the study area were excluded from the dataset.

Figure 8. Coastal Resources, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; DOS 2016; New York City Department of City Planning 2017

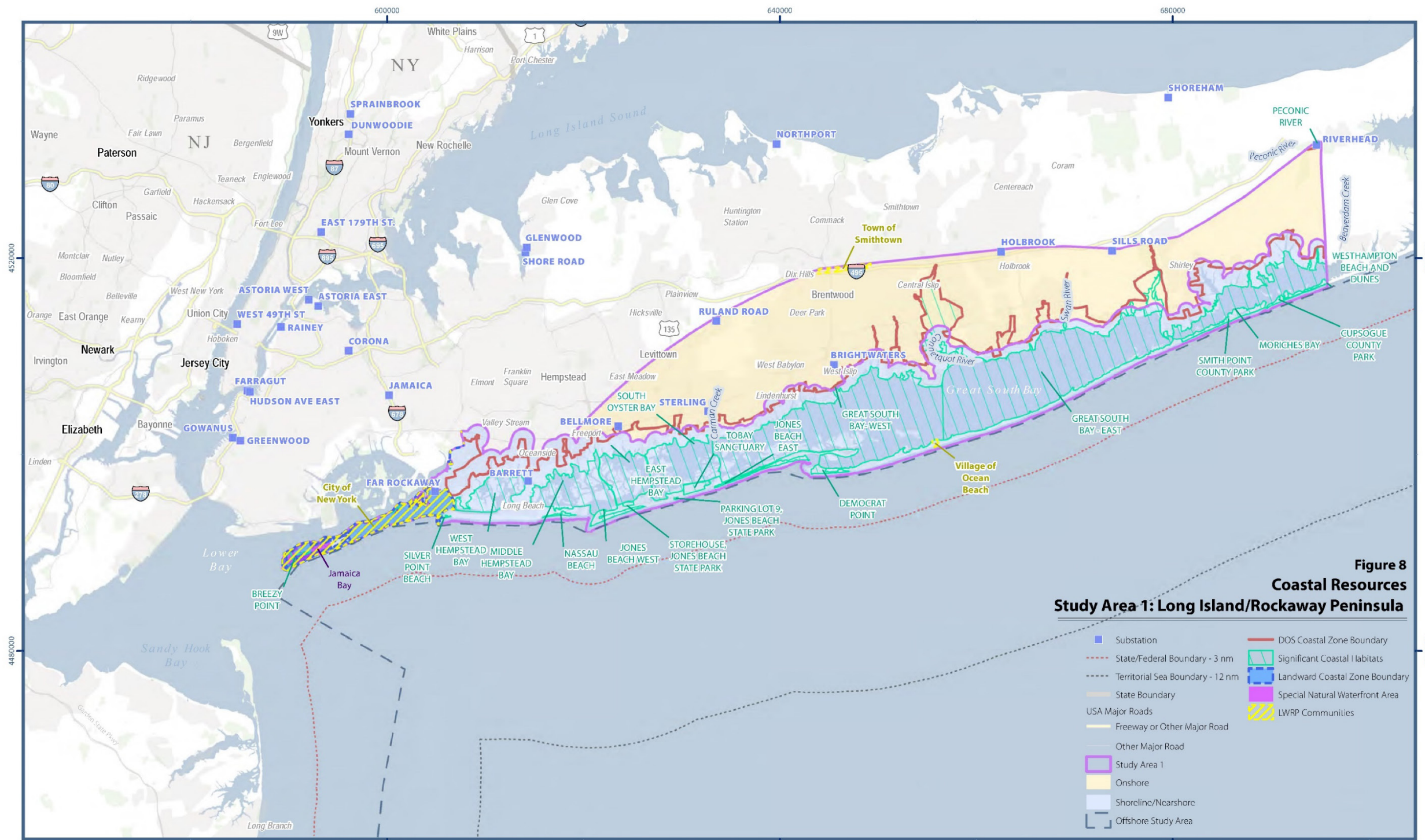


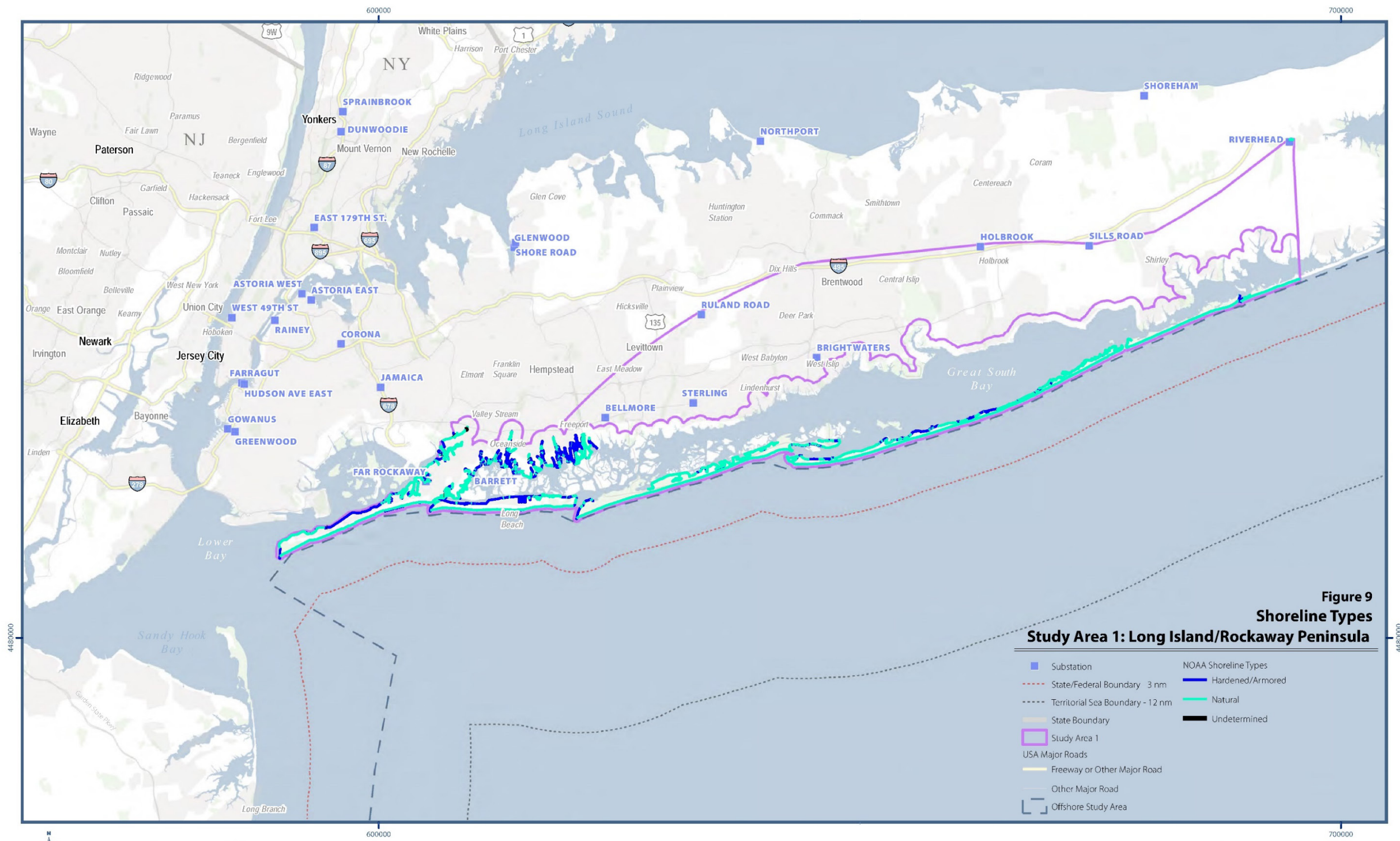
Figure 8 Coastal Resources Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; DOS 2016; New York City Department of City Planning 2017.
 Service Layer Credits: USGS, NOAA, NASA, CGA, AR, GEBCO, Robinson, NCTAS, NI, SOS, NOAA, Geodatasystem and the GIS User Community

Coordinate System: NAD_1983_UTM_Zone_18N Projection: Transverse_Mercator (Map border grid is in meters UTM zone 18N)
 Path: M:\New_York_City\NYSDPDA_Offshore\Map\MXD\Masterplan_figures\6_Onshore_Permitting\Fig8_Coastal_Resources_Study_Area_1_11x7.mxd 11/29/2017

Figure 9. Shoreline Types, Study Area 1: Long Island/Rockaway Peninsula

BOEM 2016c; ESRI2010; NOAA Geodetic Survey 2017



Source: BOEM 2016c; ESRI 2010; NOAA Geodetic Survey 2017.
 Service Layer Credits: USGS/NCA, NASA/GIARD/GEBCON, Robinson, NCEAS/NLSOS/NMA, Geodatasystem and the GIS User Community

Coordinate System: NAD_1983_UTM_Zone_18N_Projection_Transverse_Mercator; (Map border grid is in meters UTM zone 18N)
 Path: \\New_York_City\NYS\IRDA_Offshore\Maps\MXD\Wascr\plan_figures\6_Onshore_Permitting\Fig9_Shorelines_Study_Area_1_11x17.mxd 11/28/2017

Table 11. Shoreline Type in the Shoreline/Nearshore Zone of Study Area 1

Source: NOAA Geodetic Survey 2017

Shoreline Type	Length of Shoreline (miles)
Natural	
Marsh/Swamp	70
Lake/Pond	6.9
Mean High Water	125.6
River/Stream	0.14
Total	202.6
Hardened/Armored	
Breakwater	0.12
Groin	2.1
Jetty	0.73
Bulkhead/Sea Wall	83.7
Ramp	0.17
Rip Rap	11.2
Wharf/Quay	3.2
Total	101.2
Undetermined	0.19
Total	304

CEHAs. Four of the eight municipalities within the shoreline/nearshore zone have locally certified CEHA permit programs, and three have programs managed by the State (see Table 12).

Table 12. LWRP Status and CEHA Permit Programs for Municipalities within the Shoreline/Nearshore Zone of Study Area 1

Source: DOS 2017b; DEC 2017c

Municipality	LWRP Status ^a	State or Locally Certified CEHA Permit Program
City of Long Beach	N/A	State
City of New York	Approved	State ^b
Town of Babylon	N/A	Locally certified
Town of Brookhaven	N/A	Locally certified
Town of Hempstead	N/A	Locally certified
Town of Islip ^c	N/A	State
Town of Oster Bay	N/A	State
Town of Southampton	N/A	Locally certified

Notes:

- ^a As of May 2017
- ^b Two of the five boroughs of New York City—Brooklyn and Queens—are State-regulated communities.
- ^c The village of Ocean Beach, which is within the town of Islip, has an approved LWRP.

According to the 1988 CEHA maps for New York City, the Rockaway Peninsula (which includes Queens) is located within a CEHA (DEC 1988). Online data is unavailable for the remainder of the shoreline/nearshore zone, and as noted above, the maps available online for Brooklyn and Queens are outdated.

Significant Coastal Fish and Wildlife Habitats. According to the DOS, a total of 24 Significant Coastal Fish and Wildlife Habitats are located within the shoreline/nearshore zone of Study Area 1 (see Table 13 and Figure 8; DOS 2014). These areas total approximately 106,783 acres, or 59% of the total shoreline/nearshore zone, and include the bays along the southern shore of Long Island. As indicated in Table 13, the Great South Bay comprises close to 75,000 acres of the shoreline/nearshore zone. The Great South Bay is the largest protected, shallow coastal bay in the state, and supports commercial hard clam harvesting and sport fishing (DOS 2008a, 2008b). It also includes wetlands along the Fire Island National Seashore and DEC-protected wetlands along the northern shore of the bay. The bay is highly productive and supports a great diversity of fish and wildlife species, including providing nesting for the piping plover (DOS 2008a, 2008b).

Table 13. Summary of Significant Coastal Fish and Wildlife Habitats in the Shoreline/Nearshore Zone of Study Area 1

Source: DOS 2014

Significant Coastal Fish and Wildlife Habitat	Acreage
Beaverdam Creek	113.2
Breezy Point	285.5
Carmans River	375.7
Connetquot River	1,467
Cupsogue County Park	222.5
Democrat Point	352.4
East Hempstead Bay	4,954
Great South Bay - East	33,615
Great South Bay - West	34,069
Jamaica Bay	141.6
Jones Beach East	486.2
Jones Beach West	621.3
Middle Hempstead Bay	7,033
Moriches Bay	8,958
Nassau Beach	130.3
Parking Lot 9, Jones Beach State Park	14.5
Silver Point Beach	32.7
Smith Point County Park	1,030

Table 13 continued

Significant Coastal Fish and Wildlife Habitat	Acreage
South Oyster Bay	7,918
Storehouse, Jones Beach State Park	93.7
Swan River	42.7
Tobay Sanctuary	519.8
West Hempstead Bay	4,255
Westhampton Beach and Dunes	52.3
Total	106,783.4

3.1.6.2 Onshore Zone

Approximately 12,288 acres of the onshore zone are located within the designated New York State coastal zone (see Figure 8; DOS 2016). Additionally, approximately 608.6 acres are located within the town of Smithtown, which has an approved LWRP (DOS 2015). The onshore zone for Study Area 1 is located outside of New York City’s designated coastal zone and the Long Island Sound CMP boundaries.

Shoreline Type. Based on NOAA CUSP data, there are less than 0.8 miles of shoreline in the onshore zone (see Table 14). This shoreline is associated with a very limited bulkhead or seawall area, a marsh/swamp, and river/stream areas (see Figure 9).

Table 14. Shoreline Type in the Onshore Zone of Study Area 1

Source: NOAA Geodetic Survey 2017

Shoreline Type	Length of Shoreline (miles)
Natural	
Marsh/Swamp	0.05
River/Stream	0.7
Hardened/Armored	
Breakwater	0.01
Total	0.76

CEHAs. CEHAs would likely not extend into the onshore zone of Study Area 1; however, reference to CEHA maps would be required to confirm this.

Significant Coastal Fish and Wildlife Habitats. Seven Significant Coastal Fish and Wildlife Habitats exist in the onshore zone of Study Area 1; these are listed in Table 15 and depicted in Figure 8. These

areas total approximately 4,329 acres, or 2.7% of the total onshore zone, and are limited to the eastern half of the zone. The largest of these habitats is associated with the Connetquot River (3,622 acres) in the town of Islip.

Table 15. Summary of Significant Coastal Fish and Wildlife Habitats in the Onshore Zone of Study Area 1

Source: DOS 2014

Significant Coastal Fish and Wildlife Habitat	Acreage
Beaverdam Creek	47.2
Carmans River	564.2
Connetquot River	3,622
Great South Bay – East	0.2
Great South Bay – West	13
Peconic River	18.7
Swan River	63.6
Total	4,328.9

3.1.7 Marine Infrastructure and Uses

This resource discussion is applicable only to the shoreline/nearshore zone. Marine uses for the purposes of this Study include submarine cables and pipelines, shipping lanes, anchorage zones, navigational channels, and ocean disposal sites. Refer to the *Fish and Fisheries Study*, which is appended to the Master Plan, for details regarding commercial and recreational fishing, and the *Sand and Gravel Resources Study*, which is also appended to the Master Plan, for details regarding the locations of active, formerly active, and potential future sand and gravel mining sites (borrow areas).

Rules governing marine navigation are found in Title 33 of the Code of Federal Regulations. Title 33 gives the U.S. Coast Guard, U.S. Army Corps of Engineers (USACE), and other agencies the regulatory authority to oversee navigation and navigable waterways.

The locations of known in-service and out-of-service submarine cables and pipelines are shown on Figure 10 (RCG 2017). (Note that submarine pipelines and cables whose service status was unknown were included in the “in service” category.) The Neptune Project transmission line bisects a portion of the shoreline/nearshore zone; it connects Sayreville, New Jersey, and Nassau County, Long Island, where it provides power to customers. Additionally, one existing Transco pipeline makes landfall on the Rockaway Peninsula (Rockaway Delivery Lateral) and one makes landfall on Long Beach (Lower

New York Bay Lateral). A number of submarine cables make landfall along the shoreline of Study Area 1; these include both in-service and out-of-service cables.

As indicated in Figure 10, no shipping lanes/fairways or anchorage zones are located within the shoreline/nearshore zone. Within the Great South Bay and adjacent nearshore waters, there are maintained channels that are used by recreational watercraft and fishing boats. Boat ramp facilities located within the marine waters south of Long Island provide access to these channels; these facilities are managed by the DEC; OPRHP; Nassau and Suffolk County Parks; and the towns of Babylon, Brookhaven, Hempstead, Oyster Bay, Southampton, and Islip (DEC n.d.[a]).

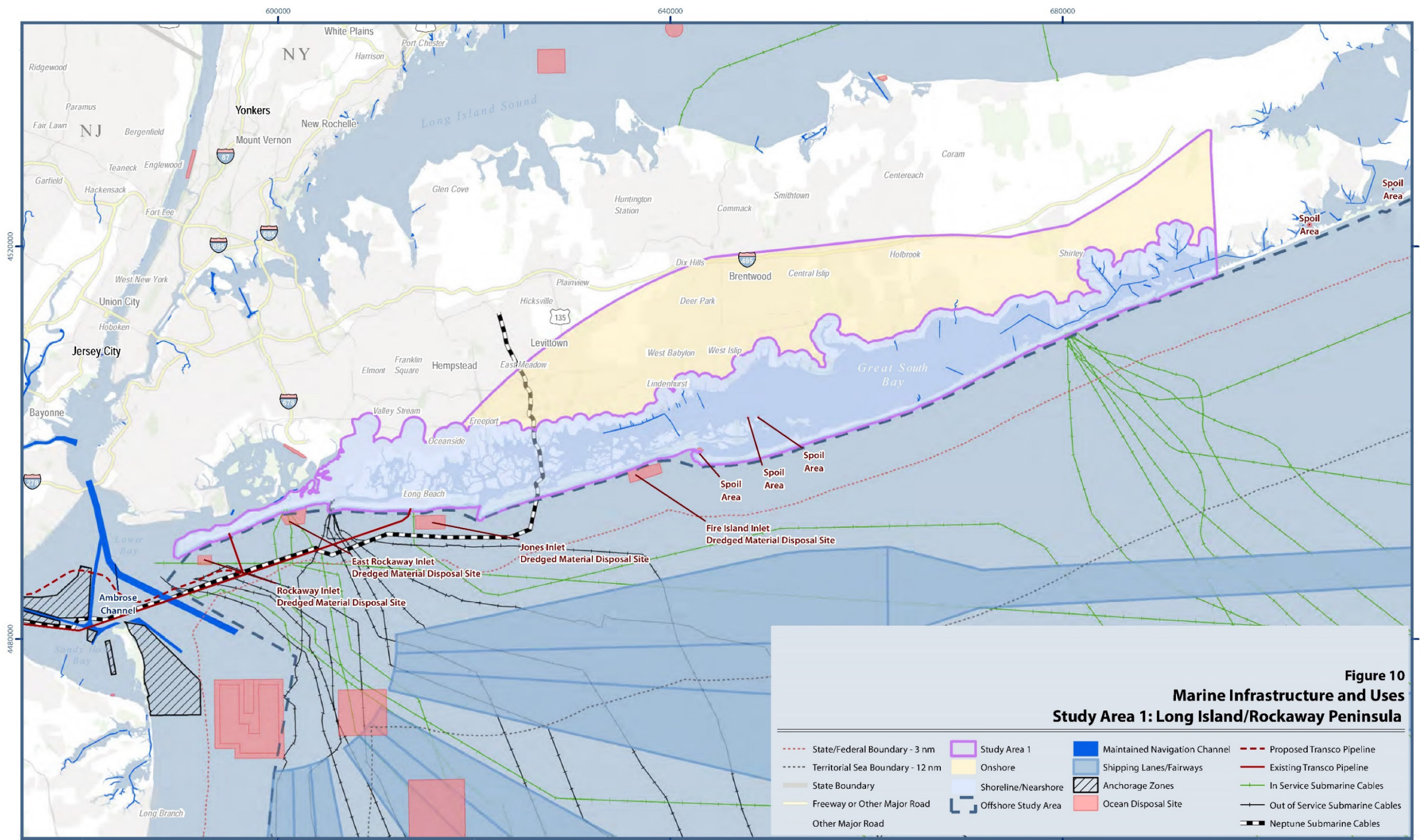
South of Study Area 1 and within the boundary of the OSA are six inbound and outbound designated shipping lanes that branch out like spokes on a wheel from the precautionary area at the entrance to the Ambrose Channel and Lower New York Bay (see Figure 10). These are generally commercial shipping lanes for vessels, often under local pilot control, transiting to and from the Port of New York and New Jersey. According to 2016 commercial vessel statistics from the Maritime Association of the Port of New York and New Jersey (2017), 4,297 vessels passed through the port in 2016. Container ships comprised just over 50 % of the total vessels for 2016, with tankers (including chemical tankers) comprising 25% of the total.

Automatic Identification System (AIS) data are collected by the U.S. Coast Guard through an onboard navigation safety device. Ships equipped with AIS transponders automatically transmit location and identification information to other vessels and shore-based facilities. At this time, only relatively large commercial vessels are required to carry AIS equipment; however, owners of all vessel types voluntarily elect to install AIS transponders. Figure 11 depicts the density of shipping vessels within and adjacent to the study area. As is shown in Figure 11, vessel density is low within the Great South Bay and connecting waters, with the exception of one small area of high density at the East Rockaway Inlet.

Three small ocean disposal sites are located in the western portion of the Great South Bay, offshore of West Islip (see Figure 10). These three disposal sites are spoil areas; all are under 0.2 square nautical miles and their use status (e.g., available, discontinued) is unknown (NOAA Office for Coastal Management 2016). Four ocean disposal sites located just outside the seaward boundary of the zone are all active dredged material disposal sites that were designated for use as dredged material placement on February 12, 1990 (EPA 2017a). Summary information for these four sites is provided in Table 16.

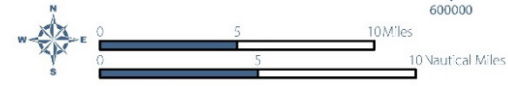
Figure 10. Marine Infrastructure and Uses, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c, ESRI 2010; NOAA 2015, 2016, 2017b; RCG 2017; USACE 2016



**Figure 10
Marine Infrastructure and Uses
Study Area 1: Long Island/Rockaway Peninsula**

- | | | | |
|--------------------------------------|---------------------|-------------------------------|---------------------------------|
| --- State/Federal Boundary - 3 nm | Study Area 1 | Maintained Navigation Channel | Proposed Transco Pipeline |
| --- Territorial Sea Boundary - 12 nm | Onshore | Shipping Lanes/Fairways | Existing Transco Pipeline |
| --- State Boundary | Shoreline/Nearshore | Anchorage Zones | In Service Submarine Cables |
| --- Freeway or Other Major Road | Offshore Study Area | Ocean Disposal Site | Out of Service Submarine Cables |
| --- Other Major Road | | | Neptune Submarine Cables |



Source: BOEM 2016c; ESRI 2010; NOAA 2015, 2016, 2017b; RCG 2017; USACE 2016.
Service Layer Credits: USGS, NGA, NASA, CIGARE, BCCN
Robinson, NCEAS, NLS, CS, NWA, GoodData, styler, and the GIS User Community

Coordinate System: NAD_1983_StatePlane_NY_Projection; Units: Meter; Map Border: 60000 4480000 68000 4520000; File Path: M:\New_York_City\NYSCRA_Offshore\MapDocs\Masterplan_Figures6_Onshore_Permitting\Fig 10_MarineUses_Study_Area_1_1x17.mxd 11/29/2017

Figure 11. Shipping Density Study Areas 1 and 2

BOEM 2016c; ESRI 2010; NOAA 2017

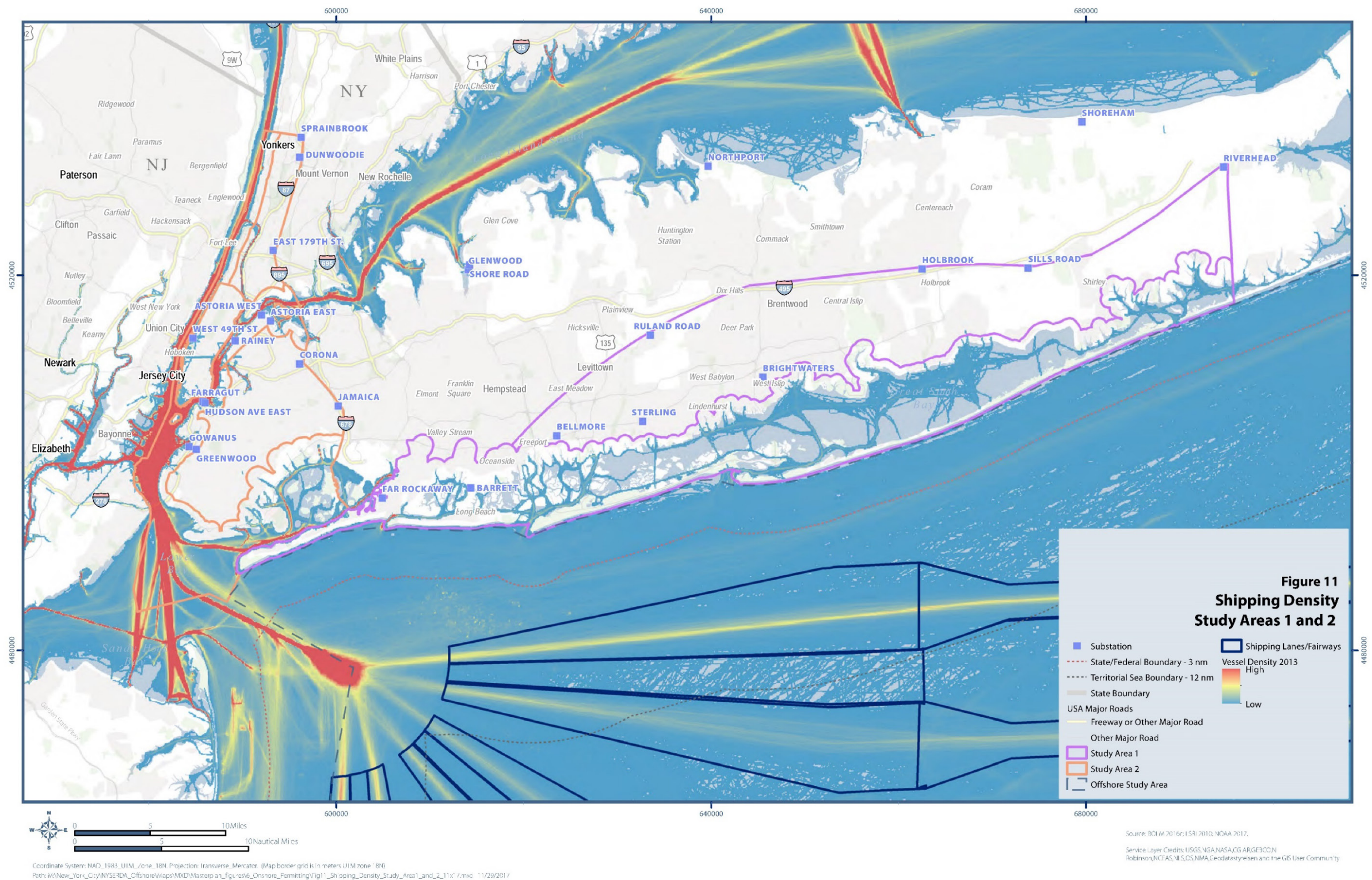


Table 16. Summary of Ocean Disposal Sites for Shoreline/Nearshore Zone of Study Area 1

Source: EPA 2017a; USACE 2017

Ocean Disposal Site	Average ^a Depth (feet)	Area (square nautical miles)	Disposal Data ^b
Rockaway Inlet Dredged Material Disposal Site	31	0.38	None available
East Rockaway Dredged Material Disposal Site	25	0.81	Dredge material from federal maintenance of East Rockaway Inlet
Jones Inlet Dredged Material Disposal Site	28	1.19	None available
Fire Island Dredged Material Disposal Site	28	1.09	None available

^a Average depth taking from EPA Ocean Disposal Map data.

^b Disposal data as reported from the USACE Ocean Disposal Database.

3.1.8 Threatened and Endangered Species

Federal Endangered Species Act. Federally listed plants and animals and critical habitat are protected under the Endangered Species Act (ESA) of 1973. Under the ESA, an “endangered” species is a species that is in danger of extinction throughout all or a significant portion of its native habitat, while a “threatened” species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its native habitat. The ESA allows the designation of geographic areas as critical habitat for T&E species. Federal “species of concern” is an informal term that indicates species that might be in need of conservation actions. Federal species of concern do not receive legal protection and this term does not imply the species will eventually be proposed for listing as threatened or endangered.

The USFWS and NOAA Fisheries jointly administer the ESA and are responsible for listing species (i.e., labeling a species as either threatened or endangered). The USFWS has primary responsibility for managing terrestrial and freshwater species; NOAA Fisheries has primary responsibility for marine species and anadromous fish species (species that migrate from saltwater to freshwater to spawn). The USFWS and NOAA Fisheries also jointly administer the Marine Mammal Protection Act to protect and manage marine mammals. A discussion of marine mammals is not included in this study. Refer to the *Marine Mammals and Sea Turtles Study*, which is appended to the Master Plan, for information on these species.

Under the ESA, federally listed plants and animals are protected from “take.” The term “take” is defined by the ESA to include “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The ESA also protects against degrading critical habitat.

Future development of an offshore wind farm would require one or more federal approvals, which would implicate environmental review under NEPA; it is probable that an EA would be prepared and, if the action has the potential to cause significant environmental impacts, a more-detailed EIS would be prepared. As part of this environmental review process, biological resources must be assessed and the USFWS would be consulted regarding potential impacts on protected species pursuant to Section 7 of the ESA. The first step is typically an inquiry to USFWS regarding known or potential occurrences of T&E species and/or designated critical habitat, with subsequent steps potentially including a habitat assessment and presence/absence survey to determine whether T&E species are present within an identified cable landfall site.

The USFWS Long Island Ecological Services Field Office is the regional office responsible for project reviews regarding impacts on federally protected plant and animal species in either Study Area 1 or Study Area 2.

State Endangered and Threatened Species Regulations. At the state level, under the Endangered and Threatened Species Regulations (6 NYCRR Part 182), the DEC has the authority to list, and subsequently protect, State-listed T&E species and their habitat, as well as species of concern and their habitat. Protection is facilitated through the requirement that no incidental take of species listed as T&E is allowed without a permit.

Regulatory Summary. Because of the need for one or more federal approvals, impacts on biological resources are required to be addressed as part of the NEPA process, and consultation with USFWS and NOAA Fisheries would likely occur for listed species within a proposed project area. If federally listed T&E species are determined to be present within a future cable landfall site based on presence/absence surveys, and one of the federal agencies determines that the action is likely to adversely affect a listed species, then formal consultation with USFWS/NOAA Fisheries would be required. Through the formal consultation process, USFWS/NOAA Fisheries may request that a project proponent apply for an Incidental Take Permit/Authorization and develop a Habitat Conservation Plan or take other measures to minimize and mitigate harm to the impacted species pursuant to Section 10 of the ESA. A similar consultation process would occur with the appropriate DEC divisions regarding State-listed species. Refer to the permit matrix in Section 4.2 for a summary of this process.

The T&E species-related desktop analysis results specific to the shoreline/nearshore zone and the onshore (upland) zone are discussed below.

3.1.8.1 Shoreline/Nearshore Zone

Federal Threatened and Endangered Species. According to the USFWS IPaC system, several species listed under the ESA have the potential to occur in the shoreline/nearshore zone of Study Area 1. These include: one mammal, the northern long-eared bat ([NLEB]; *Myotis septentrionalis*); three bird species (piping plover [*Charadrius melodus*], red knot [*Calidris canutus rufa*], and roseate tern [*Sterna dougallii dougallii*]); and two flowering plant species (the sandplain gerardia [*Agalinis acuta*] and the seabeach amaranth [*Amaranthus pumilus*]) (see Table 17). Sandplain gerardia is only found in Nassau and Suffolk counties on Long Island in four known occurrences (Natural Heritage Program 2017a), and seabeach amaranth is found as nine large occurrences, typically on large barrier islands in New York (Natural Heritage Program 2017b). Only one of these species, the piping plover, has designated critical habitat; however, Study Area 1 is outside of the designated critical habitat for that species (USFWS 2017a). For the remainder of these species, critical habitat has not been designated by USFWS.

Nesting habitat for the piping plover and roseate tern has the potential to occur within the zone, especially along the barrier beaches along the southern boundary of the shoreline/nearshore zone. The piping plover and roseate tern have been documented to nest within the Great South Bay. Results of shorebird surveys conducted between 1993 and 2005 on the eastern portion of the Great South Bay indicated that an average of six breeding pairs nested along the bay shores annually (DOS 2008a). A similar shorebird survey for the western portion of the Great South Bay found that it is home to an average of 12 nesting pairs of roseate terns per year (DOS 2008b). The annual Long Island Colonial Waterbird and Piping Plover Survey conducted by the DEC Division of Fish and Wildlife, Bureau of Wildlife includes data from 2001–2011, and more recently, in 2015 and 2016. This annual survey is conducted at numerous locations on Long Island, including Long Beach, Fire Island, Jones Beach, Rockaway Beach, Fort Tilden Beach, and Jacob Riis Beach within Study Area 1. Surveys conducted in 2015 and 2016 documented piping plovers within municipalities located in both the shoreline/nearshore and onshore zones of Study Area 1 (Table 18). No roseate terns were documented in the 2015 and 2016 surveys (Jennings 2017).

Piping plover survey results from 2015 and 2016 are similar to counts of pairs and fledges observed in a majority of the municipalities included in the Long Island Colonial Waterbird and Piping Plover Survey between 2001 and 2011. Of note, the number of pairs documented in Southampton in 2015 and 2016 (Table 18) are less than previously observed between 2001 and 2011 (Jennings 2017; Rosenblatt 2017).

Data on the occurrence of the red knot within the shoreline/nearshore zone of Study Area 1 is limited to a migratory shorebird foraging and horseshoe crab spawning study completed by the DEC and Cornell Cooperative Extension in 2012 and 2013 (Sclafani et al. 2014). Shore-based counts of different shorebirds were taken at two reference beaches in Moriches Bay on a weekly basis from April through June 2012 and 2013. Based on spatial distribution maps of the red knot in Moriches Bay, the first individual to be recorded was in early May, and the highest number of recorded individuals occurred during the first week of June (Sclafani et al. 2014). Thus, the red knot would be expected to utilize the shoreline/nearshore zone only as migratory habitat. Based on the mapping, red knots were primarily limited to the southern portion of Moriches Bay, along Fire Island (Sclafani et al. 2014).

On January 14, 2016, the USFWS published the Final 4(d) Rule, which provides protective measures to minimize potential adverse impacts on the NLEB and their habitats (USFWS 2016). If a project is located within an area of potentially suitable habitat, is located within the white-nose syndrome (WNS) zone, and may potentially affect the NLEB, certain conservation measures that protect the bat's most vulnerable life stages are required. Per the Final 4(d) Rule, in areas of the U.S. impacted by WNS, which includes all of New York, incidental take is prohibited under the following circumstances: (1) the take occurs within a hibernaculum, and (2) it results from tree removal activities where the activity occurs within 0.25 mile of a known hibernaculum, or cuts or destroys a known, occupied maternity roost tree or other trees within a 150-foot radius of the maternity roost tree during the pup season (from June 1 through July 31).

The DEC conducted acoustic surveys in 2016 and 2017 to determine the occurrence of NLEB on Long Island and will conduct additional surveys in the fall of 2017 to determine presence of hibernacula. According to the DEC data available as of May 2017, the towns of Brookhaven, Huntington, Islip, Riverhead, and Southampton within Study Area 1 have confirmed summer occurrences of the NLEB (DEC 2016a). The DEC has indicated the importance of Long Island to NLEB, and the DEC expects to identify additional occurrences—both summer and winter—as these surveys continue (Jones 2017). NLEB summer habitat consists of a wide variety of forested habitats as well as some adjacent and interspersed non-forested habitats, such as emergent wetlands, farm ponds, and adjacent edges of agricultural fields, old fields, and pastures (USFWS 2014a). Forested habitats do occur in the shoreline/nearshore zone, including within the towns of Brookhaven, Islip, and Southampton, though,

as indicated in Table 2 and in Figure 3, forested habitat comprises a small amount of the overall shoreline/nearshore zone. Specific conservation measures have been identified in the USFWS Final 4(d) Rule for NLEB in known or potential summer habitat. These include determining where NLEB occur in the summer, restricting clearing maternity colony summer habitat during the summer maternity season, and maintaining summer maternity habitat.

In addition to the requirements of the Final 4(d) Rule for NLEB, the DEC requires additional conditions for tree cutting in order to protect any bats that may be roosting in trees in the vicinity of hibernacula and documented summer occurrences. If a project occurs within 5 miles of a known hibernation site or 1.5 miles of a documented summer occurrence, there are restrictions on cutting trees, and these restrictions vary by project type—projects that result in a change of land use, and projects that do not result in a change of land use. For projects that would not result in a change in land use within NLEB-occupied habitat, there are seasonal restrictions that must be adhered to, and if they are not, a permit under Part 182 would be obtained (DEC 2017d). Refer to Section 5 for a summary of these restrictions.

Coordination with the USFWS and DEC will be necessary to assess the current status of bat occurrences in the vicinity of an identified cable landfall site, as ongoing surveys by the DEC may identify occurrences beyond those recorded as of May 2017. If the USFWS requests surveys to confirm the presence of the NLEB, the current (2017) Range-Wide Indiana Bat Summer Survey Guidelines¹ (also applicable for NLEB) utilize a phased approach to determine whether NLEB bats are present or likely absent at a given site during the summer (May 15-August 15). The process includes coordination with the USFWS; habitat assessments; acoustic, mist-net, and radio-tracking; and emergence surveys (USFWS 2017f).

In addition to the species identified by the USFWS IPaC system, NOAA Fisheries has jurisdiction over multiple listed marine species under the ESA (managed by the Greater Atlantic Region Fisheries Office [GARFO]), including four sea turtles and two fish species that can occur within the shoreline/nearshore zone of Study Area 1: loggerhead sea turtle (*Caretta caretta*), leatherback

¹ <https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2017INBASummerSurveyGuidelines9May2017.pdf>

sea turtle (*Dermochelys coriacea*), Kemp’s ridley sea turtle (*Lepidochelys kempii*), and the green sea turtle (*Chelonia mydas*), as well as the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*). None of these species has designated critical habitat within Study Area 1.

The Sea Turtle Stranding and Salvage Network (STSSN) reports that strandings of all four sea turtle species have been reported over the last three years (2015–2017) in Suffolk and Nassau counties (NOAA Fisheries Southeast Fisheries Science Center 2017). The majority of strandings occurred in Suffolk County, and the loggerhead sea turtle was the most common species reported. The Atlantic sturgeon has been documented within the Great South Bay and along the coastlines of New York and New Jersey (Dunton 2014; USFWS n.d.). Although the shortnose sturgeon has not been specifically documented within the Great South Bay, based on the species’ habitat characteristics and range it is possible they occur within the shoreline/nearshore zone of Study Area 1, although the species’ presence is unlikely (NOAA Fisheries 2015).

State Threatened and Endangered Species. At the state level, the DEC’s Nature Explorer online database indicated a total of 55 state-listed plant species have the potential to occur in the shoreline/nearshore zone of Study Area 1 (see Table 17). The review of this database focused on recently confirmed² occurrences only and did not include historical occurrences.

Table 17 summarizes each species identified by the IPaC and DEC databases and a review of the NOAA Fisheries data that have the potential to occur in the shoreline/nearshore zone of Study Area 1, as well as the habitat utilized by each species. Seasonal construction windows for federally listed species are included in Section 5.

² DEC considers “recently confirmed” as documented, with confirmed identification, within the last 30 years.

Table 17. Federal and State Protected Species with the Potential to Occur within the Shoreline/Nearshore Zone of Study Area 1

Sources: Natural Heritage Program 2015a, Natural Heritage Program 2015b, Nature Explorer 2014, USFWS 2017, Baker et al. 2013, Massachusetts Division of Fisheries and Wildlife 2012; NOAA Fisheries 2017a, 2017b, 2015, DEC n.d.[c].

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Characteristics
Mammals			
Northern long-eared bat (<i>Myotis septentrionalis</i>)	F/S = Threatened	IPaC	The northern long-eared bat hibernates in climatically stable caves or mines. ^a During the summer, this species roosts singly or in maternity colonies beneath bark, in cavities, or in crevices of both live trees and snags (dead trees). Trees greater than or equal to 3 inches diameter at breast height (DBH) that have exfoliating bark, cracks, crevices, and/or hollows are considered potentially suitable habitat for this species. The northern long-eared bat forages beneath the tree canopy, typically 3 to 10 feet above the ground, on forested hillsides and ridges, and along riparian areas. They may also forage over forest clearings, open water, and along roads.
Sea Turtles			
Loggerhead sea turtle (<i>Caretta caretta</i>) ^b	F/S = Threatened	NOAA Fisheries	Nests on ocean beaches, generally preferring high-energy, relatively narrow, steeply sloped, coarse-grained beaches. Juveniles utilize nearshore coastal areas for foraging, inter-nesting habitat, and migratory habitat.
Leatherback sea turtle (<i>Dermochelys coriacea</i>) ^b	F/S = Endangered	NOAA Fisheries	While known as open-ocean animals, they also forage in coastal waters.
Kemp's ridley sea turtle (<i>Lepidochelys kempii</i>)	F/S = Endangered	NOAA Fisheries	Nearshore habitats with muddy or sandy bottoms where prey can be found.
Green sea turtle (<i>Chelonia mydas</i>)	F/S = Threatened	NOAA Fisheries	Beaches are used for nesting, and coastal areas are used for feeding.
Fish			
Atlantic sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>) ^c	F = Endangered	NOAA Fisheries	Found throughout most of the year within estuarine, nearshore coastal, and brackish waters, migrating upriver to spawn, often between the fall line and salt front.
Shortnose sturgeon (<i>Acipenser brevirostrum</i>)	F/S = Endangered	NOAA Fisheries/DEC	Inhabit slower-moving rivers, estuaries, and nearshore marine waters, periodically migrating to faster-moving freshwater river habitat to spawn.

Table notes are at the end of the table.

Table 17 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Characteristics
Birds			
Piping Plover (<i>Charadrius melodus</i>)	F = Threatened S = Endangered	IPaC	Nest on open, sparsely vegetated beaches and sandflats between the primary dune and high-tide line.
Red Knot (<i>Calidris canutus rufa</i>)	F = Threatened	IPaC	Migration habitat generally consists of sandy coastal habitats at or near tidal inlets or the mouths of bays and estuaries.
Roseate Tern (<i>Sterna dougallii dougallii</i>)	F/S = Endangered	IPaC	Nest almost exclusively on rocky islands, barrier beach islands, and saltmarsh islands. Nest sites occur most often in dense grass or under boulders.
Plants			
Angled spikerush (<i>Eleocharis quadrangulata</i>)	S = Endangered	Nature Explorer	Pools and creeks (often tidal), and shallow water
Atlantic white cedar (<i>Chamaecyparis thyoides</i>)	S = Threatened	Nature Explorer	Swamps and ponds, typically with high water table and deep organic soils
Bead pinweed (<i>Lechea pulchella</i> var. <i>moniliformis</i>)	S = Endangered	Nature Explorer	Early successional habitats along the coastal plain
Carolina clubmoss (<i>Pseudolycopodiella caroliniana</i>)	S = Endangered	Nature Explorer	Open wetlands in interdunal swales
Coastal goldenrod (<i>Solidago latissimifolia</i>)	S = Endangered	Nature Explorer	Brackish to freshwater wet meadows, swamps, and thickets
Collins' sedge (<i>Carex collinsii</i>)	S = Endangered	Nature Explorer	Shaded sphagnum bogs or seeps, typically under <i>Chamaecyparis thyoides</i> or <i>Picea mariana</i>
Creeping spikerush (<i>Eleocharis fallax</i>)	S = Endangered	Nature Explorer	Fresh to brackish pond and lakeshores, marshes; along the coast
Cut-leaved evening-primrose (<i>Oenothera laciniata</i>)	S = Endangered	Nature Explorer	Dry, sandy open ground, including successional old fields, sandy embankments, and disturbed areas of maritime grasslands
Dark-green sedge (<i>Carex venusta</i>)	S = Endangered	Nature Explorer	In or near marshes, wet meadows, swamps, woody bogs, and wet thickets near salt marshes
Doubtful toad-rush (<i>Juncus ambiguus</i>)	S = Endangered	Nature Explorer	Salt-loving; occurs along the coast on mud and sand flats above high tide and on margins of saline and brackish lakes
Dune sandspur (<i>Cenchrus tribuloides</i>)	S = Threatened	Nature Explorer	Maritime sand dunes and beaches
Dwarf glasswort (<i>Salicornia bigelovii</i>)	S = Threatened	Nature Explorer	Maritime wetlands, including high salt marsh, salt panne, and salt shrub natural communities

Table notes are at the end of the table.

Table 17 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Characteristics
False China-root (<i>Smilax pseudochina</i>)	S = Endangered	Nature Explorer	Moist or wet low places along the coastal plain
Field beadgrass (<i>Paspalum laeve</i>)	S = Endangered	Nature Explorer	Damp meadows, fields, mowed roadsides, mowed grounds, and lawns
Flax-leaf whitetop (<i>Sericocarpus linifolius</i>)	S = Threatened	Nature Explorer	Dry to moist sandy, clay, and gravelly soils of open deciduous and pine woods, oak and pine barrens, roadsides, fields
Fringed boneset (<i>Eupatorium torreyanum</i>)	S = Threatened	Nature Explorer	Sandy, open habitats, often in grasslands or dunes; also within openings in shrub thickets or dry oak woods
Golden dock (<i>Rumex fuginus</i>)	S = Endangered	Nature Explorer	Saline, brackish or alkaline marshes and shores, as a weed in disturbed soil
Long's bittercress (<i>Cardamine longii</i>)	S = Threatened	Nature Explorer	Intertidal areas within tidal estuaries and backwater areas
Marsh straw sedge (<i>Carex hormathodes</i>)	S = Threatened	Nature Explorer	Maritime rock ledges, brackish or freshwater marshes, moist coastal sands at sea level
Narrow-leaf sea-blite (<i>Suaeda linearis</i>)	S = Endangered	Nature Explorer	Salt marshes, sandy beaches, other coastal wetlands
Northern blazing-star (<i>Liatis scariosa</i> var. <i>novae-angliae</i>)	S = Threatened	Nature Explorer	Dry, sandy habitats, usually maritime grasslands or grassy openings
Northern gama grass (<i>Tripsacum dactyloides</i>)	S = Threatened	Nature Explorer	Water courses and limestone outcrops, swamps and wet soil
Oakes' evening-primrose (<i>Oenothera oakesiana</i>)	S = Threatened	Nature Explorer	Maritime dunes, disturbed sandy soils in openings
Orange milkwort (<i>Polygala lutea</i>)	S = Endangered	Nature Explorer	Wet disturbed openings in pitch pine oak woods in sandy soils
Primrose-leaf violet (<i>Viola primulifolia</i>)	S = Threatened	Nature Explorer	Open, wet or moist sites, especially in sandy soil
Red pigweed (<i>Chenopodium rubrum</i>)	S = Threatened	Nature Explorer	Coastal areas in wet interdunal swales, stony beaches, and the shores of coastal ponds
Retorse flatsedge (<i>Cyperus retrorsus</i> var. <i>retrorsus</i>)	S = Endangered	Nature Explorer	Sandy coastal habitats
Roland's sea-blite (<i>Suaeda rolandii</i>)	S = Endangered	Nature Explorer	Open, salt-influenced wetlands
Rough rush-grass (<i>Sporobolus clandestinus</i>)	S = Endangered	Nature Explorer	Limited habitat data available
Salt-meadow grass (<i>Leptochloa fusca</i> ssp. <i>fascicularis</i>)	S = Endangered	Nature Explorer	Saline or brackish wetlands

Table notes are at the end of the table.

Table 17 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Characteristics
Saltmarsh aster (<i>Symphotrichum subulatum</i> var. <i>subulatum</i>)	S = Threatened	Nature Explorer	Coastal areas in salt to brackish marshes and swales, along the banks of salt-influenced tidal channels, creeks, and ponds
Sandplain gerardia (<i>Agalinis acuta</i>)	F/S = Endangered	IPaC/Nature Explorer	Remnant grasslands
Sandplain wild flax (<i>Linum intercursum</i>)	S = Endangered	Nature Explorer	Open, sandy habitats, including maritime dunes, grasslands, and shrublands; and pitch pine-scrub oak barrens
Scirpus-like rush (<i>Juncus scirpoides</i>)	S = Threatened	Nature Explorer	Damp sandy soil, shallow pools, wet pinelands
Screw-stem (<i>Bartonia paniculata</i> ssp. <i>paniculata</i>)	S = Endangered	Nature Explorer	Coastal wetlands, usually associated with sphagnum mosses
Sea-pink (<i>Sabatia stellaris</i>)	S = Endangered	Nature Explorer	High salt marsh and wet, brackish habitats, including interdunal swales, brackish meadows, and ponds
Seabeach amaranth (<i>Amaranthus pumilus</i>)	F/S = Threatened	IPaC/Nature Explorer	Sandy ocean beaches within the sparsely vegetated zone between the high-tide line and the toe of the primary dune
Seaside bulrush (<i>Bolboschoenus maritimus</i> ssp. <i>paludosus</i>)	S = Threatened	Nature Explorer	Open, saltwater or brackish wetlands, including disturbed areas
Showy aster (<i>Eurybia spectabilis</i>)	S = Threatened	Nature Explorer	Sandy, grassland habitats, often in pine barrens habitats
Side-oats grama (<i>Bouteloua curtipendula</i> var. <i>curtipendula</i>)	S = Endangered	Nature Explorer	Dry limestone-derived soils, disturbed areas, open habitats
Slender blue flag (<i>Iris prismatica</i>)	S = Threatened	Nature Explorer	Open, wet, coastal habitats
Slender marsh-pink (<i>Sabatia campanulata</i>)	S = Endangered	Nature Explorer	High salt marshes, fresh to brackish meadows, edges of salt/brackish ponds, sea level fens, and small, shallow brackish or freshwater depressions in dunes
Slender nutrush (<i>Scleria minor</i>)	S = Endangered	Nature Explorer	Acidic, wet habitats within pine barrens
Slender pinweed (<i>Lechea tenuifolia</i>)	S = Threatened	Nature Explorer	Dry, often grassy, natural or artificial open habitats

Table notes are at the end of the table.

Table 17 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Characteristics
Slender spikerush (<i>Eleocharis tenuis</i> var. <i>pseudoptera</i>)	S = Endangered	Nature Explorer	Wet, fresh, often calcareous meadows, swales, springy places, woods, prairie, serpentine barrens, and ditches
Small floating bladderwort (<i>Utricularia radiata</i>)	S = Threatened	Nature Explorer	Small, shallow ponds, sluggish waters, often surrounded by pine barrens
Small-flowered pearlwort (<i>Sagina decumbens</i> ssp. <i>decumbens</i>)	S = Endangered	Nature Explorer	Moist or dryish sandy fields
Southern yellow flax (<i>Linum medium</i> var. <i>texanum</i>)	S = Threatened	Nature Explorer	Early successional, artificially created habitats, dry or damp sterile open soil
St. Andrew's cross (<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>)	S = Endangered	Nature Explorer	Dry or rocky soils
Stargrass (<i>Aletris farinosa</i>)	S = Threatened	Nature Explorer	Open, often wet areas within pine barrens, pine-oak forests, coastal plain pond margins, and sandy shorelines
Swamp sunflower (<i>Helianthus angustifolius</i>)	S = Threatened	Nature Explorer	Open wetlands near the ocean
Velvety bush-clover (<i>Lespedeza stuevei</i>)	S = Threatened	Nature Explorer	Disturbed openings, dry upland woods and barrens
Weak rush (<i>Juncus debilis</i>)	S = Endangered	Nature Explorer	Wet places, shores, moist sandy soil
Willow oak (<i>Quercus phellos</i>)	S = Endangered	Nature Explorer	Floodplain forests, maritime grasslands, and roadside forests and woodlands
Yellow flatsedge (<i>Cyperus flavescens</i>)	S = Endangered	Nature Explorer	Wet sandy sites

^a The DEC has indicated that there is evidence that northern long-eared bats are hibernating on Long Island, even though no hibernacula have yet been identified (Huber 2017).

^b The loggerhead and green sea turtles have one Distinct Population Segment (DPS) each in Study Area 1: the loggerhead sea turtle Northwest Atlantic DPS and the green sea turtle North Atlantic DPS (NOAA Fisheries 2017c).

^c The Atlantic sturgeon has a DPS within Study Area 1: the New York Bight DPS (NOAA Fisheries 2017a).

Table 18. Piping Plover Survey Results*Source: Jennings 2017*

Municipalities	Number of Sites	2015		2016	
		Total Pairs	Total Fledges	Total Pairs	Total Fledges
Babylon	7	27	20	30	29
Brookhaven	16	30	37	35	80
Hempstead	7	51	63	53	85
Huntington	7	30	78	37	63
Islip	5	2	4	1	3
Oyster Bay	7	3	7	3	4
Queens	7	44	47	44	70
Riverhead	6	2	4	2	4
Smithtown	5	13	14	16	21
Southampton	41	65	107	84	162

3.1.8.2 Onshore Zone

According to the IPaC results, the same six USFWS-listed species discussed above for the shoreline/nearshore zone have the potential to occur in the onshore zone: NLEB, piping plover, red knot, roseate tern, sandplain gerardia, and the seabeach amaranth (USFWS 2017b). Additionally, the same list of species identified by the Nature Explorer database for the shoreline/nearshore zone were identified for the onshore zone. Refer to Table 17 for a list of the federally and state-listed species (with the exception of the four listed turtle species and two fish species) that have the potential to occur in the onshore zone.

3.1.9 Other Sensitive Habitats

Other sensitive habitats include Significant Natural Communities, eelgrass (*Zostera marina*) habitat, Essential Fish Habitat (EFH), and NOAA Trust Resources. (Refer to the *Fish and Fisheries Study*, which is appended to the Master Plan, for a discussion of commercial and recreational fisheries.) Significant Natural Communities are comprehensively and digitally mapped and tracked by the DEC's Natural Heritage Program. The Natural Heritage Program's Significant Natural Communities spatial data provide locations of rare or high-quality wetlands, forests, streams, and other types of habitats and ecological areas. Significant Natural Communities are included in Natural Heritage Program data and tracked by the Natural Heritage Program because they provide habitat for a wide range of plants and animals, including rare species, and offer significant ecological value. Significant Natural Communities are not specifically regulated by New York State, but they are protected under regulatory programs such as regulatory freshwater wetlands and tidal wetlands (DEC n.d.[b]). Additionally, the majority of these

communities overlap with federally, state, or locally owned seashores, parks, forests, and recreational areas. Eelgrass beds are a sensitive nearshore habitat that provides spawning and nursery habitat and protection for various species of fish and wildlife. However, the locations of eelgrass beds are not available as spatial data. Additionally, New York State does not currently have any regulations or laws specifically protecting seagrass; however, other laws and regulations apply to areas where seagrass may be found (e.g., Tidal Wetlands Land Use Regulations [6 NYCRR Part 661] and Public Use of State-Owned Tidal Wetlands [6 NYCRR Part 46]). EFH describes all waters and substrate necessary for fish for spawning, breeding, feeding, or growth to maturity; EFH is regulated under the Magnuson-Stevens Fishery Conservation and Management Act. NOAA Trust Resources such as anadromous fish, shellfish, crustaceans, or their habitats, are protected by NOAA and included in the consultation process, where applicable, as part of the Fish and Wildlife Coordination Act (NOAA Fisheries n.d.[c]).

3.1.9.1 Shoreline/Nearshore Zone

Significant Natural Communities. Significant Natural Communities within the shoreline/nearshore zone of Study Area 1 are summarized in Table 19. A total of 32,265 acres of various freshwater non-tidal wetlands, tidal wetlands, and upland Significant Natural Communities are located within the shoreline/nearshore zone. These communities overlap with many of the mapped wetland areas discussed in Section 3.1.10 as well as federally and state-protected lands and are, therefore, not shown on a separate figure.

Table 19. Significant Natural Communities within the Shoreline/Nearshore Zone of Study Area 1

Source: Natural Heritage Program 2011

System	Acreage	Percentage of Zone
Freshwater Non-tidal Wetlands		
Maritime freshwater interdunal swale	4.8	--
Red maple-blackgum swamp	259.4	--
Red maple-hardwood swamp	28.6	--
Sea level fen	26.4	--
Total	319.2	0.2
Tidal Wetlands (estuary)		
Brackish interdunal swales	229.2	--
High salt marsh	10,051	--
Low salt marsh	7,750	--
Salt panne	9,660	--
Salt shrub	525.9	--
Total	28,216	15.6
Uplands		
Coastal oak-hickory forest	194.4	--
Maritime beach	1,325	--
Maritime dunes	1,544	--
Maritime holly forest	10.4	--
Maritime pitch pine dune woodland	18.6	--
Maritime shrubland	576	--
Pitch pine-oak forest	62.1	--
Total	3,730	2.0
Overall Total	32,265	

Eelgrass Beds. Eelgrass beds are documented in the South Shore Estuary Reserve (includes Hempstead Bay, South Oyster Bay, Great South Bay, Moriches Bay, and Shinnecock Bay) in the literature (USFWS 1997; New York State Seagrass Task Force 2009) as an important component of the submerged aquatic vegetation community of the shallow subtidal areas in the shoreline/nearshore zone of Study Area 1, specifically in the Great South Bay, the Hempstead Bay-South Oyster Bay Complex, and Moriches Bay. Based on aerial surveys conducted by the DOS and NOAA's Coastal Services Center in 2002, approximately 20,015 acres of the South Shore Estuary Reserve supported seagrass, and within the Great South Bay alone, 14,744 acres of seagrass beds were identified (New York State Seagrass Task Force 2009). The surveys indicated that 99% of seagrass was found at depths of less than 2 meters (6.5 feet). Spatial data regarding the locations of these beds is lacking.

Essential Fish Habitat. EFH has been identified for 41 species that may occur within the shoreline/nearshore zone of Study Area 1 (see Table 20 and Figure 12). Table 20 is conservatively inclusive, presenting information provided in both the *Guide to Essential Fish Habitat Designations " in the Northeastern United States* (NOAA Fisheries n.d.[a]) and the online EFH Mapper tool (NOAA Fisheries n.d.[b]).

Table 20. Fish with Essential Fish Habitat within the Shoreline/Nearshore Zone of Study Area 1^a

Sources: NOAA Fisheries n.d.(a), n.d.(b)

Species	Eggs	Larvae/Early Juvenile ^b	Juveniles	Adults
Veneroida				
Surfclam (<i>Spisula solidissima</i>)	-	-	X	X
Ocean quahog (<i>Artica islandica</i>)	-	-	X	X
Ostreoida				
Atlantic sea scallop (<i>Placopecten magellanicus</i>)	X	X	X	X
Teuthida				
Long finned squid (<i>Loligo pealeii</i>)	X	X	X	X
Lamniformes				
White shark (<i>Carcharodon carcharias</i>)	-	-	X	-
Shortfin mako shark (<i>Isurus oxyrinchus</i>)	-	X	X	X
Sand tiger shark (<i>Carcharias taurus</i>)	-	X	-	-
Common thresher shark (<i>Alopias vulpinus</i>)	-	X	X	X
Carcharhiniformes				
Dusky shark (<i>Carcharhinus obscurus</i>)	-	X	X	X
Sandbar shark (<i>Carcharhinus plumbeus</i>)	-	X	X	X
Tiger shark (<i>Galeocerdo cuvieri</i>)	X	X	X	X
Blue shark (<i>Prionace glauca</i>)	-	X	X	X
Smooth dogfish (<i>Mustelus canis</i>)	X	X	X	X
Rajiformes				
Clearnose skate (<i>Raja eglanteria</i>)	X	X	X	X
Little skate (<i>Raja erinacea</i>)	-	-	X	X
Winter skate (<i>Leucoraja ocellata</i>)	X	X	X	X
Clupeiformes				
Atlantic sea herring (<i>Clupea harengus</i>)	X	X (M, S)	X (M, S)	X (M, S)
Salmoniformes				
Atlantic salmon (<i>Salmo salar</i>)		-	-	X (S)
Gadiformes				
Red hake (<i>Urophycis chuss</i>)	X	X (M, S)	X (M, S)	X (M, S)
Haddock (<i>Melanogrammus aeglefinus</i>)	-	X	-	-
Whiting (<i>Merluccius bilinearis</i>)	X	X	X	X
Pollock (<i>Pollachius virens</i>)	-	-	X (S)	-

Table notes are on the next page.

Table 20 continued

Species	Eggs	Larvae/Early Juvenile ^b	Juveniles	Adults
Lophiformes				
Monkfish (<i>Lophius americanus</i>)	X	X	X	X
Perciformes				
Black sea bass (<i>Centropristis striata</i>)	X	X	X (M, S)	X (M, S)
Bluefish (<i>Pomatomus saltatrix</i>)	X	X	X (M, S)	X (M, S)
Cobia (<i>Rachycentron canadum</i>)	X	X	X	X
Scup (<i>Stenotomus chrysops</i>)	X (S)	X (S)	X (S)	X (S)
Ocean pout (<i>Macrozoarces americanus</i>)	X	X	-	X
Atlantic mackerel (<i>Scomber scombrus</i>)	X (S)	X (S)	X (S)	X (S)
King mackerel (<i>Scomberomorus cavalla</i>)	X	X	X	X
Spanish mackerel (<i>Scomberomorus maculatus</i>)	X	X	X	X
Bluefin tuna (<i>Thunnus thynnus</i>)	X	X	X	X
Skipjack tuna (<i>Katsuwonus pelamis</i>)	-	-		X
Atlantic butterfish (<i>Peprilus triacanthus</i>)	X (S)	X (M, S)	X (M, S)	X (M, S)
Pleuronectiformes				
*Windowpane flounder (<i>Scophthalmus aquosus</i>)	X (M, S)	X (M, S)	X (M, S)	X (M, S)
Summer flounder (<i>Paralichthys dentatus</i>)	X	X (F, M, S)	X (M, S)	X (M, S)
Witch flounder (<i>Glyptocephalus cynoglossus</i>)	X	X	-	-
Yellowtail flounder (<i>Limanda ferruginea</i>)	X	X	X	X
*Winter flounder (<i>Pseudopleuronectes americanus</i>)	X (M, S)	X (M, S)	X (M, S)	X (M, S)
American plaice (<i>Hippoglossoides platessoides</i>)	-	-	X (S)	X (S)
Scorpaeniformes				
Redfish (<i>Sebastes fasciatus</i>)	X	X	X	X

Notes:

^a Area of analysis is within 16 distinct 10-minute square and major estuaries/bays/rivers boundaries:

- (1) 40° 40.0' N, 73° 50.0' W, 40° 30.0' N, 74° 00.0' W; (2) 40° 40.0' N, 73° 40.0' W, 40° 30.0' N, 73° 50.0' W; (3) 40° 40.0' N, 73° 30.0' W, 40° 30.0' N, 73° 40.0' W; (4) 40° 40.0' N, 73° 20.0' W, 40° 30.0' N, 73° 30.0' W; (5) 40° 40.0' N, 73° 10.0' W, 40° 30.0' N, 73° 20.0' W; (6) 40° 40.0' N, 73° 00.0' W, 40° 30.0' N, 73° 10.0' W; (7) 40° 40.0' N, 72° 50.0' W, 40° 30.0' N, 73° 00.0' W; (8) 40° 40.0' N, 72° 40.0' W, 40° 30.0' N, 72° 50.0' W; (9) 40° 40.0' N, 72° 30.0' W, 40° 30.0' N, 72° 40.0' W; (10) 40° 50.0' N, 72° 30.0' W, 40° 40.0' N, 72° 40.0' W; (11) 40° 50.0' N, 72° 40.0' W, 40° 40.0' N, 72° 50.0' W; (12) 40° 50.0' N, 72° 50.0' W, 40° 40.0' N, 73° 00.0' W; (13) 40° 50.0' N, 73° 00.0' W, 40° 40.0' N, 73° 10.0' W; (14) 40° 50.0' N, 73° 10.0' W, 40° 40.0' N, 73° 20.0' W; (15) Hudson River/Raritan/Sandy Hook Bays, New York/New Jersey; and (16) Great South Bay, New York

^b As sharks give birth to live young, or lay eggs that hatch fully formed, this life stage is more often referred to as “early juvenile” as opposed to “larvae.”

Key:

X = EFH designated for this life stage in area of analysis.

Shaded = EFH not designated for this life stage in area of analysis.

F = Estuarine EFH designation for this species includes the tidal freshwater salinity zone (salinity < 0.5 ppt).

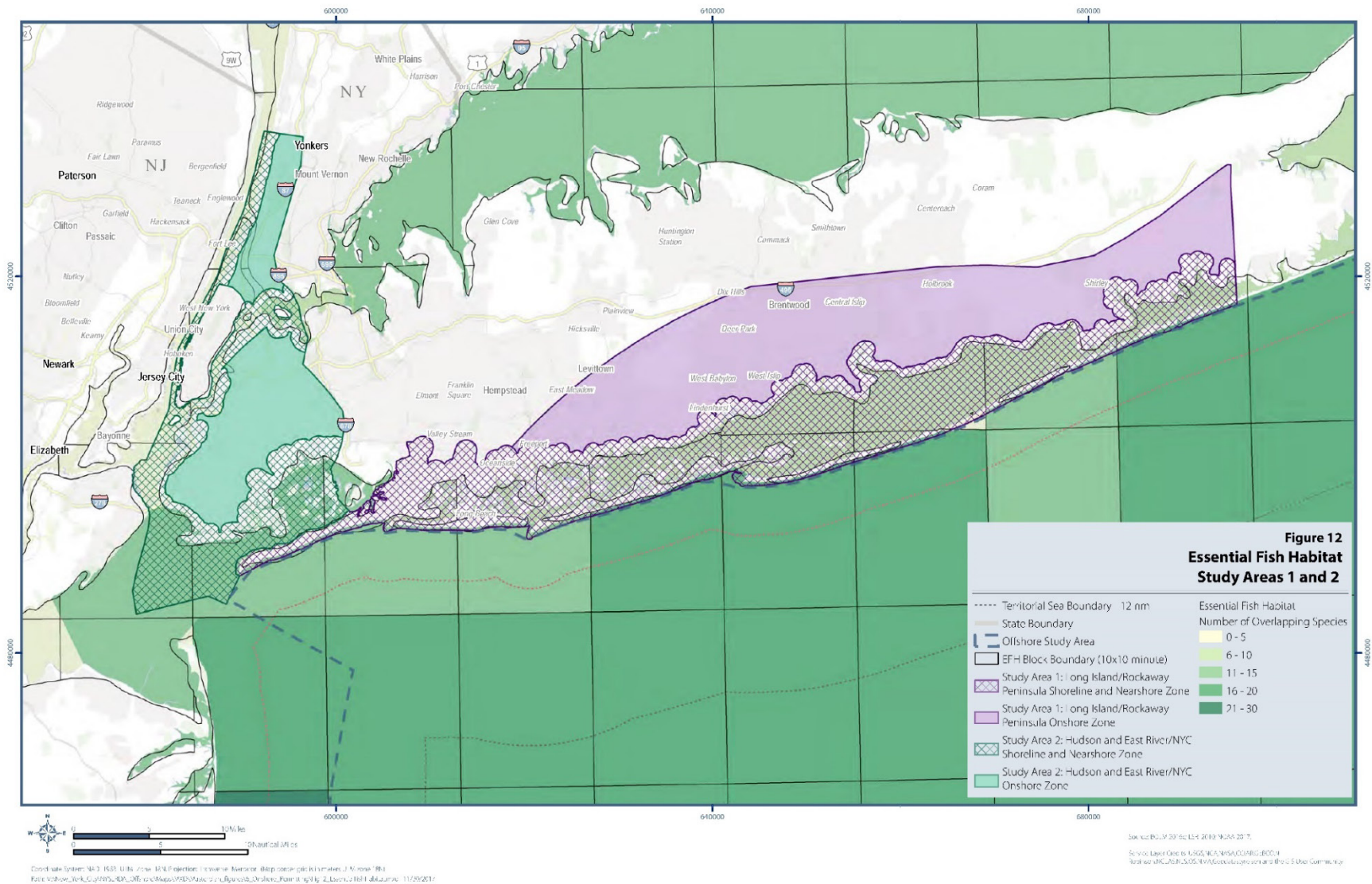
M = Estuarine EFH designation for this species includes the mixing water/brackish salinity zone (salinity < 25.0 ppt).

S = Estuarine EFH designation for this species includes the seawater salinity zone (salinity > 25.0 ppt).

* = Species with designated estuarine EFH that are considered “spawning adults” in both brackish salinity zones (salinity < 25.0 parts per thousand [ppt]) and seawater salinity zones (salinity > 25.0 ppt).

Figure 12. Essential Fish Habitat Study Areas 1 and 2

Source: BOEM 2016c; ESRI 2010, NOAA 2017



NOAA Trust Resources. NOAA Trust Resources included in Table 21 are those listed on the GARFO EFH Assessment Worksheet (NOAA Fisheries n.d.[c]) that have a documented presence within the Great South Bay (USFWS n.d.) and are, therefore, present within the shoreline/nearshore zone of Study Area 1. Additional species may be identified during NOAA consultations based on site and/or construction-specific details.

Table 21. NOAA Trust Resources within Study Area 1

Sources: NOAA Fisheries n.d.(c); USFWS n.d.; New Jersey Sea Grant Consortium n.d.(a), n.d.(b), n.d.(c); Kahnle and Hattala 2010; NOAA 2016c; ASMFC 1998, 2017a, 2017b; USFWS 2006; Tanski et al. 2014

Common Name	Scientific Name	Habitat/Life Characteristics
Anadromous/Catadromous		
River herring (alewife and blueback herring)	<i>Alosa aestivalis</i> and <i>Alosa pseudoharengus</i>	Anadromous species, spawning in coastal rivers with gravel, submerged aquatic vegetation, and detritus in the spring while adults are pelagic and highly migratory. Documented within the Great South Bay.
American eel	<i>Anguilla rostrate</i>	Catadromous species, spending a majority of their lives in freshwater and estuarine habitats. Juveniles occur at all depths, but typically burrow in mud in the daytime or winter and are commonly associated with eelgrass and sandy bottom sediment. Species migrates to offshore ocean habitat as adults to reproduce and ultimately die.
American shad	<i>Alosa sapidissima</i>	Anadromous species, spending a majority of their lives offshore, migrating into the Hudson River, Hudson estuaries, and other nearby coastal rivers to spawn in the spring.
Forage Species		
Atlantic menhaden	<i>Brevoortia tyrannus</i>	Most often found in coastal waters and estuaries, schooling near the surface, and foraging in the northwestern Atlantic during the summer.
Demersal/Groundfish		
Striped bass	<i>Morone saxatilis</i>	Spawn within the Hudson River but otherwise spend adult lives in the Atlantic Ocean.
Bivalve Shellfish		
Blue mussel	<i>Mytilus edulis</i>	Prefer gravel, shell bed, rock, submerged human structures, or other hard substrates, occurring from Labrador to Cape Hatteras, North Carolina.
Eastern oyster	<i>Crassostrea virginica</i>	Prefer other oysters or hard substrate to grow on, and are most often found in intertidal and subtidal zones in brackish and salty waters. Species is found along the eastern United States Atlantic coastline from the Gulf of St. Lawrence to the Gulf of Mexico.
Hard clam	<i>Mercenaria mercenaria</i>	Found within intertidal and subtidal bays and estuaries, with seed clams preferring sandy substrate with pieces of detritus and shell.

Table 21 continued

Common Name	Scientific Name	Habitat/Life Characteristics
Crustacean Shellfish		
Blue crab	<i>Callinectes sapidus</i>	Species can be found in shallower waters during the summer and deep water in the winter, in high-salinity waters during the larval stage, intertidal marsh and soft-sediment during the juvenile stage, and deep offshore water during the adult stage.
Horseshoe crab	<i>Limulus polyphemus</i>	Prefer sandy bottom sediment during spawning, laying eggs in nearshore intertidal sandy bottom habitats; juveniles occur on sandy intertidal beaches and mudflats; adults occur on sandy bottom habitats, migrating to deep bay waters and the continental shelf during the winter.

3.1.9.2 Onshore Zone

Significant Natural Communities. A total of approximately 17,301 acres of Significant Natural Communities appear to be located within the onshore zone (see Table 22). These communities largely overlap with State- and locally protected areas and are therefore not shown on a separate figure.

Table 22. Significant Natural Community in the Onshore Zone of Study Area 1

Source: Natural Heritage Program 2011

System	Total Acreage	Percentage
Freshwater Nontidal Wetlands		
Pine barrens shrub swamp	27.3	--
Red maple-blackgum swamp	499.7	--
Red maple-hardwood swamp	630.8	--
Total	1,158	0.7
Tidal Wetlands (estuary)		
Brackish tidal marsh	190	--
High salt marsh	100.9	--
Total	290.9	0.2
Uplands		
Coastal oak-hickory forest	179	--
Maritime grassland	7.7	--
Pitch pine-oak forest	11,814	--
Pitch pine-oak-health woodland	3,246	--
Pitch pine-scrub oak barrens	605.4	--
Total	15,852	10
Overall Total	17,301	

Eelgrass Beds. No eelgrass beds are anticipated to be located within the onshore zone due to its location outside of the tidal zone.

EFH and NOAA Trust Resources. No EFH or NOAA Trust Resources are located within the onshore zone.

3.1.10 Wetlands, Surface Waters, and Floodplains

Wetlands and Surface Waters

Federal Regulations. The Clean Water Act (CWA) (33 U.S.C. Section 1251) established the basic structure for regulating discharges of pollutants into waters of the United States, including wetlands. The CWA contains the requirements to set water quality standards for all contaminants in surface waters. The U.S. Environmental Protection Agency (EPA) is the designated regulatory authority to implement pollution control programs and other requirements of the CWA. However, the EPA may delegate regulatory authority for the CWA to the applicable State agency for the implementation of pollution control programs as well as other CWA requirements. In New York State, the DEC issues Water Quality Certifications under Section 401 of the CWA.

The USACE and EPA regulate discharges of fill into waters of the United States under Section 404 of the CWA. If a Section 404 permit is required, a Section 401 water quality certification under the CWA must also be issued. Section 404 of the CWA established a program to regulate the discharge of dredged or fill material into waters of the United States, including associated wetlands. Activities such as infrastructure development are regulated under this program, and a permit is required before any dredged or fill material can be discharged into waters of the United States. To determine the actual presence and extent of jurisdictional “waters of the United States” on a proposed project site, a delineation needs to be completed by qualified biologists. If wetlands and waters on a proposed site are determined to be waters of the United States and the discharge of fill cannot be avoided through siting and construction design, a Section 404 permit would be required prior to construction. The USACE has the authority to issue permits under Section 404 of the CWA. If wetlands are determined not to be waters of the United States, State wetland regulations would apply (see below).

The Rivers and Harbors Appropriations Act of 1899 (33 U.S.C. 401 et seq.) regulates development and use of the nation’s navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters and vests the USACE with authority to permit work on or over such waters.

State Regulations. Additional wetland regulations exist at the state level to protect both tidal and freshwater wetlands. As authorized under the Tidal Wetlands Act (Environmental Conservation Law, Article 25 – Tidal Wetlands), the DEC administers the Tidal Wetland Permit Program, which regulates activities in tidal wetlands and their adjacent areas. Generally speaking, tidal wetlands consist of the salt marshes, non-vegetated and vegetated flats, and shorelines subject to tides. The adjacent areas extend up to 300 feet inland from the wetland boundary outside of New York City, and in New York City, the adjacent area extends up to 150 feet inland (DEC 2017e). A permit is required for certain activities in wetlands and their adjacent areas.

Under the Freshwater Wetlands Act (Environmental Conservation Law Article 24 – Freshwater Wetlands), the DEC administers the Freshwater Wetland Permit Program, which regulates wetlands greater than 12.4 acres along with their adjacent areas. Adjacent areas extend 100 feet from the wetland boundary. Activities within freshwater wetlands and adjacent areas, including but not limited to placement of fill, grading, and excavation, may require permits. Permit requirements are more stringent for a higher class wetland than for a lower class wetland. Class 1 wetlands are the highest class, and Class IV wetlands are the lowest.

Additionally under Article 15 of the Environmental Conservation Law, Protection of Waters, the Protection of Waters Regulatory Program regulates five categories of activities, two of which may be applicable to a cable landfall: excavation or placement of fill in navigable waters and their adjacent and contiguous wetlands, and a Section 401 water quality certification, as described above.

If construction at a cable landfall site, including clearing, grading, filling, and excavating activities, will disturb an area equal to or greater than 1 acre, coverage under the DEC State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-15-002), effective as of January 29, 2015, would be required. A Notice of Intent (NOI) and application fee are required to obtain coverage under the General Permit (DEC 2016b).

Regulatory Summary. To determine the actual presence and extent of jurisdictional “waters of the United States” on a proposed future cable landfall site, a delineation would need to be completed by qualified biologists. The results of the delineation would dictate the permits necessary, and a Joint Permit Application can be prepared to streamline multi-agency review. Construction activities that would disturb greater than 1 acre would require coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity. Refer to the permit matrix in Section 4.2 for details regarding these permitting processes.

Floodplains

The Federal Emergency Management Agency (FEMA) defines the regulatory 100-year floodplain as the area covered by a flood that has a 1 percent chance of occurring in any given year (often referred to as the “100-year flood event”). This area is also referred to as the Special Flood Hazard Area. Development in the regulatory floodplain is discouraged because floodplains provide a natural means of detaining floodwaters and thus protect downstream properties from damage. In New York State, local communities that participate in the National Flood Insurance Program regulate development in Special Flood Hazard Areas. Local building departments would need to be contacted for specific regulations; however, it is likely that construction of a future cable landfall site would not alter floodplain storage capacity and would not trigger an in-depth project review.

The results of the desktop analysis are presented in the following sections.

3.1.10.1 Shoreline/Nearshore Zone

Freshwater and Tidal Wetlands

Based on the USFWS National Wetlands Inventory (NWI) and DEC freshwater and tidal wetland datasets, approximately 46.2% (82,028.8 acres) of the shoreline/nearshore zone of Study Area 1 consists of mapped wetlands (USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017). Table 23 provides a summary of the different wetland habitats and acreages located in the shoreline/nearshore zone of Study Area 1, and they are depicted in Figure 13. Littoral zone tidal wetlands cover the most area in this zone (see Table 23). Additionally, there are 62,638.7 acres of regulated wetland buffers/adjacent areas within the zone, or 34.7% of the shoreline/nearshore zone.

Figure 13. Wetland and Surface Waters, Study Area 1: Long Island/Rockaway Peninsula

BOEM 2016c; ESRI 2010; DEC 2017; USFWS 2017c; USGS 2017a

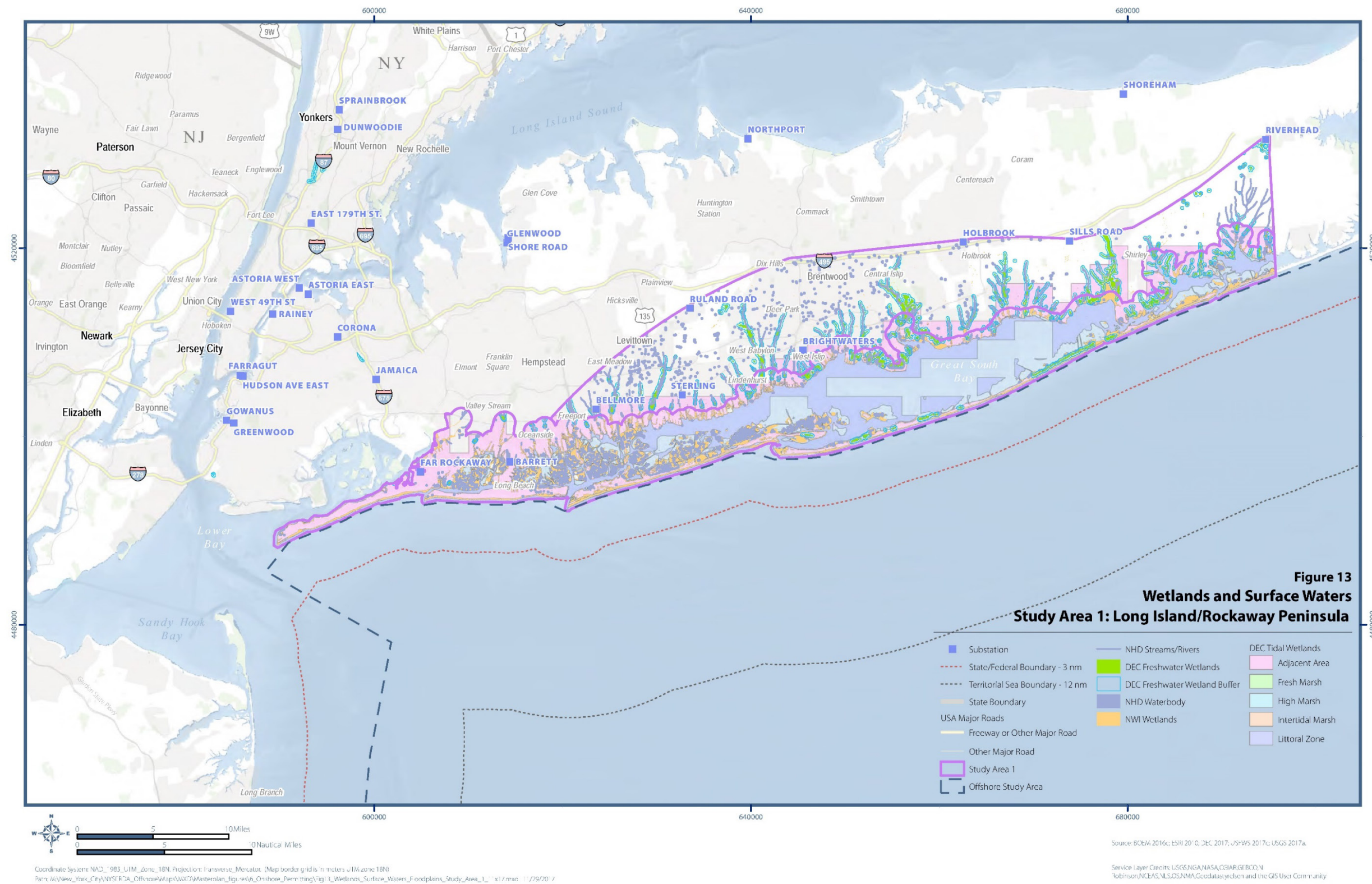


Table 23. Mapped Freshwater and Tidal Wetlands and Buffers within the Shoreline/Nearshore Zone of Study Area 1

Sources: USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017

Wetland Classification	Acreage	Percentage of Zone
DEC Freshwater Wetlands		
Class 1	1,729.2	1.6
Class 2	642.5	0.6
Class 3	0.0	0.0
No Class	9.3	> 0.1
Total Acreage^a	2,381	2.2
USFWS NWI Wetlands^b		
Estuarine and Marine Deepwater	5,294.2	2.9
Onshore Estuarine and Marine Wetland	15,977.6	8.8
Freshwater Emergent Wetland	263.8	0.1
Freshwater Forested/Shrub Wetland	433.3	0.2
Freshwater Pond	158.6	0.1
Lake	3.9	> 0.1
Riverine	148.3	0.1
Total Acreage^a	22,279.7	12.3
DEC Tidal Wetlands^c		
Fresh Marsh (FM)	6.7	> 0.1
High Marsh (HM)	231.2	0.1
Intertidal Marsh (IM)	959.5	0.5
Littoral Zone (LZ)	56,170.7	31.1
Total Acreage^a	57,368.1	31.7
Total Wetland Acreage	82,028.8	46.2
DEC Wetland Buffers		
Freshwater Buffers	10,241.8	5.7
Tidal Adjacent Area (AA)	52,396.9	29
Total Buffer Acreage	62,638.7	34.7
Overall Total Wetland and Buffer Acreage^a	144,667.5	80.9

Notes:

- ^a May not sum due to rounding.
- ^b Does not include freshwater wetlands that overlap with DEC wetlands.
- ^c Does not include wetlands that overlap with USFWS NWI wetlands.

Key:

DEC = Department of Environmental Conservation
 NWI = National Wetland Inventory
 USFWS = U.S. Fish and Wildlife Service

Surface Waters

The U.S. Geological Survey (USGS) National Hydrology Dataset (NHD) indicates that a total of 165.0 miles of streams and rivers and a total of 642.1 acres of lakes and ponds are located within the shoreline/nearshore zone of Study Area 1 (see Figure 13; USGS 2017a).

Floodplains

The FEMA Flood Map Service Center's official floodplain maps are available through the National Flood Hazard Layer (NFHL) dataset (FEMA 2017). FEMA NFHL data indicate that approximately 29% of the shoreline/nearshore zone is located within areas subject to 1 % or greater annual chance of flood (i.e., 100-year floodplain) as indicated in Table 24 and in Figure 14 (FEMA 2017). Approximately 17.7% of Study Area 1 (31,925.3 acres) is mapped within the 500-year floodplain (Zone X), which includes areas with a 0.2% annual chance of flooding. According to the FEMA NFHL, 0.23% (423 acres) of the shoreline/nearshore zone of Study Area 1 is characterized as open water.

Table 24. 100-Year Floodplains within the Shoreline/Nearshore Zone of Study Area 1

Sources: FEMA 2017

Zone	Description	Acreage	Percentage of Zone
A	SFHA, no base flood elevation provided	132.5	0.1
AE	SFHA with base flood elevation provided	42,722.3	23.6
AO	SFHA with sheet flow, ponding, or shallow flooding	0.8	> 0.1
VE	SFHA subject to coastal high-hazard flooding	9,561.5	5.3
Total Acreages^a		52,417.1	29

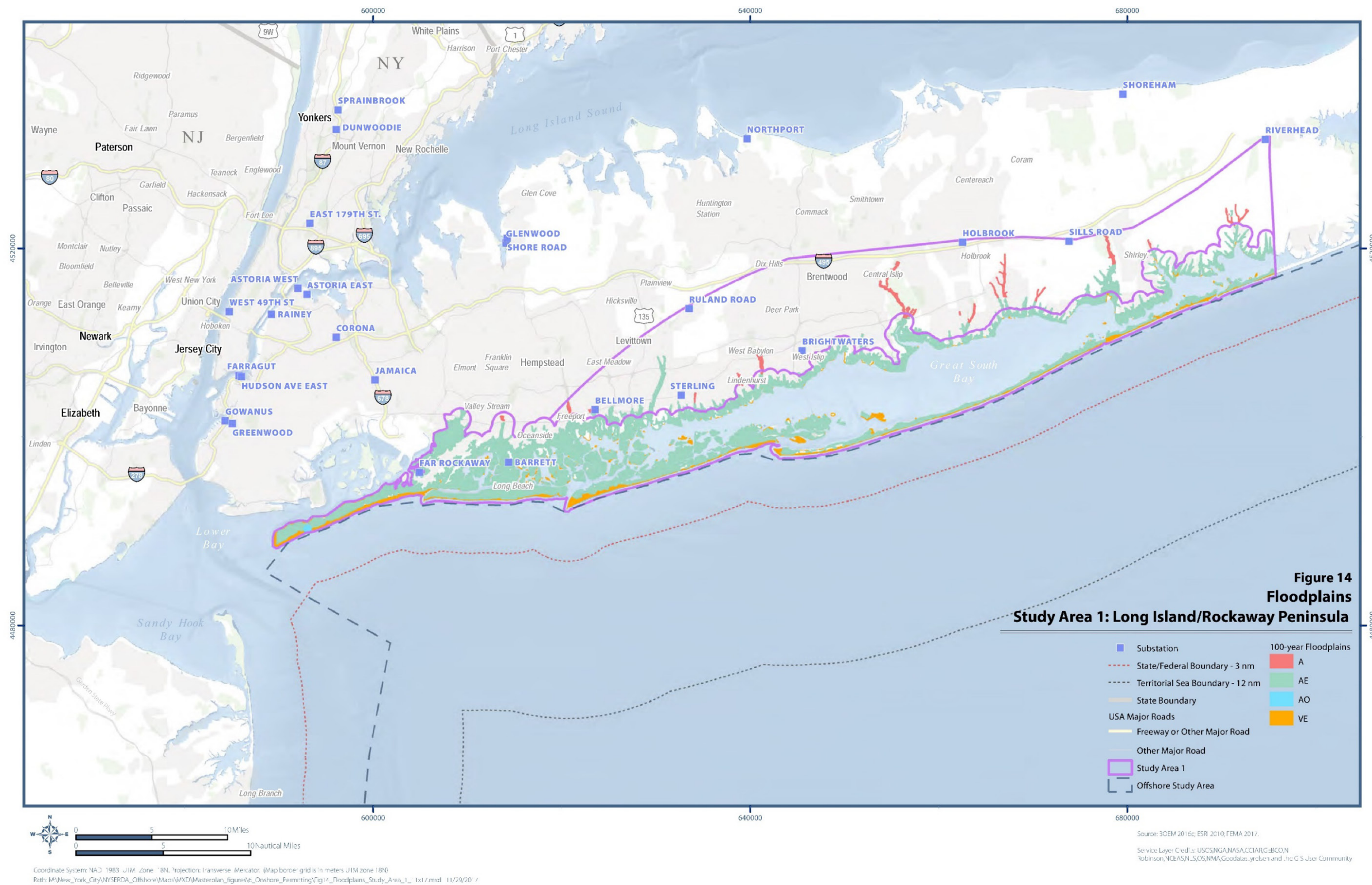
^a May not sum due to rounding.

Key:

SFHA = Special Flood Hazard Area

Figure 14. Floodplains, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; FEMA 2017



3.1.10.2 Onshore Zone

Freshwater and Tidal Wetlands

The USFWS NWI and DEC freshwater and tidal wetland datasets indicate that 5,880.9 acres, or 3.7%, of the onshore zone of Study Area 1 consists of wetlands (USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017). Additionally, there are 36,999.5 acres of regulated wetland buffers/adjacent area within the zone, or 23.4% of the upland zone. Class 1 freshwater wetlands cover the most area in this zone, aside from wetland buffers. Table 25 provides a summary of the different wetland habitats and acreages that are found in this zone according to these datasets, and they are depicted in Figure 13.

Table 25. Mapped Freshwater and Tidal Wetlands and Buffers within the Onshore Zone of Study Area 1

Sources: USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017

Wetland Classification	Acreage	Percentage of Onshore Zone
DEC Freshwater Wetlands		
Class 1	3,617.4	2.3
Class 2	234.2	0.1
Class 3	8.6	> 0.1
No Class	20.4	> 0.1
Total Acreage^a	3,880.5	2.4
USFWS NWI Wetlands^b		
Estuarine and Marine Deepwater	307.5	0.2
Estuarine and Marine Wetland	344.7	0.2
Freshwater Emergent Wetland	42.4	> 0.1
Freshwater Forested/Shrub Wetland	833.0	0.5
Freshwater Pond	236.6	0.1
Lake	11.9	> 0.1
Riverine	187.8	0.1
Other	0.1	> 0.1
Total Acreage^a	1,963.8	1.2
DEC Tidal Wetlands^c		
Fresh Marsh (FM)	5.0	> 0.1
High Marsh (HM)	4.4	> 0.1
Intertidal Marsh (IM)	0.1	> 0.1
Littoral Zone (LZ)	27.1	> 0.1
Total Acreage^a	36.6	0.4
Total Wetland Acreage	5,880.9	3.7

Table notes are on the next page.

Table 25 continued

Wetland Classification	Acreage	Percentage of Onshore Zone
DEC Wetland Buffers		
Freshwater Buffers	14,371.5	9.1
Tidal Adjacent Area (AA)	22,628.0	14.3
Total Acreage	36,999.5	23.4
Overall Total Wetland and Buffer Acreage^a		
	42,880.4	27.1

^a May not sum due to rounding.

^b Does not include freshwater wetlands that overlap with DEC wetlands.

^c Does not include wetlands that overlap with USFWS NWI.

Key:

DEC = Department of Environmental Conservation

NWI = National Wetland Inventory

USFWS = U.S. Fish and Wildlife Service Surface Waters

The USGS NHD indicates that a total of 105.3 miles of streams and rivers, and a total of 946.1 acres of lakes and ponds, are located within the onshore zone of Study Area 1 (see Figure 13; USGS 2017a).

Floodplains

FEMA NFHL data indicate that approximately 2.5% of the onshore zone of Study Area 1 is located in areas subject to 1 % or greater annual chance of flood (i.e., 100-year floodplain) as indicated in Table 26 and in Figure 14 (FEMA 2017). Approximately 97.5% of Study Area 1 (154,467.5 acres) is mapped within the 500-year floodplain (Zone X), which includes areas of minimal flood hazard or with a 0.2% annual chance of flooding.

Table 26. 100-Year Floodplains within the Onshore Zone of Study Area 1

Sources: FEMA 2017

Zone	Description	Acreage	Percentage of Onshore Zone
A	SFHA, no base flood elevation provided	1,190.3	0.8
AE	SFHA with base flood elevation provided	2,744.8	1.7
AO	SFHA with sheet flow, ponding, or shallow flooding	0.0	0.0
VE	SFHA subject to coastal high-hazard flooding	0.1	> 0.1
Total Acreages^a		3,935.2	2.5

^a May not sum due to rounding.

Key:

SFHA = Special Flood Hazard Area

3.1.11 Migratory Birds and Eagles

Migratory Bird Treaty Act. Migratory birds are protected under the Migratory Bird Treaty Act (MBTA), which makes it unlawful to kill or “take” a migratory bird, nest, or egg unless specifically permitted to do so (USFWS 2014b). Per the MBTA and its implementing regulations, “take” is defined as “pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 CFR §10.12). Migratory birds, as defined by the MBTA, include nearly all species that may occur in the United States (1,026 in total), with the exceptions of some upland game birds and non-native species that occur in the United States by way of human introduction (USFWS 2013a).

The MBTA does not explicitly include provisions for permits to authorize incidental take of migratory birds that result from an otherwise legal activity, but is not the purpose of the activity. Instead, the USFWS encourages individuals, companies, and industries to use “best practices” established to help reduce and avoid the unpermitted take of MBTA-protected species. The USFWS may exercise their discretion to prosecute individuals, companies, or industries that are aware of a situation or activity resulting in the take of MBTA-protected species and fail to remedy it (USFWS 2013b). The USFWS may also prosecute individuals, companies, or industries that fail to employ conservation measures or minimize adverse impacts on MBTA-protected species. Although the MBTA does not specifically protect habitat, the alteration or disturbance of habitat during the course of project construction or operations that results in the take of an MBTA-protected species would constitute a violation of the MBTA.

Bald and Golden Eagle Protection Act. Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA prohibits the take, possession, or any acts thereof, of any bald or golden eagle, part, nest, or egg. The BGEPA regulations define “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb.” “Disturb” is defined as agitating or bothering an eagle that causes, or is likely to cause, injury to, decrease productivity of, or cause nest abandonment by the eagle. The USFWS offers several regulatory “take” permits that authorize incidental take of eagles and eagle nests in certain situations. As may be relevant here, the USFWS offers permits for (1) the take of depredating eagles and eagles that pose a risk to human or eagle health and safety, (2) the take of golden eagle nests, (3) the take of eagles that is associated with, but not the purpose of, an activity; and (4) the removal or relocation of eagle nests.

The USFWS Region 5 Migratory Bird Permit Office is responsible for project reviews for impacts on migratory bird species, including bald and golden eagles, and is responsible for issuing permits. Refer to the permitting matrix in Section 4.2 for additional details.

Regulatory Summary. It is recommended that a future offshore wind project proponent coordinate with the USFWS Long Island Field Office regarding migratory bird species as part of its due diligence during the siting phase.

Given the range of the birds present in the vicinity of the study areas for this analysis, the discussion of species with the potential to occur is inclusive of both the shoreline/nearshore zone and onshore zone of both Study Areas 1 and 2.

A total of 44 birds of conservation concern (BCCs) may occur in the Long Island/Rockaway Peninsula study area and the Hudson and East River/NYC study area (see Table 27). BCCs are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. The USFWS designated BCCs at three distinct geographic scales: national, USFWS regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which the USFWS identified BCCs, and the lists of BCC species at this scale are expected to be the most useful for resource management agencies to comply with the MBTA. Study areas 1 and 2 both lie within BCR 30 (New England/Mid-Atlantic Coast; USFWS 2008).

Table 27. Birds of Conservation Concern from Bird Conservation Region 30 that May Occur in Study Areas 1 and 2

Sources: USFWS 2008; Rodewald et al. 2015; eBird 2017

Common Name	Scientific Name	Habitat(s)	Seasonal Occurrence	Likelihood of Occurrence ^a
Red-throated Loon	<i>Gavia stellata</i>	Marine habitat in sheltered shallow waters	Winter and migration	Likely
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Dense stands of emergent vegetation or aquatic vegetation close to the surface	Winter and migration	Possible
Horned Grebe	<i>Podiceps auritus</i>	Large-sized bodies of fresh and, more commonly, salt water	Winter and migration	Likely
Great Shearwater	<i>Puffinus gravis</i>	Marine species with a large range covering most of the Atlantic Ocean	Breeding and migration	Unlikely

Table 27 continued

Common Name	Scientific Name	Habitat(s)	Seasonal Occurrence	Likelihood of Occurrence ^a
Audubon's Shearwater	<i>Puffinus lherminieri</i>	Open ocean. Almost exclusively over warm waters; nests on islands	Breeding and migration	Unlikely
American Bittern	<i>Botaurus lentiginosus</i>	Wetlands dominated by tall, emergent vegetation	Year-round	Likely
Least Bittern	<i>Ixobrychus exilis</i>	Freshwater and brackish marshes with dense, tall growths of aquatic or semiaquatic vegetation	Breeding and migration	Likely
Snowy Egret	<i>Egretta thula</i>	Along Atlantic and Gulf coasts and in Florida; generally prefers shallow estuarine sites	Breeding and migration	Likely
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Trees in forest adjacent to bodies of water	Year-round	Likely
Black Rail	<i>Laterallus jamaicensis</i>	High in palustrine and estuarine emergent wetlands	Breeding and migration	Possible
Wilson's Plover	<i>Charadrius wilsonia</i>	Coastal areas of high salinity and sparse vegetation	Migration	Possible
American Oystercatcher	<i>Haematopus palliatus</i>	Sand and shell beaches, dunes, salt marshes, and occasionally rock or other surfaces	Breeding and migration	Likely
Solitary Sandpiper	<i>Tringa solitaria</i>	Freshwater lakes and ponds in areas of muskeg bogs and spruce trees	Migration	Likely
Lesser Yellowlegs	<i>Tringa flavipes</i>	Wide range of wetlands, usually with shallow, vegetation-filled water and mudflats	Migration	Likely
Upland Sandpiper	<i>Bartramia longicauda</i>	Obligate grassland, native prairie	Migration	Likely
Whimbrel	<i>Numenius phaeopus</i>	Dunes, meadows, short grass fields, and tidal flats	Migration	Likely
Hudsonian Godwit	<i>Limosa haemastica</i>	Variable coastal and inland wetland and estuarine habitats	Migration	Possible
Marbled Godwit	<i>Limosa fedoa</i>	Variable coastal and inland wetland and estuarine habitats	Migration	Likely
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Shallow fresh or salt water with little vegetation, muddy intertidal zones, or along edges of lakes	Migration	Likely

Table notes are at the end of the table.

Table 27 continued

Common Name	Scientific Name	Habitat(s)	Seasonal Occurrence	Likelihood of Occurrence ^a
Purple Sandpiper	<i>Calidris maritima</i>	Rocky shorelines and jetties/breakwaters, including rocky islets and peninsulas	Winter and migration	Likely
Buff-breasted Sandpiper	<i>Calidris subruficollis</i>	Dry grasslands (usually short grass), pastures, plowed fields and, rarely, mud flats	Migration	Likely
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Coastal mudflats and brackish lagoons	Migration	Likely
Least Tern	<i>Sternula antillarum</i>	Bare or sparsely vegetated sand or dried mudflats along coasts or rivers; sandy or shell islands and gravel and sand pits	Breeding and migration	Likely
Gull-billed Tern	<i>Gelochelidon nilotica</i>	Along Atlantic and Gulf coasts; most pairs nest on sandy beaches or on sandy barrier islands	Migration	Likely
Black Skimmer	<i>Rynchops niger</i>	Open sandy areas or gravel or shell bars with sparse vegetation or broad mats of seawrack	Breeding and migration	Likely
Short-eared Owl	<i>Asio flammeus</i>	Large open areas within woodlots, stubble fields, freshwater and saltwater marshes	Winter and migration	Likely
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	Deciduous or mixed forests with little or no underbrush	Breeding and migration	Likely
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Variety of treed habitats, typically with a certain degree of openness and presence of dead limbs or snags for nesting purposes	Winter and migration	Likely
Peregrine Falcon	<i>Falco peregrinus</i>	Broad range of natural and artificial habitats	Year-round	Likely
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Open country with short vegetation: pastures with fence rows, agricultural fields, riparian areas, open woodlands, etc.	Migration	Possible
Brown-headed Nuthatch	<i>Sitta pusilla</i>	Out of range	n/a	Unlikely

Table notes are at the end of the table.

Table 27 continued

Common Name	Scientific Name	Habitat(s)	Seasonal Occurrence	Likelihood of Occurrence ^a
Sedge Wren	<i>Cistothorus platensis</i>	Tall growths of sedges in palustrine and estuarine emergent wetlands	Migration	Possible
Wood Thrush	<i>Hylocichla mustelina</i>	Interior and edges of deciduous and mixed forests, especially upland forest	Breeding and migration	Likely
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	Mature deciduous or mixed deciduous-coniferous forest overlap with hillsides and smaller patches of shrubs	Breeding and migration	Likely
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Dense patches of herbs and shrubs with some taller trees; trees often form the territorial border	Migration	Likely
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Early to mid-successional habitat, patches of dense herbaceous growth	Breeding and migration	Likely
Kentucky Warbler	<i>Geothlypis formosa</i>	Bottomland forests at lower elevation with dense understory	Migration	Likely
Cerulean Warbler	<i>Setophaga cerulea</i>	Old-growth deciduous forest with preference for broad-leafed species	Migration	Likely
Prairie Warbler	<i>Setophaga discolor</i>	Early successional, open-canopied plant communities	Breeding and migration	Likely
Henslow's Sparrow	<i>Ammodramus henslowii</i>	Open-field habitats such as marsh, swamp, pocosin, and prairie	Migration	Possible
Nelson's Sparrow	<i>Ammodramus nelsoni</i>	Coastal cordgrass marshes	Breeding and migration	Likely
Saltmarsh Sparrow	<i>Ammodramus caudacutus</i>	Inland prairies, freshwater marshes, and meadows	Breeding and migration	Likely
Seaside Sparrow	<i>Ammodramus maritimus</i>	Varied vegetation structures in tidal marshes	Breeding and migration	Likely
Rusty Blackbird	<i>Euphagus carolinus</i>	Swamps, wet woodlands, and pond edges	Winter and migration	Likely

Notes:

^a Likelihood of occurrence was determined based on available suitable habitat and documented observations in counties with Study Areas 1 and 2 (eBird 2017).

Likelihood of Occurrence category definitions:

Possible – Project area lies within the species' range and contains some suitable habitat.

Likely – Project area lies within the species' range, suitable habitat is available, and data suggests species regularly occurs in the area.

Unlikely – Project area is outside of species' range, suitable habitat does not occur, and/or rare/no occurrence records in vicinity.

3.1.12 Sediment, Soil Types, and Steep Slopes

Regulations pertaining to soil erosion and sediment control and management include those at the State and local levels. At the state level, the DEC SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-15-002) is triggered when land disturbance exceeds one acre. To prepare erosion and sediment control plans required for coverage under the General Permit, the *New York State Standards and Specifications for Erosion and Sediment Control (Blue Book)* provides standards and specifications for the selection, design, and implementation of erosion and sediment control practices (DEC 2016c). Any construction activity that will disturb an area equal to or greater than one acre requires permit coverage and the preparation of an erosion and sediment control plan.

Additionally, local building departments would need to be consulted regarding regulations applicable to steep slopes; these may include specific permit requirements, the implementation of steep slope protection measures, or the outright avoidance of areas with steep slopes.

Regulatory Summary. Construction activity that disturbs more than one acre of land would require coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity (see the permit matrix in Section 4.2).

3.1.12.1 Shoreline/Nearshore Zone

Sediment Types. Sediment types within the shoreline/nearshore zone of Study Area 1 were identified using the USGS Continental Margin Mapping (CONMAP) database (USGS 2005). The predominant sediment type in the shoreline/nearshore zone of Study Area 1 is sand (see Table 28 and Figure 15). Based on online searches of publicly available data, no literature addressing documented historic contamination in the sediment of the Great South Bay has been identified.

Table 28. Sediment Types within the Shoreline/Nearshore Zone of Study Area 1

Source: USGS 2005

Sediment Type	Acreage	Percentage ^a
Sand	68,530.20	37.9
Sand-clay/silt	29,365.90	16.3
Gravel-sand	1,403.50	0.8
Gravel	107.8	> 0.1
Total	99,407.40	55

^a Percentage of the total shoreline/nearshore acreage within Study Area 1.

Soil Types and Steep Slopes. According to information obtained from the U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Soil Survey Geographic (SSURGO) database, 66 different types of soil occur within Study Area 1. Of these soils, 26 were predominant and cover 40.4% of the acreage within the shoreline/nearshore zone of Study Area 1 (see Table 29). (Due to the size of the study area and the number of soil types, an associated figure has not been included.) For the purposes of this study, soils were considered predominant if they occurred in 500 or more acres, which is approximately 0.5% of the shoreline/nearshore zone of Study Area 1.

Approximately 521.4 acres, or 0.6%, of the predominant soils within the shoreline/nearshore zone of Study Area 1 may have steep (>10%) slopes (USDA NRCS 2014a, 2015a, 2015b). The Carver and Plymouth sands have 3 to 15% slope; therefore, not all areas of this soil type may exceed 10% slopes. These potential steep slope areas are limited to the northern part of the zone in Southampton and Islip. Slope gradient is the difference in elevation between two points, expressed as a percentage of the distance between those points. Soils with low slope gradients tend to be flatter, with more uniform topography, while soils with high representative slopes are steeper and at higher risk for erosion.

Figure 15. Shoreline/Nearshore Sediment Types, Study Areas 1 and 2

Source: BOEM 2016c; ESRI 2010; New York City Department of City Planning 2017; USGS 2005

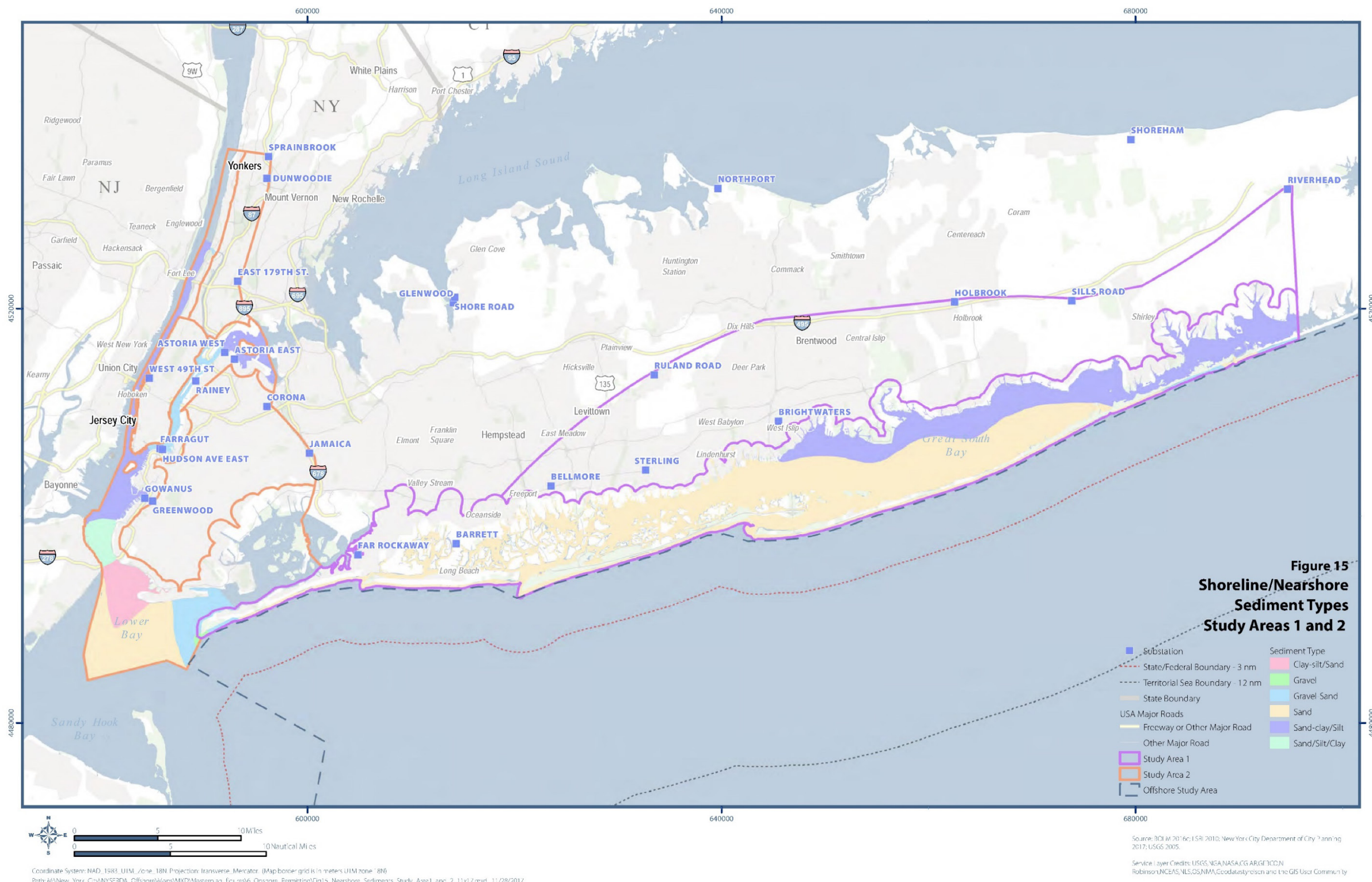


Table 29. Predominant Soil Types within the Shoreline/Nearshore Zone of Study Area 1

Sources: USDA NRCS 2014a, 2015a, 2015b

Soil Type		Acreage	Percentage ^a
Symbol	Description		
Bc	Beaches	2,463.7	1.4
Be	Beaches	544.9	0.3
CpA	Carver and Plymouth sands, 0 to 3 % slopes	610.9	0.3
CpC	Carver and Plymouth sands, 3 to 15 % slopes	521.4	0.3
CuB	Cut and fill land, gently sloping	2,230.3	1.2
Du	Dune land	4,301.4	2.4
	Duneland-Udipsamments complex	1,265.5	0.7
Fd	Fill land, dredged material	2,767.5	1.5
Fs	Fill land, sandy	1,570.1	0.9
Ip	Ipswich mucky peat, 0 to 2 % slopes, very frequently flooded	6,893.2	3.8
Pa	Pawcatuck mucky peat, 0 to 2 % slopes, very frequently flooded	915.3	0.5
PIA	Plymouth loamy sand, 0 to 3 % slopes	2,871.5	1.6
PIB	Plymouth loamy sand, 3 to 8 % slopes	863.5	0.5
RdA	Riverhead sandy loam, 0 to 3 % slopes	6,659.4	3.7
RdB	Riverhead sandy loam, 3 to 8 % slopes	807.5	0.4
RhB	Riverhead and Haven soils, graded, 0 to 8 % slopes	3,767.8	2.1
Su	Sudbury sandy loam	715.8	0.4
Tm	Tidal marsh	7,845.3	4.3
Ue	Udipsamments, wet substratum	4,537.5	2.5
Ug	Urban land	3,939.4	2.2
Ur	Urban land	510.8	0.3
UrA	Urban land-Riverhead complex, 0 to 3 % slopes	3,554.5	2.0
Us	Urban land-Sudbury complex	4,387.0	2.4
Uu	Urban land-Udipsamments complex	826.8	0.5
UVA	Urban land-Verrazano complex, 0 to 3 % slopes	1,182.6	0.7
Uw	Urban land-Udipsamments, wet substratum complex	5,980.4	3.3
Wd	Walpole sandy loam, coastal lowland, 0 to 3 % slopes	588.4	0.3
Total		73,122.4	40.5

^a Percentage of the total shoreline/nearshore acreage within Study Area 1.

3.1.12.2 Onshore Zone

Sediment Types. According to the USGS CONMAP database, there are no areas of sediment coverage in the onshore zone.

Soil Types and Steep Slopes. According to information obtained from the USDA NRCS SSURGO database, there are 89 different soil types within the onshore zone of Study Area 1. Of these soils, 20 were predominant and cover 93.9% of the acreage within the onshore zone (see Table 30). (Due to the size of the study area and the number of soil types, an associated figure has not been included.) For the purposes of this study, soils were considered predominant if they occurred in 780 or more acres, which is approximately 0.5% of the onshore zone of Study Area 1.

Approximately 12,236.5 acres, or 7.6%, of the predominant soils within the onshore zone of Study Area 1 may have steep (>10%) slopes (i.e., as indicated by the slope gradient of the dominant soil type; USDA NRCS 2015a, 2015b). Of this total, approximately 3,717.1 acres certainly have slopes greater than 10%, as the Carver and Plymouth sands have slopes from 15 to 35%. The remaining 8,519.4 acres are comprised of soils with a slope range that includes slopes less than 10% to those that are greater than 10% (i.e., 3 to 15% slopes and 8 to 15% slopes).

Table 30. Soil Types within the Onshore Zone of Study Area 1

Sources: USDA NRCS 2015a, 2015b

Soil Type		Acreage	Percentage ^a
Symbol	Description		
At	Atsion sand	783.6	0.5
Bd	Berryland mucky sand	1,217.2	0.8
CpA	Carver and Plymouth sands, 0 to 3 % slopes	2,989.0	1.9
CpA	Carver and Plymouth sands, 3 to 15 % slopes	5,556.8	3.5
CpE	Carver and Plymouth sands, 15 to 35 % slopes	3717.1	2.3
CuB	Cut and fill land, gently sloping	11,503.2	7.3
HaA	Haven loam, 0 to 2 % slopes	14,515.8	9.2
HaB	Haven loam, 2 to 6 % slopes	885.0	0.6
PIA	Plymouth loamy sand, 0 to 3 % slopes	14,279.1	9.0
PIB	Plymouth loamy sand, 3 to 8 % slopes	3,816.8	2.4
PIC	Plymouth loamy sand, 8 to 15 % slopes	1,950.7	1.2
RdA	Riverhead sandy loam, 0 to 3 % slopes	34,304.5	21.7
RdB	Riverhead sandy loam, 3 to 8 % slopes	4,612.4	2.9
RdC	Riverhead sandy loam, 8 to 15 % slopes	1,011.9	0.6

Table notes are at the end of the table.

Table 30 continued

Soil Type		Acreage	Percentage ^a
Symbol	Description		
RhB	Riverhead and Haven soils, graded, 0 to 8 % slopes	28,551.3	18.0
Ug	Urban land	1,857.0	1.2
Uh	Urban land-Hempstead complex	1,051.7	0.7
Ur	Urban land	3,068.4	1.9
UrA	Urban land-Riverhead complex, 0 to 3 % slopes	11,379.3	7.2
Us	Urban land-Sudbury complex	1,661.3	1.0
Total		148,712.1	93.9

^a Percentage of the total onshore acreage within Study Area 1.

3.1.13 Geologic Hazards

This section summarizes identified potential geologic hazards, focusing on seismicity (earthquakes), landslides, karst terrain (unexpected formation of sinkholes), and fault areas. There are no pertinent regulations, associated permits, or approvals required by New York State for geologic hazards relating to offshore wind installation, including installation of related infrastructure within the nearshore environment. However, consideration of the location of geologic hazard areas discussed below is recommended in siting specific projects.

Potential Seismic Intensity. The USGS Earthquake Hazards Program developed a series of national seismic hazard maps (peak ground acceleration [pga] maps) that depict the estimated probability that certain levels of ground shaking from an earthquake will occur within a given area over a period of time. Values on the seismic hazard maps are called pga, which are a common measurement of ground motion, and the higher the value, the greater the potential hazard (USGS 2017b). Typical bedrock pga values for a 2 % probability of being exceeded during a 50-year period are between 0.010g and 0.100g for areas that are not seismically active. Seismically active areas, such as the West Coast, typically have corresponding bedrock pga values between 0.40g and 1.00g (USGS 2014b).

Landslides. A landslide is generally described as the downslope movement of soil, rock, and organic materials under the effects of gravity (USGS 2008). Landslide hazards can be assessed in two different ways:

- Landslide incidence – areas where landslides have occurred in the past.
- Landslide susceptibility – areas where previous landslides are susceptible to future landsliding.

The digitally compiled map of landslide incidence and susceptibility in the conterminous United States, which delineates areas where large numbers of landslides have occurred and areas that are susceptible to landslides, was reviewed (USGS 2001). On the landslide incidence and susceptibility map, the landslide incidence and susceptibility category is rated from low to high: incidence of landslide is rated low if less than 1.5% of an area is involved in landsliding, moderate if 1.5% to 15% of the area is involved in landsliding, and high if more than 15% of the area is involved in landsliding.

Karst Topography/Land Subsidence. Land subsidence is the local downward movement of surface material with little or no horizontal movement (USGS 1999). One cause of land subsidence is the localized collapse of subsurface cavities (also referred to as karst topography/terrain), which is commonly caused by groundwater level declines and enhanced percolation of groundwater.

Faults. A fault is a fracture in the bedrock where movement has occurred relative to each side of the fracture. Movement can range from just a few inches to tens of feet, depending on the earthquake magnitude.

The results of the desktop analysis as they pertain to geologic hazards are discussed below, specific to the shoreline/nearshore zone and the onshore zone.

Regulatory Summary. There are no State-level regulations applicable to geologic hazards. Consideration of identified hazard areas is recommended.

3.1.13.1 Shoreline/Nearshore Zone

Review of the USGS Seismic Hazard Map indicates that the shoreline/nearshore zone of Study Area 1 is located in an area with a 2 % probability of exceedance of pga values in 50 years, with pga values in the zone ranging from 0.06g to 0.20g (USGS 2014b). The shoreline/nearshore zone of Study Area 1 is located in an area that has a low landslide incidence and susceptibility (USGS 2001). A desktop review of USGS resources identified no areas of karst terrain located in the shoreline/nearshore zone (USGS 2014c). No suspected or known active faults are located within the shoreline/nearshore zone (USGS 2006; Isachsen and McKendree 1977).

3.1.13.2 Onshore Zone

Similar to the shoreline/nearshore zone, review of the USGS Seismic Hazard Map indicated that the onshore zone of Study Area 1 is located in an area with a 2 % probability of exceedance of pga values in 50 years, with pga values in the zone ranging from 0.06g to 0.20g (USGS 2014b). The majority of the zone is located in an area that has a low landslide incidence. Approximately 1,077 acres of the northeastern tip of the onshore zone of Study Area 1 are located in an area with a high susceptibility to and low incidence of landsliding (USGS 2001). No areas of karst terrain are located in the zone (USGS 2014c). No suspected or known active faults are located within the onshore zone of Study Area 1 (USGS 2006; Isachsen and McKendree 1977).

3.1.14 Cultural and Historic Resources

Cultural resources may include archaeological sites, historic cemeteries, historic structures and buildings (e.g., houses, railroads, roads, bridges, culverts, canals, irrigation, structures, electric transmission lines, etc.), historic districts, or traditional cultural properties (TCPs). Cultural resources may be eligible for or listed on the National Register of Historic Places (NRHP) or a State register. Cultural resources that are eligible for listing on the NRHP are called historic properties and are evaluated for potential adverse impacts from federal actions. In addition, some cultural resources, such as Native American sacred sites or traditional resources, may not be historic properties, but they are also often evaluated under NEPA for potential adverse effects from a major federal action.

Under Section 106 of the National Historic Preservation Act (NHPA), federal undertakings are evaluated to determine the potential for an adverse effect on properties eligible for or listed on the NRHP. In accordance with the implementing regulations for Section 106, these resources are called historic properties. As part of the Section 106 review, an area of potential effects (APE) is identified in which to evaluate existing and potential historic properties, including both below-ground (archaeological) and above-ground (architectural) resources. The APE is the geographic area(s) within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for various kinds of effects caused by the undertaking.

In 2016, BOEM, OPRHP, the New Jersey State Historic Preservation Office, and the Advisory Council on Historic Preservation (ACHP) signed a Programmatic Agreement (PA) that outlines the process of how BOEM will conduct Section 106 reviews for the undertakings of issuing commercial leases and reviewing plans for renewable energy development on the OCS offshore New York and New Jersey. The Shinnecock Indian Nation was consulted during the development of the PA. For the protection of cultural resources in accordance with Section 106 of the NHPA, the PA serves to highlight BOEM's obligation to identify consulting parties, oversee development leases, define a project's APE, and identify and protect historic properties with lease stipulations. For all components of an offshore wind farm, including components located on the seabed portion of an APE on the OCS, located on submerged lands beneath State waters, or in onshore terrestrial areas, BOEM will oversee consultations with the State Historic Preservation Office (SHPO), and Tribal Historic Preservation Office if applicable, and other consulting parties to the Section 106 review process, prior to the initiation of offshore and onshore surveys and other identification efforts. The PA also addresses viewshed protection, the placement of meteorological buoys and meteorological towers, consultation protocols for federally recognized Indian tribes, public stakeholder participation, confidentiality requirements, and existing laws and rights (BOEM 2016a).

The New York State Historic Preservation Act (NYSHPA) was enacted in 1980 and provides for the protection of cultural resources and properties that are listed on the NRHP, or are listed or determined eligible for listing on the State Register of Historic Places (Chapter 354 of the Laws of 1980). The NYSHPA was developed as the state equivalent of the NHPA, and Section 14.09 of the NYSHPA is similar to Section 106 of the NHPA, in that any planned activities conducted by state agencies, or requiring a permit or other approval by a state agency, must be reviewed under Section 14.09 to consider whether such planned activities may or will cause any change, beneficial or adverse, in the quality of any historic, architectural, archaeological, or cultural property that is listed on the NRHP or is listed or determined eligible for listing in the State Register of Historic Places. Section 14.09 of the NYSHPA also requires state agencies to be consistent, to the fullest extent practicable, with other provisions of the law, to avoid or mitigate adverse impacts on such properties, to explore all feasible and prudent alternatives, and to give due consideration to feasible and prudent plans that would avoid or mitigate adverse impacts to such properties (OPRHP 2017c).

However, Section 14.09, Part 428.2, coordination with other review procedures, specifically states that “No project requiring review by the commissioner acting in his capacity as State Historic Preservation Officer in accordance with Section 106 of the National Historic Preservation Act of 1966, as implemented by the regulations of the Federal Advisory Council on Historic Preservation, "Protection of Historic and Cultural Properties" (36 CFR 800), shall be reviewed in accordance with these procedures” (OPRHP 2017a). Therefore, given BOEM’s authority under the Energy Policy Act of 2005 to issue leases for offshore wind energy development, the Section 106 process would likely supersede the state review under 14.09. The potential for adverse effects on historic and cultural resources would need to be assessed, and the SHPO would be consulted under Section 106 of the NHPA. Section 106 of the NHPA requires federal agencies to “take into account” the effects of their undertakings on historic properties. This review must be completed prior to the initiation of construction and/or ground disturbance. BOEM is considered the lead federal agency with the responsibility for completing review and consultation under Section 106 for the issuance of leases and approval of wind energy development plans, including all project components located in federal and state waters and on land (BOEM 2016a).

State Lands Permit. The State Lands Permit is issued by the New York State Museum for activities that have the potential to disturb archaeological or paleontological resources on State lands, which include submerged lands under State waters. Because project components would be located within 3 nautical miles of shore, which are New York State lands, a State Lands Permit (also known as a Section 233 Permit) would be required for any studies that would need to be conducted to support construction of an offshore wind project, including the cable landfall.

Section 233 of the New York State Education Law, as amended, was enacted in 1958 to provide for the protection of archaeological and paleontological resources located on State lands. Section 233 of the New York State Education Law generally describes protected cultural resources as “any object of archaeological or paleontological interest” (NYSM 2017a). Archaeological and paleontological resources located on State lands in New York State are considered “‘publicly owned’ cultural resources that are protected for ‘both scientific and for education and historic purposes’” (NYSM 2017b). State lands include submerged lands under State waters that are under the control of New York State and are considered State lands (NYSM 2017a).

Section 233 of the New York State Education Law provides for the protection of archaeological and paleontological resources located on state lands by requiring a State Lands Permit “for any activity that will ‘appropriate, excavate, injure, or destroy any object of archeological or paleontological interest, situated on or under lands owned by the State of New York.’ Under the regulations of the Commissioner of Education, reconnaissance survey projects may also require a permit, even though no excavation of any site is proposed” (NYSM 2017c). The NYSM administers Section 233 of the New York State Education Law and issues State Lands Permits that are required pursuant to Section 233 of the New York State Education Law (NYSM 2017b).

Indigenous Nations Consultation. A project area should be considered of potential interest to Indigenous Nations that historically occupied, or were associated with, the general vicinity of the area. During the early stages of project planning, and as part of identifying information on any cultural resource concerns or issues, establishing contact with the Indigenous Nations that are located in New York State, or that have an interest in any of the counties encompassing the cable landfall site, onshore cable, and/or submarine cable routes, is recommended.

Regulatory Summary. Once a potential cable landfall site has been selected, historical and cultural resources must be assessed and the SHPO must be consulted under Section 106 of the NHPA and/or the New York State Historic Preservation Act. As a part of these consultation processes, consulting parties, the public, and Indigenous Nations should be consulted. See the permit matrix in Section 4.2 for a summary of this process.

The desktop analysis for potential cultural resources consisted of identifying historic properties listed on the NRHP and other cultural resources where available. The cultural resources information presented below was obtained from the CRIS database, the NPS’s NRHP online database, and the NOAA Office of Coast Survey’s Wrecks and Obstructions database. Although information for cultural and historic resources is accessible through these databases, with the exception of the wrecks and obstructions data, this information cannot be transferred into a GIS-based application for further analysis. Therefore, a more definitive evaluation of built resources has not been developed for this Study, but this would be done as part of any required cultural resources investigations for a proposed future cable landfall site. Refer to the *Cultural Resources Study*, appended to the Master Plan, for additional discussion.

3.1.14.1 Shoreline/Nearshore Zone

Terrestrial Archaeological Sites. Based on a review of the CRIS database, there are a total of 106 previously recorded archaeological sites within the shoreline/nearshore zone of Study Area 1. Fifty-nine of the 109 sites are historic, and 32 are sites associated with indigenous peoples. Four of the sites are shipwrecks, eight are unknown, and written documentation on six of the sites is missing (OPRHP 2017b). Three of the sites are considered historic burial sites, and five are burial sites associated with indigenous peoples. With respect to NRHP eligibility, 90 of the sites are undetermined, five are eligible, eight are listed on the NRHP, and three are not eligible (OPRHP 2017b).

It should be noted that the CRIS database is a “living” database that is continually being updated with new data. Future studies associated with offshore wind development would need to develop additional information to supplement/update what is provided herein.

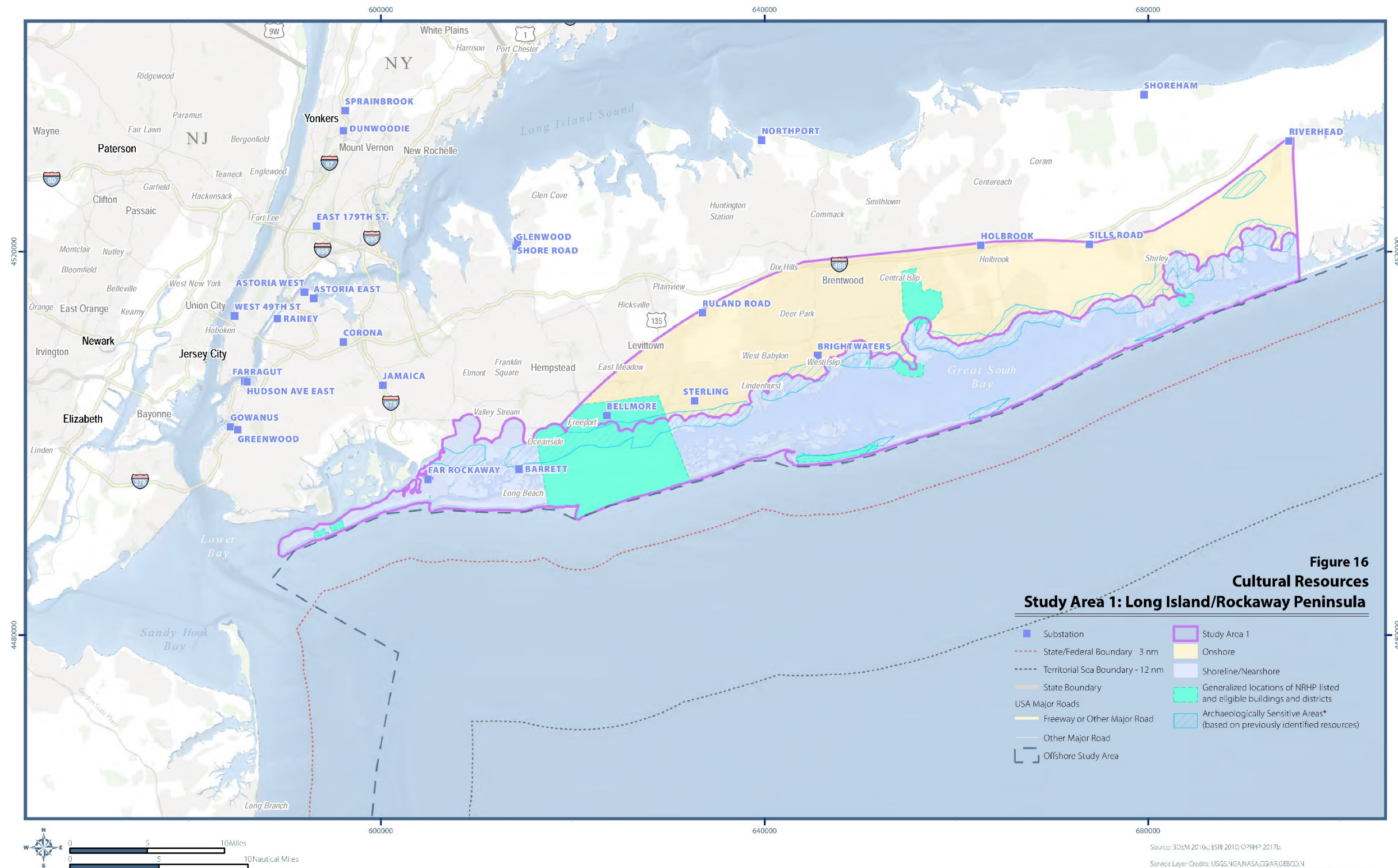
Additional details regarding the individual sites (Site Number, Name, Context, and NRHP status) are provided in Appendix B. Figure 16 shows general areas of archaeological sensitivity, as identified in the CRIS database. As indicated in the figure, much of the northern portion off the shoreline/nearshore zone has been identified as being sensitive for archaeological resources. However, the areas of archaeological sensitivity depicted in Figure 16 are generalized areas based on the data gathered from the historic record, including the tendency of sites to be associated with indigenous people, historic resource extraction sites, and habitational areas concentrated along the southern shore of Long Island. Additionally, these generalized areas take into account the results of the archaeological record, which includes data on areas where archaeological surveys have occurred. These areas indicate moderate to high probability for archaeological resources, but identification of the exact locations of archaeological sites would need to be determined through future cultural investigations.

Underwater Archaeological Sites. In addition to the results from the CRIS database, the NOAA Wrecks and Obstruction database (NOAA Office of Coast Survey 2017a) indicates that there are 24 shipwrecks within the shoreline/nearshore zone. Although not all shipwrecks constitute cultural resources, the locations of these shipwrecks are indicated in Figure 17. Note: Because the NOAA Wrecks and Obstructions database is comprised of two separate datasets [Electronic Navigational Charts (ENC) and the Automated Wrecks and Obstructions Information System (AWOIS)], the same wrecks may be included with slightly different locations. Therefore, only one dataset—the NOAA data sourced from electronic nautical charts—has been used to provide a tally of the total number of wrecks. Both datasets are depicted in Figure 17.

Terrestrial Architectural Resources, including Historic Districts and Properties. According to the CRIS and NPS’s NRHP online database (NPS n.d.), 15 historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone. Six of these districts are listed on the NRHP, and six additional districts have been determined eligible for listing. Three districts are currently under consideration and are classified as “undetermined” by the New York SHPO. Forty-six individual properties listed on the NRHP were also identified. Having met one or more of the Secretary’s Criterion for Evaluation, these historic properties consist of houses of worship, post offices, private residences, inns, firehouses, grist mills, light stations, libraries, cemeteries, and monuments. Refer to Figure 16 for generalized locations of NRHP-listed and eligible buildings and districts and Appendix B for a summary of the NRHP-listed sites. As indicated in Figure 16, two historic districts are located on the Rockaway Peninsula, and a large district that corresponds to the Jones Beach State Park, Causeway and Parkway System is located within the center of the zone.

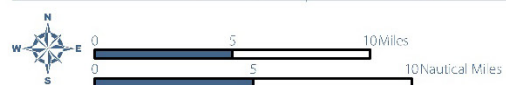
Figure 16. Cultural Resources, Study Area 1: Long Island/Rockaway Peninsula

Source: BOEM 2016c; ESRI 2010; OPRHP 2017b



**Figure 16
Cultural Resources
Study Area 1: Long Island/Rockaway Peninsula**

- Substation
- State/Federal Boundary - 3 nm
- Territorial Sea Boundary - 12 nm
- State Boundary
- USA Major Roads
- Freeway or Other Major Road
- Other Major Road
- Offshore Study Area
- Study Area 1
- Onshore
- Shoreline/Nearshore
- Generalized locations of NRHP listed and eligible buildings and districts
- Archaeologically Sensitive Areas* (based on previously identified resources)

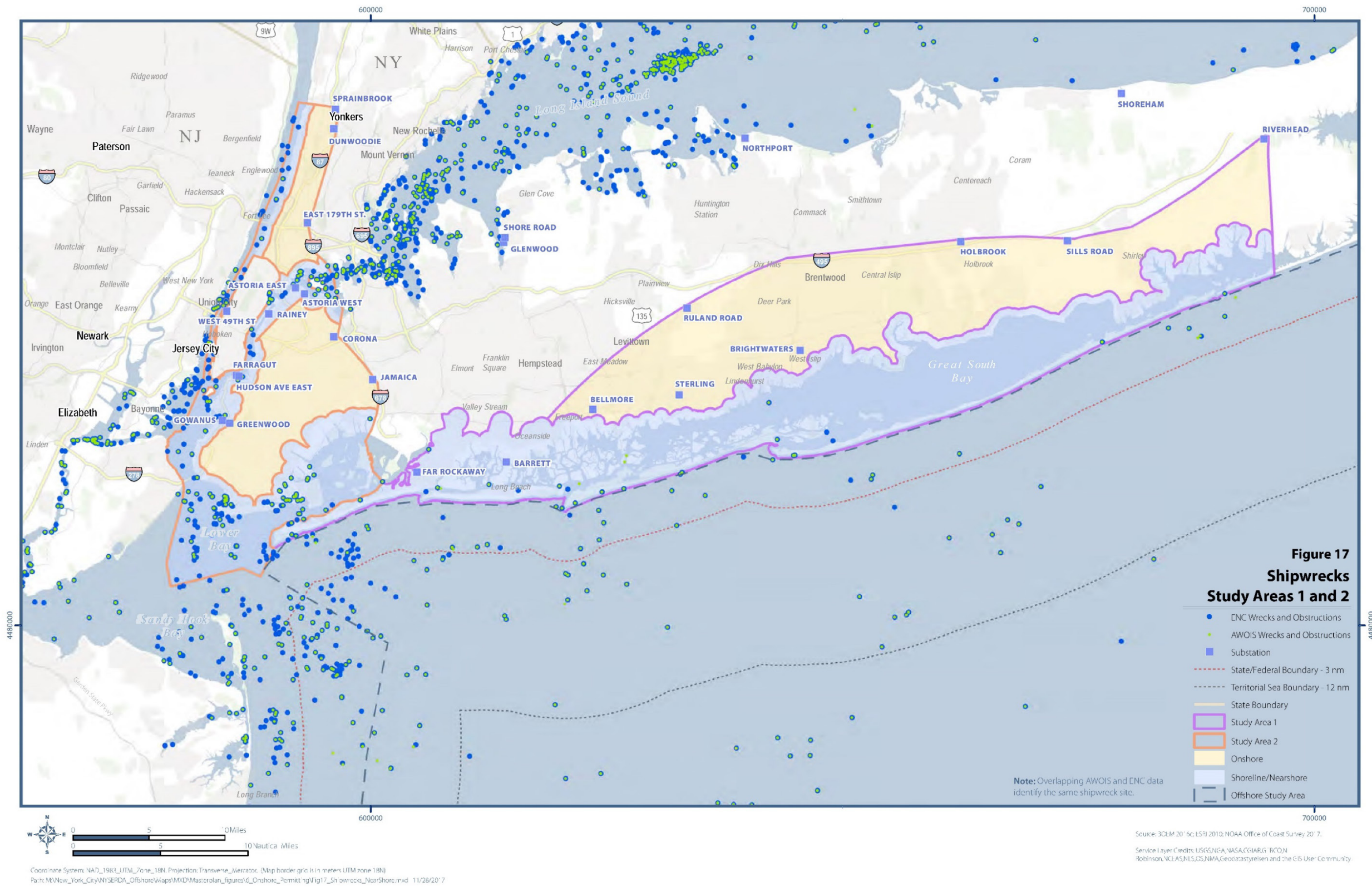


Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator, (Map border grid is in meters UTM zone 18N)
 Path: \\M:\New York City\GIS\QA Offshore\Map\MXD\Water\lan\figure16 Onshore Permitting\Fig 16 Cultural Resources Study Area 1 11x17.mxd, 11/30/2017

Source: BOEM 2016c; ESRI 2010; OPRHP 2017b
 Service Layer Credits: USGS, NEA, NASA, CGIAR, GEBCO, N
 Robinson, NCEAS, NLS, OS, NMA, Coastalstudies and the GIS User Community

Figure 17. Shipwrecks, Study Areas 1 and 2

Source: BOEM 2016c; ESRI2010; NOAA Office of Coast Survey 2017



3.1.14.2 Onshore Zone

Terrestrial Archaeological Sites. Based on results of the CRIS database review, there are 37 previously recorded archaeological sites within the onshore zone of Study Area 1. Twenty-four of the 37 sites are historic, and 11 are sites associated with indigenous peoples. One of the sites is a historical burial site, and written documentation on one of the sites is missing (OPRHP 2017b). With respect to NRHP eligibility, 33 of the sites are undetermined, none are eligible, one is listed on the NRHP, and three are not eligible for listing (OPRHP 2017b).

Additional details regarding the individual sites (Site Number, Name, Context, and NRHP status) are provided in Appendix B. Figure 16 identifies the general areas of archaeological sensitivity.

Terrestrial Architectural Resources, including Historic Districts and Properties. According to the CRIS and NRHP databases, six historic districts, comprising multiple contributing properties, were identified in the onshore zone. Two of these districts are listed on the NRHP, and two have been determined eligible for listing. Two districts are classified as “undetermined” by the New York SHPO. Thirty-two individual properties listed on the NRHP were also identified. These historic properties consist of houses of worship, cemeteries, private residences, schools, a bank, a post office, a railroad station and railroad complex, and a state park. Refer to Figure 16 for generalized locations of NRHP-listed and eligible buildings and districts and Appendix B for a summary of the NRHP-listed sites.

3.1.15 Areas of Contamination

Federal Superfund Sites. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, commonly known as Superfund, provides federal authority for response actions to clean up contamination from releases or threatened releases of hazardous substances that may endanger human health or the environment. Under CERCLA, the EPA developed a National Priorities List (NPL) of Superfund sites that present the greatest risk to public health and the environment. In 2002, the Small Business Liability Relief and Brownfields Revitalization Act (Brownfields Law) was enacted, which amended CERCLA by providing funds to assess and clean up brownfields, clarified liability protections stipulated in CERCLA, and provided funds to augment state and tribal brownfield response programs.

Land use controls are non-engineered instruments such as administrative and legal controls and physical barriers (e.g., fences) that help to minimize the potential for exposure to contamination and/or to protect the integrity of a response/remedial action at a Superfund or brownfield site. The purpose of a land use control is to limit land or resource use by providing information that helps to guide human use and redevelopment activities at a site (EPA 2017b). For example, zoning restrictions may prevent certain land uses that are not consistent with the level of cleanup for a particular Superfund or brownfield site.

State Remediation Program Sites. State remediation sites are regulated under 6 NYCRR Part 375: Environmental Remediation Programs. These programs address the timely and efficient cleanup and redevelopment of contaminated properties (DEC 2017f). This Study identifies remediation sites within the study areas that are under the following programs:

- Brownfield Cleanup Program.
- State Superfund Program.
- Environmental Restoration Program.
- Voluntary Cleanup Program.

Sites in these programs are assigned a class according to classifications in Table 31.

Table 31. Site Classifications for State Remediation Sites

Source: DEC 2017g

Classification	Description
Class 1	Contaminant constitutes a significant threat to public health and the environment and the threat is causing or presents imminent danger of causing irreversible or irreparable damage.
Class 2	Disposal of hazardous waste has been confirmed and represents a significant threat to public health or the environment, or hazardous waste has not been confirmed, but the site has been listed on the federal NPL.
Class 3	Contamination does not presently and is not reasonably foreseeable to constitute a significant threat to public health or the environment.
Class 4	Site has been properly closed but requires continued site management, operation, maintenance, and/or monitoring.
A (Active)	Remedial work is underway.
C (Completed)	Remedial work has been satisfactorily completed under a removal program.
P (Potential)	Preliminary information indicates that a site may have contamination that makes it eligible for placement on the State Superfund list. Further information is needed.

Regulatory Summary. A site’s status as a remediation site would not necessarily prevent its use as a potential future cable landfall. However, sites currently undergoing remediation, or where site closure has not been completed, could indicate the need for temporary avoidance of such areas until remediation

is complete, or incorporation of a remedy into project planning. For sites where remediation is completed, any site redevelopment, including construction on a proposed cable landfall, must be consistent with land use controls and site restrictions. It is important to note that many sites are never completely remediated and development must be consistent with land use controls identified in site closure documents.

3.1.15.1 Shoreline/Nearshore Zone

Federal and State Remediation Program Sites. According to the EPA’s Facility Registry Service (FRS) geodatabase (EPA 2017c), which provides geospatial for all publicly available FRS facilities with latitude and longitude data, one Superfund NPL site is located in the shoreline/nearshore zone of Study Area 1: the Peninsula Boulevard Groundwater Plume (Site Number: NYN000204407) is located on Peninsula Avenue within the hamlet of Hewlett in the town of Babylon (see Figure 18). (EPA data on NPL sites is limited to latitude/longitude; no site boundaries are available. Approximate site locations are included in Figure 18.)

Additionally, according to the DEC’s remediation dataset (DEC 2013), a total of 64 sites included in State remediation programs, comprising approximately 924.8 acres, are located within the shoreline/nearshore zone of Study Area 1 (see Table 32 and Figure 18). Six of these sites are Class 4, indicating that cleanup has been completed, but maintenance and monitoring are ongoing at the site, and 16 are categorized as Class C, indicating that remediation is complete.

Table 32. Summary of State Remediation Program Sites in the Shoreline/Nearshore Zone of Study Area 1

Source: DEC 2013

Site Class	Total of Acreage per Class	Count of Sites Per Class
2	130.5	20
3	0.2	1
4	200.5	6
A	482.2	21
C	111.5	16
Total	924.9	64

Sediment Contamination. There are no known areas associated with sediment contamination in the shoreline/nearshore zone of Study Area 1.

3.1.15.2 Onshore Zone

According to EPA data, there are five NPL sites in the onshore zone of Study Area 1 (see Table 33 and Figure 18). Table 33 excludes sites that have been removed from the NPL by the EPA (EPA 2017d). Three of these removed sites have been developed, one was determined not to warrant institutional controls, and one was listed as ready for reuse and development in 2006; no published information regarding institutional controls is available. (EPA data on NPL sites is limited to latitude/longitude; no site boundaries are available. Approximate site locations are included in Figure 18.)

A total of 111 sites included in State remediation programs, comprising approximately 7,050 acres, are located within the onshore zone of Study Area 1 (see Table 34 and Figure 18). Twenty-two of these sites are Class 4, indicating that cleanup has been completed but maintenance and monitoring are ongoing at the site, and 39 are categorized as Class C, indicating that remediation is complete (DEC 2013).

Table 33. Superfund NPL Sites in the Onshore Zone of Study Area 1

Source: EPA 2017d

Site Name	Location	EPA Site Number	Facility URL
Preferred Plating Corp.	32 Allen Blvd., Farmingdale (town of Oyster Bay)	NYD980768774	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0202245
Liberty Industrial Finishing	55 Motor Ave., Farmingdale (town of Oyster Bay)	NYD000337295	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0201184
Circuitron Corp	82 Milbar Blvd., Farmingdale (town of Oyster Bay)	NYD981184229	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0202301
Goldisc Recordings, Inc.	725 Broadway, Holbrook (Suffolk County)	NYD980768717	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0202239
Mackenzie Chemical Works	1 Cordello Ave., Central Islip (town of Islip)	NYD980753420	https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0202187

Table 34. Summary of State Remediation Program Sites in the Onshore Zone of Study Area 1*Source: DEC 2013*

Site Class	Total of Acreage per Class	Count of Sites Per Class
2	191.2	28
4	165.0	22
A	5,705.0	18
C	598.4	39
P	388.5	4
Total	7,048.1	112

3.2 Study Area 2: Hudson and East River/New York City

Refer to the regulatory summaries for each resource discussed under Study Area 1. Where applicable, regulatory discussion specific to Study Area 2 has been provided in the subsections below.

3.2.1 Land Cover

3.2.1.1 Shoreline/Nearshore Zone

According to 2011 NLCD data, approximately 58.6% of the shoreline/nearshore zone is categorized as open water, 20% is categorized as high-intensity developed land, and approximately 9.3% is categorized as medium-intensity developed land (see Table 35; USGS 2014a). The remaining 12.1% of the shoreline/nearshore zone consists of low-intensity development (3.2%), open space (1.9%), and small percentages of wetlands and various types of forested and vegetative cover. The locations of the various land cover types are shown in Figure 19.

Table 35. NLCD Land Cover Data for the Study Area 2 Shoreline/Nearshore Zone*Source: USGS 2014a*

Cover Type	Acres	Percentage
Barren Land	342	0.4
Cultivated Crops	20.3	0.0
Deciduous Forest	547.2	0.7
Developed, High Intensity	15,815	20
Developed, Low Intensity	2,545	3.2
Developed, Medium Intensity	7,388	9.3
Developed, Open Space	1,543	1.9
Emergent Herbaceous Wetlands	2,665	3.4
Evergreen Forest	125.0	0.2

Table 35 continued

Cover Type	Acres	Percentage
Hay/Pasture	6.3	0.0
Herbaceous	663.9	0.8
Mixed Forest	17.6	0.0
Open Water	46,461	58.6
Shrub/Scrub	945.7	1.2
Woody Wetlands	139.4	0.2

3.2.1.2 Onshore Zone

According to 2011 NLCD data, approximately 60% of the onshore zone is categorized as high intensity developed land, an additional 23% is categorized as medium intensity developed land, and approximately 8% as low intensity developed land (see Table 36; USGS 2014a). The remaining 8% of the onshore zone is comprised of very low percentages of open space, forested and herbaceous cover, and wetlands. The locations of the various land cover types are shown in Figure 19.

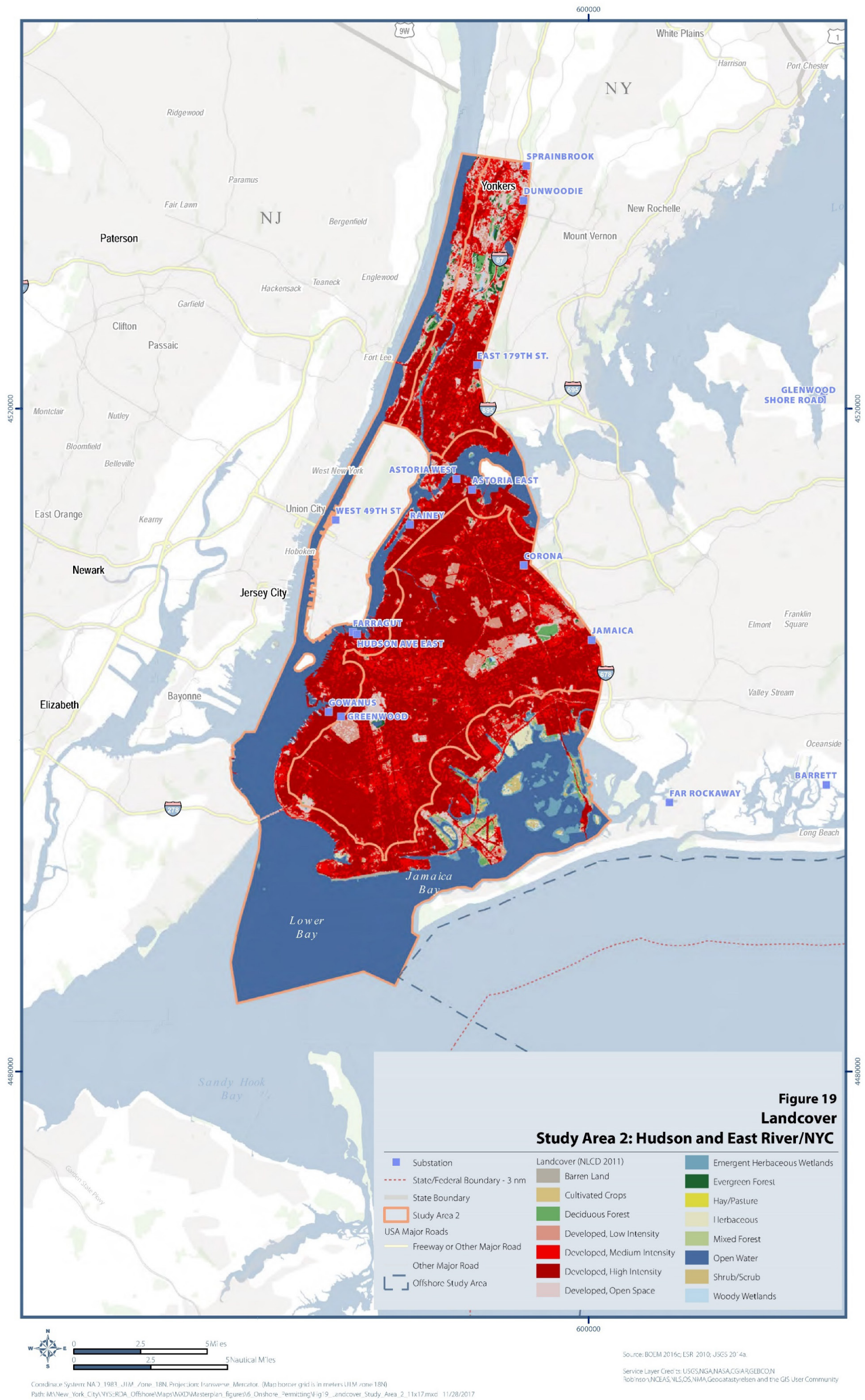
Table 36. NLCD Land Cover Data for the Study Area 2 Onshore Zone

Source: USGS 2014a

Cover Type	Acres	Percentage
Barren Land	76.8	0.1
Cultivated Crops	4.6	<0.01
Deciduous Forest	735.7	1.2
Developed, High Intensity	35,950	60.1
Developed, Low Intensity	5,024	8.4
Developed, Medium Intensity	13,930	23.3
Developed, Open Space	3,057	5.1
Emergent Herbaceous Wetlands	181	0.3
Evergreen Forest	349.3	0.6
Herbaceous	3.8	<0.01
Hay/Pasture	--	--
Mixed Forest	20.5	0.6
Open Water	374.2	<0.01
Shrub-Scrub	12.5	0.1
Woody Wetlands	85.7	0.1

Figure 19. Landcover, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; USGS 2014a



3.2.2 Publicly Managed Lands, Public Places, and Government Properties

Refer to Section 3.1.2 for a discussion of easements that may be required for crossing publicly owned lands.

3.2.2.1 Shoreline/Nearshore Zone

Table 37 summarizes the results of the desktop study for the shoreline/nearshore zone. A total of approximately 17,443 acres within the shoreline/nearshore zone are designated as publicly managed lands, public places or government properties. The locations of these lands are depicted in Figure 20. The majority of these lands are located within the Gateway National Recreational Area, which comprises approximately 14,098 acres of the shoreline/nearshore zone within Jamaica Bay and adjacent shorelines. Municipal parks include Coney Island Beach and Boardwalk on the shores of the Lower Bay, Dreier-Offerman Park, and Shore Road Park. Municipal parks also exist in the northern portion of the shoreline/nearshore zone, along the Hudson River, including Inwood Hill Park, Fort Washington Park, and Riverdale Park (see Figure 20).

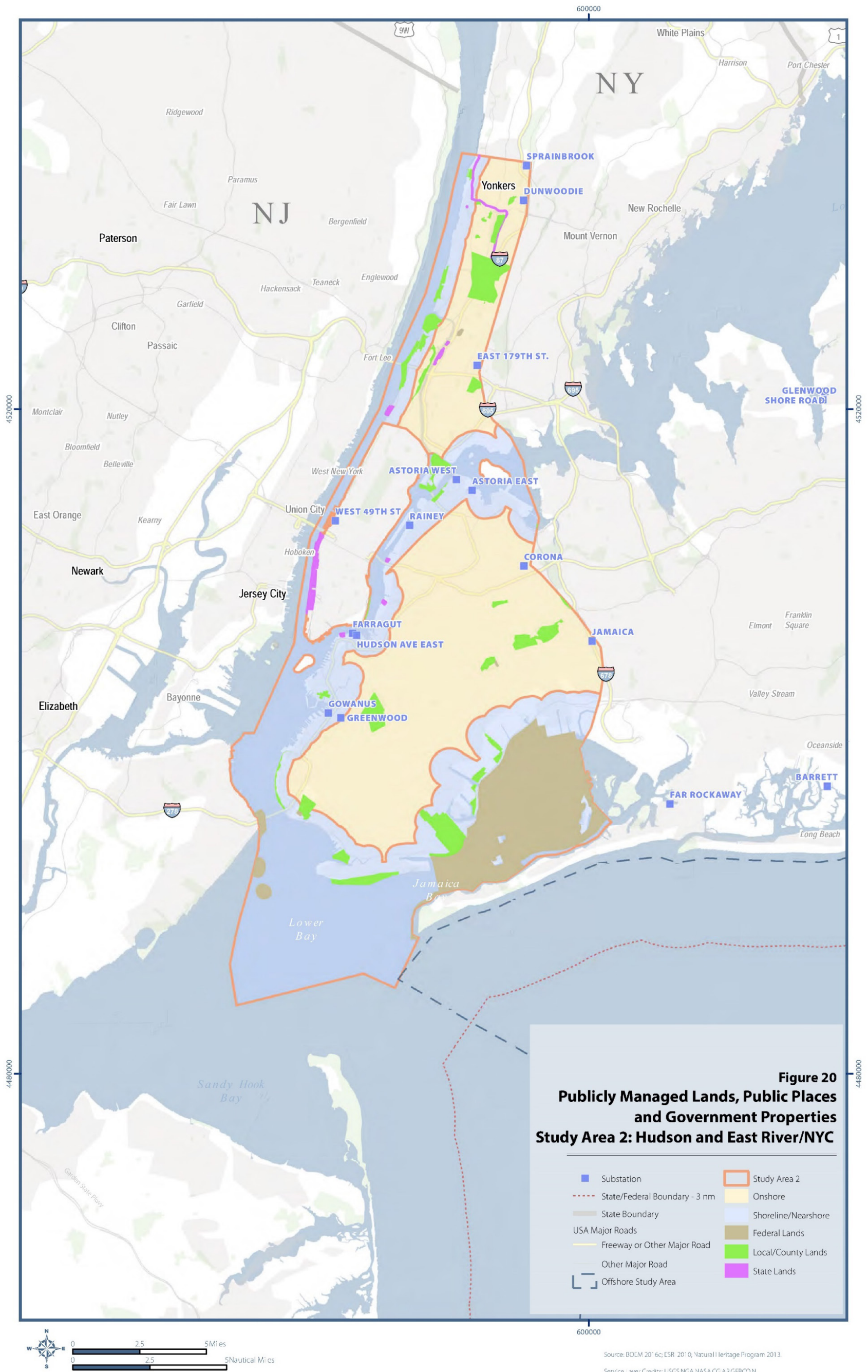
Table 37. Summary of Publicly Managed Lands, Public Places, and Government Properties in the Shoreline/Nearshore Zone of Study Area 2

Sources: NYPAD 2013; DEC 2017a

Place Name	Acres	Percentage of Zone
Federal Lands		
Gateway National Recreational Area	14, 098	17.8
State Lands		
State Park	267.6	0.3
State Historic Park	8.8	<0.1
State Historic Site	0.28	<0.01
Total	276.7	0.3
Local/Municipal Park	3,049	3.8
Other Public Lands	19.2	<0.1
Overall Total	17,443	

Figure 20. Publicly Managed Lands, Public Places, and Government Properties, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; natural Heritage Program 2013



3.2.2.2 Onshore Zone

Table 38 summarizes the results of the desktop analysis for the onshore zone within Study Area 2. A total of approximately 3,075 acres within the onshore zone are designated as publicly managed lands, public places, or government properties. The locations of these properties are shown in Figure 20.

Publicly managed local/county lands comprise over 97% of these lands within the onshore zone.

Various municipal parks are scattered throughout the onshore zone, including Prospect Park, Highland Park, Forest Park, and others.

Table 38. Summary of Publicly Managed Lands, Public Places, and Government Installations in the Onshore Zone of Study Area 2

Sources: NYPAD 2013; DEC 2017a

Place Name	Acres	Percentage
Federal Lands		
Cypress Hills National Cemetery	14.9	<0.1
State Lands		
State Park	23.8	<0.1
State Historic Park	15	<0.1
Total	38.8	<0.1
Local/County Lands		
County Park	171	0.3
Municipal Park	2,821	4.7
Total	2,992	5.0
Other Public Lands	29.6	<0.01
Overall Total	3,075	

3.2.3 Indigenous Nations Lands, ROWs, and Conservation Easements

Refer to Section 3.1.3 for a discussion of easements and ROW permits that may be required.

3.2.3.1 Shoreline/Nearshore Zone

Indigenous Nations Lands. There are no documented Indigenous Nations lands within the shoreline/nearshore zone of Study Area 2.

Roadway ROWs. Within the shoreline/nearshore zone of Study Area 2, there are approximately 406 miles of road network, ranging from freeways to local connecting roads. Freeways include the Bruckner Expressway, I-278, and the Major Deegan Expressway. Several bridges cross the East River within the shoreline/nearshore zone: the Brooklyn Bridge, the Manhattan Bridge, the Williamsburg Bridge, and the Queensboro Bridge, and the Verrazano Narrows Bridge spans the Lower Bay within the zone. The Robert F. Kennedy Bridge and Wards Island Bridge cross over to Wards Island, and the Francis Buono Memorial Bridge crosses from Astoria, Queens, to Rikers Island. On the Hudson River, the George Washington Bridge and Henry Hudson Bridge area located within the shoreline/nearshore zone (see Figure 22). The ROWs associated with some of these roads may present opportunities with respect to routing a potential onshore cable from a future cable landfall site to a substation. It should be noted that any use of the DOT limited-access freeways would require express approval from the DOT under the Accommodation Plan for Longitudinal Use of Freeway Right-of-way by Utilities. In addition, as described in Section 3.1.3, certain restrictions would apply regarding size and weight of commercial vehicles.

Electric Transmission ROWs. According to the Platts Transmission Line Database, 90.3 miles of electric transmission lines are located within the shoreline/nearshore zone. Most of these transmission lines (61.5 miles) are underground (Platts 2009). Approximately 19 miles are overhead electric transmission lines, 7.4 miles are underwater, and 2.4 miles are a combination of overhead and underground. These lines include a 345kV-450kV line extending from the Lower New York Bay up to Jersey City and lines that cross the western/northwestern portion of Brooklyn. These lines are summarized in Table 39, and their locations are shown in Figure 21. Electric transmission line ROWs may present an opportunity for routing an onshore cable from the future cable landfall site to a substation. Refer to Section 3.2.7 for a discussion of submarine cables.

Table 39. Overhead Transmission Lines in the Shoreline/Nearshore Zone of Study Area 2

Source: Platts 2009

Owner	Capacity and Type	Total Length (miles)
Atlantic Wind Connection (proposed)	Direct Current – Underwater	3.5
Consolidated Edison Co. of New York, Inc.	115 kV – 161 kV Underground	20.7
	345 kV – 450 kV Overhead	0.4
	345 kV – 450 kV Underground	30.3
	Below 100 kV Overhead	2.6
	Below 100kV Underground	0.9
Total		58.4

Table 39 continued

Owner	Capacity and Type	Total Length (miles)
Consolidated Edison	345kV – 450kV Overhead/Underground	2.4
	345kV – 450kV Underground	1.5
Total		3.9
Long Island Power Authority	345kV – 450kV Overhead	14.7
Public Service Electric and Gas Co.	345kV – 450kV Overhead	0.5
Transenergie	345kV – 450kV Underground	8.1
Transmission Developers, Inc.	DC – Underwater	3.9
Unknown	Below 100kV Overhead	0.8
Overall Total		90.3

Gas Pipeline ROWs. There are 23.3 miles of natural gas pipelines located within the shoreline/nearshore zone; 20.8 miles are owned by the Buckeye Pipeline Company, and 2.4 miles are owned by Williams Gas Pipeline – Transco line (DOT 2007). Multiple lines cross the Hudson River and Upper New York Bay (see Figure 21). The data presented in Figure 21 is from a spatial dataset purchased in 2007. Additional updated information included here was obtained from the NPMS public map viewer; however, this data is limited to general locational data; no associated spatial data is available for mapping purposes. Additional pipelines are located in the shoreline/nearshore zone, including a gas pipeline that runs along the northwest portion of Brooklyn up through Astoria Park (DOT 2017). Refer to Section 3.2.7 for discussion of submarine cables and pipelines.

Railroad ROWs. Multiple lines of the New York Subway are located within the shoreline/nearshore zone; these are not depicted in Figure 21, as spatial data is unavailable. Based on online maps, several of these lines cross the East River.

Conservation Easements. The NCED indicated that two easements, totaling 7.2 acres, are held by non-governmental organizations in the shoreline/nearshore zone. One is a 5.2-acre easement held by the Yonkers Waterfront Associates along the Hudson River at the northern tip of the shoreline/nearshore zone, and the other is a two-acre easement held by Scenic Hudson along the Hudson River, just north of the Yonkers Waterfront Association easement (see Figure 21; NCED 2012).

Figure 21. Rights-of-Way and Conservation Easements, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; Baruch College-City University of New York 2017; NCED 2016; NPMS 2017; Platts 2009

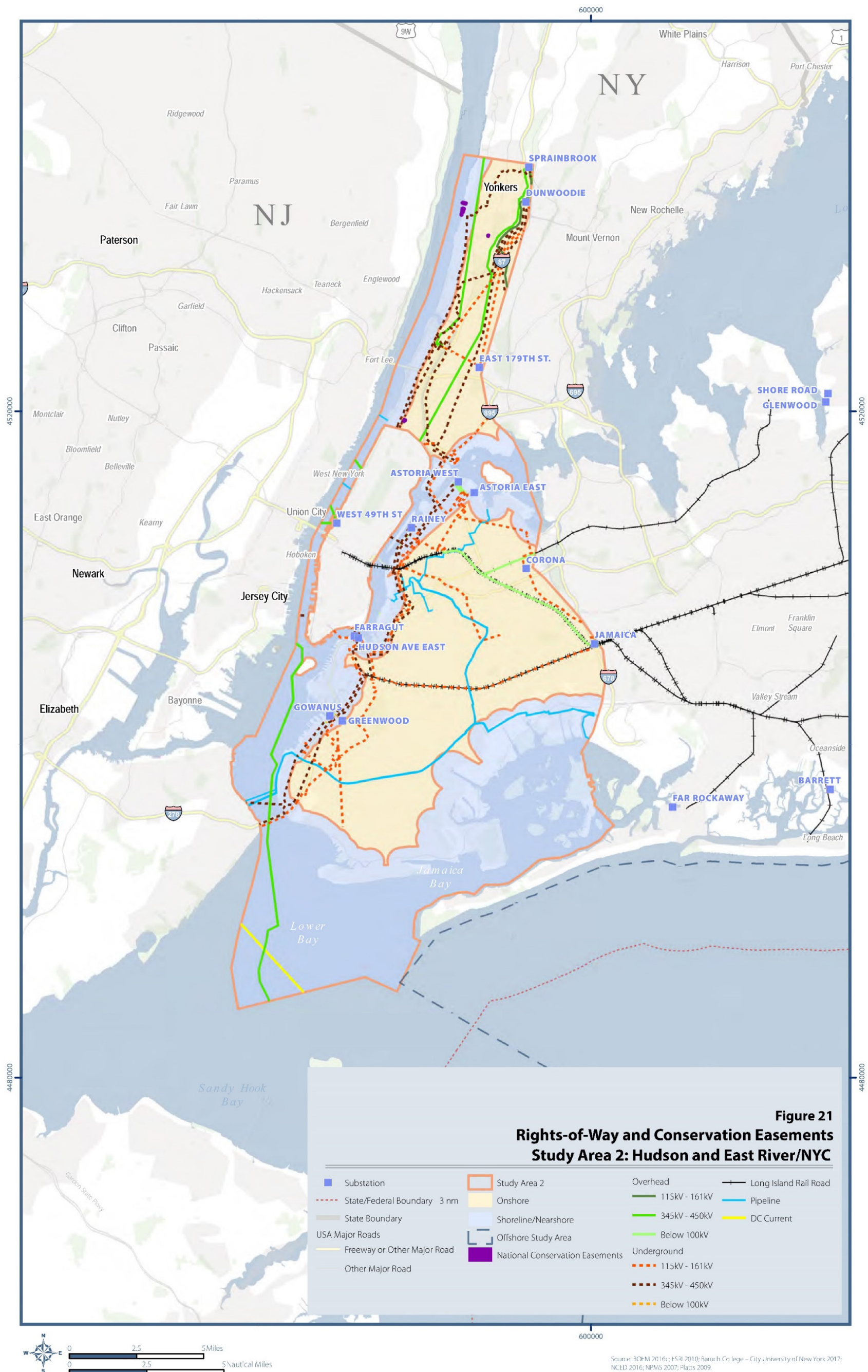
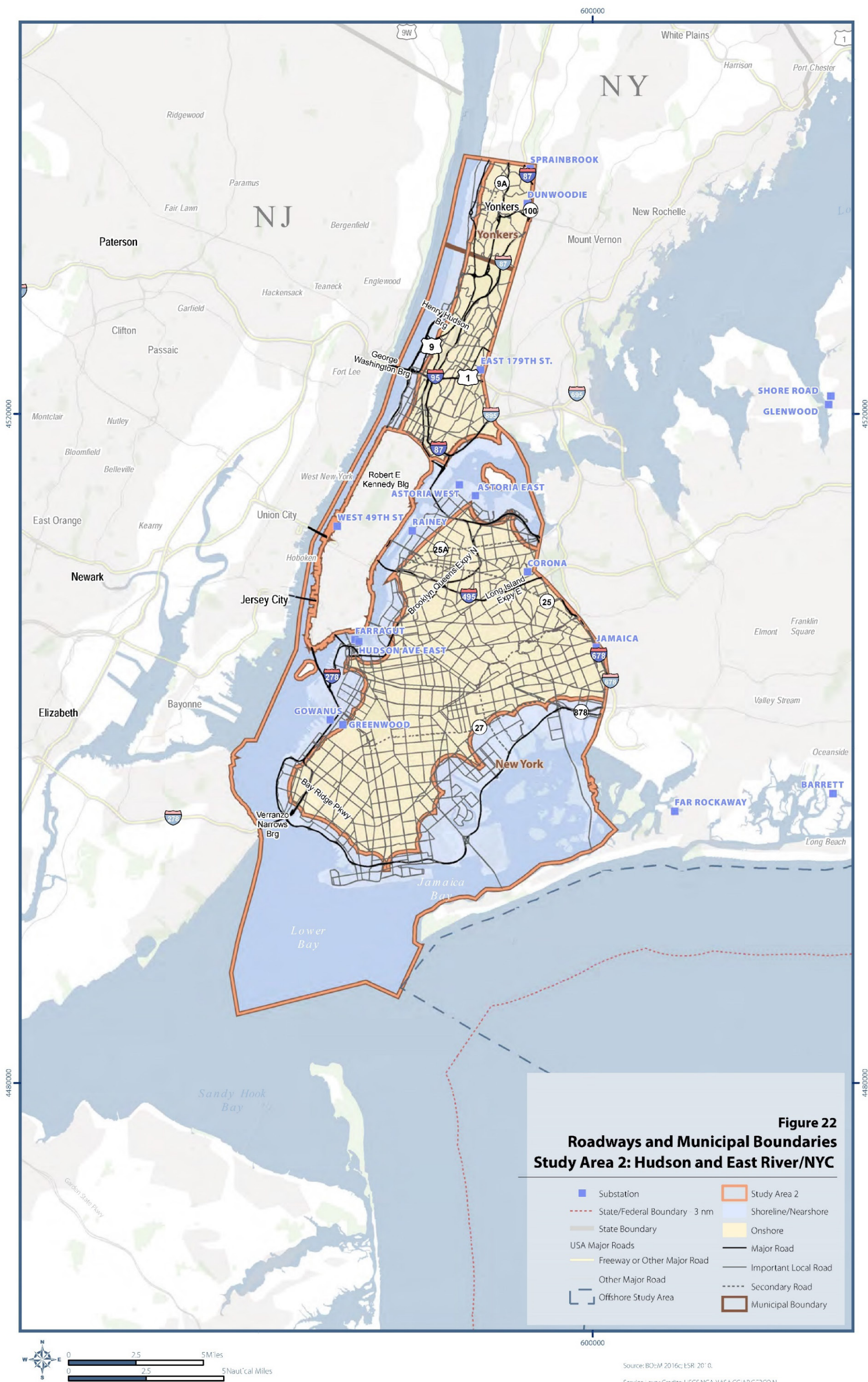


Figure 22. Roadways and Municipal Boundaries, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010



3.2.3.2 Onshore Zone

Indigenous Nations Lands. There are no documented Indigenous Nations lands within the onshore zone of Study Area 2.

Roadway ROWs. Within the onshore zone of Study Area 2, there are approximately 783 miles of road network, ranging from freeways to local connecting roads (see Figure 22). Freeways include I-87, I-278, and the Brooklyn Queens Expressway. Multiple bridges are located within the onshore zone, including the Triborough Bridge, the Cross Bay Veterans Memorial Bridge, and the Willis Avenue Bridge. Local connecting roads provide access within the zone. As indicated above, the ROWs associated with some of these roads may present opportunities for routing an onshore cable from a future cable landfall site to a substation. It should be noted that any use of DOT limited-access freeways would require express approval from the DOT under the Accommodation Plan for Longitudinal Use of Freeway Right-of-way by Utilities. Certain restrictions would apply regarding size and weight of commercial vehicles, as discussed in Section 3.1.2.1

Electric Transmission ROWs. A total of 138.5 miles of electric transmission lines are located within the onshore zone. The majority of the electric transmission lines are underground (100 miles), approximately 27.8 miles are overhead lines, 5.4 miles are underwater lines, and 5.3 miles are overhead/underground lines (Platts 2009). Multiple lines are located in the Bronx and Yonkers, as well as in the northern and western portions of Brooklyn (see Table 40 and Figure 21). Transmission line ROWs may present opportunities for routing an onshore cable from the cable landfall site to a substation.

Table 40. Overhead Transmission Lines in the Onshore Zone of Study Area 2

Source: Platts 2009

Owner	Capacity and Type	Total Length (miles)
Consolidated Edison Co. of New York, Inc.	115 kV – 161 kV Overhead	5.3
	115 kV – 161 kV Underground	53.4
	345 kV – 450 kV Overhead	13
	345 kV – 450 kV Underground	27.2
	Below 100 kV Overhead	9.1
	Below 100 kV Underground	0.1
Total		108.1
Consolidated Edison	345 kV – 450 kV Overhead/Underground	5.3
	345 kV – 450 kV Underground	8.3
Total		13.6

Table 40 continued

Owner	Capacity and Type	Total Length (miles)
Long Island Power Authority	150 kV – 161 kV Overhead	0.2
Metropolitan Edison	150 kV – 161 kV Underground	4.3
New York Power Authority	345 kV – 450 kV Overhead	0.2
Transenergie	345 kV – 450 kV Underground	6.7
Unknown	DC Underwater	5.4
Overall Total		138.5

Gas Pipeline ROWs. There are 37.3 miles of pipeline owned by Buckeye Pipeline Company within the onshore zone (DOT 2007). The pipeline traverses Brooklyn east-west and north-south. In addition to the 37.3 miles identified through a 2007 spatial dataset, there are other lines traversing the onshore zone, including two gas pipelines northwest of John F. Kennedy International Airport near the Belt Parkway, running east-west, a portion of one pipeline in Astoria, and multiple lines traversing Brooklyn (PHMSA 2017).

Railroad ROWs. Multiple lines of the New York Subway run throughout Brooklyn and the Bronx. As indicated previously, GIS shapefiles are not available for those lines.

Conservation Easements. The NCED indicated that there are two easements, totaling 1.5 acres, in the onshore zone. One is a 1.3-acre easement held by the NPS for historic preservation and is located at the north end of St. Nicholas Park, and the other is a 0.2-acre easement held by the Westchester Land Trust and is located in the Park Hill neighborhood of Yonkers (see Figure 21; NCED 2012).

3.2.4 Municipal Jurisdictions

Specific municipal regulations are discussed under pertinent resources.

3.2.4.1 Shoreline/Nearshore Zone

Most of the shoreline/nearshore zone of Study Area 2 is located within New York City (approximately 77,148 acres), and only a small portion (approximately 2,075 acres) at the northern tip of the zone is located in Yonkers (see Figure 22).

3.2.4.2 Onshore Zone

Similar to the shoreline/nearshore zone, most of the onshore zone of Study Area 2 is located within New York City (approximately 55,404 acres), and only a small portion (approximately 4,401 acres) is located in Yonkers (see Figure 22).

3.2.5 Local Zoning

Study Area 2 falls within the boundaries of the City of New York City and Yonkers (Westchester County). However, only New York City zoning data is available in GIS format. A review of zoning maps for each municipality in the study area is outside the scope of this Study, given its focus as a desktop analysis of readily available digital data. A description of applicable zoning regulations is provided below. It should be noted that other municipalities have local zoning laws and may have jurisdiction over landfall locations and other onshore development.

3.2.5.1 Shoreline/Nearshore Zone

New York City Zoning. New York City zoning regulations that may apply to a cable landfall site and the process for obtaining building permits and approvals are discussed in Section 3.1.5.1. Approximately 92% of the shoreline/nearshore zone is located within New York City and is covered by New York City zoning; the remainder is located within Yonkers, and no digital spatial zoning data is available for Yonkers.

Table 41 summarizes zoning districts in the Study Area 2 shoreline/nearshore zone in New York City, and Figure 23 shows their locations. Based on the same analysis described in Section 3.1.5.1, terminal facilities associated with offshore wind development would be permitted as-of-right on approximately 7,562 acres, or 26%, of the shoreline/nearshore zone within New York City and specially permitted on 14,993.4 acres, or 52.2%, of this zone. The City's zoning regulations for the BPC District do not mention terminal facilities for electric lines, and zoning requirements that may apply to this type of development in the BPC District are unknown; thus, a meeting should be scheduled with the applicable borough office to obtain an understanding of what requirements may apply.

Figure 23. New York City Zoning, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; New York City Department of City Planning 2017

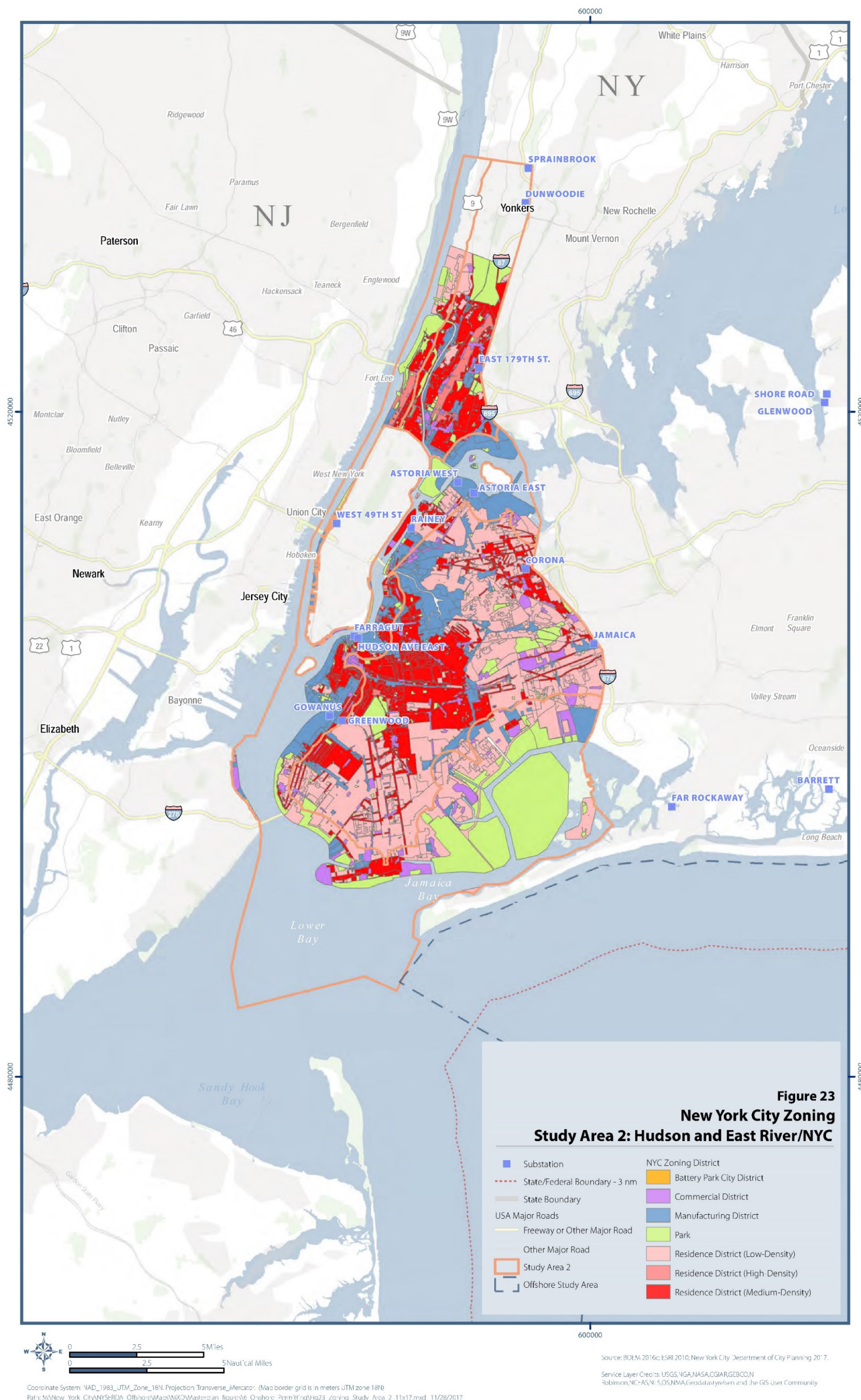


Table 41. New York City Zoning Data in the Shoreline/Nearshore Zone of Study Area 2

Source: New York City Department of City Planning 2017b

Zoning District	Permitted or Special Use ^a	Acres ^b
R1	Specially permitted	328.3
R2	Specially permitted	790.2
R3	Specially permitted	3,081
R4	Specially permitted	2,497.5
R5	Specially permitted	3,467.9
R6	Specially permitted	3,213.2
R7	Specially permitted	1,170.9
R8	Specially permitted	423.8
R9	Specially permitted	2.2
R10	Specially permitted	18.4
BPC District	Unknown	0.4
C2	Permitted as-of-right	0.6
C3	Permitted as-of-right	104
C4	Permitted as-of-right	384.7
C5	Permitted as-of-right	16.6
C6	Permitted as-of-right	87.1
C7	Permitted as-of-right	40.7
C8	Permitted as-of-right	410.5
M1	Permitted as-of-right	3,553.5
M2	Permitted as-of-right	586.8
M3	Permitted as-of-right	2,267.1
Park	Unknown	6,294.6
Total		28,740

Notes:

^a Based on “terminal facility.”

^b Acreage may not sum due to rounding.

3.2.5.2 Onshore Zone

New York City Zoning. New York City zoning regulations that may apply to a cable landfall site and the process for obtaining building permits and approvals are discussed in Section 3.1.5.1. Approximately 92% of the onshore zone is located with New York City; the remainder is located within Yonkers and no digital spatial zoning data is available for Yonkers.

Table 42 summarizes zoning districts in the Study Area 2 onshore zone in New York City, and Figure 23 shows their locations. Based on the same analysis described in Section 3.1.5.1, terminal facilities associated with offshore wind energy development would be permitted

as-of-right on approximately 8,532 acres, or 15.5%, of the shoreline/nearshore zone and specially permitted on 42,691.1 acres, or 77.7%, of this zone.

Table 42. New York City Zoning Data in the Onshore Zone of Study Area 2

Source: New York City Department of City Planning 2017b

Zoning District	Permitted or Special Use ^a	Acres ^b
R1	Specially permitted	465.3
R2	Specially permitted	701.6
R3	Specially permitted	4,175.1
R4	Specially permitted	9,403.4
R5	Specially permitted	9,058.9
R6	Specially permitted	12,379.1
R7	Specially permitted	5,542.2
R8	Specially permitted	965.5
C3	Permitted as-of-right	9.6
C4	Permitted as-of-right	1,102.3
C5	Permitted as-of-right	41.5
C6	Permitted as-of-right	187.9
C8	Permitted as-of-right	759.7
M1	Permitted as-of-right	4,837
M2	Permitted as-of-right	224.6
M3	Permitted as-of-right	1,369
Park	Unknown	3,745.5
Total		54,968.2

Notes:

^a Based on “terminal facility.”

^b Acreage may not sum due to rounding.

3.2.6 Coastal Zone

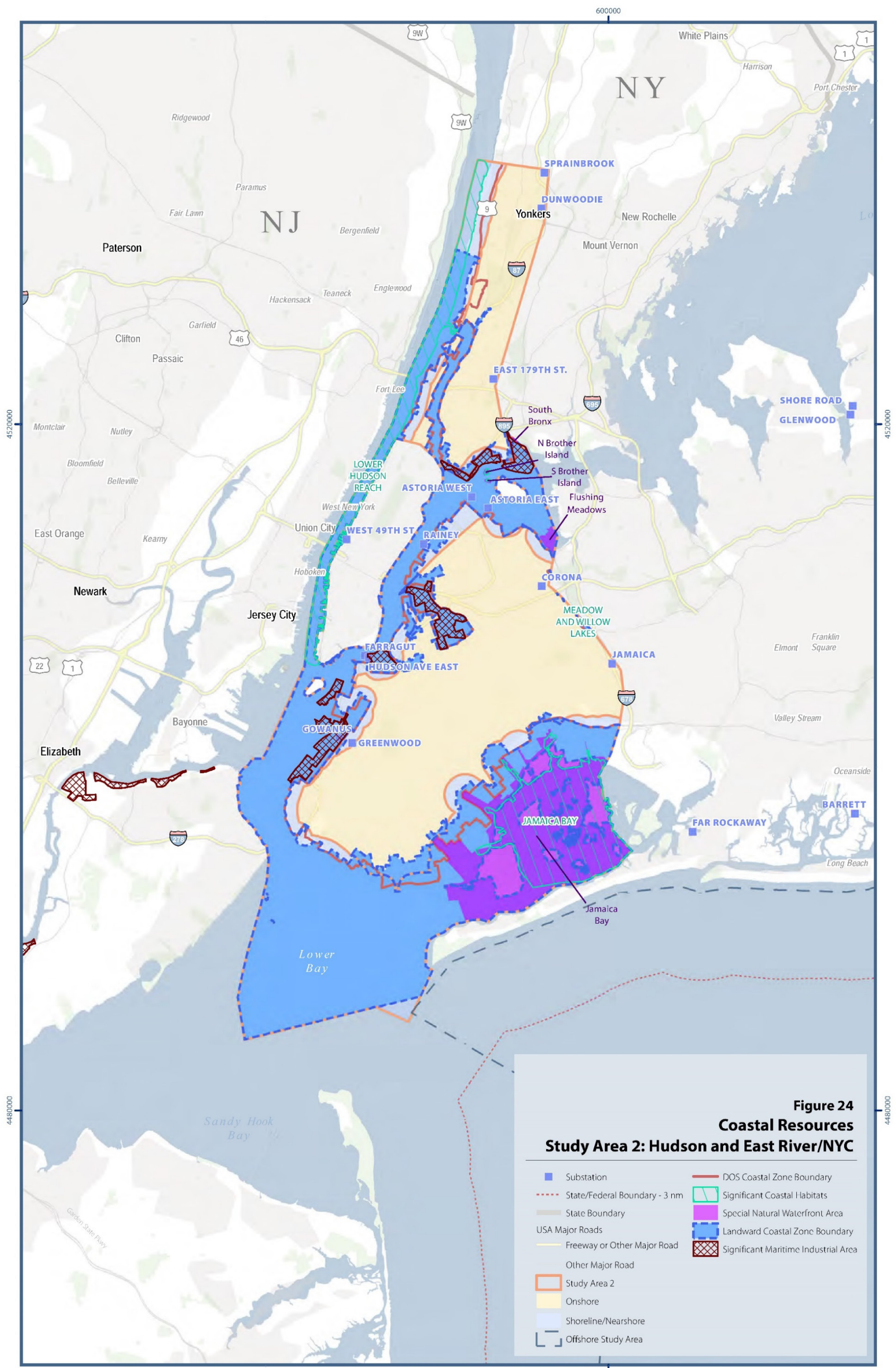
Refer to Section 3.1.6 for an overview of the regulatory framework applicable to the coastal zone.

3.2.6.1 Shoreline/Nearshore Zone

Approximately 71,954 acres (91%) of the Study Area 2 shoreline/nearshore zone is located within the New York State coastal zone (DOS 2016). Additionally, approximately 77,150 acres are located within the boundary of the New York City WRP and would be required to be consistent with its policies (see Figure 24; New York City Department of City Planning 2016b). The City of Yonkers does not have an approved LWRP (DOS 2017b).

Figure 24. Coastal Resources, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; DOS 2014, 2016; New York City Department of City Planning 2017



Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator; (Map border grid is in meters UTM zone 18N)
 Path: \\N:\New_York_City\NYS\ERDA_Offshore\Maps\MapX\Master\erian_figures\6_Onshore_Permitting\Hq24_Coastal_Resources_Study_Area_2_1x17.mxd 11/29/2017

Source: BOEM 2016c; ESRI 2010; DOS 2014, 2016; New York City Department of City Planning 2017.
 Service Layer Credits: USGS, NGA, NASAC, GIARG, RCON, Robinson, NC, AS, NLS, OS, NMA, Geodatasystem and the GIS User Community

Two SNWAs are located within the shoreline/nearshore zone of Study Area 2: the Jamaica Bay and the East River/Long Island SNWA (see Figure 24). Approximately 16,059 acres of the shoreline/nearshore zone are within the Jamaica Bay SNWA, comprising all of Jamaica Bay and associated shorelines. Approximately 269 acres of the shoreline/nearshore zone are located in the East River/Long Island SNWA; this area is limited to the northern portion of the zone.

In addition to the SNWAs, the shoreline/nearshore zone of Study Area 2 is located within five SMIA: Brooklyn Navy Yard, Newtown Creek, Red Hook, South Bronx, and Sunset Park (see Figure 24). A total of 2,193 acres of the shoreline/nearshore zone is located within these SMIA.

Shoreline Type. Based on an analysis of NOAA’s CUSP dataset, the shoreline type in the shoreline/nearshore zone includes both natural and hardened/armored. Natural shoreline accounts for approximately 29% of the total shoreline of the shoreline/nearshore zone of Study Area 2 (see Table 43 and Figure 25).

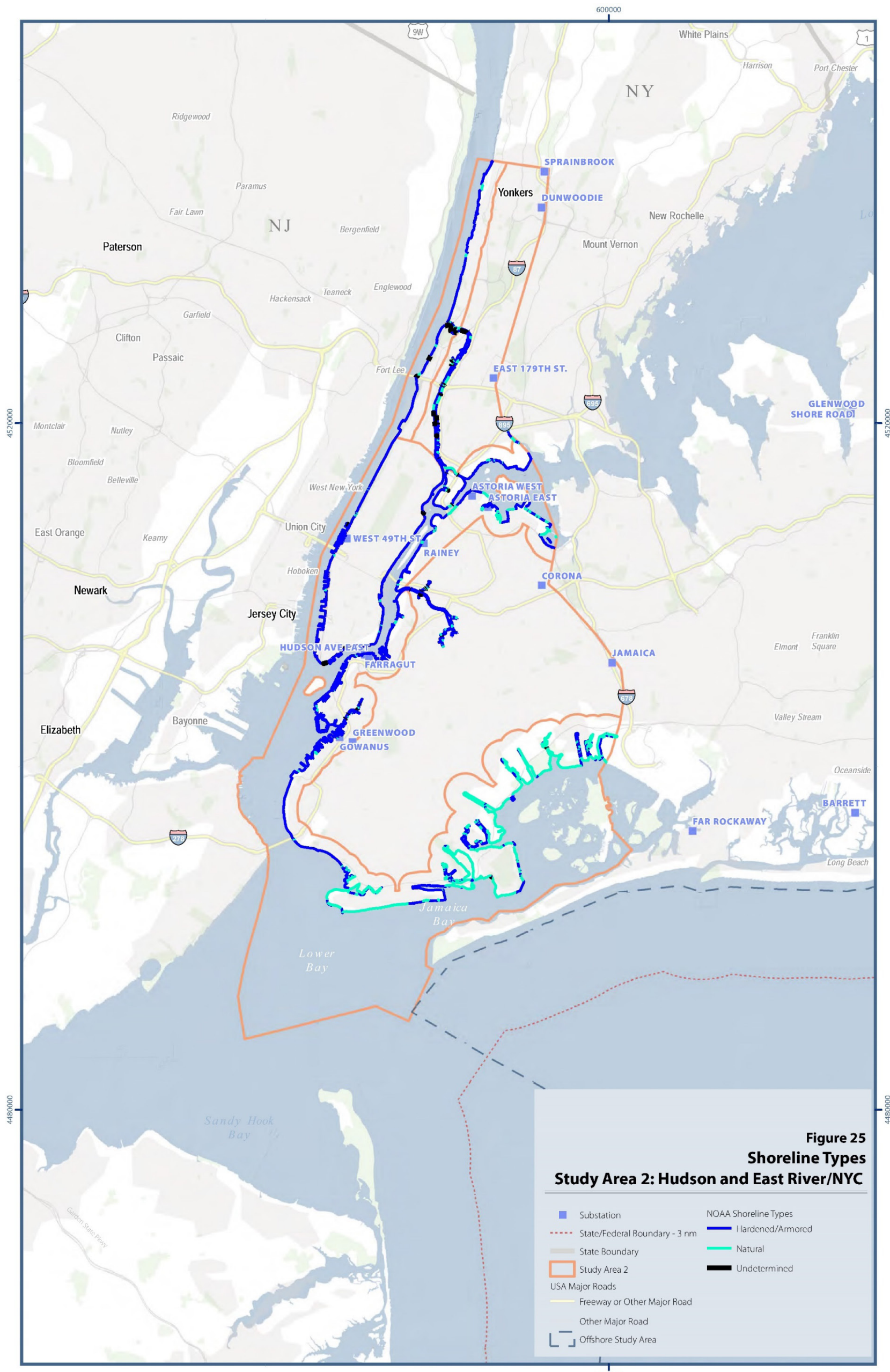
Table 43. Shoreline Type in the Shoreline/Nearshore Zone of Study Area 2

Source: NOAA Geodetic Survey 2017

Shoreline Type	Length of Shoreline (miles)
Natural	
Marsh/Swamp	11.8
Lake/Pond	0.5
Mean High Water	37.8
River/Stream	0.3
Total	50.4
Hardened/Armored	
Breakwater	0.9
Groin	0.1
Jetty	0.1
Bulkhead/Sea Wall	62.3
Canal	0.02
Permanent Dry-dock	1.8
Ramp	0.16
Riprap	29.7
Slipway	0.03
Wharf/Quay	28.2
Total	121.3
Undetermined	1.9
Total	173.6

Figure 25. Shoreline Types, Study Area 2

Source:BOEM 2016c; ESRI 2010; NOAA Geodetic Survey 2017



Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator, (Mac border grid is in meters UTM zone 18N)
 Path: M:\New_York_City\NYSE-10A_Offshore\Maps\WDX\Master-plan\Figures\6_01shore_Perm\Fig25_Shorelines_Study_Area_2_11x17.mxd 11/28/2017

Source: BOEM 2016c; ESRI 2010; NOAA Geodetic Survey 2017.
 Service Layer Credits: USGS, NASA, CGIAR, CLBCON, Robinson, NC-AS, NIS, OS, NOAA, Geodatastore and the GIS User Community

CEHAs. Brooklyn and Queens fall under CEHA jurisdiction; however, as indicated in Section 3.1.6, the maps available online are outdated (1988; DEC 2017b). Yonkers does not fall under CEHA jurisdiction.

Significant Coastal Fish and Wildlife Habitat. According to the DOS, a total of three Significant Coastal Fish and Wildlife Habitats overlap with or are entirely within the nearshore/shoreline zone of Study Area 2 (see Table 44 and Figure 24; DOS 2014). These areas total approximately 15,081 acres, or 19% of the total nearshore/shoreline zone. As indicated in Table 44, Jamaica Bay comprises over 65% of the Significant Coastal Fish and Wildlife Habitats in the zone. Jamaica Bay is one of the largest coastal wetland ecosystems in the state, and although it has been extensively disturbed because of development, much of it remains intact and provides important habitat to a number of fish and wildlife species (DOS 1992).

Table 44. Summary of Significant Coastal Fish and Wildlife Habitats in the Shoreline/Nearshore Zone of Study Area 2

Source: DOS 2014

Significant Coastal Fish and Wildlife Habitat	Acreage
Jamaica Bay	9,874
Lower Hudson Beach	5,183
North and South Brother Islands	24.1
Total	15,081

3.2.6.2 Onshore Zone

Approximately 5,109 acres (8.5%) of the onshore zone is located in the designated New York State coastal zone, and approximately 55,406 acres are located within the boundaries of New York City’s WRP and would thus be subject to consistency with its policies (see Figure 24; DOS 2016; New York City Department of City Planning 2016b). Additionally, approximately 28 acres of the onshore zone are located within the East River/Long Island SNWA. The onshore zone of Study Area 2 is also located within two SMIA: Newtown Creek and the South Bronx (see Figure 24). Approximately 1,043 acres of this zone are located within the SMIA. The City of Yonkers does not have an approved LWRP (DOS 2017b).

Shoreline Type. Based on NOAA CUSP data, there are approximately 26 miles of shoreline in the onshore zone; this shoreline is primarily associated with shorelines hardened/armored with bulkheads and riprap along the Harlem River and Newtown Creek (see Table 45 and Figure 25).

Table 45. Shoreline Type in the Onshore Zone of Study Area 2

Source: NOAA Geodetic Survey 2017

Shoreline Type	Length of Shoreline (miles)
Natural	
Marsh/Swamp	0.13
Natural Mean High Water	2.8
Total	2.9
Hardened/Armored	
Bulkhead/Seawall	17.2
Ramp	0.04
Rip Rap	4.1
Wharf/Quay	0.2
Total	21.5
Undetermined	1.5
Total	25.9

CEHAs. It is probable that CEHAs would not extend into the onshore zone of Study Area 2; however, mapping would be required to confirm this.

Significant Coastal Fish and Wildlife Habitats. One Significant Coastal Fish and Wildlife Habitat—the Meadow and Willow Lakes—overlaps with the onshore zone of Study Area 2 (see Figure 24); approximately 6.2 acres overlap with the onshore zone (DOS 2014).

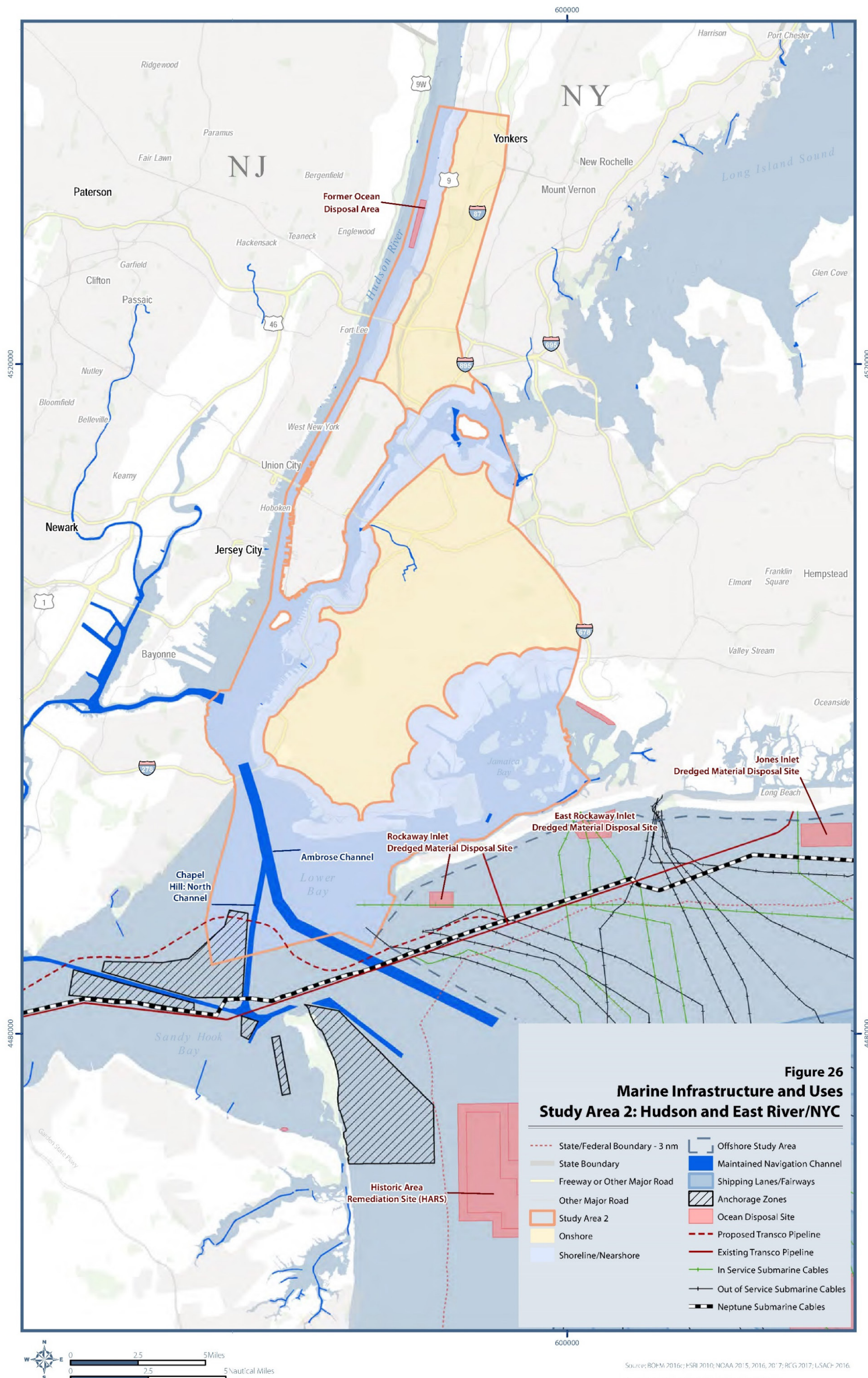
3.2.7 Marine Infrastructure and Uses

This resource discussion is applicable only to the shoreline/nearshore zone. Marine uses for the purposes of this Study include submarine cables and pipelines, shipping lanes, anchorage areas, navigational channels, and ocean disposal sites. Section 3.1.7 provides relevant regulatory information and also refers to additional studies that are appended to the Master Plan, and contain additional information on marine infrastructure and uses.

As indicated in Figure 26, one proposed Transco pipeline, the Northeast Supply Enhancement Project, bisects the southern portion of the shoreline/nearshore zone, within the Lower Bay. Additionally, just south of the shoreline/nearshore zone, there is an existing Transco pipeline, which consists of two sections: the Rockaway Delivery Lateral and the Lower New York Bay Lateral. The Neptune Project submarine cable runs parallel to the Transco pipeline (see Figure 26).

Figure 26. Marine Infrastructure and Uses, Study Area 2: Hudson and East River/NYC

Source: BOEM 2016c; ESRI 2010; NOAA 2015, 2016, 2017; RCG 2017; USACE 2016



As described in Section 3.1.7, there are six inbound/outbound designated shipping lanes that branch out like spokes on a wheel from the precautionary area at the entrance to the Ambrose Channel and Lower New York Bay; these are located southeast of Study Area 2 (see Figure 11). As discussed in Section 3.1.7, according to the Maritime Association of the Port of New York and New Jersey (2017) commercial vessel statistics for 2016, 4,297 vessels passed through the port in 2016. Containers ships comprised just over 50% of the total vessels for 2016, with tankers (including chemical tankers) comprising 25% of the total. As indicated in Figure 11, much of the shoreline/nearshore zone is categorized as having high vessel density. This is true within the Ambrose and Chapel Hill North federal channels, as well as through the Lower Bay, Upper Bay, and through the Hudson and East rivers. An area of medium vessel density parallels the Ambrose Channel on the east side and may represent an alternate approach into the Lower Bay. Areas of both high and medium density are evident in the approach to Jamaica Bay and within the bay.

As indicated above, the Port of New York and New Jersey, the Upper and Lower New York Bays, and Hudson and East rivers are heavily trafficked areas. Because of this, the U.S. Coast Guard operates a mandatory Vessel Traffic Service system in the New York Bay and surrounding areas. Within the New York Vessel Traffic Service Area, vessels must adhere to the operating procedures and designated radiotelephone frequencies (NOAA 2017), and within this area, vessel movements are coordinated through information sharing.

In addition to the vessels movements within the shoreline/nearshore zone of Study Area 2, safety and security zones have been established within the Hudson and East rivers in the vicinity of the Indian Point nuclear power station, U.S. Coast Guard cutters and shore facilities, and the New York City Passenger Ship Terminal. Additionally, there are various cable and pipeline areas within the rivers, including two cable areas within the East River between the Williamsburg and Manhattan bridges, various cable areas designated around Governors Island in both the Hudson and East rivers, and a pipeline crossing along the southeast side of Governors Island within the East River (NOAA 2017a, 2017b, 2017c). There is also a pipeline area between Manhattan and New Jersey, north of Battery Park, within the Hudson River (NOAA 2017c). Lastly, within the Upper Bay and the Narrows, there are several pipeline crossings between Brooklyn and Staten Island (NOAA 2017d). Digital spatial data is not available for these areas for inclusion in Figure 26; however, NOAA charts 12334, 12335, 12341, and 12343 can be consulted for locational information.

As indicated in Figure 26, the Ambrose Channel is a federally maintained navigation channel that connects the Atlantic Ocean with the Lower Bay and terminates at the approach to the Upper Bay. Additionally, a second federally maintained channel, the Chapel Hill North Channel, connects the Lower Bay and Sandy Hook Bay. A portion of both channels is located within the shoreline/nearshore zone (see Figure 26). Smaller maintained channels are located in the East River near Rikers Island, and in Flushing Bay, as well as at the approach to Jamaica Bay (see Figure 26).

The northwestern portion of Anchorage Area 28 is located within the southwestern corner of the shoreline/nearshore zone (see Figure 26). Four additional anchorage areas (26, 27, 49F, and 49G) are located outside and south of the shoreline/nearshore zone. According to the nautical chart 12327 for the New York Harbor, all of these are general purpose anchorages. One ocean disposal site is located along the eastern shoreline of the Hudson River in the northern portion of the shoreline/nearshore zone, south of Yonkers (see Figure 26). The use of this 0.28-square-nautical mile site has been discontinued; it was formerly used as a dumping ground (NOAA Office for Coastal Management 2016). No publicly available data have been found regarding what was historically dumped in that area.

Additionally, approximately 5 miles southeast of the study area is a Historical Area Remediation Site (HARS), which was historically used for disposal of contaminated dredged material. This HARS is 15.7 square nautical miles in area and has an average depth of 89 feet (EPA 2017a). A disposal site is designated as a HARS so that the site can be managed to reduce impacts at the site to acceptable levels (USACE New York District and EPA Region 2 2010). EPA Region 2 and USACE conducted various surveys of the HARS from 1994 to 1996, and the results of the sediment sampling indicated that the levels of toxicity present would fail ocean disposal criteria and would qualify as Category III dredged materials (USACE New York District and EPA Region 2 2010). Category III sediments refer to those that do not meet ocean disposal criteria, fail acute toxicity testing, or pose a threat of significant bioaccumulation that cannot be addressed through available disposal management practices. Thus, Category III sediments cannot be disposed of in the ocean. Since 1997, this HARS site has been remediated with imported dredged material meeting certain testing requirements from 58 dredging projects (as of 2008). The goal of these remedial activities is to create a cap with a required minimum thickness of 1 meter (USACE New York District and EPA Region 2 2010). The HARS and surrounding area was historically utilized for ocean disposal of dredged material and a variety of waste products, including sewage sludge and industrial waste. Two additional areas east of the HARS are depicted in Figure 10; a sewage sludge site is due east of the HARS site, and an acid waste site is southeast of the HARS site.

3.2.8 Threatened and Endangered Species

Refer to Section 3.1.7 for an overview of the regulatory framework for T&Especies. The results of the desktop analysis, as they pertain to T&Especies, are discussed below.

3.2.8.1 Shoreline/Nearshore Zone

Federal Threatened and Endangered Species. According to the USFWS IPaC report for the shoreline/nearshore zone, two mammal species (the NLEB and the Indiana bat [*Myotis sodalis*]), three bird species (piping plover, red knot, and roseate tern), and one flowering plant species (seabeach amaranth) listed under the ESA have the potential to occur in the shoreline/nearshore zone of Study Area 2 (see Table 46). Only one of these species, the piping plover, has designated critical habitat; however, Study Area 2 is outside of the designated critical habitat (USFWS 2017d). Nesting habitat for the piping plover does occur within the zone, and nesting habitat for the roseate tern has the potential to occur within the zone (e.g., within Jamaica Bay and the small islands within that system). The red knot would be expected to utilize only migratory habitat within the zone. In addition to the species identified by the USFWS IPaC system, NOAA Fisheries manages multiple listed marine species that occur within the shoreline/nearshore zone of Study Area 2, including two species of sturgeon (Atlantic sturgeon and shortnose sturgeon) and one species of sea turtle (loggerhead sea turtle). The loggerhead sea turtle and shortnose sturgeon do not have designated critical habitat within Study Area 2; however, in August 2017 NOAA Fisheries announced that the Atlantic sturgeon now has designated critical habitat, effective September 2017 (NOAA Fisheries 2017a). One of the four critical habitat units within the Atlantic sturgeon New York Bight Distinct Population Segment (DPS) is the Hudson River, which is located within Study Area 2 (NOAA Fisheries 2017d).

The STSSN indicates that strandings of loggerhead sea turtles have been reported over the last three years (2015-2017) in Nassau, Kings, New York, and Queens counties (NOAA Fisheries Southeast Fisheries Science Center 2017). Both Atlantic and shortnose sturgeon have a documented presence within Lower New York Bay and the Hudson River (DEC n.d.[d]; IUCN 2017a, 2017b; USFWS 2003).

Coordination with the USFWS and DEC will be necessary to assess confirmed records for bat occurrences in the vicinity of an identified cable landfall site. Refer to Section 3.1.8.1 for a discussion of survey guidelines that may be necessary.

State Threatened and Endangered Species. According to the DEC’s Nature Explorer, 17 state-listed plant species have the potential to occur in the shoreline/nearshore zone of Study Area 2 (see Table 46).

3.2.8.2 Onshore Zone

Federal Threatened and Endangered Species. According to the USFWS IPaC report for the onshore zone, three bird species (piping plover, red knot, and roseate tern) and one flowering plant species (seabeach amaranth) listed under the ESA have the potential to occur in the onshore zone of Study Area 2 (see Table 46). Although the IPaC report indicates the potential presence of these species in the onshore zone, the three bird species would be expected only to be transient in that area, and the seabeach amaranth is strictly a dune species and there are no dunes in the onshore zone based on the soils data presented in Section 3.2.12. Only one of the bird species, the piping plover, has designated critical habitat; however, Study Area 2 is outside of the designated critical habitat for that species (USFWS 2017e).

Table 46. Federal and State Protected Species with the Potential to Occur within the Shoreline/Nearshore Zone of Study Area 2

Sources: Natural Heritage Program 2015a, 2015b; Nature Explorer 2014; USFWS 2017d; Baker et al. 2013; Massachusetts Division of Fisheries and Wildlife 2012; NOAA Fisheries 2015c, 2017c, n.d.(e); DEC n.d.(c).

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Requirements
Mammals			
Northern long-eared bat (<i>Myotis septentrionalis</i>)	F/S = Threatened	IPaC	The NLEB hibernates in climatically stable caves or mines. During the summer, this species roosts singly or in maternity colonies beneath bark, in cavities, or in crevices of both live trees and snags (dead trees). Trees greater than or equal to 3 inches DBH that have exfoliating bark, cracks, crevices, and/or hollows are considered potentially suitable habitat for this species. The NLEB forages beneath the tree canopy, typically 3 to 10 feet above the ground, on forested hillsides and ridges, and along riparian areas. They may also forage over forest clearings, open water, and along roads.

Table notes are at the end of the table.

Table 46 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Requirements
Indiana bat (<i>Myotis sodalis</i>)	F/S = Endangered	IPaC	The Indiana bat hibernates in climatically stable limestone caves or mines. During the summer, maternity colonies of Indiana bats generally roost beneath the loose bark of dead or dying trees or in tree cavities. Trees greater than or equal to 5 inches DBH that have exfoliating bark, cracks, crevices, and/or hollows are considered potentially suitable habitat for this species. Foraging habitats include riparian areas, upland forests, ponds, and fields, but forested landscapes are the most important habitat within agricultural landscapes.
Sea Turtles			
Loggerhead sea turtle ^a (<i>Caretta caretta</i>)	F/S = Threatened	NOAA Fisheries	Nest on ocean beaches, generally preferring high-energy, relatively narrow, steeply sloped, coarse-grained beaches. Juveniles utilize nearshore coastal areas for foraging, inter-nesting habitat, and migratory habitat.
Fish			
Atlantic Sturgeon ^b (<i>Acipenser oxyrinchus oxyrinchus</i>)	F = Endangered	NOAA Fisheries	Spawn in freshwater and migrate into estuarine and marine waters to spend the rest of their lives. Juveniles reside in estuarine waters and adults in coastal waters and estuaries, generally in shallow nearshore areas dominated by gravel and sand substrates.
Shortnose Sturgeon (<i>Acipenser brevirostrum</i>)	F/S = Endangered	NOAA Fisheries/ DEC	Spawn in coastal rivers and prefer the nearshore marine, estuarine, and riverine habitat of large river systems.
Birds			
Least Bittern (<i>Ixobrychus exilis</i>)	S = Threatened	Nature Explorer	Freshwater and brackish marshes with dense, tall growths of aquatic or semiaquatic vegetation.
Least Tern (<i>Sternula antillarum</i>)	S = Threatened	Nature Explorer	Bare or sparsely vegetated sand or dried mudflats along coasts or rivers. Sandy or shell islands and gravel and sand pits.
Peregrine Falcon (<i>Falco peregrinus</i>)	S = Endangered	Nature Explorer	Broad range of natural and artificial habitats.
Pied-billed Grebe (<i>Podilymbus podiceps</i>)	S = Threatened	Nature Explorer	Dense stands of emergent vegetation or aquatic vegetation close to the surface.
Piping Plover (<i>Charadrius melodus</i>)	F = Threatened S = Endangered	IPaC	Nest on open, sparsely vegetated beaches and sandflats between the primary dune and high-tide line.

Table notes are at the end of the table.

Table 46 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Requirements
Red Knot (<i>Calidris canutus rufa</i>)	F = Threatened	IPaC	Migration habitat generally consists of sandy coastal habitats at or near tidal inlets or the mouths of bays and estuaries.
Roseate Tern (<i>Sterna dougallii dougallii</i>)	F/S = Endangered	IPaC	Nest almost exclusively on rocky islands, barrier beach islands, and saltmarsh islands. Nest sites occur most often in dense grass or under boulders.
Short-eared Owl (<i>Asio flammeus</i>)	S = Endangered	Nature Explorer	Large open areas within woodlots, stubble fields, fresh and saltwater marshes.
Plants			
Cut-leaved evening-primrose (<i>Oenothera laciniata</i>)	S = Endangered	Nature Explorer	Dry, sandy open ground, including successional old fields, sandy embankments, and disturbed areas of maritime grasslands.
Downy carrion-flower (<i>Smilax pulverulenta</i>)	S = Endangered	Nature Explorer	Moist soil of open woods, roadsides, and thickets
Dune sandspur (<i>Cenchrus tribuloides</i>)	S = Threatened	Nature Explorer	Maritime sand dunes and beaches
Field beadgrass (<i>Paspalum laeve</i>)	S = Endangered	Nature Explorer	Damp meadows, fields, mowed roadsides, mowed grounds, and lawns
Narrow-leaf sea-blite (<i>Suaeda linearis</i>)	S = Endangered	Nature Explorer	Salt marshes, sandy beaches, other coastal wetlands
Northern gama grass (<i>Tripsacum dactyloides</i>)	S = Threatened	Nature Explorer	Water courses and limestone outcrops, swamps and wet soil
Oakes' evening-primrose (<i>Oenothera oakesiana</i>)	S = Threatened	Nature Explorer	Maritime dunes, disturbed sandy soils in openings
Purple milkweed (<i>Asclepias purpurascens</i>)	S = Threatened	Nature Explorer	Wide diversity of open habitats
Retorse flatsedge (<i>Cyperus retrorsus</i> var. <i>retrorsus</i>)	S = Endangered	Nature Explorer	Sandy coastal habitats
Roland's sea-blite (<i>Suaeda rolandii</i>)	S = Endangered	Nature Explorer	Open, salt-influenced wetlands
Rough rush-grass (<i>Sporobolus clandestinus</i>)	S = Endangered	Nature Explorer	Limited habitat data available
Seabeach amaranth (<i>Amaranthus pumilus</i>)	F/S = Threatened	IPaC/Nature Explorer	Sandy ocean beaches within the sparsely vegetated zone between the high tide line and the toe of the primary dune
Slender spikerush (<i>Eleocharis tenuis</i> var. <i>pseudoptera</i>)	S = Endangered	Nature Explorer	Wet, fresh, often calcareous meadows, swales, springy places, woods, prairie, serpentine barrens, and ditches
Wild pink (<i>Silene caroliniana</i> ssp. <i>pennsylvanica</i>)	S = Threatened	Nature Explorer	Dry sandy, gravelly, or rocky woods and openings
Willow oak (<i>Quercus phellos</i>)	S = Endangered	Nature Explorer	Floodplain forests, maritime grasslands, and roadside forests and woodlands

Table notes are at the end of the table.

Table 46 continued

Species	Federal (F)/State (S) Status	Database	Summary of Habitat Requirements
Yellow flatsedge (<i>Cyperus flavescens</i>)	S = Endangered	Nature Explorer	Wet sandy sites
Yellow giant-hyssop (<i>Agastache nepetoides</i>)	S = Threatened	Nature Explorer	Upland in generally deciduous woods; also meadows, fencerows, thickets and lowland woods

Notes:

- ^a The loggerhead has a DPS within Study Area 2: the Northwest Atlantic DPS (NOAA Fisheries 2017c).
- ^b The Atlantic sturgeon has a DPS within Study Area 2: the New York Bight DPS (NOAA Fisheries 2017c).

In addition to the species identified by the USFWS IPaC system, NOAA Fisheries determined that one of the four critical habitat units within the Atlantic sturgeon New York Bight DPS is the Hudson River, which is located within the onshore zone of Study Area 2 (NOAA Fisheries 2017a). The loggerhead sea turtle and shortnose sturgeon do not have designated critical habitat within the onshore zone of Study Area 2. However, the STSSN indicates that strandings of loggerhead sea turtles have been reported over the last three years (2015-2017) in Nassau, Kings, New York, and Queens counties (NOAA Fisheries Southeast Fisheries Science Center 2017). Both Atlantic and shortnose sturgeon have a documented presence within Lower New York Bay and Hudson River (DEC n.d.[d]; IUCN 2017a, 2017b; USFWS 2003).

State Threatened and Endangered Species. According to the DEC’s Nature Explorer, two state-listed endangered plant species have the potential to occur in the onshore zone of Study Area 2 (see Table 47).

Table 47. State Protected Species with the Potential to Occur within the Onshore Zone of Study Area 2

Sources: Natural Heritage Program 2015a, 2015b; Nature Explorer 2014; USFWS 2017e, Baker et al. 2013; Massachusetts Division of Fisheries and Wildlife 2012

Species	State Status	Database	Summary of Habitat Requirements
Plants			
Cat-tail sedge (<i>Carex typhina</i>)	Endangered	Nature Explorer	Moist or wet woods and marshes
Minute duckweed (<i>Lemna perpusilla</i>)	Endangered	Nature Explorer	Aquatic settings, particularly in quiet waters

3.2.9 Other Sensitive Habitats

Refer to Section 3.1.9 for an overview of the regulatory framework applicable to these resources.

3.2.9.1 Shoreline/Nearshore Zone

Significant Natural Communities. Significant Natural Communities within the shoreline/nearshore zone of Study Area 2 are summarized in Table 48. These communities largely overlap with the DEC-regulated tidal wetlands and are therefore not shown on a separate figure.

Table 48. Significant Natural Communities within the Shoreline/Nearshore Zone of Study Area 2

Source: Natural Heritage Program 2011

System	Acreage	Percentage
Tidal Wetlands (estuary)		
Low salt marsh	625.9	0.8
Tidal river	9,741.6	12.3
Total	10,367.5	13.1

Eelgrass Beds. Eelgrass beds are not known to occur in Jamaica Bay (Waldman 2008), and are not expected to be found in other portions of the shoreline/nearshore areas of Study Area 2.

EFH. EFH has been identified for 29 species that may occur within the shoreline/nearshore zone of Study Area 2 (see Table 49 and Figure 12). Table 49 is conservatively inclusive, presenting information provided in both the *Guide to Essential Fish Habitat Designations in the Northeastern United States* (NOAA Fisheries n.d.[a]) and the online EFH Mapper tool (NOAA Fisheries n.d.[b]).

Table 49. Fish and Essential Fish Habitat within the Shoreline/Nearshore Zone of Study Area 2^a

Sources: NOAA Fisheries n.d.(a), n.d.(b)

Species	Eggs	Larvae/Early Juvenile ^b	Juveniles	Adults
Teuthida				
Long-finned squid (<i>Loligo pealeii</i>)	X	X	X	X
Lamniformes				
Sand tiger shark (<i>Carcharias taurus</i>)		X		

Table notes are at the end of the table.

Table 49 continued

Species	Eggs	Larvae/Early Juvenile ^b	Juveniles	Adults
Carcharhiniformes				
Dusky shark (<i>Carcharhinus obscurus</i>)		X	X	X
Sandbar shark (<i>Carcharhinus plumbeus</i>)		X	X	X
Tiger shark (<i>Galeocerdo cuvieri</i>)	X	X	X	X
Blue shark (<i>Prionace glauca</i>)				X
Smooth dogfish (<i>Mustelus canis</i>)	X	X	X	X
Rajiformes				
Clearnose skate (<i>Raja eglanteria</i>)	X	X	X	X
Little skate (<i>Raja erinacea</i>)			X	X
Winter skate (<i>Leucoraja ocellata</i>)	X	X	X	X
Clupeiformes				
Atlantic sea herring (<i>Clupea harengus</i>)	X	X (M, S)	X (M, S)	X (M, S)
Salmoniformes				
Atlantic salmon (<i>Salmo salar</i>)				X
Gadiformes				
Red hake (<i>Urophycis chuss</i>)	X	X (M, S)	X (M, S)	X (M, S)
Whiting (<i>Merluccius bilinearis</i>)	X	X	X	X
Pollock (<i>Pollachius virens</i>)		X	X	X
Lophiformes				
Monkfish (<i>Lophius americanus</i>)	X	X	X	X
Perciformes				
Black sea bass (<i>Centropristis striata</i>)	X	X	X (M, S)	X (M, S)
Bluefish (<i>Pomatomus saltatrix</i>)	X	X	X (M, S)	X (M, S)
Cobia (<i>Rachycentron canadum</i>)	X	X	X	X
Scup (<i>Stenotomus chrysops</i>)	X (S)	X (S)	X (S)	X (S)
Atlantic mackerel (<i>Scomber scombrus</i>)	X	X	X (S)	X (S)
King mackerel (<i>Scomberomorus cavalla</i>)	X	X	X	X
Spanish mackerel (<i>Scomberomorus maculatus</i>)	X	X	X	X
Atlantic butterfish (<i>Peprilus triacanthus</i>)	X	X (M)	X (M, S)	X (M, S)
Bluefin tuna (<i>Thunnus thynnus</i>)	X	X	X	X
Pleuronectiformes				
Windowpane flounder* (<i>Scophthalmus aquosus</i>)	X (M, S)	X (M, S)	X (M, S)	X (M, S)
Summer flounder (<i>Paralichthys dentatus</i>)	X	X (F, M, S)	X (M, S)	X (M, S)
Winter flounder* (<i>Pseudopleuronectes americanus</i>)	X (M, S)	X (M, S)	X (M, S)	X (M, S)

Table notes are at the end of the table.

Table 49 continued

Species	Eggs	Larvae/Early Juvenile ^b	Juveniles	Adults
Scorpaeniformes				
Redfish (<i>Sebastes fasciatus</i>)	X	X	X	X

Notes:

^a Area of analysis is within six distinct 10-minute square and major estuaries/bays/rivers boundaries: (1) 40° 40.0' N, 73° 50.0' W, 40° 30.0' N, 74° 00.0' W; (2) 40° 40.0' N, 73° 40.0' W, 40° 30.0' N, 73° 50.0' W; (3) 40° 40.0' N, 74° 00.0' W, 40° 30.0' N, 74° 10.0' W; (4) 40° 50.0' N, 74° 00.0' W, 40° 40.0' N, 74° 10.0' W; (5) 40° 50.0' N, 73° 50.0' W, 40° 40.0' N, 74° 00.0' W; (6) Hudson River/Raritan/Sandy Hook Bays, New York/New Jersey

^b As sharks give birth to live young, or lay eggs that hatch fully formed, this life stage is more often referred to as “early juvenile” as opposed to “larvae.”

Key:

- X = EFH designated for this life stage in area of analysis.
- Shaded = EFH not designated for this life stage in area of analysis.
- F = Estuarine EFH designation for this species includes the tidal freshwater salinity zone (salinity < 0.5 ppt).
- M = Estuarine EFH designation for this species includes the mixing water/brackish salinity zone (salinity < 25.0 ppt).
- S = Estuarine EFH designation for this species includes the seawater salinity zone (salinity > 25.0 ppt).
- * = Species with designated estuarine EFH that are considered “spawning adults” in both brackish salinity zones (salinity < 25.0 parts per thousand [ppt]) and seawater salinity zones (salinity > 25.0 ppt).

NOAA Trust Resources. NOAA Trust resources within Study Area 2 are the same as those listed for Study Area 1 (see Section 3.1.8). Included in Table 21 in Section 3.1.9 are those species listed on the GARFO EFH Assessment Worksheet (NOAA Fisheries n.d.[c]) that have a documented presence within the Hudson River, Lower Bay, or Jamaica Bay (NOAA Fisheries n.d.[d], n.d.[e]; USFWS n.d.; New Jersey Sea Grant Consortium n.d. [a], n.d.[b], n.d.[c]; Kahnle and Hattala 2010; DEC n.d.[b]; NOAA 2016; ASMFC 1998, 2017a, 2017b; USFWS 2006; Tanski et al. 2014). Additional species may be identified during NOAA consultations based on site and/or construction-specific details.

3.2.9.2 Onshore Zone

Significant Natural Communities. Significant Natural Communities within the onshore zone of Study Area 2 are summarized in Table 50. The tidal river overlaps with DEC-regulated tidal wetlands, and the oak-tulip tree forest community overlaps with Van Cortlandt Park; therefore, they are not shown on a separate figure.

Table 50. Significant Natural Communities within the Onshore Zone of Study Area 2

Source: Natural Heritage Program 2011

System	Acreage	Percentage
Tidal Wetlands (estuary)		
Tidal river	22.6	<0.1
Total	22.6	<0.1
Uplands		
Oak-tulip tree forest	285.2	0.5
Total	285.2	0.5
Overall Total	307.8	0.5

Eelgrass Beds. No eelgrass beds are anticipated to be located within the onshore zone due to its location outside of the tidal zone.

EFH and NOAA Trust Resources. No EFH or NOAA Trust Resources are located within the onshore zone.

3.2.10 Wetlands, Surface Waters, and Floodplains

Refer to Section 3.1.10 for an overview of the regulatory framework applicable to these resources.

3.2.10.1 Shoreline/Nearshore Zone

Freshwater and Tidal Wetlands. The USFWS NWI and DEC freshwater and tidal wetland datasets indicate that 39.9% (31,649.1 acres) of Study Area 2 consists of mapped wetlands (USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017). Table 51 provides a summary of the different wetland habitats and acreages that are found in the shoreline/nearshore zone according to these datasets, and their locations are shown in Figure 27. Only Class 1 freshwater wetlands are located within this zone (see Table 51). Additionally, there are 26,136.3 acres of wetland buffers within the zone, or 34% of the shoreline/nearshore zone.

Table 51. Mapped Freshwater and Tidal Wetlands and Buffers within the Shoreline/Nearshore Zone of Study Area 2

Sources: USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017

Wetland Classification	Acreage	Percentage of Zone
DEC Freshwater Wetlands		
Class 1	5.7	> 0.1
Class 2	0.0	0.0
Class 3	0.0	0.0
No Class	0.0	0.0
Total Acreage^a	5.7	> 0.1
USFWS NWI Wetlands^b		
Estuarine and Marine Deepwater	1,006	1.3
Estuarine and Marine Wetland	1,192.9	1.5
Freshwater Emergent Wetland	42.6	0.1
Freshwater Forested/Shrub Wetland	19	> 0.1
Freshwater Pond	9.8	> 0.1
Lake	0.0	0.0
Riverine	7.2	> 0.1
Other	0.0	0.0
Total Acreage^a	2,277.5	2.9
DEC Tidal Wetlands^c		
Adjacent Area (AA)		
Fresh Marsh (FM)	0.0	0.0
High Marsh (HM)	32.1	> 0.1
Intertidal Marsh (IM)	511.8	0.6
Littoral Zone (LZ)	28,822.2	36.4
Total Acreage^a	29,366.1	37.1
Total Wetland Acreage^a	31,649.3	39.9%
DEC Wetland Buffers		
Freshwater Buffer	27.1	<1%
Tidal Adjacent Area (AA)	26,109.2	33.0
Total Acreage	26,136.3	34%
Overall Total Wetland and Buffer Acreage^a	57,758.6	72.9

^a May not sum due to rounding.

^b Does not include freshwater wetlands that overlap with DEC wetlands.

^c Does not include wetlands that overlap with USFWS NWI wetlands.

Key:

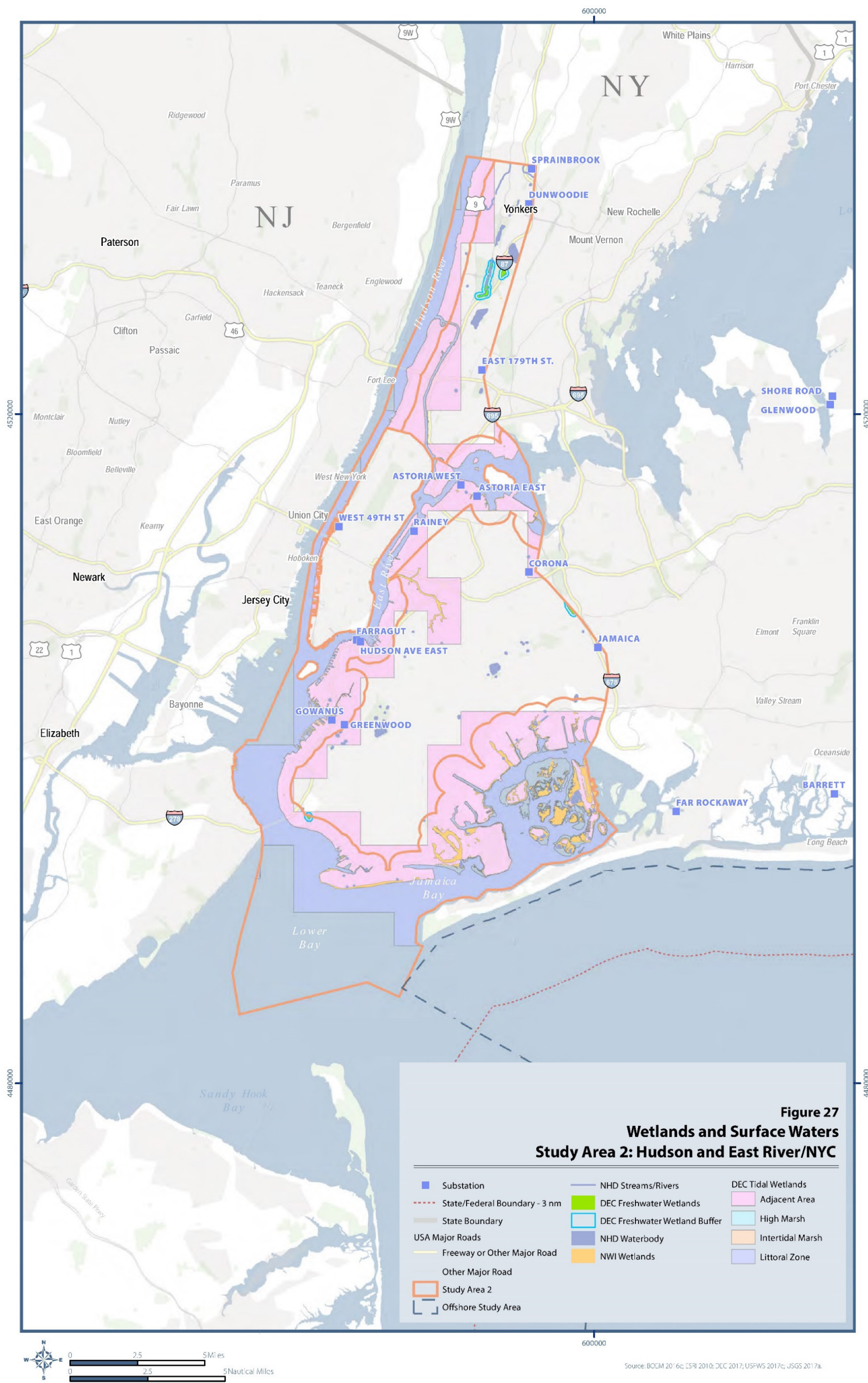
DEC = Department of Environmental Conservation

NWI = National Wetland Inventory

USFWS = U.S. Fish and Wildlife Service

Figure 27. Wetlands and Surface Waters, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; DEC 2017; USFWS 2017c; USGS 2017a



Surface Waters. According to the USGS NHD, a total of 1.8 miles of streams and rivers and a total of 57.2 acres of lakes and ponds are located within the shoreline/nearshore zone of Study Area 2 (see Figure 27; USGS 2017a).

Floodplains. FEMA NFHL data indicates that approximately 27.8% of the shoreline/nearshore zone is located within areas subject to 1% or greater annual chance of flood (i.e., 100-year floodplain), as indicated in Table 52 and in Figure 28 (FEMA 2017). Approximately 25% of the zone (19,842.0 acres) is mapped within the 500-year floodplain (Zone X), which includes areas of minimal flood hazard, or 0.2% annual chance of flooding. According to the FEMA NFHL, 36.6% (28,960.8 acres) of the shoreline/nearshore zone of Study Area 2 is characterized as open water.

Table 52. 100-Year Floodplains within the Shoreline/Nearshore Zone of Study Area 2

Sources: FEMA 2017

Zone	Description	Acreage	Percentage
A	SFHA, no base flood elevation provided	0.0	0.0
AE	SFHA with base flood elevation provided	11,175.5	14.1
AO	SFHA with sheet flow, ponding, or shallow flooding	19.8	> 0.1
VE	SFHA subject to coastal high hazard flooding	10,812.4	13.6
Total Acreages^a		22,007.7	27.8

^a May not sum due to rounding.

Key:

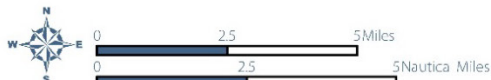
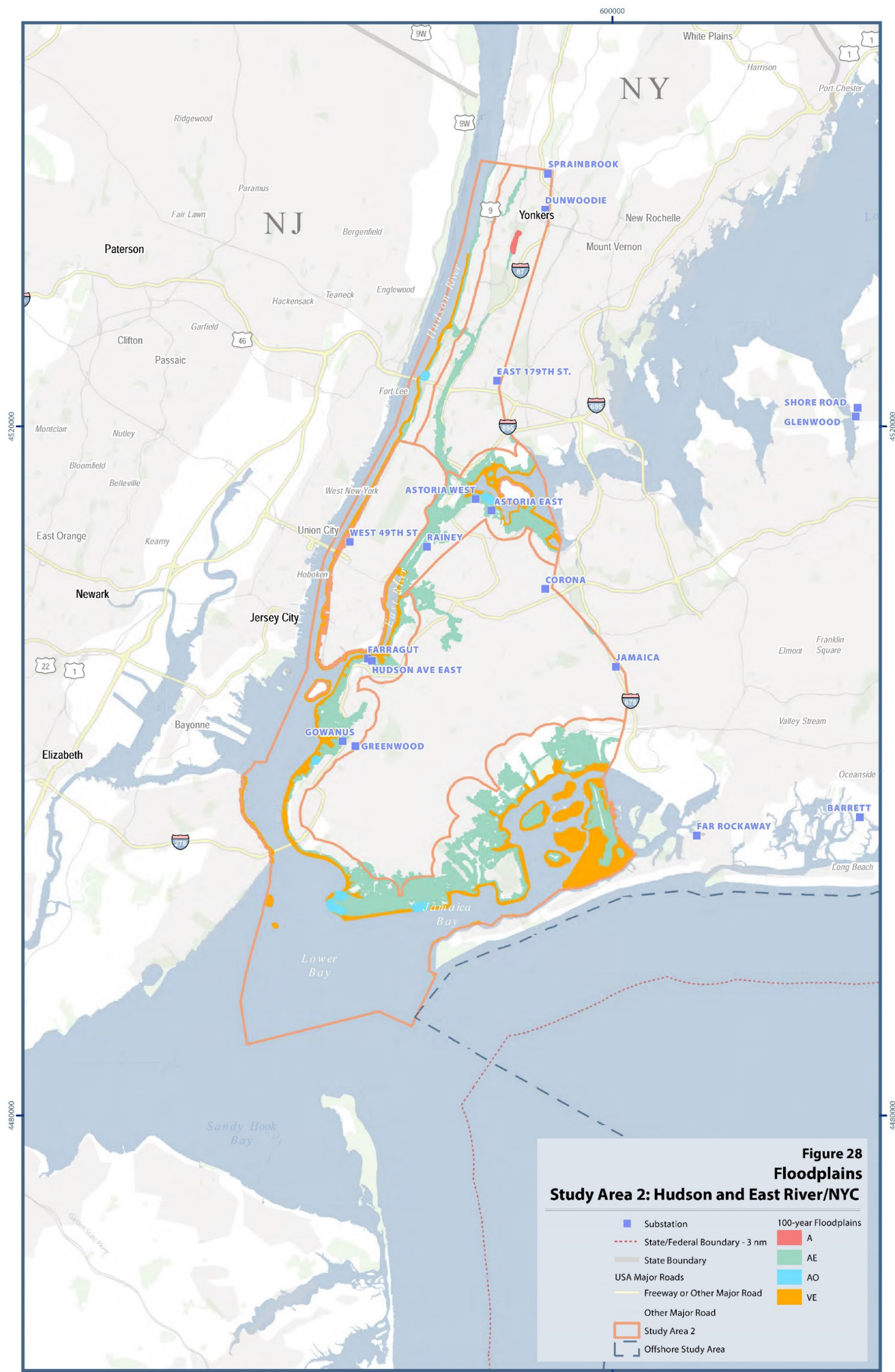
SFHA = Special Flood Hazard Area

3.2.10.2 Onshore Zone

Freshwater and Tidal Wetlands. The USFWS NWI and DEC datasets indicate that 1.5% (915.4 acres) of the onshore zone of Study Area 2 consists of wetlands (USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017). Table 53 provides a summary of the different wetland habitats and acreages that are found in the onshore zone according to these datasets, and Figure 27 shows their locations. Additionally, there are 13,084.2 acres of wetland buffers within the zone, or 21.4% of the onshore zone.

Figure 28. Floodplains, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; FEMA 2017



Coordinate System: NAD_1983_UTM_Zone_18N, Projection: Transverse_Mercator, (Map border grid is in meters UTM zone 18N)
 Path: \\M:\New York City\NYSP\03A_Offshore\Maps\WKO\Waterplan_Figures\6_Offshore_Permitting\ig28_Floodplains_Study Area 2_11x7.mxd 11/29/2017

Source: BOEM 2016c; ESRI 2010; FEMA 2017.
 Service Layer Credits: USCS, NGA, NASA, CGIAR, GHCCON, Robinson, NCEAS, NLS, OS, NMA, Geodatasysteme and the GIS User Community

Table 53. Mapped Freshwater and Tidal Wetlands and Buffers within the Onshore Zone of Study Area 2

Sources: USFWS 2017c; DEC 2005; Cornell Institute for Resource Information Sciences 2017

Wetland Classification	Acreage	Percentage
DEC Freshwater Wetlands		
Class 1	87.8	0.1
Class 2	0.0	0.0
Class 3	0.0	0.0
No Class	0.0	0.0
Total Acreage^a	87.8	0.1
USFWS NWI Wetlands^b		
Estuarine and Marine Deepwater	170.4	0.3
Estuarine and Marine Wetland	0.6	> 0.1
Freshwater Emergent Wetland	12.9	> 0.1
Freshwater Forested/Shrub Wetland	15.5	> 0.1
Freshwater Pond	38.8	0.1
Lake	228.5	0.4
Riverine	22.9	> 0.1
Other	0.0	0.0
Total Acreage^a	489.6	0.8
DEC Tidal Wetlands^c		
Fresh Marsh (FM)	0.0	0.0
High Marsh (HM)	0.3	> 0.1
Intertidal Marsh (IM)	> 0.1	> 0.1
Littoral Zone (LZ)	337.6	0.6
Total Acreage^a	338	<.1
Total Wetland Acreage	915.4	1.5
DEC Wetland Buffers		
Freshwater Buffer	349.8	<.1
Tidal Adjacent Area (AA)	12,734.4	21.3
Total Buffer Acreage	13,084.2	21.4
Overall Total Wetland and Buffer Acreage^a	13,999.6	23.4

^a May not sum due to rounding.

^b Does not include freshwater wetlands that overlap with DEC wetlands.

^c Does not include wetlands that overlap with USFWS NWI wetlands.

Key:

DEC = Department of Environmental Conservation

NWI = National Wetland Inventory

USFWS = U.S. Fish and Wildlife Service

Surface Waters. According to the USGS NHD, five5 miles of streams and rivers and 341.5 acres of lakes and ponds are located within Study Area 2 (see Figure 27; USGS 2017a).

Floodplains. FEMA NFHL data indicates that approximately 2.9% of the zone is located within the 100-year floodplain. Approximately 97.1% of the onshore zone of Study Area 2 (58,084.7 acres) is mapped within the 500-year floodplain [Zone X] (see Table 54 and Figure 28). No open waters are mapped within Study Area 2.

Table 54. Onshore Zone 100-Year Floodplains in Study Area 2

Sources: FEMA 2017

Zone	Description	Acreage	Percentage
A	SFHA, no base flood elevation provided	29.3	> 0.1
AE	SFHA with base flood elevation provided	1,691.0	2.8
AO	SFHA with sheet flow, ponding, or shallow flooding	0.0	0.0
VE	SFHA subject to coastal high-hazard flooding	1.4	> 0.1
Total Acreages^a		1,721.7	2.9

^a May not sum due to rounding.

Key:

SFHA = Special Flood Hazard Area

3.2.11 Migratory Birds and Eagles

Refer to Section 3.1.11 for an overview of the regulatory framework applicable to these resources.

Given the range of the birds present in the vicinity of the study areas for this analysis, the species identified in Table 27 in Section 3.1.11 is inclusive of Study Areas 1 and 2.

3.2.12 Sediment, Soil Types, and Steep Slopes

Refer to Section 3.1.12 for an overview of the regulatory framework applicable to these resources.

3.2.12.1 Shoreline/Nearshore Zone

Sediment Types. Sediment types within the shoreline/nearshore zone of Study Area 2 were identified using the CONMAP database (USGS 2005). The predominant sediment types in this zone are sand and sand-clay/silt (see Table 55 and Figure 15).

Table 55. Sediment Types within the Shoreline/Nearshore Zone of Study Area 2*Sources: USGS 2005*

Sediment Type	Acreage	Percentage^a
Sand	12,486.90	15.8
Sand-clay/silt	10,094.10	12.7
Gravel-sand	6,920.80	8.7
Clay-silt/sand	5,018.80	6.3
Sand/silt/clay	2,461.40	3.1
Gravel	135	0.2
Total	37,117	46.8

^a Percentage of the total shoreline/nearshore acreage within Study Area 2.

Soil Types and Steep Slopes. According to information obtained from the SSURGO database, there are 141 different soil types within the shoreline/nearshore zone of Study Area 2. Of these soils, 37 were predominant and cover 34% of the acreage within the zone (see Table 56). (Due to the size of the study area and the number of soil types, an associated figure has not been included.) For the purposes of this study, soils were considered predominant if they occurred in 155 or more acres, which is approximately 0.5% of the shoreline/nearshore zone of Study Area 2.

Approximately 593.5 acres, or 1.9% of the predominant soils within the shoreline/nearshore zone of Study Area 2, have steep (>10%) slopes (i.e., as indicated by the slope gradient of the dominant soil type) (USDA NRCS 2013, 2014a, 2014b). However, 180 acres may not exceed 10% slopes throughout, as the soil type Chatfield-Hollis-Greenbelt Complex ranges from 0-15% slopes.

Table 56. Predominant Soil Types within the Shoreline/Nearshore Zone of Study Area 2*Sources: USDA NRCS 2013, 2014a, 2014b*

Soil Type		Acreage	Percentage^a
Name	Description		
BaA	Barren sand, 0 to 3 % slopes	214.0	0.8
Be	Beaches	253.8	0.9
BiA	Bigapple fine sand, 0 to 3 % slopes	1,287.1	4.8
CHGC	Chatfield-Hollis-Greenbelt complex, 0 to 15 % slopes, rocky	180.0	0.2
FkB	Freshkills sandy loam, 0 to 8 % slopes	174.8	0.2
FkE	Freshkills sandy loam, 15 to 35 % slopes	188.3	0.2
FoA	Fortress sand, 0 to 3 % slopes	488.8	0.6

Table notes are on the next page.

Table 56 continued

Soil Type		Acreage	Percentage ^a
Name	Description		
GOB	Gravesend and Oldmill coarse sands, 0 to 8 % slopes	544.4	0.7
GUA	Greenbelt-Urban land complex, 0 to 3 % slopes	224.5	0.3
GUB	Greenbelt-Urban land complex, 3 to 8 % slopes	202.5	0.3
lwA	Ipswich mucky peat, 0 to 2 % slopes, very frequently flooded	292.8	0.4
JaA	Jamaica sand, 0 to 3 % slopes, frequently ponded	400.0	0.5
LUA	Laguardia-Urban land complex, 0 to 3 % slopes	540.9	0.7
MVA	Marinepark-Verrazano complex, 0 to 3 % slopes	188.6	0.2
PaA	Pawcatuck mucky peat, 0 to 2 % slopes, very frequently flooded	185.5	0.2
SaA	Sandyhook mucky fine sand, 0 to 2 % slopes, very frequently flooded	157.6	0.2
UBA	Urban land-Bigapple, non-dredge material complex, 0 to 3 % slopes	302.8	0.4
Uf	Urban land	683.9	0.9
UFA	Urban land-Flatbush complex, 0 to 3 % slopes	2,259.1	2.9
UFAI	Urban land-Flatbush complex, 0 to 3 % slopes, low impervious surface	308.3	0.4
UFB	Urban land-Flatbush complex, 3 to 8 % slopes	334.6	0.4
UGA	Urban land-Greenbelt complex, 0 to 3 % slopes	505.5	0.6
UGAI	Urban land-Greenbelt complex, 0 to 3 % slopes, low impervious surface	201.3	0.3
UGB	Urban land-Greenbelt complex, 3 to 8 % slopes	1,507.9	1.9
UGBI	Urban land-Greenbelt complex, 3 to 8 % slopes, low impervious surface	370.4	0.5
UGCRB	Urban land-Greenbelt-Chatfield-Rock outcrop complex, 0 to 8 % slopes	172.3	0.2
UGDI	Urban land-Greenbelt complex, 15 to 25 % slopes, low impervious surface	225.2	0.3
ULA	Urban land-Laguardia complex, 0 to 3 % slopes	336.2	0.4
ULAI	Urban land-Laguardia complex, 0 to 3 % slopes, low impervious surface	335.8	0.4
UmA	Urban land, tidal marsh substratum, 0 to 3 % slopes	2,127.6	2.7
UoA	Urban land, outwash substratum, 0 to 3 % slopes	1,392.0	1.8
UrA	Urban land, reclaimed substratum, 0 to 3 % slopes	2,407.5	3.0
UsA	Urban land, sandy substratum, 0 to 3 % slopes	827.0	1.0
UtA	Urban land, till substratum, 0 to 3 % slopes	2,087.6	2.6
UtB	Urban land, till substratum, 3 to 8 % slopes	1,422.6	1.8
UVA	Urban land-Verrazano complex, 0 to 3 % slopes	2,827.2	3.6
UVAI	Urban land-Verrazano complex, 0 to 3 % slopes, low impervious surface	730.3	0.9
Total		26,888.7	838.3

^a Percentage of the total shoreline/nearshore acreage within Study Area 2.

3.2.12.2 Onshore Zone

Sediment Types. Sediment types within the onshore zone of Study Area 2 were identified using the USGS CONMAP database (USGS 2005). The predominant sediment type in the zone was gravel-sand (see Table 57 and Figure 15). Refer to the next subsection for a discussion of soils, as the remainder of the zone is comprised of soils due to its upland nature.

Table 57. Sediment Types within the Onshore Zone of Study Area 2

Sources: USGS 2005

Sediment Type	Acreage	Percentage^a
gravel-sand	482.5	0.8
sand-clay/silt	4.9	> 0.1
Total^b	487.4	0.8

^a Percentage of the total onshore acreage within Study Area 2.

^b May not sum due to rounding.

Soil Types and Steep Slopes. According to information obtained from the SSURGO database, there are 135 different soil types within the onshore zone of Study Area 2. Of these soils, 25 were predominant and cover 88.5% of the acreage within the zone (see Table 58). (Due to the size of the study area and the number of soil types, an associated figure has not been included.) For the purposes of this study, soils were considered predominant if they occurred in 300 or more acres, which is approximately 0.5% of the onshore zone of Study Area 2.

Approximately 2,504.9 acres, or 4.8% of the predominant soils within the onshore zone of Study Area 2, have steep (>10%) slopes (i.e., as indicated by the slope gradient of the dominant soil type; USDA NRCS 2013, 2014a, 2014b).

Table 58. Predominant Soil Types within the Onshore Zone of Study Area 2

Sources: USDA NRCS 2013, 2014a, 2014b

Soil Type		Acreage	Percentage ^a
Name	Description		
CsD	Chatfield-Charlton complex, 15 to 35 % slopes, very rocky	330.8	0.6
GUAw	Greenbelt-Urban land complex, very deep water table, 0 to 3 % slopes, cemetery	870.1	1.5
GUB	Greenbelt-Urban land complex, 3 to 8 % slopes	331.1	0.6
GUBw	Greenbelt-Urban land complex, very deep water table, 3 to 8 % slopes, cemetery	1,295.6	2.2
GUCw	Greenbelt-Urban land complex, very deep water table, 8 to 15 % slope, cemetery	393.2	0.7
Ub	Udorthents, smoothed	304.0	0.5
Uf	Urban land	1,116.3	1.9
UFA	Urban land-Flatbush complex, 0 to 3 % slopes	13,561	22.8
UFAI	Urban land-Flatbush complex, 0 to 3 % slopes, low impervious surface	474.2	0.8
UGA	Urban land-Greenbelt complex, 0 to 3 % slopes	5,454	9.2
UGAI	Urban land-Greenbelt complex, 0 to 3 % slopes, low impervious surface	923.5	1.6
UGB	Urban land-Greenbelt complex, 3 to 8 % slopes	7,161.9	12.0
UGBI	Urban land-Greenbelt complex, 3 to 8 % slopes, low impervious surface	1,093.9	1.8
UGC	Urban land-Greenbelt complex, 8 to 15 % slopes	582.8	1.0
UGD	Urban land-Greenbelt complex, 15 to 25 % slopes	545.4	0.9
UGDI	Urban land-Greenbelt complex, 15 to 25 % slopes, low impervious surface	324.4	0.5
UIC	Urban land-Charlton-Chatfield complex, rolling, very rocky	551.6	0.9
UID	Urban land-Charlton-Chatfield complex, hilly, very rocky	429.5	0.7
UmA	Urban land, tidal marsh substratum, 0 to 3 % slopes	1,377.8	2.3
UoA	Urban land, outwash substratum, 0 to 3 % slopes	5,618.6	9.4
UpB	Urban land-Paxton complex, 3 to 8 % slopes	389.0	0.7
UpC	Urban land-Paxton complex, 8 to 15 % slopes	328.3	0.6
UrA	Urban land, reclaimed substratum, 0 to 3 % slopes	308.4	0.5
UtA	Urban land, till substratum, 0 to 3 % slopes	4,706.7	7.9
UtB	Urban land, till substratum, 3 to 8 % slopes	4,113.1	6.9
Total		52,585.3	88.5

^a Percentage of the total onshore acreage within Study Area 2.

3.2.13 Geologic Hazards

As indicated in Section 3.1.13, there are no regulations specific to geologic hazards.

3.2.13.1 Shoreline/Nearshore Zone

Review of the USGS Seismic Hazard Map indicates that the shoreline/nearshore zone of Study Area 2 is located in an area with a 2% probability of exceedance of pga values in 50 years, with values in the zone ranging from 0.14g to 0.20g (USGS 2014b). The shoreline/nearshore zone is located in an area that has a low landslide incidence (less than 1.5% of the area involved; USGS 2001). A desktop review of USGS resources identified no areas of karst terrain in the shoreline/nearshore zone of Study Area 2 (USGS 2014c). No suspected or known active faults are located within the study area (USGS 2006; Isachsen and McKendree 1977).

3.2.13.2 Onshore Zone

The discussion of geologic hazards for the onshore zone is the same as for the shoreline/nearshore zone above.

3.2.14 Cultural and Historic Resources

Refer to Section 3.1.14 for a regulatory overview of cultural and historic resources.

3.2.14.1 Shoreline/Nearshore Zone

Terrestrial Archaeological Sites. Based on a review of the CRIS database, a total of 168 previously recorded archaeological sites are located within the shoreline/nearshore zone of Study Area 2. Of these 168 sites, 131 are historic and 33 are sites associated with indigenous peoples. One of the sites is a shipwreck and one is unknown. Thirteen of the sites are historic burial sites and eight are burial sites associated with indigenous peoples. With respect to NRHP eligibility, 132 sites are undetermined, 19 are eligible, 10 are listed on the NRHP, six are not eligible, and one site has no data (OPRHP 2017b).

It should be noted that the CRIS database is a “living” database that is continually being updated with new data. Future studies associated with offshore wind development would need to develop additional information to supplement/update what is provided herein.

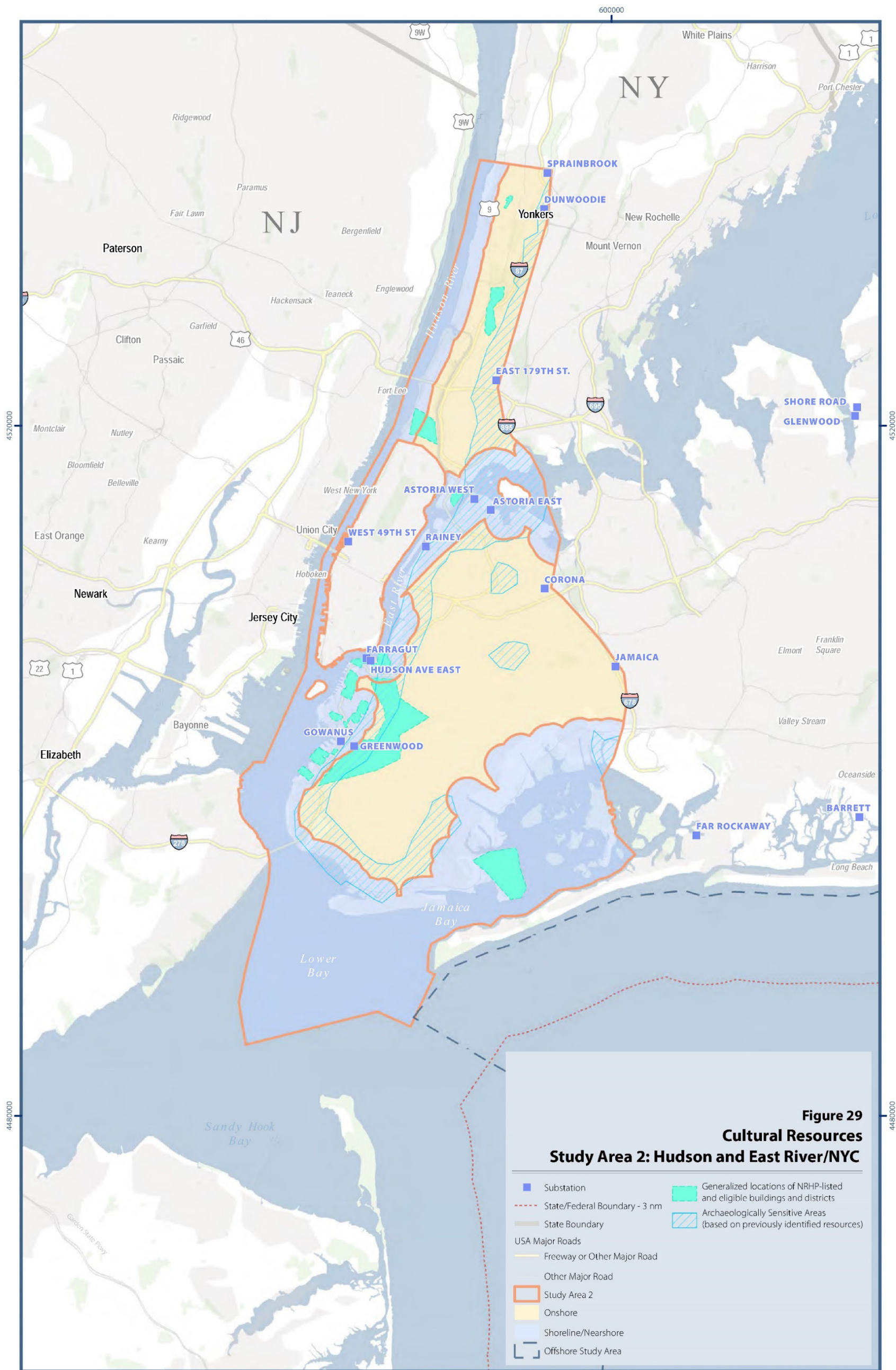
Additional details regarding the individual sites (Site Number, Name, Context, and NRHP status) are presented in Appendix B. Figure 29 identifies the general areas of archaeological sensitivity and shows that much of the southern and western portions of Brooklyn within the shoreline/nearshore zone are identified as being archaeologically sensitive.

Underwater Archaeological Sites. In addition to the results from the CRIS database, the NOAA Wrecks and Obstruction database (NOAA Office of Coast Survey 2017a) indicates that 223 shipwrecks are located within the shoreline/nearshore zone. The locations of these shipwrecks are identified in Figure 17. Note: (Because the NOAA Wrecks and Obstructions database is comprised of two separate datasets, the same wrecks may be included with slightly different locations. Therefore, only one dataset—the NOAA data which pulls from electronic nautical charts—has been used to provide a tally of the total number of wrecks. Both datasets are depicted in Figure 17.)

Terrestrial Architectural Resources, including Historic Districts and Properties. According to the CRIS and NRHP databases, 25 historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone of Study Area 2. Ten of these districts have been listed on the NRHP, 11 have been determined eligible for listing, three are classified as “undetermined” by the New York SHPO, and one has been determined not to be eligible for listing. Ninety-seven individual properties listed on the NRHP were also identified. These historic properties consist of houses of worship, cemeteries, private residences, schools, hospitals, banks, post offices, subway stations, tunnels, terminals bridges, stables, lighthouses, gardens/greenhouse, manufacturing and commercial structures, and a roller coaster. Refer to Figure 29 for generalized locations of NRHP-listed and eligible buildings and districts and Appendix B for a summary of the NRHP-listed sites.

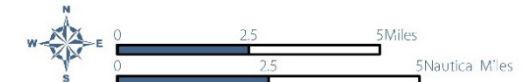
Figure 29. Cultural Resources, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; ESRI 2010; OPRHP 2017b



**Figure 29
Cultural Resources
Study Area 2: Hudson and East River/ NYC**

- Substation
- State/Federal Boundary - 3 nm
- State Boundary
- USA Major Roads
- Freeway or Other Major Road
- Other Major Road
- Study Area 2
- Onshore
- Shoreline/Nearshore
- Offshore Study Area
- Generalized locations of NRHP-listed and eligible buildings and districts
- Archaeologically Sensitive Areas (based on previously identified resources)



Coordinate System: NAD_1983_UTM_Zone_18N. Projection: Transverse_Mercator. (Map border grid is in meters UTM zone 18N)
 Path: M:\New_York_City\NYSE3DA_Offshore\Maps\WDX\Masterplan_figure\A6_Onshore_Permitting\Fig29_Cultural_Resources_Study_Area_2_11x17.mxd 11/30/2017

Source: BOEM 2016c; ESRI 2010; OPRHP 2017b.
 Service Layer Credits: USGS, NGA, NASA, CGIAR, HRC, N Robinson, NC, AS, NLS, OS, NMA, Geocast, syren and the GIS User Community

3.2.14.2 Onshore Zone

Terrestrial Archaeological Sites. Based on a review of the CRIS database, a total of 12 previously recorded archaeological sites are located within the onshore zone of Study Area 2. Seven of the 12 sites are historic and five are sites associated with indigenous peoples. One of the sites is a burial site associated with indigenous peoples. With respect to NRHP eligibility, eight sites are undetermined, three are eligible, and one is listed on the NRHP (OPRHP 2017b).

Refer to Figure 29 for generalized locations of NRHP-listed and eligible buildings and districts and Appendix B for a summary of the NRHP-listed sites.

Terrestrial Architectural Resources, including Historic Districts and Properties. According to the CRIS and NRHP databases, 69 historic districts, comprising multiple contributing properties, were identified in the onshore zone of Study Area 2. Fifty-three of these districts have been listed on the NRHP, 12 have been determined eligible for listing, two are classified as “undetermined” by the New York SHPO, and two have been determined not to be eligible for listing (OPRHP 2017b). Two hundred forty-three individual properties listed on the NRHP were also identified. These historic properties consist of houses of worship, cemeteries, private residences, schools, post offices, subway stations, one tunnel, cultural buildings, firehouse, municipal buildings, and public bathhouses. Refer to Figure 29 for generalized locations of NRHP-listed and eligible buildings and districts, and Appendix B for a summary of the NRHP-listed sites.

3.2.15 Areas of Contamination

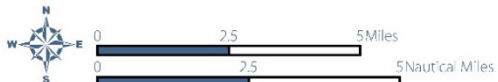
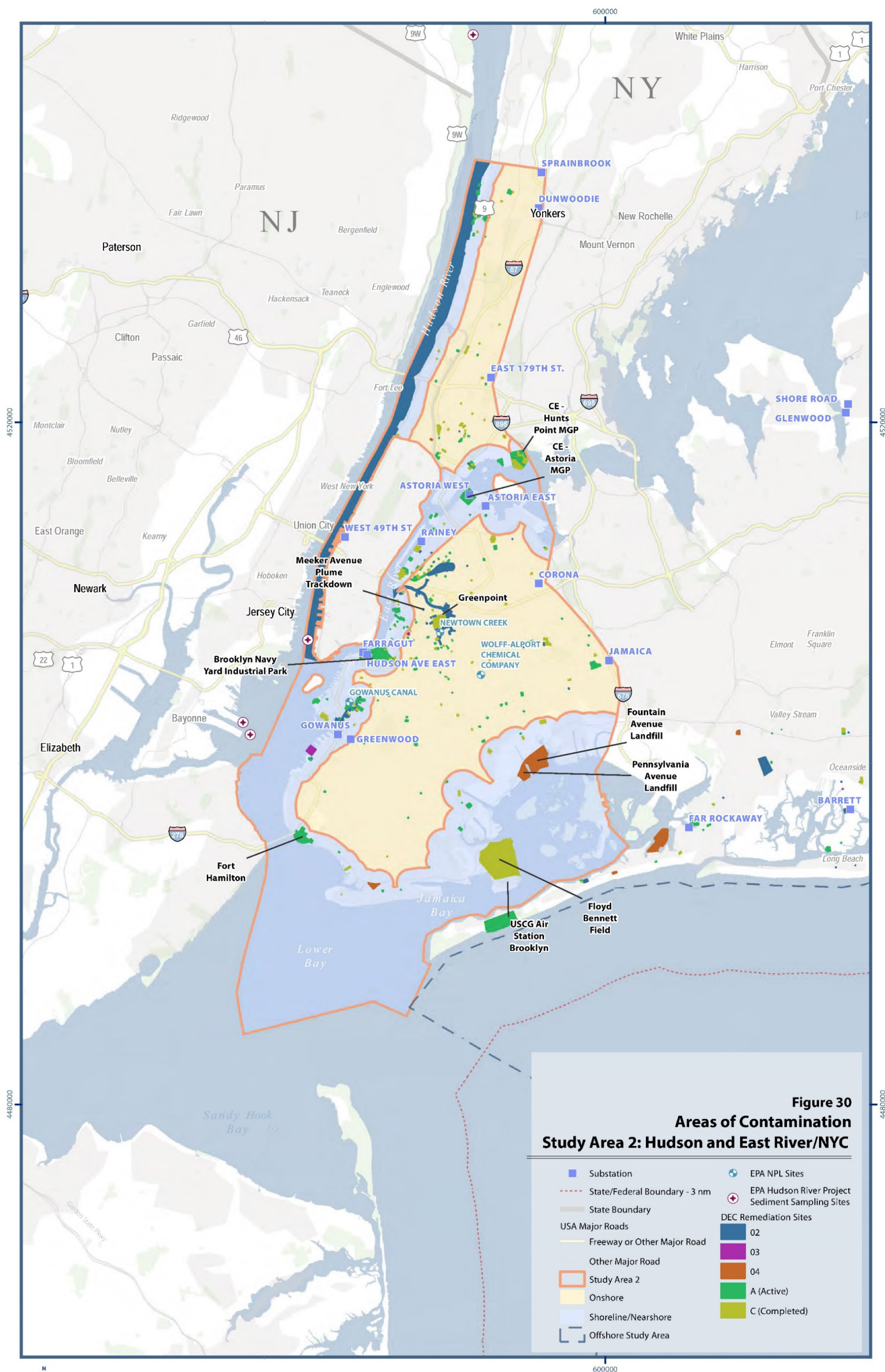
Refer to Section 3.1.15 for a regulatory overview of areas of contamination.

3.2.15.1 Shoreline/Nearshore Zone

Federal and State Remediation Program Sites. According to the EPA’s FRS geodatabase, one Superfund NPL site is located in the shoreline/nearshore zone of Study Area 2, the Gowanus Canal (Site Number: NYN000206222), located on Butler Street in Brooklyn (see Figure 30; EPA 2017c). (EPA data on NPL sites is limited to latitude/longitude; no site boundaries are available. Approximate site locations are included in Figure 30.)

Figure 30. Areas of Contamination, Study Area 2: Hudson and East River/ NYC

Source: BOEM 2016c; USEPA 2017a,c,d; ESRI 2010; New York City Department of City Planning 2017; DEC 2013; TAMS Consultant Gradient Corporation 1995



Coordinate System: NAD_1983_UTM_Zone_18N. Projection: Transverse_Mercator. (Map border grid's in meters UTM zone 18N)
 Path: I:\New_York_City\NYSEROA_Offshore\Waps\WMD\Waste-plan_figures\6_Onshore_Permitting\Fig30_Brownfields_and_Superfund_Sites_Study_Area_2_11x17.mxd 11/29/2017

Source: BOEM 2016c; USEPA 2017a,c,d; ESRI 2010; New York City Department of City Planning 2017; DEC 2013; TAMS Consultants and Gradient Corporation 1995.
 Service Layer Credits: USGS,NGA,NASA,CGIAR,GEBCO
 Robinson,NCEAS,NLS,OS,NMA,Geodatastore and the GIS User Community

Additionally, according to the DEC’s remediation dataset, a total of 418 sites included in State remediation programs, comprising approximately 7,905 acres, are located within the shoreline/nearshore zone of Study Area 2 (see Table 59 and Figure 30; DEC 2013). Three of the sites are Class 4, indicating that cleanup has been completed but maintenance and monitoring are ongoing at the site, and 127 of the 418 sites are Class C, indicating that remediation is complete.

Table 59. Summary of State Remediation Program Sites in the Shoreline/Nearshore Zone of Study Area 2

Source: DEC 2013

Site Class	Total of Acreage per Class	Count of Sites Per Class
2	4,986.0	57
3	25.5	2
4	406.7	3
A	988.4	222
C	1,212.0	127
P	286.4	7
Total	7,905	418

Sediment Contamination. Historic sediment contamination is well documented in the Hudson River and New York/New Jersey Harbor. To support the efforts under the Comprehensive Conservation Management Plan for the New York/New Jersey Harbor Estuary Program, specifically the section that focuses on management of toxic contamination, the EPA conducted sediment investigations in 1998 under its Regional Environmental Monitoring and Assessment Program (REMAP) to determine whether biological health and sediment quality had improved, declined, or remained the same when compared to previous efforts conducted in 1993 and 1994 (EPA 2003). The study included sampling locations in the shoreline/nearshore zone within the Lower and Upper Harbors, as well as within Jamaica Bay. Sediment samples were analyzed for polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), metals, pesticides, dioxins, and furans. Data were analyzed to determine potential biological effects using environmental toxicity thresholds, including the effects range median (ERM); ERM indicates the concentration above which effects are generally or always observed.

According to the data, the Upper Harbor was one of two areas that had the most widespread and diverse contaminant levels, with 82% of Upper Harbor exceeding an ERM value for at least one chemical. Of the 10 metals analyzed, mercury had the highest percent area of all of the metals that exceeded an ERM in the New York/New Jersey Harbor as a whole; 71% of the area in the Upper Harbor exceeded the ERM

concentration for mercury, 32% of the area in the Lower Harbor exceeded this ERM, and only 3.6% of Jamaica Bay exceeded this ERM (EPA 2003). Stations where the mercury concentrations were elevated above the threshold include several within the shoreline/nearshore zone along the western shoreline of Manhattan and near Rikers Island. Dichlorodiphenyltrichloroethane (DDT) was found in lower concentrations than the metals, and only 3.6% of the area of the Upper Harbor exceeded the ERM concentration for DDT, and DDT was documented at 0% for the Lower Harbor and Jamaica Bay (EPA 2003). PAHs above the ERM value were not documented in the Upper Harbor, including the shoreline/nearshore zone (EPA 2003).

In addition to the REMAP data, 1993 Lower Hudson River sediment data obtained from the EPA Hudson River Project (TAMS Consultants and Gradient Corporation 1995) indicated that PCB levels in the sediment at three locations within the Upper New York Bay would be classified as Class C sediments, meaning that they are considered to be highly contaminated and likely to pose a risk to aquatic life. Total PCBs greater than 1,000 parts per billion (ppb) are considered to be Class C sediments for saltwater sediments such as those in the Upper New York Bay (DEC 2014). Values at the three locations within the Upper New York Bay ranged from 2,000 to as high as 32,000 ppb (see Figure 30). When contaminant levels exceed Class C, the applicant is responsible for determining whether the material is hazardous as defined in 6 NYCRR Part 371. Contamination extended up the Hudson River, as data for a location approximately 3.5 miles north of the upper limit of Study Area 2 indicates that PCB concentrations ranged from 40 ppb to as high as 6,000 ppb (see Figure 30; TAMS Consultants and Gradient Corporation 1995).

In 1997, the Contamination Assessment and Reduction Project began, which was a collaborative project comprised of federal, state, and non-governmental partners aimed at providing guidance on the status and future of contamination in the NY/NJ Harbor Estuary. Sediment, water, external sources, biota, and trackdown (i.e., sampling focused on PCBs and mercury in select areas) samples were collected between 1999 and 2006. Contaminants of concern included PCBs, dioxins and furans, PAHs, pesticides, heavy metals, particulate, and dissolved organic carbon. The data analyses included numerical modeling to evaluate contaminant loadings in relation to measured contaminant concentrations; a sediment transport model that estimated suspended sediment, organic carbon, and nutrient loadings into the NY/NJ Harbor; and a contaminant fate, transport, and bioaccumulation model (Lodge et al. 2015).

According to the Contamination Assessment and Reduction Project, as of the last year of data collected (2006), the NY/NJ Harbor still contained persistent contaminated sediments, which likely play a larger role in controlling contamination than external loadings. PCB contamination was found to be widespread throughout the NY/NJ Harbor Estuary. There were problematic concentrations of dioxins and furans in sections of the Harbor, with 10 other contaminants detected in exceedance of applicable New York or New Jersey water quality standards (Lodge et al. 2015).

Historic sediment contamination also has been found in the East River and Jamaica Bay. Based on 1993 and 1994 sediment data collected as part of the REMAP, mercury was detected at about five parts per million in a few samples from the East River, and PCBs were detected in samples from several locations in the East River at concentrations above 450 ppb, with a high value of 1,973 ppb. PAHs were detected in samples from five sites in the East River at concentrations exceeding 20,000 ppb (Adams et al. 1998). The Jamaica Bay Watershed Protection Plan (NYCDEP 2007) includes a discussion of sediment quality in the bay. A review of previous studies indicated that various trace and heavy metals and priority pollutants are present in the sediments of Jamaica Bay. These include copper, mercury, chromium, PAHs, and PCBs/pesticides. These contaminants were generally found near outfalls of water pollution control plants, combined sewer overflows and storm sewers, and near landfills (NYCDEP 2007). Based on data collected in 1998, 20% of the bay's sediment was found to be highly toxic, and 32% was found to be toxic (NYCDEP 2007).

In addition to the historical data discussed above, the Monmouth University Urban Coast Institute received a \$4 million grant to work with the Hudson River Foundation and other partners to study sediment contaminant levels in the New York/New Jersey Harbor. Their research will focus on navigation channels, but should provide valuable data on sediment quality for part of the shoreline/nearshore zone (Dredging Today 2017).

3.2.15.2 Onshore Zone

According to EPA data, there are two NPL sites in the onshore zone of Study Area 2 (see Table 60 and Figure 30). Table 60 excludes one site that has been removed from the NPL by EPA (EPA 2017d). This site was listed as ready for reuse and redevelopment in 2006, and no published information regarding institutional controls is available. (EPA data on NPL sites is limited to latitude/longitude; no site boundaries are available. Approximate site locations are included in Figure 30.)

Table 60. Superfund NPL Sites in the Onshore Zone of Study Area 1*Source: EPA 2017d*

Site Name	Location	EPA Site Number	Facility URL
Wolff-Airport Chemical Company	1125-1139 Irving Ave., Ridgewood, Queens	NYC200400810	https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.topics&id=0206479#Status
Newtown Creek	South end of Ivy Hill Rd, Brooklyn	NYN000206282	https://cumulis.epa.gov/supercpad/cursites/csinfo.cfm?id=0206282

A total of 273 sites included in the State remediation programs, comprising approximately 995 acres, are located within the onshore zone of Study Area 2 (see Table 61 and Figure 30). One site is classified as Class 4, meaning that cleanup has been completed but maintenance and monitoring are ongoing at the site, and 100 of the sites are classified as Class C, indicating that remediation is complete (DEC 2013).

Table 61. Summary of State Remediation Program Sites in the Onshore Zone of Study Area 2*Source: DEC 2013*

Site Class	Total of Acreage per Class	Count of Sites Per Class
2	444.1	44
3	1.5	1
4	1.5	1
A	141.0	111
C	234.0	100
P	173.3	16
Total	995.3	273

4 Summary of Desktop Findings

Section 4 provides a high-level summary of potential opportunities as well as the principal environmental, physical, and social constraints associated with each study area. The focus of this section is on comparing the two study areas in terms of the general potential opportunities and constraints/risks of onshore permitting.

4.1 Opportunities and Constraints

Using the results of the desktop analysis (Section 3), a summary matrix was created to highlight the resource characterizations and associated opportunities and constraints (see Table 62). This summary matrix was compiled with specific focus given to the resource characterizations in the shoreline/nearshore zone that are considered to have the greatest influence on siting a cable landfall site. Supplemental information is also provided for onshore resources to help inform consideration of potential onshore cable or submarine cable routes. Each resource was categorized by color, according to the following scheme:

Green	No specific constraint identified from findings of the desktop analysis
Yellow	Potential constraint identified from findings of the desktop analysis

Potential constraints were qualified as being hard or soft. Hard constraints refer to resources that create potential avoidance areas due to the inability to mitigate impacts. Soft constraints refer to resources that can be mitigated, though that mitigation typically adds time or costs to the siting and permitting process. Because of the size of the study areas and the diversity of the resources within those study areas, some of the resources are associated with both hard and soft potential constraints as well as opportunities. Opportunities can generally be considered as areas not specifically identified as having a potential constraint. A high-level summary of each study area is presented below. Hard constraints for each of the study areas are shown in Figures 31 and 32. It should be noted that the constraints illustrated on these figures are based on “known” constraints; additional constraints may be identified during site-specific assessments of potential landfall sites.

For Study Area 1, five resources are associated with hard potential constraints (publicly owned lands, local zoning, marine infrastructure and uses, sediment/soil types/steep slopes, and areas of contamination), and four are associated with soft potential constraints (Indigenous Nations lands/ROWS/conservation easements, threatened and endangered species, other sensitive habitats,

and wetlands/surface waters/floodplains). Lastly, two of the resources—coastal zone and cultural resources—would be associated with both hard and soft constraints due to the specific elements within those resource headings. Six resources are associated with constraints due to time (publicly managed lands, public places, and government properties; local zoning, coastal zone/CEHAs; threatened and endangered species; other sensitive habitats; and wetlands, surface waters and floodplains), six resources are associated with constraints related to the creation of avoidance areas (Indigenous Nations lands, ROWs, and conservation easements; local zoning; coastal zone/CEHAs; steep slopes; cultural resources; and areas of contamination), and three resources are associated with constraints due to added costs (marine infrastructure, other sensitive habitats, and wetlands, surface waters and floodplains).

Three resources in Study Area 1 (Indigenous Nations lands/ROWs/conservation easements, local zoning, and areas of contamination) are associated with specific opportunities with respect to either siting a cable landfall site or routing a future onshore cable from the cable landfall site to a substation.

Similar conclusions apply to Study Area 2. Five resources are associated with hard potential constraints (publicly owned lands, local zoning, marine infrastructure and uses, sediment/soil types/steep slopes, and areas of contamination), and four are associated with soft potential constraints (Indigenous Nations lands/ROWs/conservation easements, threatened and endangered species, other sensitive habitats, and wetlands/surface waters/floodplains). Two of the resources—coastal zone and cultural resources—would be associated with both hard and soft potential constraints due to the specific elements within those resource headings. Eight resources are associated with constraints due to time, six are associated with constraints related to avoidance areas, and three are associated with constraints due to added costs.

Three resources in Study Area 2 (Indigenous Nations lands/ROWs/conservation easements, local zoning, and areas of contamination) are associated with opportunities for either siting a cable landfall site or routing a future onshore cable from the cable landfall to a substation.

Refer to Table 62 for additional details regarding each of these identified constraints and opportunities.

Table 62. Summary Constraint/Opportunity Matrix

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Study Area 1: Long Island/Rockaway Peninsula			
Land Cover	Land cover throughout Study Area 1 varies from undeveloped habitats such as forests and wetlands to developed areas with a range of intensities. Half of the shoreline/nearshore zone is characterized as open water. The onshore zone is more developed, with 72.4% of the zone categorized as developed land, the majority of which is low and medium intensity.	No specific constraints have been identified for land cover; refer to other resources (land ownership, coastal zone, zoning and planning, wetlands, and other sensitive nearshore habitats) for additional information regarding the cover types present in the Study Area and identified constraints and opportunities.	Constraints related to land cover could result in additional time needed to acquire permits, the use of construction methods to avoid sensitive nearshore habitats and wetlands, and the need for compliance with local planning and zoning requirements.
Publicly Managed Lands, Public Places, and Government Properties	<p>Within the shoreline/nearshore zone, 34,396 acres (19%) are designated as publicly managed lands, public places, and governmental properties. The largest is the Fire Island National Seashore, which comprises nearly 17,000 acres. A total of approximately 23,080 acres (15%) within the onshore zone are designated as publicly managed lands, public places, and governmental properties. High concentrations of these areas are located in the northeastern corner of the onshore zone and are associated with several pine barren state forests; others are located within the center of the zone, including Connetquot River State Park.</p> <p>The Fire Island National Seashore extends approximately 26 miles along the southern shoreline of the shoreline/nearshore zone, and the Gateway National Recreation Area spans approximately 4.4 miles of shoreline on the western end of the Rockaway Peninsula.</p>	The Fire Island National Seashore and the Gateway National Recreation Area present the largest constraints to siting a cable landfall site and would require an easement from the National Park Service; these areas would be considered hard constraints and are likely avoidance areas. Additionally, a petition for an easement for a cable to cross state-owned lands underwater would be required in order to traverse state-held lands in the nearshore. The latter is not considered a constraint but has been identified as an area requiring agency coordination.	The hard constraint related to the easement on National Seashore or National Park Service property is a separate and time-consuming process adding potentially a year or more to the schedule.
Indigenous Nations Lands, Rights-of-Way, and Conservation Easements	Land ownership in the shoreline/nearshore zone includes approximately 55 acres of the Poospatuck Indian Reservation in the easternmost portion of the zone. Conservation easements comprise 1.4 acres of this zone, and 34.6 miles of overhead electric transmission lines are located primarily in the western portion of the shoreline/nearshore zone. There are almost 210 miles of overhead electric transmission lines and 22.4 miles of underground electric transmission lines within the onshore zone. One gas pipeline traverses the shoreline/nearshore zone and terminates in Long Beach. Road networks provide access throughout Study Area 1, as do several major bridge crossings. Several branches of the Long Island Railroad cross the Study Area.	<p>Roadway, Long Island Railroad, and electric transmission line and gas pipeline rights-of-way may present an opportunity with respect to routing an onshore cable from a cable landfall site to a substation. There may be an opportunity for co-location within existing commuter rail corridors for overhead lines, if adequate space exists. Commercial rail lines for freight are a likely hard constraint due to the difficulty of obtaining access agreements, resulting in avoidance areas.</p> <p>The Poospatuck Indian Reservation would be considered a soft constraint due to the need for coordination and demonstration that impacts can be mitigated.</p>	<p>Existing rights-of-way may present an opportunity for routing an onshore cable as they would represent previously disturbed areas that are maintained for infrastructure purposes. However, commercial rail lines for freight are a likely hard constraint.</p> <p>Road network access must consider the use of parkways, which have visual and height restriction constraints that can limit access for construction vehicles, resulting in the need to carefully consider traffic plans during construction or factoring in a Special Hauling Permit.</p> <p>The Poospatuck Indian Reservation would require additional coordination and demonstration that impacts can be mitigated, which would likely add time to the siting process.</p>
Municipal Jurisdictions	The shoreline/nearshore zone is located within a portion of eight municipalities; the towns of Brookhaven, Hempstead, Islip, and Babylon comprise the majority of the shoreline/nearshore zone of Study Area 1. The onshore zone is located within a portion of nine municipalities; the towns of Islip, Brookhaven, and Babylon comprise the majority of the onshore zone of Study Area 1.	No specific constraints have been identified related to municipal boundaries. Refer to the discussions under Zoning, as well as Coastal Zone, for municipality-specific regulations.	Recognizing the number of municipalities an onshore cable may be crossing is an opportunity for informed outreach if taken advantage of early in the siting process. By conducting outreach, one may become aware of projects at the local level that state agencies may not have considered, which can ultimately inform the siting process.
Local Zoning	Digital spatial zoning data (i.e., GIS data) is available only for New York City, which comprises only 6.3% of Study Area 1, and is limited to the Rockaway Peninsula. Within the Rockaway Peninsula, a terminal utility facility similar to a cable landfall would be permitted as-of-right within 268.2 acres and would be specially permitted within 4,289 acres.	<p>Because a review of individual zoning maps for each municipality in the Study Area is outside the scope of this desktop analysis, the potential for constraints associated with the underlying zoning in much of the shoreline/nearshore or onshore zone has not been determined. If a cable landfall is not permitted as-of-right or specially permitted in a particular zoning district, potential avoidance areas would exist, creating a hard constraint.</p> <p>Along the Rockaway Peninsula where zoning data does exist, there are multiple areas that would present cable landfall site opportunities with respect to zoning, as a cable landfall would be allowed by special use permit in all residential districts.</p>	<p>The assumption of a cable landfall being allowed by special permit in a residential zoning district in New York City was based on a review of the zoning code with attention paid to the designation of "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines." This land use designation was the most applicable to a potential future cable landfall site.</p> <p>The unknowns are associated with variables such as time for local zoning process completion (e.g., 9-18 months for special use permit in New York City), and the potential for physical constraints at the cable landfall site due to potential variables such as setbacks outside of New York City and comprehensive plans that recommend future identified uses for a particular area.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
<p>Coastal Zone/Coastal Erosion Hazard Areas (CEHAs)</p>	<p>Approximately 93% of the shoreline/nearshore zone is within the designated NYS coastal zone, and the zone is also partially located within two communities with approved Local Waterfront Revitalization Programs (LWRPs). Approximately 7.8% of the onshore zone is within the designated NYS coastal zone, and less than 1% (608.6 acres) is located within the town of Smithtown, which has an approved LWRP. Significant coastal fish and wildlife habitats are located within Study Area 1 and include the Great South Bay and areas in the eastern half of the onshore zone.</p> <p>Approximately 202 miles of natural shoreline and 101 miles of hardened/armored shoreline exist within the shoreline/nearshore zone.</p> <p>CEHA mapping is currently being updated for the Study Area.</p>	<p>Demonstrating consistency with state and local coastal policies, including significant coastal fish and wildlife habitats, wetlands, historic and scenic resources, and recreational and public access areas, will require consideration of alternative construction techniques (e.g., HDD) and a limited construction workspace to show that impacts on the coastal zone can be minimized. This is not considered a constraint but will require additional engineering considerations.</p> <p>Consistency must also consider the larger footprint of the project, specifically the relationship between the cable landfall site and the associated cable routing from the offshore environment into state waters.</p> <p>Hardened/armored shorelines present a hard constraint for a cable landfall site.</p> <p>The potential presence of state-regulated CEHAs has been identified as a soft constraint due to the need to obtain a Coastal Erosion Management Permit, which requires that a determination be made concerning the impact of the project on properties listed on or eligible for listing on the New York State Register of Historic Places or the National Register of Historic Places (NRHP). Thus, the Coastal Erosion Management Permit will be dependent upon coordination with the State Historic Preservation Office (SHPO) and will be tied in with the overall consultation process described below for Cultural Resources. This will likely increase the permit review time but is not considered a hard constraint due to the minimal footprint associated with a cable landfall site and lack of change to the viewshed in the vicinity of the site. Additionally, this permit review process will require a demonstration of the resiliency of a future cable and associated infrastructure in the context of concerns related to sea level rise.</p>	<p>Refer to Figure 16 for generalized locations of NRHP-listed and eligible properties and districts to use in the siting process.</p> <p>The coastal zone review is holistic and is not limited to a future cable landfall site. Demonstrating that the landfall site location within the coastal zone has been sited considering all of the constraints related to all project components, both nearshore and offshore, would be required.</p> <p>As noted, because of the link to the SHPO review of the project, there may be additional review time associated with the Coastal Erosion Management Permit.</p>
<p>Marine Infrastructure and Uses</p>	<p>No shipping lanes/fairways or anchorage zones are located within the shoreline/nearshore zone. Multiple, small, maintained channels exist within the Great South Bay for use by recreational watercraft. Multiple cables and pipelines make landfall along the shoreline. Three small ocean disposal sites (spoil areas) are located within the western portion of the Great South Bay, and four are located just outside the seaward boundary of the shoreline/nearshore zone. These four are active dredged material disposal sites.</p>	<p>The existing cables and pipelines may need to be crossed by submarine export cables from the wind farm, which would require coordination with the owners of that infrastructure. Additionally, information regarding whether these cables are protected, buried, or surface laid would need to be obtained. The small channels maintained for use by boat owners/users would not be avoidance areas, but would require coordination with local boat ramp facilities and recreational boaters.</p> <p>The four active dredged material disposal sites located just outside the seaward boundary of the shoreline/nearshore zone would represent hard constraints due to additional engineering and construction considerations and costs associated with locating cables within these areas.</p>	<p>Coordination with local boat ramp facilities and recreational boaters would be required if a cable route were to intersect with one of the maintained channels within the Great South Bay. Coordination would also be required with owners of submarine cables and pipelines.</p> <p>Locating cables within the active dredged material disposal sites would require additional planning, which would result in increased time and costs, as well as the need for additional engineering and construction considerations.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Threatened and Endangered Species	<p>USFWS IPaC data indicates that one mammal (northern long-eared bat), three birds, and two flowering plant species listed under the federal ESA have the potential to occur within the shoreline/nearshore and onshore zones. Piping plover nesting pairs and fledges have been documented in 10 municipalities in Study Area 1; however, no USFWS-designated critical habitat occurs within Study Area 1. Historically, roseate terns were documented in the Great South Bay but were not recorded in 2015-2016 surveys. Red knot would utilize only migratory habitat in the shoreline/nearshore zone. The DEC database indicated 55 state-listed plant species that have the potential to occur in the shoreline/nearshore and onshore zones, two of which are protected at the federal level.</p> <p>No USFWS-designated critical habitat occurs within the Study Area 1. In the shoreline/nearshore zone, the towns of Brookhaven, Huntington, Islip, Riverhead, and Southampton have confirmed summer occurrences of the northern long-eared bat, a federally listed threatened species. The DEC and USFWS should be consulted if a potential cable landfall site is expected to lead to the removal of trees anywhere in Study Area 1. Coordination with the DEC and USFWS would be necessary to assess confirmed records of bat occurrences in the vicinity of the cable landfall site, and surveys to confirm the presence of the northern long-eared bat within an identified cable landfall site could be necessary. Consultation with the USFWS and DEC would also likely be necessary under NEPA to determine whether other listed species (e.g., piping plover and roseate tern) may be present within a cable landfall site in the shoreline/nearshore zone.</p> <p>Listed marine species also occur within the shoreline/nearshore zone, including the loggerhead, leatherback, Kemp's ridley, and green sea turtles and the Atlantic and shortnose sturgeon. Consultation with NOAA Fisheries would be necessary to determine whether these species may be present within a cable landing site.</p>	<p>Consultation with the USFWS, NOAA Fisheries, and DEC could be a lengthy process and, based on survey findings, may result in the exclusion of potential cable landfall sites due to documented habitat. The presence of individuals of threatened and endangered species does not necessarily constitute a hard constraint; rather, it presents an opportunity to mitigate impacts through coordination with the USFWS, NOAA Fisheries, and DEC and to consider alternative construction technologies and siting options.</p>	<p>The presence of threatened and endangered species or habitat would likely result in the need for additional time to complete agency consultation and field surveys, additional costs incurred through required surveys and analysis, as well as the identification of potential constraints at the cable landfall site. Additionally, there may be seasonal restrictions associated with these species that could impact the construction schedule.</p>
Other Sensitive Habitats	<p>A total of 32,265 acres of Significant Natural Communities are located within the shoreline/nearshore zone and generally overlap with mapped wetland areas and federally and state-protected lands. A total of 17,301 acres of Significant Natural Communities are located within the onshore zone; these largely overlap with state and locally protected areas. Eelgrass beds have been documented in the literature in the shoreline/nearshore zone in the Great South Bay, Hempstead Bay, South Oyster Bay, and Moriches Bay, but exact locations of these beds are not available.</p> <p>EFH has been identified for 41 species that may occur in the shoreline/nearshore zone, and consultation would be required with NOAA Fisheries regarding potential impacts. Ten NOAA Trust Resources have been identified and would be part of the EFH consultation process.</p>	<p>Siting a cable landfall site within areas of documented eelgrass beds or a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program) and may also require an easement for federally or state-owned lands. The locations of these nearshore ecological communities do not represent hard constraints if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Coordination with regulatory agencies would be necessary to mitigate impacts that cannot be avoided.</p> <p>Similarly, EFH and NOAA Trust Resources do not represent a hard constraint if engineering constraints are incorporated to avoid these resources.</p>	<p>If impacts on sensitive nearshore habitats are not avoided, additional time will be added to the agency review process, additional costs to mitigate impacts will result, and avoidance areas will be created, presenting physical constraints to landfall siting.</p>
Wetlands, Surface Waters, and Floodplains	<p>Based on USFWS NWI wetland and DEC freshwater and tidal wetland datasets, approximately 46.2% (82,028.8 acres) of the shoreline/nearshore zone consists of wetlands. Additionally, wetland buffers comprise 34.7% (62,638.7 acres) of the shoreline/nearshore zone. NHD data indicates that a total of 165 miles of streams and rivers and 642 acres of lakes and ponds are located within this zone. Based on FEMA data, approximately 29% of the shoreline/nearshore zone is located within the 100-year floodplain. Approximately 3.7% (5,880.9 acres) of the onshore zone consists of wetlands. Wetland buffers comprise 23.4% (36,999.5 acres) of the onshore zone. NHD data indicates that a total of 105.3 miles of streams and rivers, and 946.1 acres of lakes and ponds are located within the onshore zone. Approximately 2.5% of the onshore zone is located within the 100-year floodplain.</p>	<p>Permitting requirements would be triggered for location of a cable landfall site within a wetland and/or its buffer areas, as well as a river/stream. Locations of these resources do not represent a hard constraint, if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall site. DEC is becoming less accepting of wetland impacts and is looking at these coastal wetland areas because of resiliency and climate changes concerns and wants these areas to be protected.</p>	<p>If impacts on wetlands, specifically coastal wetlands, are not avoided, additional time will be added to the agency review process, additional costs associated with the mitigation of impacts will result, and avoidance areas will be created, representing physical constraints to siting a cable landfall site. The DEC prefers that ecologically significant coastal wetland areas are avoided and protected due to their concerns related to ecosystem resiliency and climate change.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Migratory Birds and Eagles	USFWS IPaC data indicates that 44 migratory birds of conservation concern may occur in Study Area 1, depending upon the season. Tree clearing may be limited during bird nesting season; specific windows would need to be determined through consultation with USFWS.	Seasonal windows for tree clearing are not considered a constraint and should be integrated into project planning and construction scheduling.	Unlike the importance of beach habitats for species such as the federally listed piping plover and roseate tern, migratory birds are more likely to be associated with forested habitats which, as indicated in Figure 3, are more prevalent in the inland areas of Study Area 1 and less prevalent in the nearshore zone. Thus, the incorporation of seasonal windows for tree clearing is not considered a constraint for construction.
Sediment, Soil Types, and Steep Slopes	Sand is the predominant (37%) sediment type in the shoreline/nearshore zone. No literature regarding historic contamination of sediment in the Great South Bay has been identified. Approximately 521.4 acres (0.6%) of the predominant soils within the shoreline/nearshore zone may have steep slopes, given their range of 3 to 15% slopes, and approximately 12,236 acres may have steep slopes in the onshore zone. These areas should be avoided.	Areas of steep slopes would be considered a hard constraint but can be avoided during the siting process. With sand being the most predominant sediment type, the lack of consolidated material should be a consideration for possible construction techniques.	Construction techniques such as HDD in a sandy environment will require a feasibility study for demonstration to the permitting agencies that a successful installation, particularly in sensitive nearshore environments, is possible without any high risk of inadvertent return of drilling mud.
Geological Hazards	No suspected or known active faults are located within the Study Area. A USGS Seismic Hazard Map indicates that Study Area 1 is located in an area with a 2% probability of exceedance of peak ground acceleration values in 50 years. The majority of Study Area 1 is located in an area that has a low landslide incidence. Approximately 1,077 acres of the northeastern tip of the onshore zone of Study Area 1 are located in a high susceptibility to landsliding and low incidence area. No constraints have been identified as the high susceptibility to landsliding area can be avoided as it is not in an area where a cable landfall site would be located.	No constraints identified; the area of high susceptibility to landsliding would be excluded from siting considerations due to its location in the northeastern tip of the onshore zone and outside of the shoreline/nearshore zone where landfall would be made.	N/A
Cultural and Historic Resources	There are a total of 106 previously recorded archaeological sites within the shoreline/nearshore zone of Study Area 1; eight are listed on the NRHP and five are eligible for listing. Much of the northern portion of the shoreline/nearshore zone has been identified as being sensitive for archaeological sites. Fifteen historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone. Six of these have been listed on the NRHP, and six additional districts have been determined to be eligible for listing. In the onshore zone, 37 previously recorded archaeological sites were identified; only one is listed on the NRHP and no others have been determined eligible for listing. Six historic districts were identified in the onshore zone; two have been listed on the NRHP, and two have been determined to be eligible for listing. Consultation with the SHPO will be required under NHPA in connection with any federal approvals, and Section 14.09 of the New York Parks, Recreation and Historic Preservation Law to the extent a state permit is required. It can be expected that more definitive evaluations of cultural resources would be undertaken as part of any required cultural resources investigations for a proposed cable landfall site.	<p>Within the shoreline/nearshore zone, a hard constraint would exist where avoidance areas are created due to the presence of shipwrecks and submerged resources such as historic settlements and settlements associated with indigenous peoples.</p> <p>Aboveground cultural resources would represent soft constraints, as BMPs can be employed and screening can be utilized during construction to minimize impacts on those resources.</p> <p>There is insufficient survey data at this time to provide concrete evidence of exact locations; surveys would be a likely component of agency consultation during the siting process.</p>	<p>Buffers would be required around the shipwrecks for cable routing purposes, creating minor avoidance areas.</p> <p>Cultural resource surveys to determine the potential for submerged resources would add both time and costs to the agency review process and may result in the identification of avoidance areas as these areas cannot be addressed with minor siting considerations such as the buffers discussed above.</p>
Areas of Contamination	One NPL Superfund site is located within the shoreline/nearshore zone; it is located in the hamlet of Hewlett, within the town of Babylon. Additionally, 64 sites are included in the DEC brownfield and state Superfund programs, comprising approximately 925 acres. At 22 of these 64 sites, cleanup has been completed. For the remainder of the sites and the NPL Superfund site, cleanup is ongoing. In the onshore zone, there are five NPL Superfund sites and 111 sites included on the DEC brownfield and state Superfund program lists. At 61 of these sites, cleanup has been completed; cleanup is ongoing at the remainder.	<p>For those sites where cleanup is ongoing, they represent temporary avoidance areas/hard constraints until remediation is complete. Consideration of these areas should be included during the siting process.</p> <p>For NPL Superfund and DEC brownfield or Superfund sites where cleanup is completed, these may represent opportunities for siting a cable landfall site; however, they may represent soft constraints due to institutional controls that may limit excavation depths or other engineering controls.</p>	<p>Physical constraints to cable landfall sites would be created with Superfund and brownfield sites where cleanup is ongoing.</p> <p>For sites where cleanup is complete, it is assumed that a cable landfall would be an industrial use that would be consistent with identified land use controls for these sites. Any on-site management or future use of water or soil must be done in coordination with the EPA and/or DEC.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Study Area 2: Hudson and East River/NYC			
Land Use/Land Cover	Land cover throughout Study Area 2 is largely developed land, with small areas of wetlands and forested lands. Over half (58.6%) of the shoreline/nearshore zone is characterized as open water. The onshore zone is more developed due to highly developed New York City, with 60.1% of the zone categorized as high intensity developed land. No specific constraints have been identified; refer to other resources (wetlands, zoning and planning) for additional information.	No specific constraints have been identified related to land cover; refer to other resources (land ownership, coastal zone, zoning and planning) for additional information regarding the cover types present in the Study Area and identified constraints and opportunities.	Constraints related to land cover could result in additional time to acquire permits, the use of construction methods to avoid things such as sensitive nearshore habitats and wetlands, and the need for compliance with local planning and zoning requirements.
Publicly Managed Lands, Public Places, and Government Properties	17,443 acres (22%) are designated as publicly managed lands, public places, and governmental properties in the shoreline/nearshore zone. The largest is the Gateway National Recreation Area, which comprises just over 14,098 acres and comprises all of Jamaica Bay. A total of approximately 3,075 acres (5.1%) within the onshore zone are designated as publicly managed lands, public places, and governmental properties.	The Gateway National Recreation Area represents the largest constraint to siting a cable landfall and would require an easement from the National Park Service. Additionally, a petition for an easement for a cable to cross state-owned lands underwater would be required to traverse state-held lands. The latter is not considered a constraint but has been identified as an area requiring agency coordination.	The hard constraint related to the easement in National Recreational Area is a separate and time-consuming process, potentially adding a year or more to the schedule.
Indigenous Nations Lands, Rights-of-Way, and Conservation Easements	<p>Land ownership in the shoreline/nearshore zone is a mix of locally, state-, and federally owned lands. Conservation easements comprise 7.2 acres of this zone, and 90.3 miles of electric transmission lines are located within the shoreline/nearshore zone, the majority of which is underground (61.5 miles). Additionally, 23.3 miles of natural gas pipeline are located within this zone. The onshore zone contains 1.5 acres of conservation easements, and 138.5 miles of electric transmission lines, the majority of which are underground (100 miles). There are also 37.3 miles of pipeline within this zone. Road networks provide access throughout Study Area 2, as do major several major bridge crossings. Multiple lines of the New York Subway and two branches of the Long Island Railroad cross the Study Area.</p> <p>Refer to the discussion on Publicly Managed Lands regarding the need for an easement for a cable to cross state-owned lands underwater. Roadway, rail, and electric transmission line rights-of-way may present an opportunity with respect to routing an onshore cable from the cable landfall site to a substation.</p>	Roadway, Long Island Railroad, electric transmission line, and gas pipeline rights-of-way may present an opportunity with respect to routing an onshore cable from the cable landfall site to a substation. Commercial rail lines for freight are a likely hard constraint due to the difficulty of obtaining access agreements, resulting in avoidance areas.	Existing rights-of-way may present an opportunity for routing an onshore cable as they would represent previously disturbed areas that are maintained for infrastructure purposes. However, commercial rail lines for freight are a likely hard constraint.
Municipal Jurisdictions	The majority of the shoreline/nearshore zone is located within New York City (77,148 acres), and only a small portion (2,075 acres) at the northern tip of the zone is located in Yonkers. Similarly, the majority of the onshore zone is located within New York City (55,404 acres), and a small portion is located in Yonkers (4,401 acres).	No constraints have been identified that are specific to municipal boundaries. Refer to the discussions under Zoning, as well as Coastal Zone, for municipality-specific regulations.	Consulting with the municipalities that an onshore cable may be crossing is an opportunity for informed outreach if this is taken advantage of early in the siting process. By doing such outreach, one may become aware of projects at the local level that state agencies may not have considered, which can ultimately inform the siting process.
Local Zoning	The majority of the shoreline/nearshore zone is covered by New York City zoning (92%); the remainder is located in Yonkers, for which no digital spatial zoning data is available. A terminal utility facility similar to a cable landfall would be permitted as-of-right in 7,562 acres and would be specially permitted in 14,993 acres.	<p>Based on the zoning data available, a cable landfall would be permitted or specially permitted in over 15,000 acres of the shoreline/nearshore zone; these areas represent opportunities for cable landfall sites. Additionally, it is assumed that, because electric substations are a permitted use in manufacturing districts, a cable landfall would also be considered a permitted use. These areas would add another 6,408 acres to the available area for a cable landfall site from a zoning standpoint.</p> <p>Because a review of individual zoning maps for each municipality in the Study Area is outside the scope of this desktop analysis, the potential for constraints associated with underlying zoning in the Battery Park district is unknown. Because a review of individual zoning maps for Yonkers is outside the scope of this desktop analysis, the zoning associated with the northern top of the nearshore zone in Yonkers has not been determined. If a cable landfall is not permitted as-of-right or specially permitted in a particular zoning district, avoidance areas would exist, creating a hard constraint.</p>	<p>The assumption of a cable landfall being specially permitted in a residential zoning district was based on a review of the zoning code with attention to the designation of "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines." This land use designation was the most applicable to a cable landfall site.</p> <p>These unknowns are associated with variables such as time required for local zoning process completion and the potential for physical landfall constraints due to potential variables such as setbacks and future identified uses for a particular area.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Coastal Zone	<p>Approximately 91% of the shoreline/nearshore zone is within the designated NYS coastal zone, and within the boundary of the New York City WRP. Approximately 8.5% of the onshore zone is within the designated NYS coastal zone, and 92.6% is located within the boundary of the New York City WRP. Both zones are located within SNWAs and SMAs as designated by the WRP. Significant coastal fish and wildlife habitats are within Study Area 2 and include Jamaica Bay, Lower Hudson Beach, North and South Brother Islands in the nearshore, and Meadow and Willow Lakes in the onshore zone.</p> <p>Approximately 50 miles of natural shoreline and 121 miles of hardened/armored shoreline exists within the shoreline/nearshore zone.</p> <p>CEHA mapping is currently being updated for the Study Area.</p>	<p>Demonstrating consistency with state and New York City coastal policies, including significant coastal fish and wildlife habitats, wetlands, historic and scenic resources, and SNWAs, will require consideration of alternative construction techniques (e.g., HDD) and a limited construction workspace to show that impacts on the coastal zone can be minimized. This is not considered a constraint but will require additional engineering considerations.</p> <p>Consistency must also consider the overall footprint of the project, specifically the relationship between the cable landfall site and submarine cable route from the offshore wind farm into state waters.</p> <p>Hardened/armored shorelines present a hard constraint for a cable landfall site.</p> <p>Based on Coastal Erosion Management Permit requirements, the potential presence of CEHAs has been identified as a constraint due to the need to include a Structural/Archaeological Assessment Form, which requires that a determination be made concerning the impact of the project on properties listed on or eligible for listing on the State or National Register of Historic Places. Thus, the Coastal Erosion Management Permit will be dependent upon coordination with the SHPO and will be tied in with the overall consultation process described below for Cultural Resources. This will likely increase the permit review time but is not considered a hard constraint, due to the minimal footprint associated with a cable landfall site and lack of change to the viewshed in the vicinity of the site. Additionally, this permit review process will require a demonstration of the resiliency of a future cable and associated infrastructure in the context of concerns related to sea level rise.</p>	<p>Refer to Figure 29 for generalized locations of NRHP-listed and eligible properties and districts to use in the siting process.</p> <p>The coastal zone review is holistic and is not limited to a future cable landfall site. Demonstrating that the cable landfall site within the coastal zone has been sited considering all of the constraints related to all project components, associated with both nearshore and offshore, would be required.</p> <p>As noted, because of the link to the SHPO review of the project, there may be additional review time associated with the Coastal Erosion Management Permit.</p>
Marine Infrastructure and Uses	<p>One proposed submarine pipeline bisects the southern portion of the shoreline/nearshore zone, and just south of the zone, one pipeline and one submarine cable run east-west. A portion of two federally maintained navigation channels—Ambrose Channel and Chapel Hill North Channel—are located within the shoreline/nearshore zone along with smaller maintained channels in the East River. The Ambrose and Chapel Hill North channels are heavily used by shipping vessels, as are the Hudson River and East River. A portion of one anchorage area is located within the southwestern corner of the shoreline/nearshore zone, and one discontinued ocean disposal site is located along the eastern shoreline of the Hudson River in the northern part of the shoreline/nearshore zone. A Historical Area Remediation Site (HARS) is located approximately 5 miles southeast of Study Area 2.</p>	<p>The existing cables and pipelines would be crossed by export cables from the wind farm, which would require coordination with the owners of the existing infrastructure. Additionally, information regarding whether these cables are protected would need to be obtained.</p> <p>The location of the federally maintained navigation channels and the anchorage area represent potential hard constraints due to the review and approval required by the US Coast Guard and USACE. These translate into additional planning time and costs as well as engineering considerations. Additionally, the HARS represents a hard constraint; though outside the study area, consideration of its location must be included for cable routing.</p>	<p>Coordination would be required with the owners of submarine pipelines and cables. Crossing of the Ambrose Channel would require additional US Coast Guard and USACE coordination on both burial depth requirements and interaction with shipping traffic during construction. The Ambrose Channel should be avoided, if feasible, for cable routing. If avoidance is not possible, coordination will be required as indicated above.</p> <p>Additional engineering and construction considerations would be required for routing a cable through the channels and anchorage area, resulting in increased costs associated with additional planning and construction vessel types.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Threatened and Endangered Species	<p>USFWS IPaC data indicate that two mammals (northern long-eared and Indiana bats), three birds, and one flowering plant species listed under the federal ESA have the potential to occur within the shoreline/nearshore and onshore zones. No USFWS-designated critical habitat for these species occurs within Study Area 2. Nesting habitat for the piping plover and roseate tern has the potential to occur within Jamaica Bay and the small islands within that system. The DEC database indicated 17 state-listed plant species have the potential to occur in the shoreline/nearshore and onshore zones. No USFWS-designated critical habitat for these species occurs within Study Area 2. Coordination with the DEC and USFWS would be necessary to assess confirmed records for bat occurrences in the vicinity of a cable landfall site. Consultation with the USFWS and DEC would likely be necessary under NEPA/ESA to determine whether other listed species (e.g., piping plover and roseate tern) may be present within a cable landfall site.</p> <p>Listed marine species also occur within the shoreline/nearshore zone, including the loggerhead sea turtle, Atlantic surgeon, and shortnose sturgeon. Atlantic sturgeon has designated critical habitat in the Hudson River. Consultation with NOAA Fisheries would be necessary to determine whether any of these species may be present within a cable landing site.</p>	<p>Consultation with the USFWS, NOAA Fisheries, and DEC may be a lengthy process and, based on survey findings, may result in the exclusion of potential cable landfall sites due to documented habitat. The presence of threatened and endangered species does not constitute a hard constraint; rather, it presents an opportunity to mitigate impacts through coordination with the USFWS, NOAA Fisheries, and DEC and consideration of alternative construction technologies and siting options.</p>	<p>The presence of threatened and endangered species will likely be associated with additional time due to the need to complete agency consultation and field surveys, additional costs incurred through required surveys and analysis, and the identification of potential constraints (avoidance areas) at the cable landfall site. Additionally, there may be seasonal restrictions associated with these species that could impact the construction schedule.</p>
Other Sensitive Habitats	<p>Eelgrass beds have not been historically documented in Jamaica Bay or other portions of the shoreline/nearshore zone. A total of 10,367.5 acres of Significant Natural Communities—tidal wetlands—is located within the shoreline/nearshore zone and generally overlap with DEC tidal wetlands. A total of 307.8 acres of Significant Natural Communities is located within the onshore zone; these overlap with state- and locally protected areas. Siting a cable landfall site within a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program).</p> <p>EFH has been identified for 29 species that may occur within the shoreline/nearshore zone, and consultation would be required with NOAA Fisheries regarding potential impacts. Ten NOAA Trust Resources have also been identified and would be part of the EFH consultation process.</p>	<p>Siting a cable landfall site within a Significant Natural Community would be reviewed under the authorities of other programs (e.g., the tidal wetlands program) and may also require an easement for crossing federally or state-owned lands. The locations of these nearshore ecological communities do not represent hard constraints if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Coordination with regulatory agencies would be necessary to mitigate impacts that cannot be avoided.</p> <p>Similarly, EFH and NOAA Trust Resources do not represent a hard constraint if engineering constraints are incorporated to avoid these resources.</p>	<p>If impacts on sensitive nearshore habitats are not avoided, additional time will be added to the agency review process, additional costs to mitigate impacts will result, and avoidance areas will be created, presenting physical constraints to siting a cable landfall.</p>
Wetlands, Surface Waters, and Floodplains	<p>Based on USFWS NWI wetland and DEC freshwater and tidal wetland datasets, approximately 39.9% (31,649 acres) of the shoreline/nearshore zone consists of wetlands. Additionally, wetland buffers comprise 34% (26,136 acres) of the shoreline/nearshore zone. NHD data indicates that a total of 1.8 miles of streams and rivers and 57.2 acres of lakes and ponds are located within this zone. Based on FEMA data, approximately 27.8% of the shoreline/nearshore zone is located within the 100-year floodplain. Approximately 1.5% (915 acres) of the onshore zone consists of wetlands. Wetland buffers comprise 21.4% (13,084 acres) of the onshore zone. NHD data indicate that a total of 5 miles of streams and rivers and 341.5 acres of lakes and ponds are located within the onshore zone. Approximately 2.9% of the onshore zone is located within the 100-year floodplain.</p>	<p>Permitting requirements would be triggered by siting a cable landfall within a wetland and/or its buffer areas, or within a river/stream. The locations of these resources do not represent a hard constraint if engineering considerations are incorporated to appropriately avoid these resources during siting and construction of a future cable landfall. Because of resiliency and climate changes concerns, the DEC is becoming less accepting of wetland impacts and wants to protect coastal wetland areas.</p>	<p>If impacts on wetlands, specifically coastal wetlands, are not avoided, additional time will be added to the agency review process, additional costs associated with the mitigation of impacts will result, and avoidance areas will be created, representing physical constraints to siting a cable landfall. The DEC prefers that ecologically significant coastal wetland areas be avoided and protected due to their concerns regarding ecosystem resiliency and climate change.</p>
Migratory Birds and Eagles	<p>USFWS IPaC data indicates that 44 migratory birds of conservation concern may occur in Study Area 2, depending on the season. Tree clearing may be limited during bird nesting season; specific windows would need to be determined through consultation with USFWS.</p>	<p>Seasonal windows for tree clearing are not considered a constraint and should be integrated into project planning and construction scheduling.</p>	<p>Unlike the importance of island and beach habitats for species such as the federally listed piping plover and roseate tern, migratory birds are more likely to be associated with forested habitats which, as indicated in Figure 19, are very limited throughout Study Area 2 as a whole; however, there are some forested habitats within the nearshore zone adjacent to Floyd Bennett Field. Thus, the incorporation of seasonal windows for tree clearing is not considered a constraint for construction.</p>

Table 62 continued

Resource	General Resource Characterization	Potential Constraint/Opportunity Conclusion	Notes
Sediment, Soil Types, and Steep Slopes	<p>Sand is the predominant (15.8%) sediment type in the shoreline/nearshore zone.</p> <p>Approximately 593.5 acres (1.9%) of the predominant soils within the shoreline/nearshore zone may have steep slopes (180 acres may not exceed 10% slopes throughout as the soil type ranges from 0-15% slopes) and approximately 2,505 acres may have steep slopes in the onshore zone. These areas should be avoided.</p>	<p>Areas of steep slopes would be considered a hard constraint but can be avoided during the siting process. With sand being the most predominant sediment type, the lack of consolidated material should be a consideration for possible construction techniques.</p>	<p>Construction techniques such as HDD in a sandy environment will require a feasibility study for demonstration to the permitting agencies that a successful installation, particularly in sensitive nearshore environments, is possible without significant erosion or sedimentation impacts.</p>
Geological Hazards	<p>No suspected or known active faults are located within this Study Area. A USGS Seismic Hazard Map indicates that Study Area 2 is located in an area with a 2% probability of exceedance of peak ground acceleration values in 50 years. Study Area 2 is located in an area that has a low landslide incidence. No constraints have been identified.</p>	<p>No constraints identified.</p>	<p>N/A</p>
Cultural and Historic Resources	<p>There are a total of 168 previously recorded archaeological sites within the shoreline/nearshore zone of Study Area 2; 10 are listed on the NRHP and 19 are eligible for listing. Much of the southern and western portions of the shoreline/nearshore zone in Brooklyn has been identified as being sensitive for archaeological sites. Twenty-five historic districts, comprising multiple contributing properties, were identified in the shoreline/nearshore zone. Ten of these have been listed on the NRHP and 11 additional districts have been determined eligible for listing. In the onshore zone, 12 previously recorded archaeological sites were identified; only one is listed on the NRHP and three have been determined eligible for listing. Sixty-nine historic districts were identified in the onshore zone; 53 have been listed and 12 have been determined to be eligible for listing. Consultation with the SHPO will be required under NEPA in connection with any federal approvals, and under Section 14.09 of the New York Parks, Recreation and Historic Preservation Law to the extent a State permit is required. It can be expected that more definitive evaluations of cultural resources would be undertaken as part of any required cultural resources investigation for a proposed cable landfall site.</p>	<p>Within the nearshore zone, a hard constraint would exist where avoidance areas are created due to the presence of a shipwreck and submerged resources such as historic settlements and settlements associated with indigenous peoples.</p> <p>Aboveground cultural resources would represent soft constraints, as BMPs can be employed and screening can be utilized during construction to minimize potential impacts on such resources.</p> <p>There is insufficient survey data at this time to provide concrete evidence of exact locations; surveys would be a likely component of agency consultation during the siting process.</p>	<p>Buffers would be required around the shipwreck for cable routing purposes, creating minor avoidance areas.</p> <p>Cultural resource surveys to determine the potential for submerged resources would add both time and costs to the agency review process and may result in the identification of avoidance areas as these areas cannot be addressed with minor siting considerations such as the buffers discussed above.</p>
Areas of Contamination	<p>One NPL Superfund site in Brooklyn is located within the shoreline/nearshore zone. Additionally, 418 sites are included in the DEC brownfield and state Superfund programs, comprising approximately 7,905 acres. At 130 of these 418 sites, cleanup has been completed. For the remainder of the sites and the NPL Superfund site, cleanup is ongoing, and those sites represent temporary avoidance areas/constraints, at least until remediation is complete. In the onshore zone, there are two NPL Superfund sites, and 273 sites are included on the DEC brownfield and state Superfund program lists. At 101 of these sites, cleanup has been completed; cleanup is ongoing at the remainder.</p> <p>Historic sediment contamination has been documented in portions of the shoreline/nearshore zone, including the Upper and Lower Bays, Hudson River, East River, and Jamaica Bay.</p>	<p>For those sites where cleanup is ongoing, these represent temporary avoidance areas/constraints until remediation is complete. Consideration of these areas should be made during the siting process.</p> <p>For NPL Superfund and DEC brownfield and Superfund sites where cleanup is completed, these may represent opportunities for siting a cable landfall; however, they may represent soft constraints due to institutional controls that may limit excavation depths or other engineering controls.</p> <p>Sediment contamination is considered a soft constraint as it would require additional engineering considerations (e.g., the application of burial techniques with minimized sediment suspension) to minimize potential impacts.</p>	<p>Physical constraints to construction at a cable landfall would be present at Superfund and brownfield sites where cleanup is ongoing.</p> <p>For sites where cleanup is complete, it is assumed that a cable landfall would be an industrial use that would be consistent with identified land use controls for these sites. Any on-site management or future use of water or soil must be done in coordination with the EPA and DEC.</p> <p>The use of specialized burial techniques may result in increased costs and added time.</p>

4.2 Summary Permit Matrix

Table 63 provides a summary of potential federal, State, and local permits that may be required for the cable landfall site, including the activity triggering the permit and the expected agency review time and any consultation requirements. The permit matrix has not been separated by study area, as the potential permitting requirements would be the same across both areas; there are no unique regulatory requirements that pertain to one study area instead of the other, based upon the available data.

In addition to the resource-specific permit requirements identified in Section 3 and included in Table 63 as being pertinent to the siting and construction of a cable landfall, other regulatory requirements would likely be triggered by the onshore cable or submarine cable, specific to the need to obtain a Certificate of Environmental Compatibility and Public Need under Article VII of the New York Public Service Law. To the extent Article VII applies, it may preempt the need for certain state and local requirements, although as a general matter, a future project developer would still be required to demonstrate that the project complies with substantive requirements associated with such permitting processes, unless they are determined to be unreasonably restrictive.

Table 63. Potential Federal and New York State Requirements for Cable Landfall Site

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations Federal	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
BOEM or other federal permitting agency	NHPA Section 106 Review. Evaluate project effects on historic properties through federal Lead Agency in consultation with State Historic Preservation Officer (SHPO), federally recognized Indian tribes, and consulting parties.	Federal "undertaking" triggers Section 106 review.	<ul style="list-style-type: none"> National Historic Preservation Act of 1966, as amended; 54 U.S.C. 300101 et seq., regulations 36 CFR Part 800. Section 106, 54 U.S.C. § 306108, regulations - 36 CFR Part 800. 	<ul style="list-style-type: none"> Determine likelihood of effect on properties that are listed on the National Register of Historic Places (NRHP) or that are eligible for listing on the NRHP. If adverse effects are identified, identify measures to avoid, minimize, or mitigate such effects. Obtain concurrence/comments from SHPO and/or the Tribal Historic Preservation Officer (THPO). 	Highly variable; dependent on the federal undertaking, presence of properties listed or eligible for listing on the NRHP, potential for adverse effects, and need for and participation in development of Memorandum of Agreement or Programmatic Agreement to address adverse effects.
National Park Service	Right-of-Way	Required for utilities to pass over, across or through a National Park System, which includes areas of land and water administered by the National Park Service.	<ul style="list-style-type: none"> 54 U.S.C. 100902(a). 54 U.S.C. 100902(b). 	<ul style="list-style-type: none"> Meet with NPS staff to discuss project before submitting application. Applications include the necessary NEPA/NHPA Section 106 compliance 	Applications take between six months and one year to process.
U.S. Army Corps of Engineers (USACE), New York District	Individual Permits	Required for dredge, fill, and other work in federally regulated waters, with some exceptions for which Nationwide Permits can provide coverage.	<ul style="list-style-type: none"> Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. 403, regulations 33 CFR Part 322 Section 404 of the Clean Water Act of 1972, 33 U.S.C. § 1344 Section 103 of the Marine Protection, Research, and Sanctuaries Act, 33 U.S.C. § 1413, regulations 33 CFR 324.1 et seq. USACE general policies and permit regulations, 33 CFR Part 320; 33 CFR Part 325^a 	<ul style="list-style-type: none"> Pre-application consultation recommended for larger projects. Joint Permit Application form and all required information, including: <ol style="list-style-type: none"> Description of overall activity or project. Indicate whether discharge of dredged or fill material is involved and provide details on volume of fill, pollution controls, and erosion controls. Description of effects on the aquatic environment, alternatives available to accomplish the project purpose, measures for reducing the impacts of the project. Site plan, cross-sectional plan. Application also must be submitted to the DEC for issuance of a Clean Water Act Section 401 Water Quality Certification, which must be granted before the USACE can issue a permit. See state-specific section for more details. 	<ul style="list-style-type: none"> Individual Permits require a 30-day Public Notice, following a completeness determination after submittal. On average, individual permit decisions are made within six to nine months from receipt of a complete application.
U.S. Fish and Wildlife Service (USFWS), New York Field Office, and NOAA Fisheries	Endangered Species Act (ESA) – Section 7 Consultation Process	<p>Actions potentially impacting federally threatened and endangered (T&E) species, i.e., "take," or resulting in the destruction or adverse modification of the critical habitat of such species.</p> <p>ESA Section 7 applies if a federal action is required for the project.</p>	ESA Section 7	<ul style="list-style-type: none"> Section 7 consultation. Species and habitat-specific surveys as needed. Biological Assessment to identify any T&E species likely to be affected by the federal action. Scientific permit for studies if adverse effects are anticipated. 	Varies. Concurrence with a "Not Likely to Adversely Affect" determination is likely to take 30 to 60 days. However, determinations that project impacts may affect T&E species can drive agency review time to six months or more and require additional data collection, consultation, and permitting.
USFWS, Region 5 Permit Office	Migratory Bird Treaty Act (MBTA) review	Incidental "take" of a migratory bird species (voluntary or otherwise) listed under the Act.	MBTA (16 U.S.C. 703-712), listed migratory birds, 50 CFR § 10.13, regulations 40 CFR Parts 13 (General Permit Procedures) and 21 (Migratory Bird Permits).	<ul style="list-style-type: none"> There is no "incidental take" permit under the MBTA; it is simply prohibited. However, USFWS provides voluntary guidance to help reduce incidental take. Informal consultation with the USFWS during project development phase can build support for potential future USFWS enforcement. Informal consultation regarding the proposed project and its location. 	Currently, no incidental permit under the MBTA is available. Consultation with the USFWS and appropriate planning can minimize potential impacts on migratory birds.

Table notes are at the end of the table.

Table 63 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
USFWS, Region 5 Permit Office	Permit for the removal or relocation of an eagle nest and permit for eagle take that is associated with, but not the purpose of, an activity	Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act. Activities with the potential to take any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof. Seasonal construction windows and buffer zones are required around nesting eagle nests.	Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), regulations 50 CFR Part 22	<ul style="list-style-type: none"> • Applicant must propose and implement practical measures to minimize potential impacts from their activity. • For an eagle nest take permit, fill out application form, including why the nest must be taken and details of the type of nest to be taken. • For a non-purposeful take permit for bald eagles, applicant must be prepared to: <ol style="list-style-type: none"> a) Identify the specific activities that will result in take. b) Quantify impacts on eagles. c) Develop and document avoidance and minimization procedures. d) Develop a monitoring and reporting program. e) Provide compensatory mitigation, if necessary. 	Varies. Obtaining an eagle take permit requires agency consultation on bald or golden eagles.
State					
Department of State (DOS), Office of Planning and Development	Coastal Zone Management Program Federal Consistency Certification	Federal actions (including those requiring federal permits/approvals) that affect any use or natural resource of the coastal zone must be certified as consistent with the policies of a State's federally approved coastal zone program. In New York, the coastal policies are those in the New York Coastal Management Program (NYCMP) and any applicable Local Waterfront Revitalization Programs (LWRP).	<ul style="list-style-type: none"> • Coastal Zone Management Act (CZMA) 16 U.S.C 1451 et seq. • State Executive Law Article 42, § 910 et seq 15 CFR Parts 923 and 930. • 19 NYCRR Part 600. 	Federal consistency assessment form (FCAF), including written analysis of the activity's consistency with state and applicable local coastal policies. Application must include: <ul style="list-style-type: none"> - Copy of the completed federal permit application and supporting documentation. - Copies of applications submitted to involved state agencies. - All documentation submitted to siting board if facility subject to Articles VII or C of the New York State Public Service Law. 	For most activities, DOS's review and decision are completed within one to two months of receipt of a completed consistency certification and all necessary information. In some instances, especially for those activities that are more complicated, involve more coordinated public and interagency reviews, or are the subject of an environmental impact statement, DOS's review and decision may take up to three to six months and is contingent on the availability of the NEPA document for review (DOS 2017) .
Department of Public Service, Public Service Commission (PSC)	Certificate of Environmental Compatibility and Public Need under Article VII	Construction and operation of a major utility transmission facility. Siting of major utility transmission facilities in New York is under the jurisdiction of the PSC. "Major" electrical transmission facilities are defined as lines with a design capacity of 100 kV or more extending for at least 10 miles, or 125 kV and over, extending a distance of one mile or more. Note: This certificate is not required specifically for the cable landfall but for other project components (i.e., onshore cable connection and submarine export cable).	<ul style="list-style-type: none"> • New York State Public Service Law, Article VII, § 120 et seq. • 16 NYCRR Parts 85-88. 	Applicant must demonstrate compliance with the substantive requirements of all applicable state and local approvals. Application must include: <ul style="list-style-type: none"> - Location of line and ROW. - Description of transmission facility. - Summary of studies of environmental impact. - Statement of need for the facility. - Description and analysis of reasonable alternate routes. - Any other relevant information. 	An applicant must publish a newspaper notice of its intent to file an Article VII application at least once per week in the two weeks prior to filing in all areas throughout which the facility would pass. Generally takes the PSC 30 days after an application is submitted to determine whether the application is in compliance with filing requirements. Once an application is deemed compliant, a public statement hearing must be held within 60 to 90 days. Evidentiary hearings follow before a final decision is issued.

Table notes are at the end of the table.

Table 63 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
Office of General Services (OGS)	State Submerged Lands Easement	The title to the bed of numerous bodies of water is held in trust for the People of the State of New York under the jurisdiction of the OGS. Structures, including fill, located in, on, or above state-owned lands underwater require a license, grant, or easement from the OGS. Pipelines, cables, docks, wharves, moorings, and permanent structures, including wind turbines and cables, require an easement.	<ul style="list-style-type: none"> • New York Public Lands Law, Article 2, Section 3. • 9 NYCRR Part 270 & 271. 	<p>The OGS requires a completed application for use of land underwater, which includes:</p> <ul style="list-style-type: none"> • Petition for an easement. • Plan and profile showing proposed work/structure. • Survey showing lands applied for, including desired width of proposed easement. • Certified copy of deed(s) of applicant's adjacent upland or consent of owner of such adjacent upland with a certified copy of the deed(s). • Copy of adjoining shorefront deed(s) and tax map section. • Duplicate copy of permit/letter issued by the USACE. • Completed Environmental Assessment Form (EAF), if applicable, and other evidence of compliance with the State Environmental Quality Act (SEQR). • Affidavits of service of notice of application. 	<p>Notice of application must be served to the city/town/village in which the land is located and to the owners of adjacent properties; this notice must be made 20 days before the application is submitted.</p> <p>The OGS may determine that additional public notice is required and may require the applicant to post additional public notices, adding up to 40 additional days to the review process.</p>
Department of Environmental Conservation (DEC)	Coastal Erosion Management Permit	The construction or placement of a structure, or any action or use of land that materially alters the condition of land, including grading, excavating, dumping, mining, dredging, filling or any disturbance of soil, within a CEHA, is a regulated activity requiring a coastal erosion management permit.	<ul style="list-style-type: none"> • ECL Article 34 Coastal Erosion Hazard Areas. • 6 NYCRR Part 505. 	Application includes Joint Permit Application, locational map, EAF, Structural/Archaeological Assessment Form (SAAF), and other applicable items as indicated on the checklist (DEC 2017a).	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete. ^d Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Water Quality Certification (WQC) under Section 401 of the Clean Water Act (CWA)	State WQC is required for projects that require a USACE Section 404 Clean Water Act Permit. A project may be eligible for coverage under the DEC's Blanket WQC (effective 3/7/17) if it is authorized by a NWP.	<ul style="list-style-type: none"> • U.S. Clean Water Act Section 401, 33 U.S.C. 13411. • 6 NYCRR Part 608 and 621. 	Joint Permit Application form can be used to streamline application process.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15-30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Article 15 - Protection of Waters Permit - Excavation or Placement of Fill in Navigable Water and Their Adjacent and Contiguous Wetlands Permit	Installation of transmission cables within New York State waters are subject to Article 15 jurisdiction under the New York Protection of Waters Regulatory Program for the excavation or placement of fill and could be needed for disturbance of the bed or banks of a protected stream or other watercourse.	<ul style="list-style-type: none"> • ECL Title 15, Article 15, (water resources), and Article 70 (uniform procedures). • 6 NYCRR Part 608 and 621 (uniform procedures). 	Joint Permit Application, along with project plans, photos, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.

Table notes are at the end of the table.

Table 63 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
DEC	Tidal Wetlands Permit	Certain activities within and adjacent to tidal wetlands are regulated under the Tidal Wetlands Act. Adjacent areas extend up to 300 feet inland from the wetland boundary (up to 150 feet inland within New York City).	<ul style="list-style-type: none"> • ECL Article 25 New York Tidal Wetlands Act. • 6 NYCRR Part 661. 	Joint Permit Application along with project plans, photographs, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 to 30 days. If no public hearing is held, the DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC 2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	Freshwater Wetlands Permit	This law provides for regulation of certain activities that could adversely affect freshwater wetlands of 5 hectares (12.4 acres) or more as well as smaller wetlands identified as having an unusually significant local value. Activities that occur within 30.5 meters (100 feet) of the wetland boundary are also regulated.	<ul style="list-style-type: none"> • ECL Article 24 New York Freshwater Wetlands Act. • 6 NYCRR Parts 663, 664, 665. 	Joint Permit Application, along with project plans, photographs, EAF, and SAAF.	Regulations provide that applicant will be informed within 15 days of application submittal as to whether the application is complete. Requests for additional information are common before an application will be deemed complete. The notice of a complete application triggers a public comment period, typically 15 days. If no public hearing is held, DEC should make its final decision on the application within 90 days of its determination that the application is complete (DEC2017b). Notice of incomplete application suspends the agency review until a suitable response is provided.
DEC	State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity	Pursuant to Section 402 of the CWA, stormwater discharges from certain construction activities are unlawful unless they are authorized by a National Pollutant Discharge Elimination System ("NPDES") permit or by a state permit program. New York's SPDES program (ECL Article 17, Title 8) is a NPDES-approved program. Permit coverage is required for construction activities involving soil disturbances of 1 or more acres.	<ul style="list-style-type: none"> • ECL Article 17. • 6 NYCRR Part 750. 	To obtain permit coverage, a Stormwater Pollution Prevention Plan (SWPPP) must be prepared in accordance with all permit requirements, and then a Notice of Intent (NOI) must be submitted in order to be authorized to discharge under the permit.	An applicant that has satisfied the general permit requirements, including a SWPPP, will be authorized to discharge stormwater from their construction activity within 5 business days from the date the DEC receives a completed electronic version of the NOI for construction activities with a SWPPP that has been prepared in conformance with the design and performance criteria stipulated in the permit (DEC 2015). Notice of incomplete application suspends the agency review until a suitable response is provided.

Table notes are at the end of the table.

Table ES-2 continued

Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
DEC/ Natural Heritage Program	State-listed threatened/endangered species consultation and incidental take permits	Actions potentially impacting state-listed T&E species. The applicant can ask the DEC to make a determination as to whether the proposed activity is likely to result in the take of any listed species.	<ul style="list-style-type: none"> ECL 11-0535. 6 NYCRR Part 182. 	<p>The potential impacts of the proposed project's construction and operation with respect to species listed in New York State as endangered, threatened, or species of concern are examined as part of this consultation. Consultation should be with the Division of Fish, Wildlife, and Marine Resources – Bureau of Marine Resources on State Shellfish and Marine Fish Habitat; Rare, Threatened and Endangered Marine Species.</p> <p>Additionally, for listed bats, consultation should be with the DEC Region 1 (or in NYC, Region 2) Wildlife staff. If seasonal restrictions on tree clearing cannot be met, an incidental take permit may be required. In that instance, the applicant will have to identify mitigation that leads to net conservation benefit, and the length (Jones 2017).</p> <p>An application for an incidental take permit includes:</p> <ul style="list-style-type: none"> Completed application. Applicant information. Detailed description of the proposed activity, location, species at issue, nature and expected extent of the take, and impacts on species. Analysis of whether the permit would jeopardize the continued existence of the population of the species. Description of efforts to modify the activity to minimize or avoid the taking. Mitigation plan. Implementation agreement. Certification statement. 	The DEC typically responds within 30 days of receiving a request for a determination, to convey that determination, request additional information, or request an extension.
Office of Parks, Recreation, and Historic Preservation (OPRHP)	Section 106 Consultation under the National Historic Preservation Act (NHPA), and Section 14.09 of the New York State Historic Preservation Office (SHPO) Historic Preservation Act	Projects with any associated federal or state permitting requirements must consider the effect of the project on cultural resources.	<ul style="list-style-type: none"> NHPA, 54 U.S.C. 300101 et seq. Parks, Recreation and Historic Preservation Law, Article 14. 	The SHPO will require an architectural study to identify National Register sites, state register sites, and other sensitive historical, cultural, and traditional sites within an Area of Potential Effects (APE) from the project. The SHPO Archaeologist will also require archaeological studies to identify potentially significant sites.	Highly variable; dependent on potential resources, project impacts, and significance of any findings.
Department of Transportation (DOT)	Highway Work Permit for Utility Work	Any utility work—including construction and installation—in state highway right-of-way. The interconnection from the landfall site to a substation would be the trigger.	New York Highway Law Article 3, § 52.	PERM 32 application form, including work plans, a traffic maintenance plan, and supporting documents (e.g., insurance certificates).	Permitting timeframes vary by DOT region and can range from 14 to 90 days.
DOT	Special Hauling Permits	Vehicles/loads that exceed the legal dimensions or weights specified in Section 385 of the NYS Vehicle and Traffic Law.	New York State Vehicle and Traffic Law § 385	PERM 39 application form, including carrier information, vehicle information (i.e., vehicle dimensions and load information), trip information (i.e., start date, permit type, routes).	Permitting timeframes vary by DOT region and may range from 14 to 90 days.
New York State Museum	State Lands Permit	Activities that have the potential to disturb archaeological or paleontological resources on state lands, which include submerged lands under state waters.	Section 233 of the New York State Education Law	Permit application requires site details, detailed plans, conservation information, maps/charts, and project timeframe.	Typical review and approval process takes about 45 days if all the necessary information is available.

Table notes are at the end of the table.

Table ES-2 continued

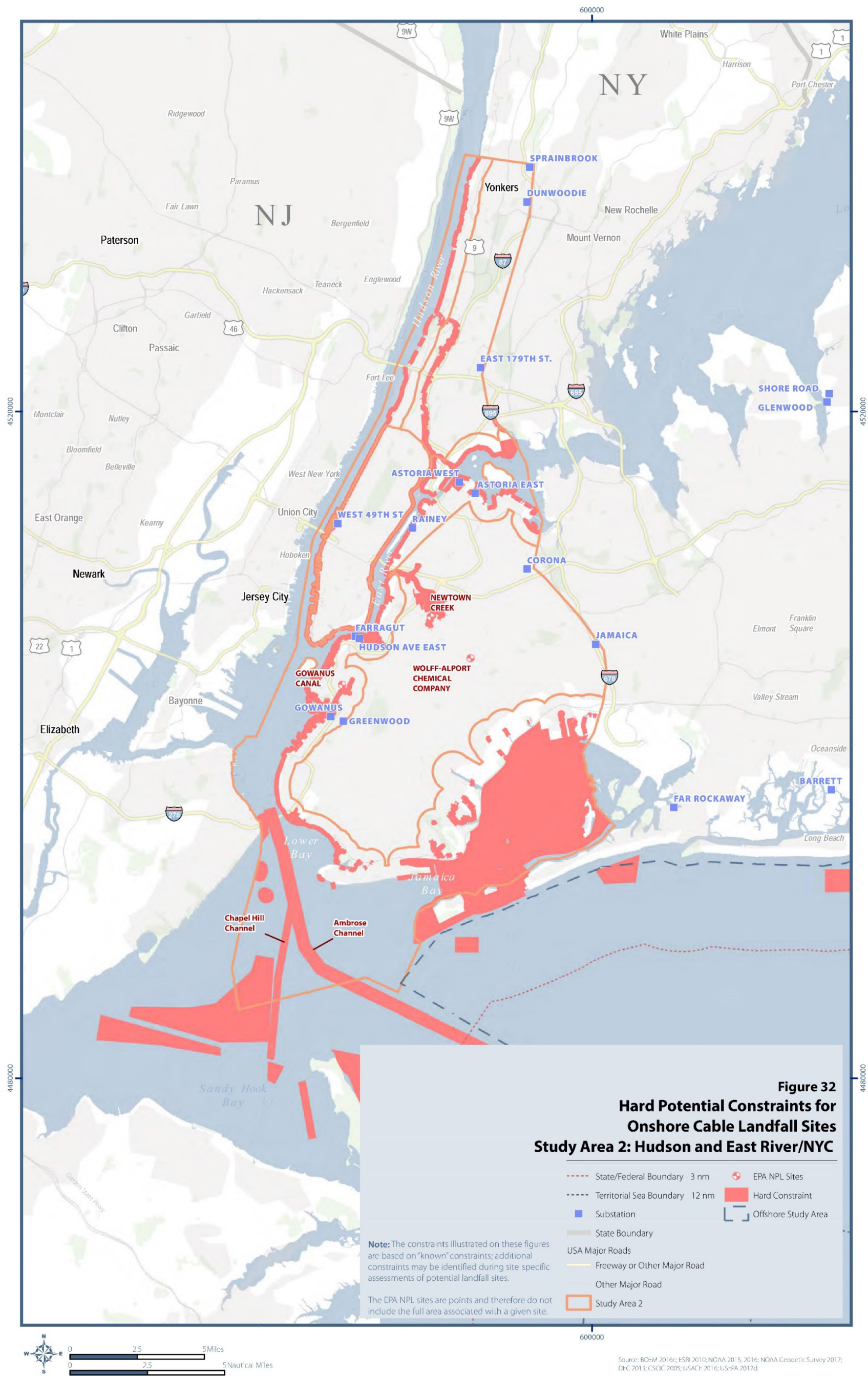
Agency/Entity	Permit/Approval/Review Process	Regulated Activity/Trigger	Applicable Laws/Regulations	Information Required for Permits, Supporting Studies, and Applicability to Project	Permitting Process and Timeframe for Permit Acquisition
Local					
New York City Department of City Planning	New York City Waterfront Revitalization Program Consistency (coordinated with DOS for CZMA review)	WRP review is required for any project located within the Coastal Zone boundary and which also requires a federal agency permit/authorization.	New York State's Waterfront Revitalization of Coastal Areas and Inland Waterways Act	A WRP Consistency Assessment Form, which includes a policy assessment, must be completed and submitted.	Review is coordinated with DOS. See above under DOS for timeframe.
New York City Board of Standards and Appeals (BSA)	Special Permit	Required for a cable landfall in a zone where "public utility or public service facilities, terminal facilities at river crossings for access to electric, gas, or steam lines" are not permitted as-of-right. Depending on the size and the zoning district, electric substations can be allowed as-of-right or specially permitted.	New York Zoning Resolution	Applications for conditional use permits must follow the Board of Standards and Appeals process outlined in the instructions for completing the "BZ" application, which are available online at: http://www1.nyc.gov/site/bsa/applications/forms-and-instructions.page .	Applicant must provide a copy of the BZ application form and attachments to the affected Community Board or Borough Board, City Councilmember, and Borough President, as well as to the City Department of Buildings administrative official and the City Planning Commission before or within three business days of filing the application. A public hearing may be held by the affected community board within 60 days of receipt of the BZ application, or the affected community may waive the right to hold such a meeting and submit written recommendations. Within 30 days of receipt of a BZ application, or after an affected community board has waived a public hearing, the affected borough board may hold a public hearing and submit a written recommendation or may waive the hearing. After receipt of recommendations or waivers, or the expiration of the time period for review, the Board of Standards and Appeals will hold a public hearing on the application and make a decision. Once the application is deemed complete, the board will provide the hearing notice and related forms to the applicant at least 30 days before the first scheduled hearing date. Note: Depending on the cable landfall location, review by BSA may be coordinated on coastal issues with DOS and other agencies.

Note:

^a The placement of a submarine cable on the seabed is considered a structure under the regulations for implementing Section 10 of the Rivers and Harbors Act of 1899 (see 33 CFR 322.2(b)) and not a loss of waters of the United States subject to the 0.5-acre limit in Nationwide Permit 12.

Figure 32. Hard Potential Constraints for Cable Landfall Sites, Study Area 2: Hudson and East River/ NYC

BOEM 2016c; ESRI 2010; NOAA 2015, 2016; NOAA Geodetic Survey 2017; DEC 2013; OCSCIC 2005; USACE 2016; USEPA 2016



5 Best Management Practices and Guidelines

Existing guidelines and BMPs from other offshore wind farm developments in the U.S. and Europe are available for consideration for developers during future cable landfall siting, construction, and operation. Based on a review of existing documentation, pertinent guidelines and BMPs are summarized in this section for review and consideration. Additionally, pertinent recommendations to improve the permitting process for offshore wind in New York State are also included. Additional guidance and BMPs should be considered as presented in resource specific studies also appended to the Master Plan, including *the Fish and Fisheries Study*, *Sand and Gravel Resources Study*, *Marine Mammals and Sea Turtles Study*, and the *Cultural Resources Study*. For the purposes of this Study, a guideline is defined as a general rule or piece of advice; a BMP is defined as a practice, method or technique found to be the most effective and practical means of achieving a desired result or goal.

Guidelines and BMPs summarized from regulatory guidance documents are subject to change over time and new guidance, technologies, or regulations may also arise after publication of this Study. Developers should consult federal and state agencies for up-to-date regulatory recommendations or requirements at the time of project planning and development. This Study does not intend to propose changes to existing guidance or to develop new guidance. The State is in the planning phase for offshore wind energy development, the outcome of which will help to inform their next steps, including an approach to develop guidelines.

5.1 Cable Landfall Siting

A set of guidelines for the siting of cable landfalls have been compiled based on a review of offshore wind farms in the U.S. and Europe, including: the Block Island Wind Farm in Rhode Island (Tetra Tech 2012), the Virginia Offshore Wind Technology Advancement Project in Virginia (Tetra Tech 2013), and the Triton Knoll (RWE Innogy UK 2015) and Greater Gabbard (PMSS 2005) offshore wind farms in the United Kingdom. These guidelines are summarized below.

- Consider the availability of and access to existing electrical infrastructure.
- Consider the availability of a location with sufficient temporary construction workspace.
- Consider a location with appropriate vehicular access from the existing public road network.
- Avoid or minimize the disturbance of sensitive coastal areas, habitat and resources (e.g., eelgrass, beach dunes).
- Minimize the potential impacts on the local community, including from closure of beaches, disturbance of shorelines, and reduced access to shorelines.
- Consider the potential visual impact of onshore infrastructure.

- Minimize the potential complexity and engineering risk involved with cable installation.

5.2 Resource-Specific Guidelines/BMPs

Table 64 presents BMPs and other guidelines that have been implemented on constructed offshore wind farms, organized by resource. In addition to the offshore wind farms cited above, this table also draws from the Cape Wind Energy Project (MMS 2009) and the BOEM Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (2016). Table 64 focuses on the measures applicable to project components in the shoreline/nearshore and onshore environment in terms of planning, construction, and operation.

Table 64. Summary of Shoreline/Nearshore and Onshore Permitting BMPs by Resource

Sources: Tetra Tech 2012, 2013; MMS 2009; USFWS New Jersey Field Office 2017

Resource	Guideline/BMP
Land Cover	No specific guidelines/BMPs have been cited for other offshore wind farms. Refer to other resources below for resource-specific BMPs (e.g., surface waters and wetlands).
Publicly Managed Lands, Public Places, Government Properties	No specific guidelines/BMPs have been cited for other offshore wind farms.
Indigenous Nations Lands, ROWs, and Conservation Easements	No specific guidelines/BMPs have been cited for other offshore wind farms with respect to land ownership and site encumbrances. <u>Access</u> <ul style="list-style-type: none"> • Prepare and implement a Traffic and Transportation Plan to minimize potential vehicle traffic impacts during construction. • Construction associated with cable landfalls should be limited during the summer months to avoid the peak tourist season (Tetra Tech 2012).
Municipal Jurisdictions	No specific BMPs pertain to this resource. Specific municipality-dependent regulations and associated mitigation are discussed for the other resources.
Local Zoning	No specific BMPs pertain to this resource beyond compliance and consistency with local zoning regulations.
Coastal Zone	No specific BMPs pertain to this resource beyond careful consideration of all relevant coastal policies in project planning and preparation of coastal consistency documentation.

Table 64 continued

Resource	Guideline/BMP
Marine Infrastructure and Uses	<ul style="list-style-type: none"> • Submarine cables should be buried at a target depth of 6 feet below the seafloor to avoid interactions with fishing gear and/or anchors (Tetra Tech 2012). Coordination with the U.S. Coast Guard would establish a target depth for the nearshore zone, including potential passage through the Upper and Lower Bays and rivers. • Implement a comprehensive communication plan during offshore construction to inform commercial and recreational fishermen, mariners, and recreational boaters of construction activities and vessel movements. • Establish designated construction vessel traffic routes, construction standby areas, and work areas.
Threatened and Endangered Species	<ul style="list-style-type: none"> • Restore disturbed areas to preconstruction conditions following completion of construction. • Use HDD during construction to minimize potential impacts on shoreline habitats. • Utilize existing roadways, minimize construction workspace, and use existing ROWs to interconnect the cable landfall site to an existing substation. • Minimize clearing of natural vegetation or alteration of existing wetland areas that could provide foraging habitat for bats. • Do not drive construction vehicles on the beach, dunes, or in other sensitive shoreline habitats. • Tree clearing should be minimized to the maximum extent possible. Trees removed should be low-quality and/or diseased trees. • Locate cable landfalls and onshore facilities to avoid impacts on known sea turtle nesting beaches (BOEM 2016b). • Locate cable landfalls and onshore facilities to avoid impacts on known nesting beaches of sensitive species during the breeding season (BOEM 2016b). • Species-specific construction windows are provided below, based on USFWS/DEC guidelines: <ul style="list-style-type: none"> ○ NLEB: The DEC requires additional conditions on tree cutting in addition to the conservation measures in the Final 4(d) Rule. These conditions are summarized below the table. ○ Piping Plover: Avoid disturbances between March 15 and August 31 within 1 mile of a beach, dune, or intertidal area. ○ Red Knot: Because this is a migrant species, there are no specific construction windows. Spring migration is from mid-May through early June, and fall migration is from late July through November. ○ Roseate Tern: Avoid noise and disturbance during the nesting season (May 15–August 15).

Table 64 continued

Resource	Guideline/BMP
Other Sensitive Habitats	<ul style="list-style-type: none"> • Refer to measures listed under Wetlands, Surface Waters, and Floodplains. • Minimize construction workspace. • Do not drive construction vehicles on the beach, dunes, or in other sensitive shoreline habitats. • For eelgrass beds: <ul style="list-style-type: none"> ○ No anchoring of vessels or cable installation near eelgrass beds. ○ Demark the edge of the beds at the water's surface. ○ Conduct a dive survey to confirm the limits of the eelgrass beds. ○ Conduct pre- and post-construction monitoring of the eelgrass beds. If it is determined that beds were lost as a result of project activities, replanting should occur.
Wetlands, Surface Waters, and Floodplains	<ul style="list-style-type: none"> • Develop and implement a Stormwater Management Plan and Erosion and Sediment Control Plan in support of construction activities. • Develop and implement a Stormwater Pollution Prevention Plan, including spill containment measures. • Select construction methodologies (e.g., HDD) to minimize disturbance of the nearshore environment, including wetlands. If HDD is used, develop and implement an HDD Contingency Plan to address the inadvertent release of drilling fluid. • Require all construction and operation vessels to comply with regulatory requirements related to the prevention and control of spills and discharges.
Migratory Birds and Eagles	<ul style="list-style-type: none"> • Avoid clearing during bird nesting season to avoid take of bird eggs and chicks. Exact dates should be developed through consultation with USFWS.
Sediment, Soils and Steep Slopes	<ul style="list-style-type: none"> • Restore disturbed areas to preconstruction conditions following completion of construction. • Develop and implement a Stormwater Management Plan and Erosion and Sediment Control Plan in support of construction activities.
Geologic Hazards	<ul style="list-style-type: none"> • Conduct geophysical surveys and analyses of the nearshore/tidal zone prior to finalization of site selection and construction. • Evaluate the use of HDD where feasible to reduce potential impacts.

Table 64 continued

Resource	Guideline/BMP
Cultural and Historic Resources	<ul style="list-style-type: none"> • Make contact with the SHPO during the early stages of project planning as part of the process of identifying information on any additional cultural resources concerns or issues they may wish to identify for the Onshore Permitting Study areas. • Consult with SHPO to determine required field investigations for the onshore and nearshore portions of any project prior to construction. • Identify all submerged potentially archaeologically sensitive areas prior to construction. • Implement an Unanticipated Discoveries Plan for construction that specifies stop work and notification procedures in the event a site of potential cultural significance is encountered during construction. • Consult with the SHPO under NHPA to develop specific mitigation measures regarding potential visual impacts on onshore aboveground historic properties.
Areas of Contamination	Review of appropriate site closure documents for land use restrictions/controls and compliance with those restrictions/controls.

5.2.1 NLEB Protection Measures

For projects that do not result in a change of land use within NLEB-occupied habitat, the DEC stipulates that the following requirements be met; otherwise, a permit must be obtained (DEC 2017d):

November 1 to March 31.

- No cutting of trees may occur inside of the quarter mile buffer around a hibernaculum.

April 1 to October 31.

- Within five miles of known hibernacula or within 150 feet of documented summer occurrence: Leave uncut all known and documented roost trees and any trees within a 150-foot radius of a documented summer occurrence.
 - Leave all uncut snag and cavity trees unless their removal is necessary for protection of human life and property.
 - If any bats are observed flying from a tree, or are on a tree that has been cut, forestry activities in the area should be suspended and DEC Wildlife staff should be notified as soon as possible.
- Within quarter mile of a hibernaculum, leave all trees uncut unless their removal is necessary for protection of human life and property.

5.3 Recommendations to Improve the Permitting Process

In 2015, New York State released a report entitled *Advancing the Environmentally Responsible Development of Offshore Wind Energy in New York State: A Regulatory Review and Stakeholder Perceptions* (NYSERDA 2015). This report summarizes the feedback and findings of facilitated stakeholder discussions regarding environmental issues and regulations associated with the development of offshore wind in New York State. A variety of stakeholders were asked to participate in the process to identify information needs for regulatory and permitting processes and to help define the goals of environmental assessment for offshore wind and wildlife (NYSERDA 2015). Based on participant feedback, general recommendations were developed that would inform the responsible development of offshore wind projects. Of the two principal recommendations, one is applicable to developers and the other is specific to actions that regulators can take to improve and clarify the environmental assessment and permitting process for offshore wind. The recommendation applicable to developers focuses on frequent communication and the benefits that can have on the permitting process: “Frequent communication is critical between developers and regulators, as well as between State and federal regulators, before and during all phases of permitting” (NYSERDA 2015).

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Appendix A. Summary of GIS Metadata Used in Desktop Analysis

Layer Name	Source	Date Data Downloaded	Data Download URL	Online metadata location
Significant Natural Community Occurrences	Department of Environmental Conservation, New York Natural Heritage Program	6/12/2017	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1241	http://gis.ny.gov/gisdata/metadata/nysdec.natcomm_reg34_KML.xml
New York Protected Areas Database (NYPAD)	New York Protected Areas Database (NYPAD) New York Natural Heritage Program	6/13/2017	http://nypad.org/Download	http://nypad.org/sites/default/files/metadata/NYPAD%20v1.1%20metadata.pdf
Multi-Resolution Land Characteristics (MRLC) Consortium. National Land Cover Data (NLCD) 2011 Database	Multi-Resolution Land Characteristics (MRLC) Consortium	2/16/2017	https://www.mrlc.gov/nlcd11_data.php	https://www.mrlc.gov/nlcd2011.php
High Resolution NHD Flowline, Area and Waterbodies	USGS National Hydrography Dataset (NHD) High Resolution 2017-03-16 for New York State or Territory	6/14/2017	http://prd-tnm.s3-website-us-west-2.amazonaws.com/?prefix=StagedProducts/Hydrography/NHD/State/HighResolution/	https://prd-tnm.s3.amazonaws.com/StagedProducts/Hydrography/NHD/State/HighResolution/GDB/NHD_H_New_York_GDB.xml
DEC Freshwater Wetlands and Checkzone Buffers	Department of Environmental Conservation	6/14/2017	http://cugir.mannlib.cornell.edu/datatheme.jsp?id=111	For each county: http://cugir.mannlib.cornell.edu/transform?xml=DECfwet.36103.e00.00488.xml
USFWS NWI Wetlands	U.S. Fish and Wildlife Service	6/13/2017	https://www.fws.gov/wetlands/data/State-Downloads.html	https://www.fws.gov/wetlands/Data/metadata/FWS_Wetlands.xml
DEC Tidal Wetlands	Department of Environmental Conservation - Tidal Wetlands - NYC and Long Island - 1974 (DEC)	6/14/2017	https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1139	http://gis.ny.gov/gisdata/metadata/nysdec.tidal_wetlands_lower.html
FEMA Floodplains	Federal Emergency Management Agency	6/14/2017	http://msc.fema.gov/portal/availabilitySearch?communityID=12089C&communityName=NASSAU+COUNTY+ALL+JURISDICTIONS&postDate=03%2f09%2f2017#searchresultsanchor	Not available
Preliminary Flood Maps and Data for NYC	Federal Emergency Management Agency - EMA-DFIRM-Preliminary	6/14/2017	https://www.msc.fema.gov/portal/downloadProduct?productID=360497_PRELIMDB	https://data.femadata.com/NationalDisasters/Hurricane%20Sandy/RiskMAP/Public/Public_Documents/PreliminaryFIRM/NYC_FIS_Factsheet_508.pdf

Layer Name	Source	Date Data Downloaded	Data Download URL	Online metadata location
Native American Lands	New York State Office of Cyber Security & Critical Infrastructure Coordination (CSCIC)	6/14/2017	http://opdgig.dos.ny.gov	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuid={F1806A48-5CE8-4A03-8CAE-A82F60CD7EE1}
Federally owned lands	ESRI 2014	N/A	N/A	https://nationalmap.gov/small_scale/mld/fedlanp.html
DEC Owned Lands	Department of Environmental Conservation, published 2009-03-25	6/16/2017	https://gis.ny.gov/gisdata/inventories/details.cfm?D_SID=1114	Not available
DOS Planning and Development Coastal Boundary (acres)	Department of State		http://opdgig.dos.ny.gov/#!/map/0/3345C51F-A8E3-4662-87B2-4780F59C73CC,DDF4BC5E-FA70-4FF4-8310-A6E624AB96CC,F7F8A6C4-BDF1-42B8-9D1D-AF2310B6EF37,71573495-B113-487A-BC3F-2CCFB6F3BE9D,731BDCCC-4E4B-4E2B-862A-888C77C73380,0BFF00DA-3AFB-4F51-9AE8-4C03604AC17F,F1806A48-5CE8-4A03-8CAE-A82F60CD7EE1,D680152F-4C6D-4171-B122-BBA1E4F40BA1,CEF26D31-A7DE-4752-A2DB-92EF2A0347C6/-80.490,39.387,-70.954,45.930/topo/111155577	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuid={CEF26D31-A7DE-4752-A2DB-92EF2A0347C6}
Waterfront Revitalization Program (WRP) - Special Natural Waterfront Area	New York City Department of City Planning Waterfront and Open Space Division	6/14/2017	http://www1.nyc.gov/site/planning/data-maps/open-data/dwn-wrp.page	http://www1.nyc.gov/site/planning/data-maps/open-data/dwn-wrp.page
Waterfront Revitalization Program (WRP) - Significant Maritime and Industrial Area	New York City Department of City Planning Waterfront and Open Space Division	6/14/2017	http://www1.nyc.gov/site/planning/data-maps/open-data/dwn-wrp.page	http://www1.nyc.gov/assets/planning/download/pdf/data-maps/open-data/smia_meta.pdf
Waterfront Revitalization Program (WRP) - Coastal Zone Boundary	New York City Department of City Planning Waterfront and Open Space Division	6/14/2017	http://www1.nyc.gov/site/planning/data-maps/open-data/dwn-wrp.page	http://www1.nyc.gov/assets/planning/download/pdf/data-maps/open-data/czb_meta.pdf

Layer Name	Source	Date Data Downloaded	Data Download URL	Online metadata location
Community with approved Local Waterfront Revitalization (LWRP Communities)	Office of Planning & Development, published 10/24/2014	6/14/2017	https://gis.ny.gov/gisdata/inventories/details.cfm?D SID=1284	Not available
NCED Polygons	Conservation Biology Institute, Defenders of Wildlife, Ducks Unlimited, NatureServe, and The Trust for Public Land	6/16/2017	http://conservationeasement.us/login	Not available
Airport - count of airports (total acreages)	ESRI 2014	N/A	N/A	Not available
SSURGO Soils	Natural Resources Conservation Service (NRCS)	6/21/2017	https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx	Not available
Existing Transmission Lines	Platts 2009	N/A	Data purchased in 2009	https://www.platts.com/IM.Platts.Content/ProductsServices/Products/gismetadata/trans_in.pdf
Existing Pipelines	National Pipeline Mapping System (NPMS) collected in 2007	2007	Not applicable	Not available
Existing Major Roads	ESRI 2014, Tele Atlas North America, Inc. 2010	N/A	N/A	N/A
Long Island Rail Road Routes	Baruch College – City College of New York 2017	6/9/2017	https://www.baruch.cuny.edu/confluence/display/geoportal/NYC+Mass+Transit+Spatial+Layers	https://www.baruch.cuny.edu/confluence/display/geoportal/NYC+Mass+Transit+Spatial+Layers
City and Town Boundaries (Municipalities)	Office of Information Technology Services GIS Program Office (GPO)	6/20/2017	http://gis.ny.gov/gisdata/inventories/details.cfm?DS ID=927	http://gis.ny.gov/gisdata/metadata/nysgis.Cities_Towns.pdf

Layer Name	Source	Date Data Downloaded	Data Download URL	Online metadata location
DEC Environmental Remediation Dataset - Queried for all Site Classes EXCEPT for N, across ALL programs (Count)	Department of Environmental Conservation, updated nightly	6/14/2017	https://gis.ny.gov/gisdata/inventories/details.cfm?D SID=1097	http://gis.ny.gov/gisdata/metadata/nysdec.REMGIS.xml
EPA FRS - Queried for Superfund NPL sites only (Count)	EPA, as of June 1 2017	6/14/2017	https://www.epa.gov/enviro/geospatial-data-download-service	Not available
Department of State, Division of Coastal Resources - Significant Coastal Fish and Wildlife Habitats - (SigHabs_NYSDOS_2014)	Department of State, Division of Coastal Resources, 2014	10/6/2017	http://opdgig.dos.ny.gov/#/search/browse	http://opdgig.dos.ny.gov/geoportal/catalog/search/resource/detailsnoheader.page?uuid={DDF4BC5E-FA70-4FF4-8310-A6E624AB96CC}
Submerged Aquatic Vegetation (SAV) - NYSDEC Hudson River Estuary Program	Cornell Institute for Resource Information Sciences (Cornell IRIS), 2011	6/20/2017	http://gis.ny.gov/gisdata/inventories/details.cfm?DS ID=1208	http://gis.ny.gov/gisdata/metadata/nysdec.hre_sav_2007.shp.xml
AWOIS Wrecks	NOAA	7/14/2017	https://www.nauticalcharts.noaa.gov/hsd/wrecks_and_obstructions.html	https://www.nauticalcharts.noaa.gov/hsd/wrecks_and_obstructions.html
ENC Wrecks	NOAA	7/14/2017	https://marinecadastre.gov/data/	https://www.ncddc.noaa.gov/approved_recs/nos_de/ocs/ocs/ocs/AWOIS.html
Shipping Lanes	NOAA	6/9/2017	https://Marinecadastre.gov	https://www.ncddc.noaa.gov/approved_recs/nos_de/ocs/ocs/ocs/ship_fwys_lanes_zones_us_waters.html
Ocean Disposal Sites	NOAA	6/8/2017	ftp://ftp.coast.noaa.gov/pub/MSP/OceanDisposalSites.zip	https://coast.noaa.gov/arcgis/rest/services/MarineCadastre/NavigationAndMarineTransportation/MapServer
Maintained Navigation Channels	NOAA	7/14/2017	https://data.noaa.gov/dataset/coastal-maintained-channels-in-us-waters	https://data.noaa.gov/harvest/object/31dc1307-da39-439c-92e0-e5bf7cd05b70/html

Layer Name	Source	Date Data Downloaded	Data Download URL	Online metadata location
Anchorage Areas	Digitized from US Coast Guard map	5/5/2016		
Essential Fish Habitat	NOAA, National Marine Fisheries Service; The Nature Conservancy	7/28/2017	http://portal.midatlanticocean.org/data-catalog/conservation/#layer-info-essential-fish-habitats	http://portal.midatlanticocean.org/static/data_manager/metadata/html/efh_overlay_update.htm
Continually Updated Shoreline Product (Shoreline Types)	NOAA	10/11/2017	https://www.ngs.noaa.gov/NSDE/	https://www.ngs.noaa.gov/NSDE/ (Metadata available on a tab within this website)
EPA Hudson River Project Sediment Sampling Sites	USEPA	N/A	N/A – Data provided directly from USEPA Hudson River Office	N/A –Data provided directly from USEPA Hudson River Office
Vessel Density	Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), Office for Coastal Management	8/10/2017	ftp://ftp.coast.noaa.gov/pub/MSP/2013AIS/VesselDensity2013.zip	https://coast.noaa.gov/dataservices/Metadata/TransformMetadata?u=https://coast.noaa.gov/data/Documents/Metadata/harvest/MarineCadastre/VesselDensity2013.xml&format=html

Appendix B. Archaeological and Historic Site Summary Tables

Study Area 1. Shoreline/Nearshore Zone

Site No.	Context	Name	NRHP Status	Region
10309.000245	Historic	Baily Historic Site	UND	Coastal
10309.000242	Prehistoric	Baily Prehistoric Site	NE	Coastal
10309.000050	Prehistoric	Mystery Hill Site	UND	Coastal
10302.001137	Historic	Pye's or Old West Mill	UND	Coastal
10309.000051	Prehistoric	Fish Creek Site	UND	Coastal
10302.001136	Historic	Smith-Havans-Roberts House Site	UND	Coastal
10302.002946	Prehistoric	Eagan Pre-Contact Site	UND	Coastal
10302.001135	Historic	Jeremiah Smith Grist Mill Site	UND	Coastal
10302.001739	Historic	Havan's House Historic Site	UND	Coastal
10302.001745	Prehistoric	Oak Tree Bay #6	UND	Coastal
10302.001744	Historic	Earthen Berm Site	UND	Coastal
10302.001747	Prehistoric	Oak Tree Bay #8	UND	Coastal
10302.001742	Prehistoric	Oak Tree Bay #3	UND	Coastal
10302.001741	Prehistoric	Oak Tree Bay #2	UND	Coastal
10302.000076	Prehistoric	Oak Tree Bay #1	UND	Coastal
10302.001743	Historic	Havan's Hunting Lodge	UND	Coastal
10302.001748	Prehistoric	Oak Tree Bay #9	UND	Coastal
10302.001843	Historic (HR)	Hawken's Farm Site	UND	Coastal
10302.001134	Historic	Down's Tavern Site	UND	Coastal
10302.001133	Historic	Moriches Paper/Grist/Saw Mill Site	UND	Coastal
10302.001131	Historic	General Nathaniel Woodhull House Site	UND	Coastal
10302.000028	Historic	Fish Hatchery Site	UND	Coastal
10302.000026	Historic	Carman House Historic Site	UND	Coastal
10302.001130	Historic	Carman's Mill & Homestead	UND	Coastal
10302.002928	Historic	South Haven Circle Site	UND	Coastal
10302.001587	Historic	South Haven Presbyterian Church Site	UND	Coastal
10302.001570	Historic	Hawkins-Carmen-Husband Site	UND	Coastal
10302.002921	Prehistoric	Warthin Site	UND	Coastal
10302.002938	Prehistoric	Red Fox Site	Eligible	Coastal
10302.000507	Prehistoric	Fire Place Site	UND	Coastal
10302.001129	Historic	Hawkins House Site	UND	Coastal
10302.001623	Prehistoric	Long Meadow Farm	UND	Coastal
10302.001568	Historic	Ireland Historic Site	UND	Coastal
10302.001567	Historic	Mott House Site	UND	Coastal
10302.000533	Historic	Fort Saint George Site	UND	Coastal
10302.000508	Prehistoric (HR)	Mastic Neck Site	UND	Coastal
10302.002204	Form Missing	Old South Haven Church Isolates	UND	Coastal
10302.001140	Historic	Bicycle Railroad R.O.W.	UND	Coastal

Study Area 1. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
10302.002691	Prehistoric	Roe Isolates	UND	Coastal
10302.001128	Historic	Swezy/Swan River Grist Mill	UND	Coastal
10302.002927	Prehistoric	Swan Bluff Site	UND	Coastal
10302.001127	Historic	Canaan Lake Mill Site	UND	Coastal
10305.000486	Historic	Bayport Barrel Factory Site	UND	Coastal
10302.000919	Historic	Five Mile Look House Gate Post	UND	Coastal
10305.000603	Historic	Franklin Avenue Site (Foundation)	UND	Coastal
10305.000599	Historic	Roosevelt Estate Outbuilding Site	Listed	Coastal
10305.000607	Unknown	Frank Penny Boat Shop	Eligible	Coastal
10305.000350	Form Missing	Pepperidge Hall Site	UND	Coastal
10305.000349	Historic	Ludlow House Foundation	UND	Coastal
10305.000288	Form Missing	Connetquot II Site	Listed	Coastal
10305.000009	Prehistoric	River Bend Site	Listed	Coastal
10305.000008	Historic	Timber Point Site	UND	Coastal
10305.000005	Historic	Timber Point Site 13-8	UND	Coastal
10305.000882	Prehistoric	Brookwood Hall Site	UND	Coastal
10305.000274	Prehistoric	Hedger Site	UND	Coastal
10305.000275	Unknown	Sounding 23 Site	UND	Coastal
10305.000283	Prehistoric	Chaplin Creek II Site	UND	Coastal
10305.000007	Historic	Old Mill Pond Site	UND	Coastal
10305.001942	Historic	Sagtikos Manor Site	UND	Coastal
10305.000011	Prehistoric	Gardiner County Park Site 19-2	UND	Coastal
10305.000013	Prehistoric	Gardiner County Park Site 19-8	UND	Coastal
10305.000014	Historic	Gardiner County Park Site 19-1	UND	Coastal
10305.000282	Prehistoric (HR)	Cedar Point Site	UND	Coastal
10305.000130	Prehistoric (HR)	Oak Neck Indian Site	UND	Coastal
10305.000280	Prehistoric (HR)	Willetts Creek	UND	Coastal
10344.000306	Unknown	Nathaniel Conklin House Site	Listed	Coastal
10305.000748	Historic (HR)	Selby Burying Ground	UND	Coastal
10301.000148	Historic	Austin Shell Midden	UND	Coastal
10301.000543	Historic (HR)	Albany Avenue Cemetery	UND	Coastal
05903.000127	Prehistoric	NYSM#10244	NE	Coastal
05903.000001	Unknown	Fort Massapeag Site	Listed	Coastal
05901.000040	Prehistoric	Seaford Park Site	UND	Coastal
05920.000006	Historic	Raynor Grist Mill and House Site	UND	Coastal
05947.000004	Historic	Smith Pond Pump Station	UND	Coastal
05941.000135	Historic	Rock Hall Museum Grounds	UND	Coastal
08101.000091	Prehistoric (HR)	Aqueduct Site	UND	Coastal
08101.000090	Prehistoric	Bolton's Site	UND	Coastal

Study Area 1. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
08101.000089	Unknown	Jacob Riis Park	Listed	Coastal
08101.000107	Historic	Breezy Point Life Saving Station	UND	Coastal
08101.000088	Historic	Fort Tilden	Listed	Coastal
08101.011957	Historic	Fort Tilden Burial Ground	Listed	Coastal
08101.000106	Historic	Refuse Deposit	UND	Coastal
05901.001368	Historic	Mexico Shipwreck	Eligible	Coastal
05901.001366	Unknown	Long Beach Underwater Anomaly 18	UND	Coastal
15901.001367	Unknown	Long Beach Underwater Anomaly 29	UND	Coastal
15901.000082	Historic	Unknown Tugboat Shipwreck	NE	Coastal
15901.00045	Historic	Marble Shipwreck	Eligible	Coastal
10305.000015	Historic	Fire Island Lighthouse	UND	Coastal
10305.000018	Historic	Lighthouse Tract: Stratified Deposits	UND	Coastal
10305.001580	Historic	U.S. Naval Radio Compass	UND	Coastal
10305.000605	Historic	Camp Cheerful	Eligible	Coastal
10305.000931	Historic	Greenberg House Site	UND	Coastal
10305.000930	Historic	Razed Factory Site	UND	Coastal
10305.000002	Historic	Casino Site	UND	Coastal
10305.000001	Form Missing	Saltair Dump Site	UND	Coastal
10305.000610	Form Missing	Lopped Tree Site	UND	Coastal
10302.001577	Historic	Point O Woods Refuse Middens	UND	Coastal
10302.001578	Historic	Blue Point Life Saving Station Site	UND	Coastal
10302.003246	Historic	Bessie White Shipwreck	UND	Coastal
10302.001579	Historic	Whale House Point Site	UND	Coastal
10302.001580	Multi-Component	Smith Point Coast Guard Station Site	UND	Coastal
10302.001582	Form Missing		UND	Coastal
10357.000421	Historic	Mill Hill Mill	UND	Coastal
10380.000001	Prehistoric	Shinnecock Indian Reservation Site	UND	Coastal
10309.000103	Prehistoric	Ponquogue Point Lighthouse	UND	Coastal
10309.000053	Unknown	Pine Neck Site	UND	Coastal

Study Area 1. Shoreline/Nearshore Zone NRHP Buildings and Districts

Number	Name	Municipality
90NR01869	Southside Sportsmen's Club District	Great River, North Great River, Oakdale, Bohemia
01NR01780	St. Ann's Episcopal Church and Rectory	Sayville
90NR01901	Nathaniel Conklin House	Babylon
90NR01591	Sage, Russell, Memorial Church	Queens
90NR01701	United States Post Office-Freeport	Freeport
90NR01723	Grace Church Complex	Massapequa
01NR01764	Bay Shore Methodist Episcopal Church	Bay Shore
96NR01015	Bellport Village Historic District	Bellport
90NR01579	Riis, Jacob, Park Historic District	Queens
90NR01571	Fort Tilden Historic District	Queens
92NR00297	Terry-Ketcham Inn	Center Morchies
97NR01169	Haviland-Davison Grist Mill	East Rockaway
90NR01715	Granada Towers	Long Beach
01NR01750	Bay Shore Hose Company No. 1 Firehouse	Bay Shore
90NR01714	Rock Hall	Lawrence
90NR01716	United States Post Office-Long Beach	Long Beach
90NR01873	Roosevelt, John Ellis, Estate (Meadowcroft)	Sayville
90NR01871	Sagtikos Manor	West Bay Shore
90NR01872	Fire Island Light Station	Fire Island
90NR01870	Cutting, Bayard, Estate	Great River, North Great River
90NR01874	United States Post Office-Bay Shore	Bay Shore
01NR01799	Trinity Chapel	Far Rockaway
01NR01795	First Congregational Church of Bay Shore	Bay Shore
90NR01778	Masury Estate Ballroom	Center Moriches
90NR01772	Floyd, William, Estate (Old Mastic House)	Mastic
90NR01732	United States Post Office-Rockville Centre	Rockville Centre
90NR01613	United States Post Office-Far Rockaway	Queens
02NR04952	Wood, Joseph, House	Sayville
04NR05378	Felix, Pauline, House	Long Beach
04NR05380	Vaisberg, Samuel, House	Long Beach
04NR05404	Jones Beach State Park, Causeway and Parkway System	Towns of Hempstead and Oyster Bay
05NR05433	Sayville Congregational Church	Sayville
05NR05462	Babylon Town Hall (Town of Babylon Old Town Hall)	Babylon
05NR05503	Wereholme	Islip
07NR05779	House at 251 Rocklyn Avenue (Brower House)	Lynbrook
07NR05780	House at 474 Ocean Avenue (Luning House)	Lynbrook
08NR05887	House at 226 West Penn (Long Beach Historical Museum)	Long Beach
09NR06051	Fire Island Light Historic District (Boundary Increase)	Fire Island

Study Area 1. Shoreline/Nearshore Zone NRHP Buildings and Districts continued

Number	Name	Municipality
10NR06169	Dr. Richard Pasternack House	Islip
10NR06170	The Edwards Homestead	Sayville
12NR06370	Far Rockaway Beach Bungalow Historic District	Queens
12NR06405	Carirngton House	Brookhaven (Fire Island)
13NR06425	Cherry Grove Community House and Theatre	Cherry Grove
13NR06473	Rafael Guastavino House	Bay Shore
13NR06491	Temple of Israel Synagogue	Rockaway Beach
13NR06492	Rockaway Courthouse	Rockaway Beach
14NR06544	John Mollenhauer House	Bay Shore / Islip
14NR06578	Denton Homestead	East Rockaway
14NR06602	Cobble Villa	Long Beach
14NR06604	Barkin House	null
15NR00035	Babylon Public Library	null
15NR00059	Rockville Cemetery and Mariners Monument	null
Grand Total: 52		

Study Area 1. Upland Zone

Site No.	Context	Name	NRHP Status	Region
05903.000266	Historic	Central Railroad Roundhouse	UND	Upland
10301.000006	Prehistoric	Prehistoric Site	UND	Upland
10304.000994	Prehistoric	Half Hollow Tree Nursery Site	UND	Upland
10305.001218	Historic	Pilgrim Site	UND	Upland
10305.000286	Historic	Collins House Site	Listed	Upland
10302.002846	Historic	Bellport Road Depot Site	UND	Upland
10302.002290	Historic	Carmans River 5 Locus 2	NE	Upland
10302.002289	Historic	Carmans River 5 Locus 1	NE	Upland
10302.002287	Prehistoric	Carmans River 3 Locus 1	UND	Upland
10302.002288	Historic	Carmans River 3 Locus 2	UND	Upland
10302.002286	Prehistoric	Carmans River 2 Locus 3	UND	Upland
10302.002285	Multicomponent	Carmans River 2 Locus 2	UND	Upland
10302.002284	Prehistoric	Carmans River 2 Locus 1	UND	Upland
10302.000523	Historic	Haman Mill/Dam Site	UND	Upland
10302.000473	Prehistoric	SCPAS 3-22	UND	Upland
10302.000510	Historic	Corduroy Road Site	UND	Upland
10302.000509	Historic	Earth/Log Dam	UND	Upland
10302.000524	Prehistoric	SCPAS 3-24	UND	Upland
10302.000030	Historic	Hart Hunting Lodge	UND	Upland
10302.000040	Prehistoric	SCPAS 3-18	UND	Upland
10302.000525	Historic	Pheasant Pens Site	UND	Upland
10302.000028	Historic	Fish Hatchery Site	UND	Upland
10302.000026	Historic	Carmen House Site	UND	Upland
10302.000011	Historic	White House Foundation Site	UND	Upland
10302.000010	Historic	20 th Century Foundation Site	UND	Upland
10302.000517	Historic	Hama-Smith-Gerard Saw Mill Site	UND	Upland
10302.000467	Historic	Gerard Mill Site	UND	Upland
10302.000522	Form Missing	Yaphank Prehistoric Site	UND	Upland
10302.000520	Historic (HR)	Saint Andrews Cemetery	UND	Upland
10302.000521	Historic	Property Line Road Site	UND	Upland
10302.000472	Historic	House Site	UND	Upland
10302.002894	Historic	Claire Rose Site	UND	Upland
10302.001617	Prehistoric	Whisper Hill Site	NE	Upland
10309.000011	Historic	Saw Mill Site	UND	Upland
10309.000013	Historic	SCPAS Site 36-6	UND	Upland
10309.000086	Prehistoric	Wildwood Lake Site	UND	Upland
10309.000092	Prehistoric	Meadowbrook Farm Site	UND	Upland

Study Area 1. Upland Zone NRHP Buildings and Districts NR Buildings

Number	Name	Municipality
93NR00437	St. John's Episcopal Church and Cemetery	Oakdale
93NR00436	Congregational Church of Patchogue	Patchogue
90NR01869	Southside Sportsmen's Club District	Great River, North Great River, Oakdale, Bohemia
01NR01780	St. Ann's Episcopal Church and Rectory	Sayville
90NR01901	Nathaniel Conklin House	Babylon
91NR00006	Farmingdale Railroad Station	FARMINGDALE
90NR01841	Rogers, John, House	Half Hollow Hills
90NR01723	Grace Church Complex	Massapequa
96NR01015	Bellport Village Historic District	Bellport
92NR00298	Ockers, Jacob, House	Oakdale
94NR00728	Modern Times School	Brentwood
90NR01873	Roosevelt, John Ellis, Estate (Meadowcroft)	Sayville
90NR01871	Sagtikos Manor	West Bay Shore
90NR01870	Cutting, Bayard, Estate	Great River, North Great River
90NR01912	United States Post Office-Patchogue	Patchogue
90NR01911	United Methodist Church	Patchogue
01NR01795	First Congregational Church of Bay Shore	Bay Shore
90NR01770	Wantagh Railroad Complex	Wantagh
90NR01772	Floyd, William, Estate (Old Mastic House)	Mastic
95NR00786	St. Paul's Episcopal Church Complex	Patchogue
92NR00310	Smith-Rourke House	East Patchogue
95NR00860	Jerusalem District No. 5 Schoolhouse	Wantagh
02NR04952	Wood, Joseph, House	Sayville
04NR05404	Jones Beach State Park, Causeway and Parkway System	Towns of Hempstead and Oyster Bay
05NR05433	Sayville Congregational Church	Sayville
05NR05462	Babylon Town Hall (Town of Babylon Old Town Hall)	Babylon
05NR05503	Wereholme	Islip
06NR05600	Jackson, Samuel and Elbert, House	Wantagh
07NR05700	Sisters of St. Dominic Motherhouse Complex	North Amityville
07NR05747	Davis Field	Bayport
10NR06094	Union Savings Bank	Patchogue
10NR06145	Frank W. Smith House	Amityville
10NR06169	Dr. Richard Pasternack House	Islip
10NR06170	The Edwards Homestead	Sayville
Grand Total: 34		

Study Area 2. Shoreline/Nearshore Zone

Site No.	Context	Name	NRHP Status	Region
00501.000073	Prehistoric		Listed	Coastal
00501.000791	Multicomponent	Chapel Farm II	Eligible	Coastal
00501.000068	Prehistoric		UND	Coastal
00501.000067	Historic	Canal House Feature 2	UND	Coastal
00501.000072	Multicomponent	Midden	UND	Coastal
00501.000071	Historic	Building Foundation	UND	Coastal
00501.000069	Multicomponent	Woodland Shell Midden	UND	Coastal
00501.000065	Historic	Lime Kiln Feature 1	UND	Coastal
06101.000113	Prehistoric	Harlem Ship Canal Site	UND	Coastal
06101.000533	Prehistoric (HR)	Village Site	UND	Coastal
00501.000056	Historic	Fort #4	UND	Coastal
00501.000054	Historic	Fort #6	UND	Coastal
06101.000121	Prehistoric	Inwood Park Rock Shelter Site	UND	Coastal
06101.000534	Prehistoric	Isham's Gardens (Parker No. 4)	UND	Coastal
06101.000115	Historic (HR)	Negro Graveyard	UND	Coastal
06101.000127	Historic	Nagel House Site (Century House)	UND	Coastal
06101.000114	Prehistoric	Harlem River Shell Heaps	UND	Coastal
06101.000532	Prehistoric	Shorakapkok/Clear Springs Site	UND	Coastal
06101.000119	Prehistoric (HR)	Seaman Avenue Indian Burial Mound	UND	Coastal
06101.000536	Form Missing	Inwood Station Site	UND	Coastal
06101.000123	Prehistoric	Dongan Place Shell Heap	Listed	Coastal
06101.000112	Historic	Observation Platform Site	Listed	Coastal
06101.000125	Historic	Barrier Gate	UND	Coastal
06101.000116	Prehistoric	Brook Crossing Camp Site	UND	Coastal
00501.000044	Historic	Fort #8	UND	Coastal
06101.000122	Historic	Hessian Hut Camp	UND	Coastal
06101.000120	Historic	Fort Washington Site	Listed	Coastal
06101.000118	Historic	Barbette Battery (Fort Washington)	UND	Coastal
06101.000020	Historic	Blue Bell Tavern	UND	Coastal
06101.000126	Historic	Oblienis House Site	UND	Coastal
06101.000027	Historic	Vandorog Musketeers Camp	UND	Coastal
06101.019103	Historic (HR)	Harlem African Burial Ground	UND	Coastal
06101.018571	Historic	Second Reform Dutch Church Site	UND	Coastal
00501.000014	Historic		UND	Coastal
00501.000021	Historic	J.L. Mott Iron Works Site	UND	Coastal
00501.000027	Prehistoric	RANACHQUA	UND	Coastal
06101.000541	Prehistoric	Conykeest Site	UND	Coastal
06101.000542	Prehistoric	Rechewanis/Konande Kongh Site	UND	Coastal
06101.012137	Historic (HR)	Manhattan Psychiatric Center Site	UND	Coastal

Study Area 2. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
06101.009531	Historic	Seneca Village	UND	Coastal
06101.000146	Historic	Horn Hook	UND	Coastal
08101.000099	Prehistoric	Hallet's Point (Parker No.12)	UND	Coastal
08101.000100	Prehistoric	Sunwick (Bolton III)	UND	Coastal
06101.017164	Historic	City Island Hospital Site	UND	Coastal
06101.017151	Historic	City Island Hospital Intact Land Surface Site	UND	Coastal
06101.017150	Historic	Smallpox Hospital Kitchen Addition	UND	Coastal
06101.019225	Historic	Hudson River Bulkhead	UND	Coastal
06101.009530	Historic	Bernard M. Baruch College Site No. 3	NE	Coastal
06101.015723	Historic	Historic Feature	NE	Coastal
06101.018336	Historic	PSA4-Pre Civil War Cistern	UND	Coastal
06101.017934	Historic	Block 377 Lot 42 Site	Eligible	Coastal
06101.018564	Historic (HR)	Saint Phillips Cemetery Remnants	UND	Coastal
06101.016915	Historic (HR)	Washington Square Park Potter's Field	UND	Coastal
06101.001286	Historic		UND	Coastal
06101.001273	Historic	Sheridan Square Site	UND	Coastal
06101.019246	Historic	69 Bedford Street	UND	Coastal
06101.017265	Historic (HR)	Spring Street Church Cemetery	UND	Coastal
06101.007671	Historic	576 Broome Street	UND	Coastal
06101.001285	Historic	Washington Street Urban Renewal Site	UND	Coastal
06101.015708	Historic	School Privy	UND	Coastal
06101.012569	Historic	Worth Street Site	UND	Coastal
06101.016117	Historic	Columbus Park Pavilion Cistern	UND	Coastal
06101.013335	Historic (HR)	Tweed Courthouse Area Report	Listed	Coastal
06101.006980	Historic (HR)	African Burial Ground	Listed	Coastal
06101.001304	Historic	City Hall Park Site	UND	Coastal
06101.015825	Historic	Block 100 Lot 1 Site	NE	Coastal
06101.000604	Historic	209 Water Street	Listed	Coastal
06101.000623	Historic	Block 74 Telco Site	UND	Coastal
06101.017931	Historic	Well beneath Corbin Building	Eligible	Coastal
06101.018121	Historic	Liberty Street Pilings Site	Eligible	Coastal
06101.018000	Historic	WTC-USC Ship	Eligible	Coastal
06101.018120	Historic	Pier 7 Complex	Eligible	Coastal
06101.013876	Historic	Federal Hall Archaeological Site	UND	Coastal
06101.000001	Historic	Form Missma District Extension	Listed	Coastal
06101.000014	Historic	From Missma Schermerhorn Row Block Site	Listed	Coastal

Study Area 2. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
06101.0018115	Historic	Burling Slip Walls	Eligible	Coastal
06101.001271	Historic		UND	Coastal
06101.019277	Historic	Wall Street Site	UND	Coastal
06101.106196	Historic	Log Cribbing and Fill	UND	Coastal
06101.015768	Historic	18 th Century Battery Wall	Eligible	Coastal
06101.015598	Historic	Whitehall Slip Site	UND	Coastal
04701.000074	Historic	Empire Site	UND	Coastal
04701.000179	Historic	Dock Remnant	UND	Coastal
04701.000102	Historic	Corporation House Foundation	UND	Coastal
04701.019317	Historic	22 Chapel Street Burial Ground	UND	Coastal
04701.016569	Historic	PCI/Admiral Row Historic Site	UND	Coastal
04701.618574	Historic	Tillary Street Privy	Eligible	Coastal
06101.018574	Historic	Fort Gibson	UND	Coastal
06101.018537	Prehistoric (HR)	Ellis Island Pre-Contact Site	UND	Coastal
06101.018966	Historic	Washington Bath House Foundation	UND	Coastal
06101.019128	Historic	Governors Island Potable Water Site	UND	Coastal
06101.018965	Historic	Washington House Feature B	UND	Coastal
06101.007420	Historic (HR)	Historic Burials	Eligible	Coastal
06101.018960	Historic	Governors Island Potable Water Site	UND	Coastal
06101.018959	Historic	Circa 1900 Pump Room Site	UND	Coastal
06101.019019	Historic	Governor Island Sea Wall	UND	Coastal
06101.019020	Historic	Stable 1867-1906	UND	Coastal
06101.019126	Historic	Gardner Complex	UND	Coastal
06101.018024	Historic	Unidentified Buried Wall	UND	Coastal
06101.016056	Historic	Building 125 Well Site	UND	Coastal
06101.016057	Historic	Ash Filled Brick Feature	UND	Coastal
06101.009524	Prehistoric	Nolan Park Site	Eligible	Coastal
06101.009528	Historic	Governor House Feature 10	NE	Coastal
06101.017246	Unknown	Interior Cribbing Pier 102	UND	Coastal
06101.019125	Historic	Stone Foundation	UND	Coastal
06101.019133	Historic	19 th Century Carpenter's Shop	UND	Coastal
06101.009523	Prehistoric	Fort Jay Site	Eligible	Coastal
06101.018349	Historic	Fort Jay Courtyard	UND	Coastal
06101.009527	Historic	Fort Jay Midden Site	Eligible	Coastal
06101.015029	Historic	Governor's Island Archaeo. Sites	Listed	Coastal
06101.019127	Historic	Feature 10 Footing	UND	Coastal
06101.019132	Historic (HR)	Garrison Cemetery	UND	Coastal
06101.009529	Historic	Golf Course Battery Site	NE	Coastal
06101.019131	Historic	Stone Foundations	UND	Coastal

Study Area 2. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
06101.018398	Historic	Saint Cornelius Church Site	UND	Coastal
06101.018964	Historic	Laundress Quarters	UND	Coastal
06101.019130	Historic	Brick and Stone Wall	UND	Coastal
06101.017110	Historic	Quarters Building Site	UND	Coastal
06101.018963	Historic	Conservatory Site	UND	Coastal
06101.019123	Historic	Concrete Footing	UND	Coastal
06101.019124	Historic	Brick Surface	UND	Coastal
06101.069526	Historic	Hospital Wings	UND	Coastal
06101.019134	Historic (HR)	Fort Columbus Cemetery	UND	Coastal
06101.019127	Historic	Pre 1919 Footings	UND	Coastal
04701.015450	Historic	Privy and Cistern Block 176	Eligible	Coastal
04701.000508	Historic	Bishop Mungavero Site	Eligible	Coastal
04701.017322	Prehistoric (HR)	Native American Burial, Case No. K04-541	No Data	Coastal
04701.019115	Historic	Shipwreck: Target 31A	NE	Coastal
04701.014947	Historic (HR)	Revolutionary War Mass Grave	UND	Coastal
04701.018702	Historic (HR)	Barkaloo Family Cemetery	Eligible	Coastal
08501.000423	Form Missing	Saint Claire's Roman Catholic Church	UND	Coastal
08501.000424	Form Missing	Saint Claire's Roman Catholic Chapel	UND	Coastal
04701.000124	Historic	Floyd Bennett Field	UND	Coastal
04701.000114	Prehistoric (HR)	Floyd Bennett Field Site	UND	Coastal
04701.000122	Historic	Gertison Creek Vicinity	UND	Coastal
04701.000112	Prehistoric	Gertison Creek	UND	Coastal
04701.00126	Historic	Mill Basin, Jamaica Bay	UND	Coastal
04701.000117	Historic	Jamaica Bay	UND	Coastal
04701.000120	Historic	Mill Island	UND	Coastal
04701.000121	Historic	Mill Island	UND	Coastal
04701.000119	Historic	Bergan Beach	UND	Coastal
04701.000115	Prehistoric (HR)	Bergan Beach	UND	Coastal
04701.000123	Historic	Paerdegot	UND	Coastal
04701.000125	Historic	Canarsie Pier	UND	Coastal
04701.000118	Historic	Canarsie Pier	UND	Coastal
08101.000090	Prehistoric	Bolton's Site 136	UND	Coastal
08101.000091	Prehistoric (HR)	Aqueduct Site	UND	Coastal
04701.000116	Historic	Ruffle Bar	UND	Coastal
08101.000152	Historic	GSA Site	UND	Coastal
08101.009571	Historic	One Jamaica Center	Eligible	Coastal
00501.000028	Prehistoric	Quinnahung Site	UND	Coastal
00501.000079	Historic		UND	Coastal

Study Area 2. Shoreline/Nearshore Zone continued

Site No.	Context	Name	NRHP Status	Region
00501.000077	Historic		UND	Coastal
00501.000078	Historic		UND	Coastal
00501.000076	Historic		UND	Coastal
00501.000075	Historic		UND	Coastal
00501.000074	Historic		UND	Coastal
00501.000030	Historic	Early Brook Industrial Site	UND	Coastal
00501.000031	Prehistoric	Bruckner Site	UND	Coastal
00501.000025	Prehistoric	Ranachqua Site	UND	Coastal
08101.007355	Prehistoric (HR)	Wilkins Site	Eligible	Coastal
08101.000102	Prehistoric	Parker 9	UND	Coastal
08101.000103	Prehistoric	North Beach	UND	Coastal
08101.000101	Prehistoric	Parker 14	UND	Coastal
08101.000133	Prehistoric	Grantville Site	UND	Coastal
04701.018779	Historic	Schnaderbeck Brewery Site	Eligible	Coastal
04701.018883	Historic	101 South Street Site	UND	Coastal
04701.015991	Historic	Hunerfly Road House	UND	Coastal

Study Area 2. Shoreline/Nearshore Zone NRHP Buildings and Districts

Number	Name	Municipality
94NR00550	Thomson Meter Company Building	Brooklyn
90NR00793	Chapel of the Intercession Complex and Trinity Cemetery	New York
93NR00477	Holland Tunnel	New York
90NR01592	Long Island City Courthouse Complex	Queens
91NR00005	Cyclone Roller Coaster	Brooklyn
91NR00007	Brooklyn Historical Society Building	Brooklyn
90NR00634	Strecker Memorial Laboratory	New York
90NR00630	Lighthouse	New York
90NR00632	Octagon, The	New York
90NR00632	Octagon, The	New York
90NR00633	Smallpox Hospital	New York
92NR00388	MACHIGONNE (YANKEE) Ferryboat	New York
90NR00819	Riverside Park and Drive	New York
90NR02472	Bell Place-Locust Avenue Historic District	Yonkers
90NR02477	United States Post Office-Yonkers	Yonkers
01NR01765	Yonkers Trolley Barn	Yonkers
90NR01259	Brooklyn Borough Hall	Brooklyn
90NR00730	Jeffrey's Hook Lighthouse	New York
00NR01724	Bohemian Hall and Park	Queens
90NR00731	Audubon Terrace Historic District	New York
90NR00618	Governor's Island	New York
90NR01573	Armstrong, Louis, House	Queens
90NR01336	Rankin, John, House	Brooklyn
90NR01330	Friends Meetinghouse and School	Brooklyn
90NR01575	United States Post Office-Long Island City	Long Island City
90NR01333	South Congregational Church	Brooklyn
90NR00066	Edgehill Church of Spuyten Duyvil	Bronx
90NR00067	Spaulding, Henry F., Coachman's House	Bronx
90NR01295	Casemate Fort, Whiting Quadrangle	Brooklyn
90NR01299	Parachute Jump	Brooklyn
90NR01286	Cobble Hill Historic District	Brooklyn
90NR01282	Sixty-Eighth Police Precinct Station House and Stable	Brooklyn
90NR01288	Fulton Ferry District	Brooklyn
90NR01284	Cronyn, William B., House	Brooklyn
90NR01281	Quarters A	Brooklyn
02NR01911	Philipsburgh Building	Yonkers
90NR01324	Brooklyn Bridge	Brooklyn, New York
90NR01565	Lent Homestead and Cemetery	Queens
90NR01326	Plymouth Church of the Pilgrims	Brooklyn
90NR01322	Rockwood Chocolate Factory Historic District	Brooklyn

Study Area 2. Shoreline/Nearshore Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01323	Federal Building and Post Office	Brooklyn
90NR01327	Astral Apartments	Brooklyn
90NR00846	IRT Broadway Line Viaduct	New York
90NR03137	Atlantic Avenue Tunnel	Brooklyn
90NR01325	Brooklyn Heights Historic District	Brooklyn
90NR01329	Public School 7	Brooklyn
90NR00053	Colgate, Robert, House	Bronx
90NR00055	Wave Hill	Bronx
90NR02462	Philipse Manor Hall	Yonkers
90NR02467	St. John's Protestant Episcopal Church	Yonkers
00NR01718	Cuyler Presbyterian Church	Brooklyn
90NR00947	Fort Tryon Park And The Cloisters	New York
90NR01267	Williamsburgh Savings Bank	Brooklyn
90NR01260	State Street Houses	Brooklyn
90NR00948	Queensboro Bridge	New York
90NR01308	New England Congregational Church and Rectory	Brooklyn
90NR01303	Ocean Parkway	Brooklyn
94NR00545	Fort Washington Avenue (22nd Corps of Engineers) Armory	New York
94NR00549	Green-Wood Cemetery	Brooklyn
91NR00260	New York Architectural Terra Cotta Company Office Building	Queens
90NR01344	Coney Island Fire Station Pumping Station	Brooklyn
90NR03153	St. Paul's Protestant Episcopal Church	Brooklyn
90NR01349	Holy Trinity (Protestant Episcopal) Church	Brooklyn
90NR01580	Marine Air Terminal	Queens
90NR01589	Hunters Point Historic District	Queens
90NR01587	Steinway House	Queens
90NR00628	City Hospital	New York
90NR00625	Blackwell House	New York
90NR00627	Chapel Of The Good Shepherd	New York
00NR01657	DUMBO Industrial District	Brooklyn
90NR01612	Paramount Studios Complex	Queens
90NR01271	Russian Orthodox Cathedral of the Transfiguration of Our Lord	Brooklyn
90NR01278	Weir Greenhouse	Brooklyn
90NR01270	Kings County Savings Bank	Brooklyn
90NR01316	Carroll Gardens Historic District	Brooklyn
90NR01319	Greenpoint Historic District	Brooklyn
90NR01310	Sunset Park Historic District	Brooklyn
90NR01314	U.S. Army Military Ocean Terminal	Brooklyn
90NR00049	Dodge, William E., House	Bronx
90NR00045	Fonthill Castle and the Administration Building of the College of	Bronx

Study Area 2. Shoreline/Nearshore Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01315	Boerum Hill Historic District	Brooklyn
03NR05194	St. Walburga's Academy	New York
04NR05274	Borough Hall Subway Station (IRT)	Brooklyn
04NR05297	168th Street Subway Station (IRT)	New York
04NR05305	181st Street Subway Station (IND)	New York
04NR05306	190th Street Subway Station (IND)	New York
04NR05311	45th Road - Court House Square Station (Dual System IRT)	Queens
04NR05366	Ocean Parkway Subway Station (BMT)	Brooklyn
04NR05370	4th Avenue Station (IND)	Brooklyn
05NR05428	Joralemon Street Tunnel (IRT)	New York
05NR05489	Sheffield Farms Stable	New York
06NR05648	West Bank Light Station	Staten Island
06NR05688	Austin, Nichols & Company Warehouse	Brooklyn
06NR05692	216-264 Ovington Avenue, Houses at	Brooklyn
08NR05931	Soundview Manor	White Plains
09NR06001	Brooklyn Trust Company	Brooklyn
09NR06005	Astoria Center of Israel	Astoria/Queens
10NR06174	Wallabout Historic District	Brooklyn
11NR06226	Floyd Bennett Field	Brooklyn
11NR06231	Fourth Church of Christ, Scientist	Manhattan
11NR06290	Wallabout Industrial Historic District	Brooklyn
12NR06355	Mary A. Whalen	Brooklyn
12NR06399	Storehouse #2, US Navy Fleet Supply Base	Brooklyn
13NR06472	Jewish Center of Coney Island	Brooklyn
13NR06474	New York Navy Yard	Brooklyn
13NR06490	Port Morris Ferry Bridges	Bronx
13NR06495	Sohmer Piano Factory	Astoria
14NR06620	Lehigh Valley Railroad Barge 79	null
15NR00017	Manhattan Beach Jewish Center	null
15NR00089	B & B Carousel	null
15NR00099	Hudson View Gardens	null
Grand Total: 111		

Study Area 2. Upland Zone

Site Number	Context	Name	NRHP Status	Region
11940.000008	Prehistoric	Indian Village Site	UND	Upland
00501.000791	Multicomponent	Chapel Farm II	Eligible	Upland
06101.000111	Historic	Fort George	Eligible	Upland
08101.000109	Prehistoric	Saint Michael's Church Site	UND	Upland
08101.011526	Prehistoric	New York Hall of Science Site	Eligible	Upland
04701.015997	Historic	Jamaica Avenue School	UND	Upland
08101.000108	Historic	Vander Endeonderdonk House Site	Listed	Upland
04701.017142	Historic	Shaft 21-B	UND	Upland
04701.019352	Historic	Ingersoll	UND	Upland
04701.013923	Historic	Atlantic Terminal Site	UND	Upland
04701.000023	Historic	Peter Claeson Wyckoff House Site	UND	Upland
04701.000113	Prehistoric (HR)	Canarsie Beach	UND	Upland

Study Area 2. Upland Zone NRHP Buildings and Districts

Number	Name	Municipality
90NR00714	United States Post Office-Inwood Station	New York
05NR05533	Seagram Building	New York
06NR05682	St. Luke's Evangelical Lutheran Church	New York
07NR05737	Engineering Societies' Building and Engineers' Club	New York
08NR05833	Garment Center Historic District	New York
08NR05834	146 East 38th Street, House at	New York
08NR05940	240 Central Park South	New York
12NR06394	Murray Hill Historic District (Boundary Expansion)	Manhattan
90NR02470	Delavan Terrace Historic District	Yonkers
90NR02474	Public Bath House #2	Yonkers
90NR02472	Bell Place-Locust Avenue Historic District	Yonkers
90NR02476	Public Bath House #4	Yonkers
90NR00054	Public School 11	Bronx
12NR06415	Space Shuttle Enterprise	Manhattan
90NR00051	Bronx County Courthouse	Bronx
13NR06493	New York Bible Society	Manhattan
15NR00130	Bayard Rustin Apartment	null
90NR00853	Schomburg Center for Research in Black Culture	New York
90NR00854	Croton Aqueduct Gate House	New York
90NR00059	Washington Bridge	New York, Bronx
13NR06420	Fire Hook and Ladder No. 14	NULL
90NR00039	Bronx Central Annex-U.S. Post Office	Bronx
13NR06494	North Presbyterian Church	Manhattan
90NR00040	Mott Avenue Control House	Bronx
90NR02435	Old Croton Aqueduct	Yonkers, Ossining, Briarcliff Manor, Mount Pleasant, North Tarrytown, Tarrytown, Irvin
01NR01879	Sugar Hill Historic District	NEW YORK
90NR00722	Henson, Matthew, Residence	New York
90NR00054	Public School 11	Bronx
90NR00043	Park Plaza Apartments	Bronx
90NR00058	Sunnyslope	Bronx
03NR05200	C. Rieger's Sons Factory	Bronx
90NR00057	Morris High School Historic District	Bronx
90NR00051	Bronx County Courthouse	Bronx
90NR00059	Washington Bridge	New York, Bronx
90NR00923	High Bridge Aqueduct and Water Tower	New York
90NR00929	Mills, Florence, House	New York
10NR06191	Dollar Savings Bank	Bronx
90NR00928	McKay, Claude, House	New York

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR00648	Dunbar Apartments	New York
90NR00649	Jumel Terrace Historic District	New York
00NR01719	Hertlein and Schlatter Silk Trimmings Factory	Bronx
02NR05048	West 147th-149th Streets Historic District	New York
94NR00529	Our Lady of Lourdes Roman Catholic Church	New York
90NR00706	Cook, Will Marion, House	New York
90NR00708	Johnson, James Weldon, House	New York
90NR00714	United States Post Office-Inwood Station	New York
90NR00048	Grand Concourse Historic District	Bronx
90NR00946	Harlem River Houses	New York
90NR00707	Ellington, Edward Kennedy Duke, "New York"	
92NR00429	Astor Row Houses	New York
90NR00824	College of the City of New York	New York
90NR00730	Jeffrey's Hook Lighthouse	New York
90NR00066	Edgehill Church of Spuyten Duyvil	Bronx
90NR00947	Fort Tryon Park And The Cloisters	New York
90NR00955	Dyckman, William, House	New York
90NR00032	Bronx Borough Courthouse	Bronx
90NR00036	St. Ann's Church Complex	Bronx
90NR00039	Bronx Central Annex-U.S. Post Office	Bronx
90NR00035	Mott Haven Historic District	Bronx
90NR00035	Mott Haven Historic District	Bronx
04NR05278	Dyckman Street Subway Station (IRT)	New York
04NR05299	181st Street Subway Station (Dual System IRT)	New York
90NR00040	Mott Avenue Control House	Bronx
90NR00048	Grand Concourse Historic District	Bronx
00NR01724	BOHEMIAN HALL AND PARK	QUEENS
02NR05048	West 147th-149th Streets Historic District	New York
04NR05305	181st Street Subway Station (IND)	New York
03NR05200	C. Rieger's Sons Factory	Bronx
04NR05306	190th Street Subway Station (IND)	New York
04NR05283	Prospect Avenue Subway Station (IRT)	Bronx
04NR05284	Jackson Avenue Subway Station (IRT)	Bronx
04NR05285	Simpson Street Subway Station and Substation #18 (IRT)	Bronx
04NR05297	168th Street Subway Station (IRT)	New York
04NR05298	145th Street Subway Station (IRT)	New York
05NR05417	Substation #17 (IRT)	New York
11NR06231	Fourth Church of Christ, Scientist	Manhattan
04NR05317	Ivey Delph Apartments	New York
15NR00099	Hudson View Gardens	null

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR00050	Hall of Fame Complex	Bronx
05NR05423	Substation #219 (IND)	New York
90NR00056	United Workers' Cooperatives	Bronx
90NR00052	Christ Church Complex	Bronx
90NR00053	Colgate, Robert, House	Bronx
90NR00055	Wave Hill	Bronx
99NR01459	Keeper's House, Williamsbridge Reservoir	Bronx
09NR06027	Fort Washington Presbyterian Church	New York
10NR06191	Dollar Savings Bank	Bronx
99NR01517	Jerome Park Reservoir	Bronx
90NR02480	United States Post Office-Mount Vernon	Mount Vernon
13NR06494	North Presbyterian Church	Manhattan
13NR06497	St. Anselm's Roman Catholic Church Complex	Bronx
90NR00070	Public School 15	Bronx
14NR06619	Crotona Play Center	null
90NR00072	Lorillard Snuff Mill	Bronx
17NR00002	Reformed Church of Melrose	Bronx
Grand Total: 95		

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01350	Wyckoff, Pieter, House	Brooklyn
90NR01350	Wyckoff, Pieter, House	Brooklyn
90NR01351	Wyckoff-Bennett Homestead	Brooklyn
90NR01594	75th Avenue-61st Street Historic District	Queens
90NR01598	Cornelia-Putnam Historic District	Queens
90NR01596	Central Ridgewood Historic District	Queens
98NR01367	Jackson Heights Historic District	Jackson Heights
90NR01592	Long Island City Courthouse Complex	Queens
90NR01593	68th Avenue-64th Place Historic District	Queens
90NR01597	Cooper Avenue Row Historic District	Queens
90NR01595	Central Avenue Historic District	Queens
90NR01599	Cypress Avenue East Historic District	Queens
90NR01604	Madison-Putnam-60th Place Historic District	Queens
90NR01600	Cypress Avenue West Historic District	Queens
90NR01608	Willoughby-Suydam Historic District	Brooklyn
90NR01606	Seneca-Onderdonk-Woodward Historic District	Queens
90NR01602	Fresh Pond-Traffic Historic District	Queens
90NR01603	Grove-Linden-St. John's Historic District	Queens
01NR01809	Brooklyn Public Library, Central Building	Brooklyn
90NR01607	Summerfield Street Row Historic District	Queens
90NR01605	Seneca Avenue East Historic District	Queens
90NR01601	Forest-Norman Historic District	Queens
90NR01609	Woodbine-Palmetto-Gates Historic District	Queens
90NR03023	Pratt Institute Historic District	Brooklyn
01NR01760	Wyckoff-Snediker Family Cemetery	Woodhaven
90NR01258	Boathouse on the Lullwater of the Lake in Prospect Park	Brooklyn
94NR00539	Eighth Avenue (14th Regiment) Armory	Brooklyn
90NR01332	South Bushwick Reformed Protestant Dutch Church Complex	Brooklyn
90NR01573	Armstrong, Louis, House	Queens
90NR01334	Erasmus Hall Academy	Brooklyn
90NR01338	United States Post Office-Kensington Station	Brooklyn
90NR01330	Friends Meetinghouse and School	Brooklyn
90NR01572	Reformed Church of Newtown Complex	Queens
90NR01331	Public School 71K	Brooklyn
90NR01339	United States Post Office-Metropolitan Station	Brooklyn
90NR01335	Stoothoff-Baxter-Kouwenhaven House	Brooklyn
92NR00293	Stockholm-DeKalb-Hart Historic District	Queens
90NR01574	Bunche, Ralph, House	Queens

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01337	United States Post Office-Flatbush Station	Brooklyn
90NR01297	Flatlands Dutch Reformed Church	Brooklyn
90NR01291	Prospect Park South Historic District	Brooklyn
90NR01296	Brooklyn Museum	Brooklyn
90NR01292	St. Mary's Episcopal Church	Brooklyn
90NR01290	Clinton Hill South Historic District	Brooklyn
90NR01294	Flatbush Town Hall	Brooklyn
90NR01280	New Lots Reformed Church and Cemetery	Brooklyn
90NR01284	Cronyn, William B., House	Brooklyn
90NR01285	Gage and Tollner Restaurant	Brooklyn
90NR01289	Albemarle-Kenmore Terraces Historic District	Brooklyn
90NR01287	Clinton Hill Historic District	Brooklyn
91NR00014	Lefferts Manor Historic District	Brooklyn
01NR01759	St. Matthew's Episcopal Church	Woodhaven
90NR01320	Ditmas Park Historic District	Brooklyn
90NR01328	Knickerbocker Field Club	Brooklyn
90NR01564	Vander Ende--Onderdonk House Site	Ridgewood
90NR03137	Atlantic Avenue Tunnel	Brooklyn
98NR01291	New Utrecht Reformed Church Complex (Boundary Increase)	New York
95NR00806	Baptist Temple	Brooklyn
96NR01081	Stuyvesant Heights Historic District (Boundary Increase)	New York
91NR00174	Andrews United Methodist Church	Brooklyn
97NR01247	Old First Reformed Church	New York
00NR01718	Cuyler Presbyterian Church	Brooklyn
90NR01269	Eighty-Third Precinct Police Station and Stable	Brooklyn
90NR01261	Grecian Shelter	Brooklyn
90NR01265	Feuchtwanger Stable	Brooklyn
90NR01263	Lincoln Club	Brooklyn
90NR01264	Boys' High School	Brooklyn
90NR01260	State Street Houses	Brooklyn
90NR01266	New Utrecht Reformed Church and Buildings	Brooklyn
90NR01262	Old Brooklyn Fire Headquarters	Brooklyn
90NR01262	Old Brooklyn Fire Headquarters	Brooklyn
90NR00948	Queensboro Bridge	New York
90NR01300	Flatbush Avenue, Buildings at 375-379 and 185-187 Sterling Place	Brooklyn
90NR01304	St. George's Protestant Episcopal Church	Brooklyn
99NR01471	Bay Ridge United Methodist Church	Brooklyn
90NR01302	Flatbush Dutch Reformed Church Complex	Brooklyn

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01306	Public Bath No. 7	Brooklyn
90NR01307	Litchfield Villa	Brooklyn
99NR01470	Saint James Church	Elmhurst
90NR01303	Ocean Parkway	Brooklyn
00NR01619	Hubbard House	Brooklyn
90NR01309	Prospect Heights Historic District	Brooklyn
94NR00549	Green-Wood Cemetery	Brooklyn
90NR01340	United States Post Office-Parkville Station	Brooklyn
90NR01348	Emmanuel Baptist Church	Brooklyn
93NR00463	Lott, Hendrick I., House	Brooklyn
90NR01346	Public School 65K	Brooklyn
90NR01347	Public School 111 and Public School 9 Annex	Brooklyn
90NR01347	Public School 111 and Public School 9 Annex	Brooklyn
90NR01343	Hunterfly Road, Houses on, Historic District	Brooklyn
90NR01341	Park Slope Historic District	Brooklyn
90NR01345	Public School 108	Brooklyn
90NR01589	Hunters Point Historic District	Queens
90NR01583	Sunnyside Gardens Historic District	Queens
97NR01229	Cypress Hills National Cemetery	Cypress Hills
97NR01229	Cypress Hills National Cemetery	Cypress Hills
97NR01229	Cypress Hills National Cemetery	Cypress Hills
98NR01397	Prospect Hall	Brooklyn
90NR01615	United States Post Office-Forest Hills Station	Queens
01NR01811	Congregation Tifereth Israel	Brooklyn
90NR01616	United States Post Office-Jackson Heights Station	Queens
90NR01612	Paramount Studios Complex	Queens
90NR01277	Twenty-third Regiment Armory	Brooklyn
90NR01273	Hanson Place Seventh Day Adventist Church	Brooklyn
90NR01271	Russian Orthodox Cathedral of the Transfiguration of Our Lord	Brooklyn
90NR01279	Robinson, John Roosevelt Jackie "Brooklyn"	
90NR01275	Atlantic Avenue Control House	Brooklyn
90NR01272	Public School 39	Brooklyn
90NR01276	McGolrick, Monsignor, Park and Shelter Pavilion	Brooklyn
90NR01274	St. Bartholomew's Protestant Episcopal Church and Rectory	Brooklyn
90NR01278	Weir Greenhouse	Brooklyn
90NR01312	Old Gravesend Cemetery	Brooklyn
90NR01310	Sunset Park Historic District	Brooklyn
90NR01311	St. Luke's Protestant Episcopal Church	Brooklyn
90NR01318	Fort Greene Historic District	Brooklyn
95NR00838	Renaissance Apartments	Brooklyn

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
90NR01317	Eastern Parkway	Brooklyn
90NR01313	Prospect Park	Brooklyn
90NR01315	Boerum Hill Historic District	Brooklyn
02NR04905	Senator Street Historic District	NULL
02NR05012	Church of the Resurrection	Kew Gardens
03NR05085	RKO Keith's Theatre	Richmond Hill
03NR05092	Public School 66	Richmond Hill
03NR05126	75th Police Precinct Station House	Brooklyn
03NR05162	Magen David Synagogue	Brooklyn
04NR05204	Forest Park Carousel	Queens
04NR05211	Maple Grove Cemetery	Kew Gardens
04NR05274	Borough Hall Subway Station (IRT)	Brooklyn
04NR05280	Beverly Road Subway Station (BRT pre-Dual System)	Brooklyn
04NR05282	Atlantic Avenue Subway Station (IRT)	Brooklyn
04NR05311	45th Road - Court House Square Station (Dual System IRT)	Queens
04NR05364	Wilson Avenue Subway Station (Dual System BMT)	Brooklyn
04NR05365	Substation #401 (BMT)	Brooklyn
04NR05367	New Utrecht Avenue Subway Station (Dual System BRT)	Brooklyn
04NR05368	9th Avenue Subway Station (Dual System BRT)	Brooklyn
04NR05369	15th Street - Prospect Park Subway Station (IND)	Brooklyn
04NR05371	Bay Parkway Station (Dual System BRT)	Brooklyn
04NR05372	Avenue U Station (Dual System BRT)	Brooklyn
04NR05377	Elmhurst Avenue Subway Station (IND)	Queens
04NR05415	Church of the Holy Innocents	Brooklyn
05NR05420	Coney Island Yard Gatehouse (Dual System BMT)	Brooklyn
05NR05424	Coney Island Yard Electric Motor Repair Shop (Dual System BMT)	Brooklyn
05NR05534	Brooklyn Academy of Music	Brooklyn
05NR05555	Van Nuyse, Joost, House	Brooklyn
06NR05560	Immanuel Congregational Church	Brooklyn
06NR05561	East Midwood Jewish Center	Brooklyn
06NR05644	St. Benedict Joseph Labre	Richmond Hill
06NR05678	Saitta House	Brooklyn
06NR05692	216-264 Ovington Avenue, Houses at	Brooklyn
07NR05736	Christ Evangelical English Lutheran Church	Brooklyn
07NR05770	Evergreens Cemetery	Brooklyn
08NR05837	Trinity Lutheran Church	Queens
08NR05903	New York Congregational Home for the Aged	Brooklyn
08NR05939	Industrial Complex at 221 McKibbin Street	Brooklyn
08NR05943	Congregation Beth Abraham	Brooklyn
08NR05944	Parkway Theater	Brooklyn

Study Area 2. Upland Zone NRHP Buildings and Districts continued

Number	Name	Municipality
09NR05973	Beth-El Jewish Center of Flatbush	Brooklyn
09NR06006	Rego Park Jewish Center	Rego Park/Queens
09NR06022	Kol Israel Synagogue	Brooklyn
09NR06023	Ocean Parkway Jewish Center	Brooklyn
09NR06024	Shaari Zedek Synagogue	Brooklyn
09NR06025	Kingsway Jewish Center	Brooklyn
09NR06025	Kingsway Jewish Center	Brooklyn
09NR06032	Congregational Church of the Evangel	Brooklyn
09NR06050	The Church-in-the-Gardens	Forest Hills Gardens
09NR06050	The Church-in-the-Gardens	Forest Hills Gardens
09NR06050	The Church-in-the-Gardens	Forest Hills Gardens
09NR06050	The Church-in-the-Gardens	Forest Hills Gardens
09NR06065	Jewish Center of Kings Highway	Brooklyn
09NR06065	Jewish Center of Kings Highway	Brooklyn
09NR06066	Young Israel of Flatbush	Brooklyn
09NR06084	Temple Beth El of Borough Park	Brooklyn
10NR06147	Saint Luke's Episcopal Church	Forest Hills Gardens
10NR06174	Wallabout Historic District	Brooklyn
11NR06264	Old Stone House of Brooklyn	Brooklyn
12NR06354	St. Matthias RC Church Complex	Queens
12NR06356	Loew's King Theatre	Brooklyn
13NR06450	First Presbyterian Church of Newtown	Queens
13NR06471	Kismet Temple	Brooklyn
13NR06488	Crown Heights North Historic District	Brooklyn
14NR06550	Nassau Brewery	Brooklyn
14NR06579	Benevolent and Protective Order of Elks, Lodge #878	NULL
15NR00002	Union Temple of Brooklyn	null
15NR00068	Prospect Heights (Boundary Expansion)	null
15NR00069	Greenwood Baptist Church	null
15NR00111	Crown Heights North Historic District (Boundary Increase)	null
15NR00113	Congregation Chevra Linath Hazedek	null
15NR00134	Bushwick Avenue Central Methodist Episcopal Church	null
16NR00010	Beth Olam Cemetery	null
16NR00079	Offerman Building	Brooklyn
Grand Total: 190		

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