Empire Offshore Wind LLC

and

EW Offshore Wind Transport Corporation

Empire Wind 2 Project

Article VII Application

Appendix D
Wetland and Terrestrial Vegetation Report

August 2023

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ACRONYMS AND ABBREVIATIONS

ac	acre
CWA	Clean Water Act
Empire or the Applicant	Empire Offshore Wind LLC and EW Offshore Wind Transport Corporation
EW 2	Empire Wind 2 Project
ft	foot
ha	hectare
HUC	Hydrologic Unit Code
LIRR	Long Island Rail Road
m	meter
NWI	National Wetlands Inventory
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
POI	Point of interconnection at the Hampton Road substation
PEM	Palustrine Emergent
PWS	Professional Wetland Scientist
Study Area	Four potential landfall locations in the City of Long Beach and the Town of Hempstead, New York; the onshore export cable corridors under consideration from the potential landfall locations to the onshore substation; the interconnection cable corridors under consideration from the onshore substation to the POI in Oceanside, New York; the Hampton Road substation and the loop-in / loop-out line corridor.
Tetra Tech	Tetra Tech, Inc.
USACE	U.S. Army Corps of Engineers

D. WETLAND AND TERRESTRIAL VEGETATION REPORT

D.1 Introduction

Tetra Tech, Inc. (Tetra Tech) was contracted by Empire Offshore Wind LLC[1] and EW Offshore Wind Transport Corporation (collectively, Empire or the Applicant) to prepare a Wetland and Terrestrial Vegetation Report in support of the development of the Empire Wind 2 (EW 2) Project. The Applicant proposes to construct and operate the EW 2 Project as one of two separate offshore wind projects to be located within the Bureau of Ocean Energy Management-designated Renewable Energy Lease Area OCS-A 0512.

Tetra Tech conducted a field survey of wetlands and terrestrial vegetation Study Area for the EW 2 Project, including the onshore export and interconnection cable routes, onshore substation, Hampton Road substation and loop-in / loop-out lines, as well as the Study Area for route alternatives and temporary workspace. The field survey included wetland delineations within the proposed onshore cable landfall site, onshore export cable corridor, onshore substation site, interconnection cable corridor, Hampton Road substation site, and loop-in / loop-out line corridor. The field survey includes three additional alternative landfall locations in the City of Long Beach and the Town of Hempstead, New York; the alternate onshore export cable corridors from the potential landfall locations to the onshore substation; and the alternate interconnection cable corridors from the onshore substation to the Hampton Road substation in Oceanside, New York and potential staging areas under consideration, which collectively comprise the Study Area totaling approximately 99.51 acres (ac), (40.27 hectares [ha]) (Study Area) **Figure D-1**. Terrestrial vegetation was characterized concurrently during the wetland delineation and wetland verification effort.

This report provides a description of the wetlands, surface waterbodies, and terrestrial vegetation within the Study Area. Included are a regulatory framework, Study Area description, methods used to delineate wetlands and characterize terrestrial vegetation, summary of the documents reviewed, field survey results, and a literature cited section. Select site photographs are provided as an Attachment to this report.

Formal wetland delineations and terrestrial vegetation surveys described in this report were completed over several field visits during the growing season in 2021, 2022, and 2023 (see Section D.4.1) as access was granted to the various parcels within the Study Area. As of June 16, 2023 all portions of the Study Area have been field delineated to confirm the presence or absence of wetland habitat, including observations of adjacent parcels where access was not obtained. The results of these surveys are collectively provided in this report.

D.2 Regulatory Framework

D.2.1 Wetlands and Waterbodies

Wetlands and waterbodies in New York may be protected under federal law, New York State law, or both. The U.S. Army Corps of Engineers (USACE) is responsible for assessing permit applications for activities otherwise prohibited by Section 404 of the Clean Water Act (CWA) and Section 10 of the 1899 Rivers and Harbors Act. Under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, the USACE has regulatory jurisdiction over navigable waters and waters of the United States, including wetlands. Additionally, under

[1] Empire is a direct, wholly owned subsidiary of Empire Offshore Wind Holdings LLC (Empire HoldCo). Empire HoldCo is jointly owned by (1) an indirect, wholly owned subsidiary of Equinor ASA (collectively, Equinor); and (2) an indirect, wholly owned subsidiary of BP Wind Energy North America Inc. BP Wind Energy North America Inc. acquired ownership interest in Empire HoldCo in a transaction that closed on January 29, 2021.

Section 401 of the CWA, applicants for a federal license or permit must obtain certification from the state indicating that the permitted activity will not violate the state's water quality standards.

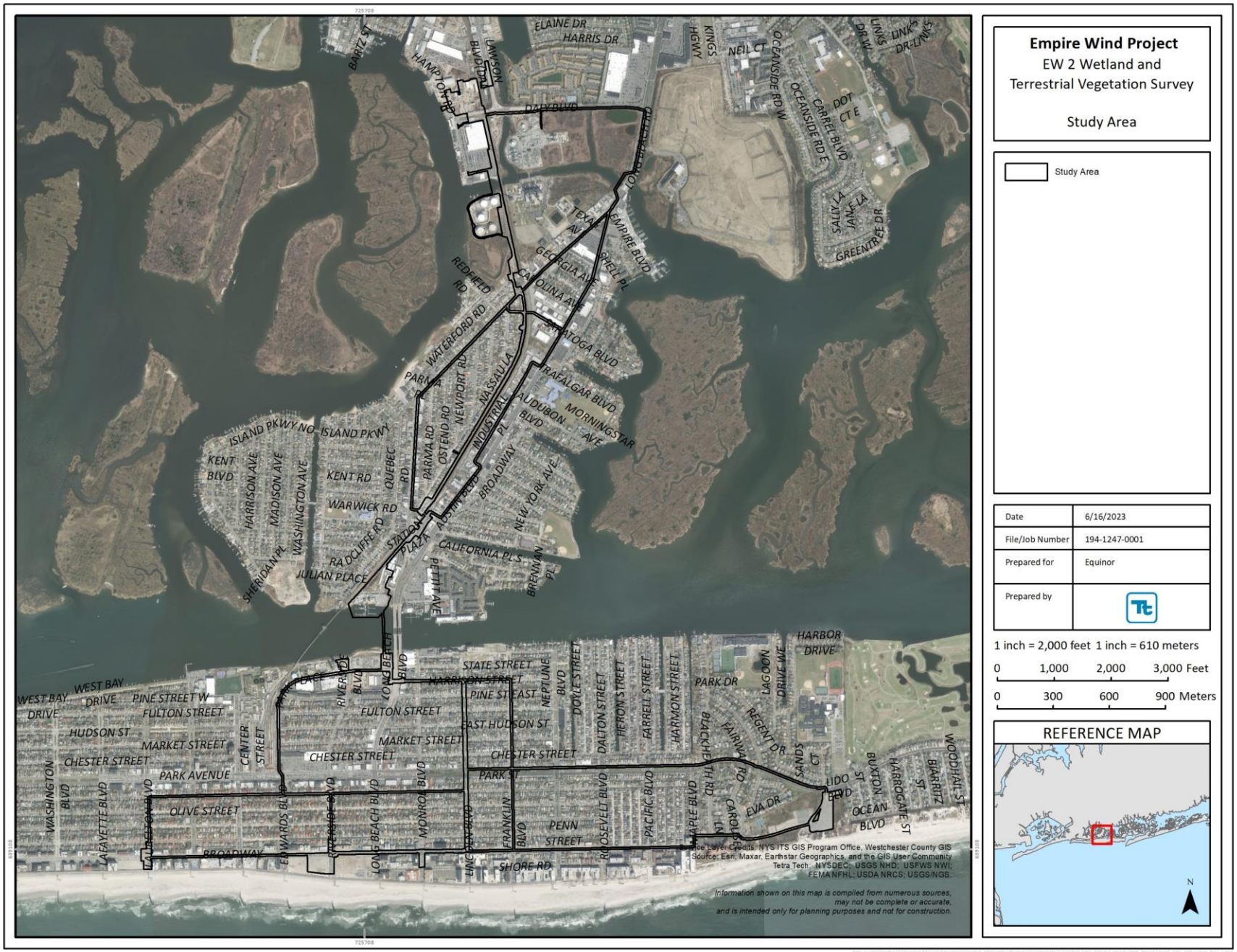

Figure D-1 Study Area Location

Under Article 24 of the Environmental Conservation Law, commonly referred to as the Freshwater Wetlands Act, New York regulates freshwater wetlands greater than 12.4 ac (5.0 ha) or freshwater wetlands of any size that are of "unusual local importance" (such as those with a documented presence of a threatened or endangered species). New York also regulates the freshwater wetlands adjacent area, defined as the area of land or water that is outside of a wetland and within 100 feet (ft, 30 meters [m]) of the wetland boundary. The New York Department of Environmental Conservation (NYSDEC) is the agency responsible for regulating activities within freshwater wetlands and adjacent areas. NYSDEC assigns freshwater wetlands under its jurisdiction a classification value from 1 (highest) to 4 (lowest), based on characteristics that provide ecological, hydrological, pollution control, and/or other special benefits.

Stream banks are defined by NYSDEC as the land area immediately adjacent to, and which slopes toward, the bed of a watercourse, and which is necessary to maintain the integrity of the watercourse. A bank will not be considered to extend more than 50 ft (15 m) horizontally from the mean high-water line, except where a generally uniform slope of 45 degrees (100 percent) or greater adjoins the bed of a watercourse. The bank is then extended to the crest of the slope or the first definable break in slope, either a natural or constructed (road, or railroad grade) feature lying generally parallel to the watercourse.

Tidal wetlands in New York State are protected under Article 25 of the Environmental Conservation Law, known as the Tidal Wetlands Act. Under this Act, New York regulates all tidal wetlands displayed on an inventory map, as defined in 6 New York Codes, Rules and Regulations (NYCRR) § 661.4(o), and the associated tidal wetlands adjacent areas. There are multiple types of tidal wetlands based on 6 NYCRR § 661.4(hh), including:

- *Coastal Fresh Marsh*: The tidal wetland zone, designated FM on an inventory map, found primarily in the upper tidal limits of riverine systems where significant freshwater inflow dominates the tidal zone. Species normally associated with this zone include narrow leaved cattail (*Typha angustifolia*), the tall brackish water cordgrasses (*Spartina pectinata* and/or *S. cynosuroides*), and the more typically emergent fresh water species such as arrow arum, (*Peltandra virginica*), pickerel weed (*Pontederia cordata*), and rice cutgrass (*Leersia oryzoides*).
- *Intertidal Marsh*: The vegetated tidal wetland zone, designated IM on an inventory map, lying generally between average high and low tidal elevation. The predominant vegetation in this zone is smooth cordgrass (*Spartina alterniflora*).
- *Coastal Shoals, Bars and Flats*: The tidal wetland zone, designated SM on an inventory map, that satisfies each of the following, except as otherwise determined in specific cases where such lands do not function biologically as tidal wetlands due to such factors as pollution, sedimentation, or other physical disturbances:

    (1) at high tide is covered by water,

    (2) at low tide is exposed or is covered by water to a maximum depth of approximately one foot, and

    (3) is not vegetated by smooth cordgrass.

- *Littoral Zone*: The tidal wetlands zone, designated LZ on an inventory map, that includes all lands under tidal waters which are not included in any other category, except as otherwise determined in specific cases where such lands do not function biologically as tidal wetlands due to such factors as pollution,

sedimentation or other physical disturbances. The Littoral Zone does not extend under waters deeper than six feet at mean low water.

- *High Marsh or Salt Meadow*: The normal uppermost tidal wetland zone, designated HM on an inventory map, usually dominated by saltmeadow cordgrass (*Spartina patens*) and spike-grass (*Distichlis spicata*). This zone is periodically flooded by spring and storm tides and is often vegetated by low vigor (dwarf form) smooth cordgrass and Seaside lavender (*Limonium carolinianum*). Upper limits of this zone often include black grass (*Juncus Gerardi*), chairmaker's rush (*Scirpus pungens*), marsh elder (*Iva frutescens*), and groundsel bush (*Baccharis halimifolia*).
- *Formerly Connected Tidal Wetlands*: The tidal wetlands zone, designated FC on an inventory map, in which normal tidal flow is restricted by man-made causes. Typical tidal wetland plant species may exist in such areas although they may be infiltrated with common reed (*Phragmites australis*).

NYSDEC also regulates activities in tidal wetlands adjacent areas. The tidal wetlands adjacent area is defined as the land adjacent to the wetland boundary to a maximum landward distance of 150 ft (46 m) for tidal wetlands within the New York City limits and 300 ft (91 m) for tidal wetlands elsewhere in the State. The maximum landward distance (150 ft [46 m] or 300 ft [91 m] from the tidal wetland boundary) is reduced per section 661.4 of Title 6 of the New York State regulations in the presence of a lawfully and presently existing (i.e., as of August 20, 1977) functional structure greater than 100 ft (30 m) in length (including, but not limited to, paved streets and highways, railroads, bulkheads and sea walls, and rip-rap walls) or where an elevation reaches 10 ft (3 m) above mean sea level (6 NYCRR § 661.4(b)(1)).

Under Article 15 of the Environmental Conservation Law, New York classifies surface water resources by their best uses (fishing, source of drinking water, etc.; 6 NYCRR Part 701) or as Wild, Scenic and Recreation Rivers (6 NYCRR Part 666). Saline surface waters fall into five categories based on the best uses assigned by NYSDEC:

- Classification SA: assigned to waters used for shell fishing for market purposes along with primary and secondary contact recreation and fishing.
- Classification SB: assigned to waters used for primary and secondary contact recreation and fishing.
- Classification SC: assigned to waters used for fishing and primary and secondary contact recreation, although other factors may limit the use for these purposes.
- Class I: assigned to waters used for secondary contact recreation and fishing. Class I waters may be suitable for primary contact recreation, other factors may limit the use for this purpose.
- Class SD: assigned to waters used for fishing. All of the defined water quality classifications are suitable for fish, shellfish, and wildlife propagation and survival; however, Class SD waters cannot meet the requirements for fish propagation due to natural or man-made conditions.

D.2.2 Terrestrial Vegetation

Terrestrial vegetation is not universally protected under federal or state law. However, impacts to terrestrial vegetation may be regulated at the federal and/or State level by restricting tree removal or other alterations to the vegetation community due to the presence, or potential presence, of threatened or endangered species. Additionally, NYSDEC regulates invasive plant species through 6 NYCRR Part 575, Department of Environmental Conservation, Chapter V, Resource Management Services, Subchapter C, Invasive Species, Part 575, Prohibited and Regulated Invasive Species of the New York Codes, Rules and Regulations. The Part 575 list includes 69 prohibited and six regulated plant species ("Part 575 Listed Species"). Prohibited species are those that cannot be sold, imported, purchased, transported, introduced or propagated, in New York. Regulated species can be possessed, sold, purchased, propagated and transported, but cannot be introduced into a free-living state (i.e., unconfined and outside the control of a person).

D.3 Project Setting / Information Review

D.3.1 Mapped Wetlands

The submarine export cables make landfall from the marine environment of the Atlantic Ocean in the Long-Island-Atlantic Ocean watershed (10-digit Hydrologic Unit Code [HUC 10]: 0203020209). The Study Area includes four reasonable alternative landfall sites: Landfall A (the proposed landfall), Landfall B, Landfall C, and Landfall E. The potential onshore export cable routes north of the cable landfall sites enter the South Oyster Bay-Jones Inlet watershed (HUC 10: 0203020202) and traverse developed areas of the Town of Hempstead and the City of Long Beach. Each onshore export cable route is located primarily within existing road rights-of-way. Based on United States Fish and Wildlife Service's National Wetland Inventory (NWI) and NYSDEC mapping, the onshore export cable corridors between the cable landfall and Reynolds Channel do not cross any tidal wetlands. There are no NYSDEC-mapped freshwater wetlands in the vicinity of the Study Area. NYSDEC-mapped tidal wetlands are adjacent to and within 300 ft (91 m) of the onshore export cable corridor where the corridor follows Park Street and also at the southern bank of Reynolds Channel.

The onshore export cable route crosses Reynolds Channel (also identified as Wreck Lead Channel on some mapping) to the onshore substation in the Village of Island Park. Reynolds Channel is classified by NWI as a subtidal estuarine feature with an unconsolidated bottom (E1UBL), and by the NYSDEC tidal wetland database as a Littoral Zone. NYSDEC also maps portions of the southern bank of Reynolds Channel as Coastal Shoals, Bars and Flats. The onshore substation site is located on the northern bank of Reynolds Channel on developed lands comprising commercial properties. NWI and NYSDEC mapping indicates that Reynolds Channel extends into the onshore substation site by a maximum of approximately 40 ft (12 m).

From the onshore substation, the interconnection cable routes under consideration traverse the Village of Island Park north to the Hampton Road substation, located primarily within existing railroad or road rights-of-way. Tidal wetlands mapped by NWI and NYSDEC are located within the Study Area (adjacent to Barnums Channel) 0.25 miles south of the Hampton Road substation. NWI classifies these wetlands as subtidal estuarine with an unconsolidated bottom (E1UBL) with intertidal estuarine wetlands (E2US2N) along select banks. The NWI mapped wetlands at these locations are approximately consistent with NYSDEC tidal wetlands mapping, which depicts Littoral Zone with Coastal Shoals, Bars and Flats as well as Intertidal Marsh in this area. The NWI also maps a freshwater wetland complex east of the existing Barrett 138-kilovolt Substation, southwest of the intersection of Long Beach Road and Daly Boulevard. This wetland is classified as a temporarily-flooded palustrine emergent and scrub-shrub wetland (PEM1/SS1S). NYSDEC-mapped tidal wetlands are adjacent to and within 300 feet of the interconnection cable corridor where the corridor follows Austin Boulevard as well as in the vicinity of the Hampton Road substation in the northern portion of the Study Area.

The interconnection cable corridor within the Study Area also includes one small, vacant, and paved parcel on the west side of Hampton Road (west of the Hampton Road substation) with a wooden bulkhead shoreline along a tidal wetland mapped as Hog Island Channel to the west. NWI classifies this tidal wetland as subtidal estuarine community with an unconsolidated bottom (E1UBL). The interconnection cable route terminates at the POI at the Hampton Road substation site in Oceanside, New York. The Hampton Road substation site includes several large vacant parcels comprising pavement and gravel, all confined by Hampton Road to the west, Daly Boulevard to the south, the Long Island Rail Road (LIRR) right-of-way to the east, and industrial development to the north. No mapped wetlands exist within the Hampton Road substation parcel.

Additionally, the proposed loop-in / loop-out line route connecting to existing utilities along Lawson Boulevard east of the LIRR right-of-way do not cross any NWI- or NYSDEC-mapped wetlands. Lawson Boulevard is bordered by additional commercial buildings on both sides of the road. East of Lawson Boulevard is a tidal

wetland identified as the Oceanside Grand Canal, which is hydraulically connected to Barnums Channel to the south, as well as to Hog Island Channel to the west of the Hampton Road substation site. The NWI maps Oceanside Grand Canal as an excavated subtidal estuarine community with an unconsolidated bottom (E1UBLx). No regulated tidal wetland adjacent area associated with the Oceanside Grand Canal extends into the loop-in / loop-out line cable corridor per section 661.4 of Title 6 of the New York State regulations as described above in Section D.2.

Mapped wetlands within and proximal to the Study Area are presented on **Figure D-2**.

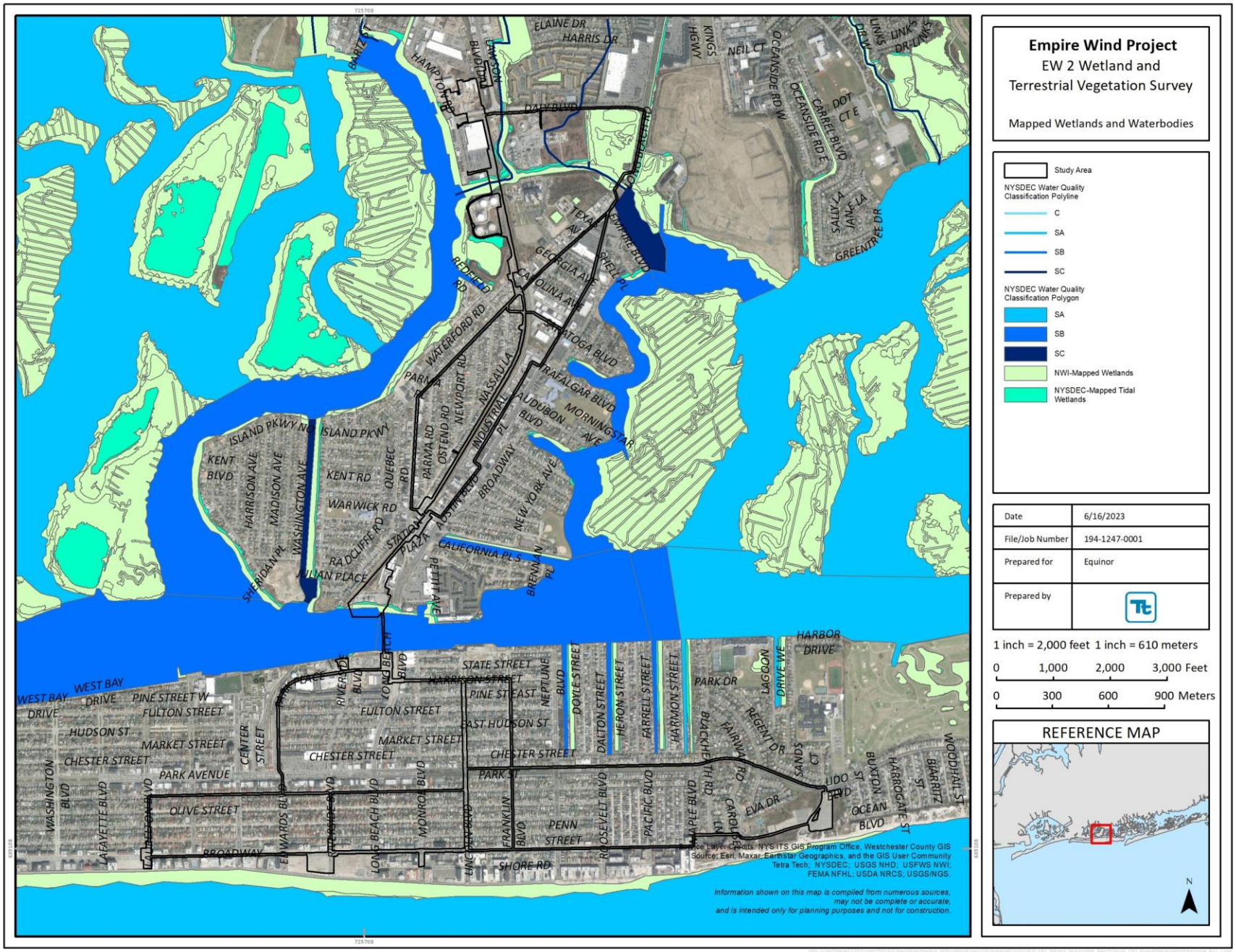

Figure D-2 Mapped Wetlands and Waterbodies

D.3.2 Mapped Surface Waterbodies

NYSDEC mapping identifies Reynolds Channel and Barnums Channel as surface waterbodies crossed by the EW 2 Project. Barnums Channel corresponds to the NWI and NYSDEC-mapped tidal wetland that the interconnection cable route crosses approaching the POI. Reynolds Channel is classified as a Class SB waterbody, for primary and secondary contact recreation and fishing. NYSDEC classifies Barnums Channel as a Class SC waterbody, used for primary and secondary contact recreation and fishing, although other factors may limit the use for these purposes.

Mapped surface waterbodies within and proximal to the Study Area are presented on **Figure D-2**.

D.3.3 Terrestrial Vegetation

The Study Area is located within the Barrier Islands/Coastal Marshes Level III U.S. Environmental Protection Agency ecoregion. This ecoregion consists of flat to gently sloping plains, coastal bays and inlets, islands, bluffs, dunes, beaches, tidal flats, and marshes. Natural vegetation comprises coastal forests of scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), post oak (*Quercus stellata*), beech (*Fagus grandifolia*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*), pitch pine (*Pinus rigida*), and American holly (*Ilex opaca*). Coastal forests may have a dense shrub layer and vines including sassafras (*Sassafras albidum*), greenbrier (*Smilax* spp.), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), beach plum (*Prunus maritima*), lowbush blueberry (*Vaccinium angustifolium*), or grape (*Vitis* spp.). Beach communities comprise sea-rocket (*Cakile* spp.), dune grasses (*Ammophila breviligulata*), beach pea (*Lathyrus japonicus*), and seabeach orache (*Atriplex glabriuscula*). Salt marshes are dominated by saltmeadow cordgrass (*Spartina patens*), smooth cordgrass (*Spartina alterniflora*), spikegrass (*Distichlis spicata*), and saltmarsh rush (*Juncus gerardii*) (Bryce et al. 2010).

The Study Area is broadly located within urbanized landscapes of the City of Long Beach, the Village of Island Park, and Town of Hempstead, New York. Based on aerial imagery review, the vegetation typical of this ecoregion, as described above, is limited within the Study Area. Aerial imagery review indicates that vegetated areas are primarily limited to undeveloped portions of the cable landfall alternative C, areas within and surrounding the onshore substation site, the northern portion of the Study Area, east of the existing Barrett 138-kilovolt Substation, and a small area within the loop-in / loop-out line corridor. The onshore export cable, interconnection cable and loop-in / loop-out line corridors are located primarily within existing road or railroad rights-of-way, which contain sparse trees and shrubs and limited maintained grass.

D.4 Methods

D.4.1 Wetland Delineation

Wetland delineations were conducted on November 4, 2021, June 28, 2022, August 18, 2022, September 26, 2022, and June 16, 2023 following methods described in the USACE Wetlands Delineation Manual (USACE 1987) and the New York State Freshwater Wetlands Delineation Manual (Browne et al. 1995). NYSDEC-mapped tidal wetland boundaries were assessed, field-delineated, and categorized into the appropriate wetland type based on 6 NYCRR § 661.4(hh), as detailed in Section D.3.1.The presence of unmapped freshwater wetlands was verified using the Routine Onsite Determination Method, as described in USACE 1987, together with methods and guidelines provided in the Northcentral and Northeast Region Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (USACE 2012). In addition, the Routine Delineation Procedure, as described in Browne et al. 1995 was also considered. These methods incorporate a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands. The presence of a wetland was field verified by analyzing dominant vegetation, soil classification, and hydrology at paired sample stations within the investigated area. Under the New York State

method, the presence of hydrophytic vegetation characteristics (i.e., greater than 50 percent facultative wet or wetter species, 10 percent or greater areal cover of obligate perennial species, morphological adaptions, or expanses of peat mosses over persistently saturated soils) typically indicates a wetland and an area that exhibits these indicators can generally be considered a wetland without detailed examination of hydrology and/or soils.

Wetland boundary points were recorded in a geodatabase (i.e., field geodatabase) using an Eos Arrow 100© handheld Global Positioning System and an Apple iPad©. The Eos Arrow 100© provides sub-meter accuracy. Each delineated feature was photo-documented.

D.4.2 Wetland Verification

Field reconnaissance was conducted during visits to the Study Area on November 4, 2021, June 28, 2022, August 18, 2022, and September 26, 2022, within those portions of the Study Area not delineated as described in Section D.4.1 to (1) verify the presence of any mapped wetland and waterbody resources identified during the desktop analysis, (2) assess the potential presence of unmapped wetland and waterbody resources, and (3) verify the presence of any potential regulated adjacent wetland areas that may overlap the Study Area. The field reconnaissance was conducted from publicly accessible areas only.

Wetlands within the Study Area that were subject to field verification were subsequently delineated as described in Section D.4.1 as access was obtained to the parcels within the Study Area. However, several NYSDEC-mapped tidal wetlands that approached to within 300 ft (91 m) of the Study Area were field verified from publicly accessible areas to assess the associated regulated wetland adjacent areas that may potentially extend into the Study Area.The potential presence of unmapped wetlands within or adjacent to the Study Area was evaluated based on the occurrence of hydrophytic vegetation within topography conducive to wetland hydrology. Each field-verified wetland was photo-documented.

D.4.3 Terrestrial Vegetation Survey

A terrestrial vegetation survey was conducted concurrently with the wetland delineation (Section D.4.1) and the wetland verification (Section D.4.2) efforts on November 4, 2021, June 28, 2022, August 18, 2022, September 26, 2022, and June 16, 2023. These surveys included both a characterization of the vegetation communities within the Study Area, as well as a documentation of invasive species observed, as described below. The terrestrial vegetation survey was conducted from publicly accessible areas and within areas where full access was authorized.

D.4.3.1 Vegetation Communities

Vegetation within the Study Area was classified into ecological communities as described in *Ecological Communities of New York State, Second Edition* (Edinger et al. 2014). Distinct communities were recorded in the field geodatabase as either polygons in non-linear areas (e.g., landfall sites, the onshore substation, and Hampton Road substation) or using start/stop points in linear areas (e.g., cable corridors). Representative photographs of each community type were recorded.

D.4.3.2 Invasive Species

Part 575 Listed Species were recorded in the field geodatabase by tallying all invasive species observed within each tax parcel that was able to be accessed or viewed from publicly-accessible vantage points. Invasive species were compiled into a comprehensive list to quantify species richness. The extent of each distinct invasive species stands was not delineated as part of this survey considering that part of the survey was conducted outside of the flowering period for most of the Part 575 Listed Species, potentially influencing detectability at time of survey. Representative photographs of observed invasive species were recorded.

D.5 Results

Wetland delineations, wetland verifications, and terrestrial vegetation surveys were conducted on November 4, 2021 and June 28, 2022 by Stephen Ryan, Professional Wetland Scientist (PWS), and Jessica Atutubo, Biologist, both of Tetra Tech. The August 18, 2022, September 26, 2022, and June 16, 2023, field efforts were conducted by Heather Berry, PWS, and Dylan Corbett, Environmental Scientist, of Tetra Tech.

D.5.1 Wetland Delineation

A list of wetlands delineated and acreages in the onshore Study Area is provided in **Table D-1**.

Wetland TW1 corresponds to the hydraulicly connected tidal system that includes Reynolds Channel, Barnums Channel, and the Hog Island Channel in West Hempstead Bay, which are mapped as tidal wetland by NWI and NYSDEC (Section D.3.1) and surface waterbodies by NYSDEC (Section D.3.2).

Table D-1 Wetlands Delineated Within the Study Area

Wetland ID	Type	Total Acres (ha) within Study Area
TW1 (at Reynolds Channel)	Tidal Wetland (E1UBL)	3.48 (1.41)
TW1 (Barnums Channel)	Tidal Wetland (E1UBL)	0.69 (0.28)
TW1 (Hog Island Channel)	Tidal Wetland (E1UBL)	<0.01 (<0.01)
W001 (Freshwater Wetland)	Palustrine Emergent (PEM)	0.28 (0.11)
Total		**4.45 (1.8)**

Photographs supporting the wetland delineation are provided in **Attachment D-1**.

D.5.1.1 Onshore Export Cable Route

The Study Area for the onshore export cables does not cross any wetlands until the southern boundary of TW1 at Reynolds Channel. From the southern bank of Reynolds Channel, the onshore export cable traverses the channel via horizontal direction drill (HDD), making landfall within the bounds of the onshore substation site on the north side of the channel. Approximately 3.48 acres of TW1 overlap with the Study Area at Reynolds Channel. Approximately 2,113.5 feet of shoreline along the southern bank of Reynolds Channel was delineated, which includes 1,673 ft of natural shoreline intersecting the HDD route, 303 feet of concrete bulkhead shoreline supporting the Long Beach Boulevard bridge east to the HDD route, and another 137.5 feet of concrete bulkhead supporting the LIRR track bridge over the channel to the west of the HDD route. The natural shoreline in this area is highly disturbed and comprises a Littoral Zone with a mix of sandy banks, debris, and invasive vegetation.

D.5.1.2 Onshore Substation

The northern boundary of wetland TW1 at Reynolds Channel comprises a Littoral Zone that transitions immediately to uplands at the onshore substation parcels in the Village of Island Park, that includes a former restaurant, a marina with floating docks, and supporting ancillary buildings and parking lots around Reynolds Channel (**Figure D-3)**

A total of 1.71 ac (0.69 ha) of tidal wetland adjacent area associated with the delineated boundary of wetland TW1 extends into the Study Area at the onshore substation site, measured perpendicularly from the delineated natural shorelines of Reynolds Channel. Based on section 661.4 of Title 6 of NYSDEC regulations, the tidal wetland adjacent area is truncated in this area by two different features: by a 160 ft (49 m) segment of the delineated wetland boundary that coincides with the wooden bulkheading along Reynolds Channel, and by Railroad Place that runs through the site (**Figure D-3**). This interpretation of the wetland adjacent area at the site was provided by NYSDEC via email on November 28, 2022 based on a verified delineation conducted for a prior request for tidal wetland jurisdiction request at the same location, and was discussed during a subsequent consultation meeting on January 6, 2023.

D.5.1.3 Interconnection Cable Corridor

The interconnection cable corridor follows the LIRR right-of-way north through the Village of Island Park. Within the LIRR right-of-way, a small palustrine emergent (PEM) wetland community (W001) was delineated to be approximately 0.28 acres overlapping the Study Area (**Figure D-3**). This wetland is a small depression dominated by common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria)*, and Japanese knotweed (*Reynoutria japonica)* that flowed parallel to the LIRR right-of-way and received flow from a culvert draining stormwater from a residential street (Nassau Lane).

The interconnection cable route continues north within the LIRR right-of-way where it traverses the LIPA Barrett Station before crossing Barnums Channel via a proposed above ground cable bridge connecting to the north side of Barnums Channel, which is occupied by an active Costco parking lot and shopping center. Approximately 0.69 acres of TW1 overlap with the Study Area at this cable bridge crossing, which includes a low marsh community dominated by smooth cordgrass (*Spartina alterniflora*) located at the base of the LIRR track bridge. This area at Barnums Channel was delineated as additional shoreline associated with the tidal wetland TW1 (**Figure D-4**).

The interconnection cable corridor continues north past the Costco Lot to the POI at the Hampton Road substation. One additional small, vacant and paved parcel exists in the Study Area on the west side of Hampton Road that has approximately 40 ft (12.2 m) of rip rap shoreline, and 70.7 ft (21.6 m) of wooden bulkhead shoreline along a tidal wetland mapped as Hog Island Channel (TW1) to the east, with approximately <0.01 acres of tidal wetland overlapping the Study Area. NWI classifies this tidal wetland as subtidal estuarine with an unconsolidated bottom (E1UBL). No vegetation was observed at this paved lot. (**Figure D-4**).

The additional boundaries of TW1 located along the Town of Hempstead Sanitation Department property at the eastern outlet of Barnums Channel, and at the Oceanside Grand Canal were delineated on the September 26, 2022 site visit to assess whether any wetland adjacent areas overlap with the Study Area. Oceanside Grand Canal is mapped in the NWI as E1UBLx as described in Section D.3, and the tidal wetlands of eastern Barnums Channel along the Sanitation department property are mapped as Emergent Intertidal, Persistent Estuarine and Marine Wetland, Irregularly Flooded, Partially Drained/Ditch (E2EM1Pd) After delineating the boundaries of TW1 in both of these areas, it was confirmed that wetland adjacent areas do not overlap with onshore cable routes in this area, because they are truncated by roads in excess of 100 ft long that are assumed to be presently existing as of August 20, 1977, functional and substantial fabricated structures; Long Beach Road and Daly Boulevard. Additional boundaries of TW1 were once again delineated at the existing LIPA Barrett Station tank farm property in Oceanside, New York on June 16, 2023, to confirm the presence of wetland habitats and associated adjacent areas overlapping with the Study Area. It was again confirmed that wetland adjacent areas at this property are truncated by the presence of private roads in excess of 100 ft that are assumed to be presently existing as of August 20, 1977, functional and substantial fabricated structures. These delineated areas are shown in **Figure D-4.**

D.5.1.4 Hampton Road Substation and Loop-in / Loop-out Line Corridor

No mapped or unmapped wetlands were observed at the Hampton Road substation site. The area was devoid of vegetation and any wetland habitat with the exception of some opportunistic herbaceous cover, primarily mugwort (Artemisia vulgaris).

The loop-in / loop-out line route connecting to Lawson Boulevard, east of the LIRR right-of-way, does not cross any NWI- or NYSDEC-mapped wetlands. During field reconnaissance efforts, the loop-in / loop-out line corridor was observed to be absent of any wetland indicators, and no significant ecological communities were observed at this site. This area is currently occupied by active commercial buildings with sparse tree coverage including black locust (*Robinia pseudoacacia*) trees and Tree of Heaven (*Ailanthus altissima*) along with various herbaceous vegetation such as mugwort (*Artimisia vulgaris*). Invasive common reed (*Phragmites australis*) and invasive vines were observed including oriental bittersweet (*Celastrus orbiculatus*).

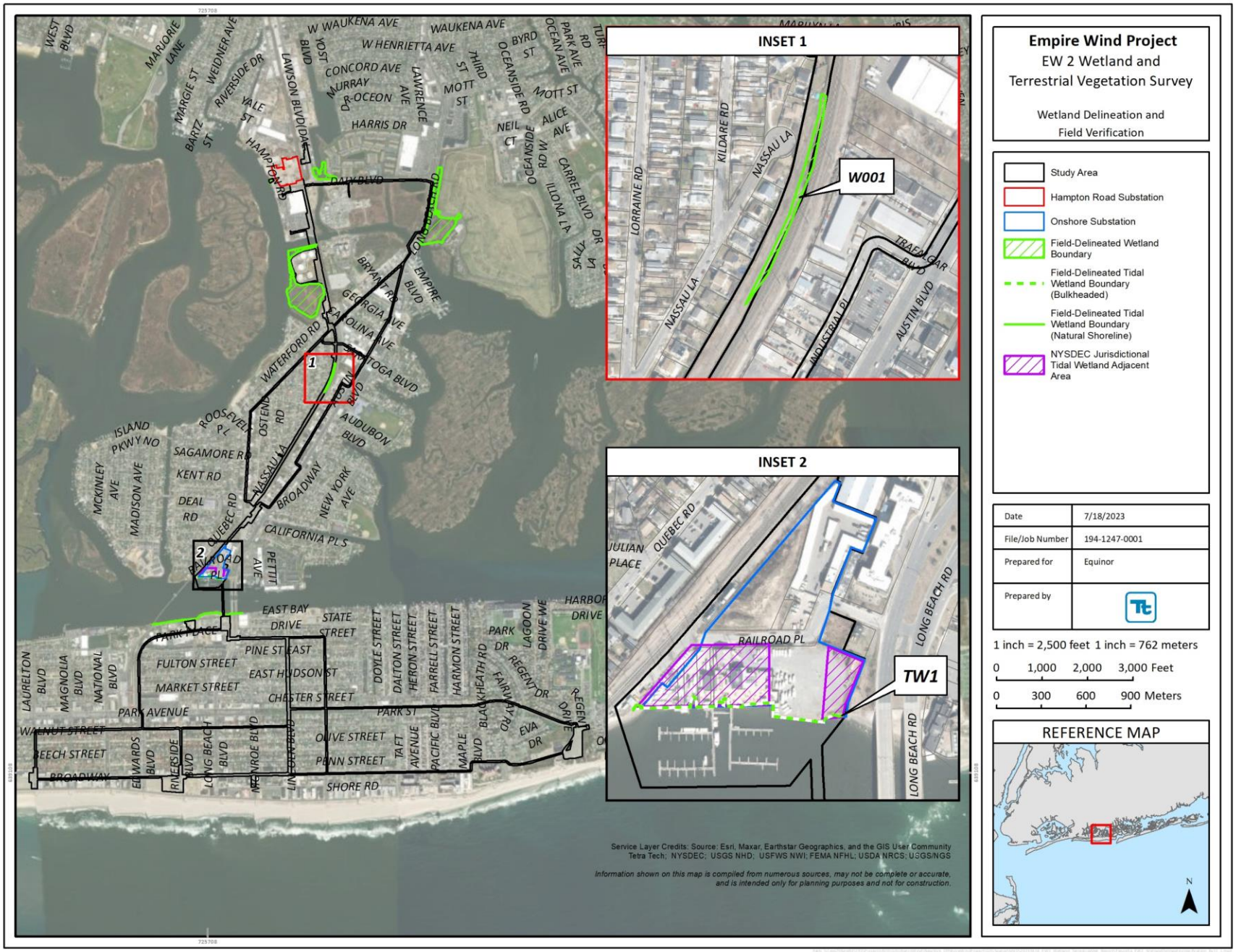

Figure D-3 Wetland Delineation and Verification

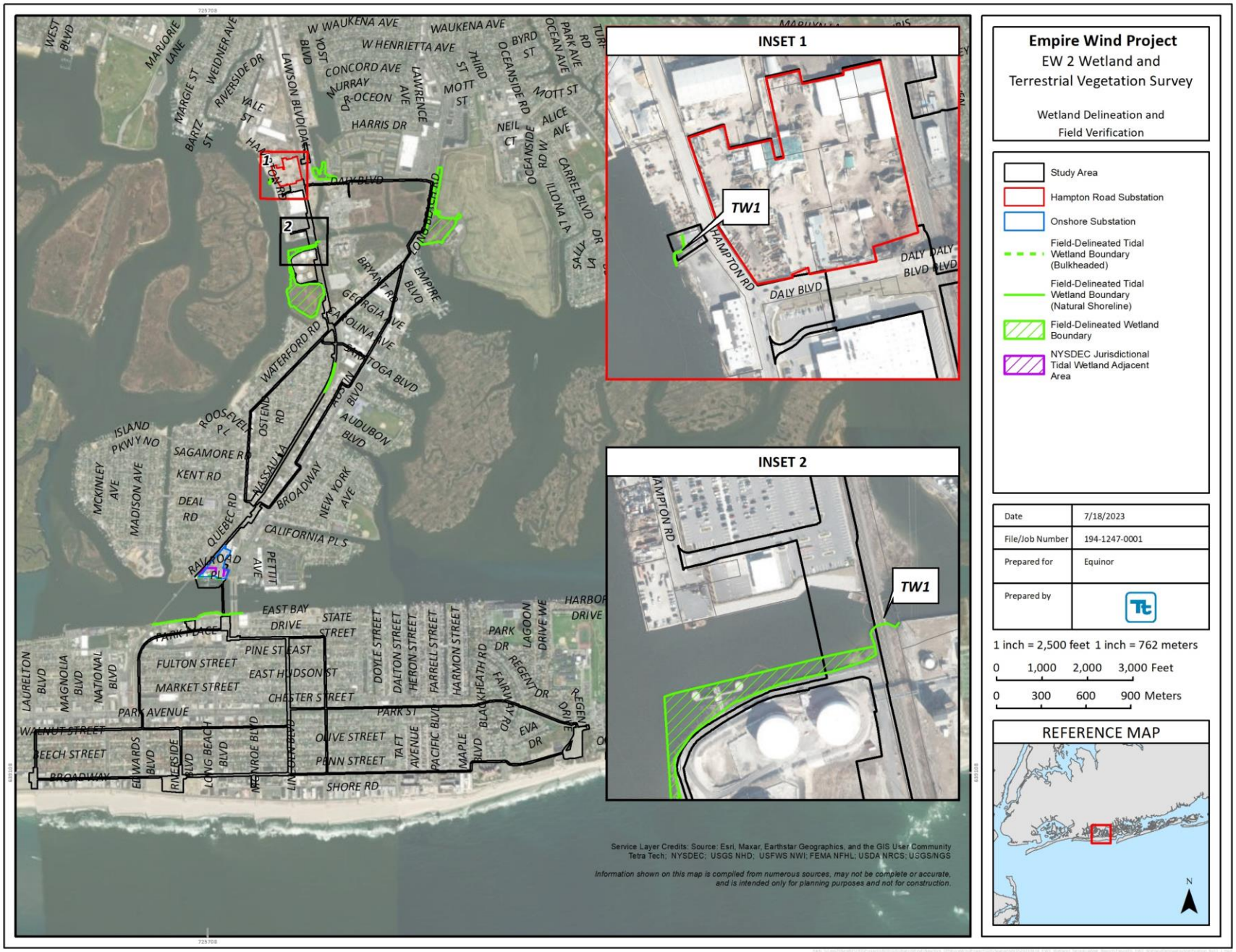

Figure D-4 Wetland Delineation and Verification

D.5.2 Wetland Verification

A total of five NYSDEC-mapped tidal wetlands (all additional shorelines of TW1 and mapped as canals of South Hempstead Bay) were field-verified from public rights-of way within or adjacent to the Study Area. One previously field-verified wetland was subsequently delineated and is reported in Section D.5.1. Field-verified wetlands include:

- Four tidal wetland areas adjacent to the north of the onshore export cable route alternative that follows Park Avenue. These wetlands are fully bulkheaded within a heavily-populated residential area and the tidal wetland adjacent area is truncated at the bulkhead and does not extend to the onshore export cable corridor.
- The tidal wetland adjacent to the east of the interconnection cable route alternative that follows Austin Boulevard. Similar to above, this wetland is fully bulkheaded within a heavily-populated residential area; therefore, the tidal wetland adjacent area is truncated at the bulkhead and does not extend to the interconnection cable corridor.

No unmapped tidal wetlands, freshwater wetlands, or surface waterbodies were identified within the Study Area during the field verification. Photographs supporting the wetland verification field reconnaissance are provided in **Attachment D-1**.

D.5.3 Terrestrial Vegetation Survey

D.5.3.1 Vegetation Communities

A total of 11 Edinger communities categorized under two larger systems (Estuarine and Terrestrial) were identified within the Study Area (**Figure D-5**). **Table D-2** provides the total acreage and the percentage of the Study Area occupied by each of these communities.

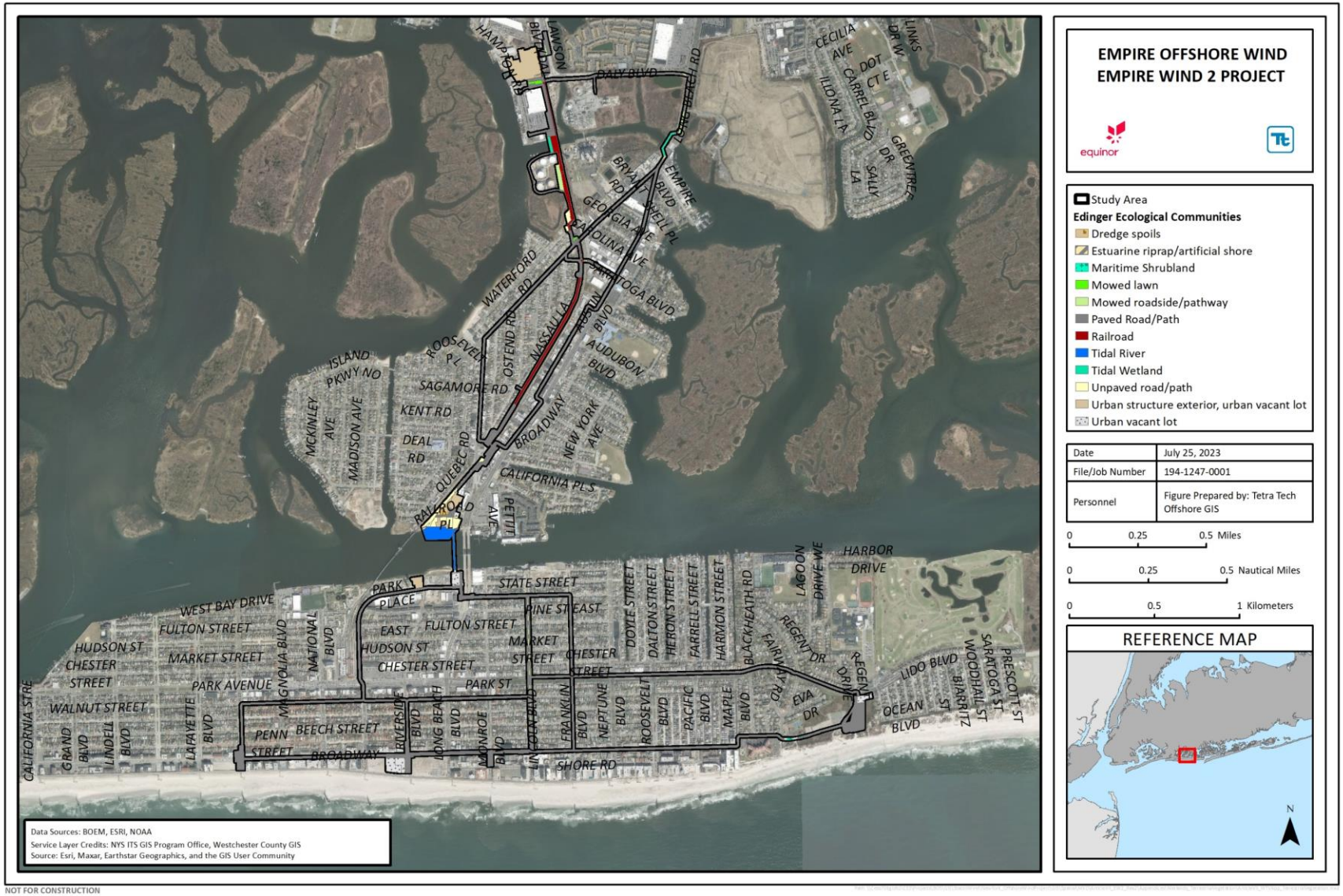

Figure D-5 Terrestrial Vegetation

Table D-2 Edinger Community Types Identified within the Study Area

Sub System	Edinger Community Type	Total Acres (ha)	Percent of Study Area
Terrestrial Cultural	Paved Road / Path	67.56 (27.34)	66.88%
Terrestrial Cultural	Urban Structure Exterior / Urban Vacant Lot	9.21 (3.73)	9.12%
Terrestrial Cultural	Unpaved Road / Path	3.86 (1.56)	3.82%
Terrestrial Cultural	Urban Vacant Lot	4.23 (1.71)	4.19%
Terrestrial Cultural	Mowed Roadside / Pathway	2.74 (1.11)	2.71%
Estuarine Subtidal	Tidal River	3.58 (1.45)	3.54%
Terrestrial Cultural	Dredge Spoils	0.93 (0.38)	0.92%
Terrestrial Cultural	Mowed Lawn	0.39 (0.16)	0.39%
Terrestrial Cultural	Railroad	7.48 (3.03)	7.40%
Estuarine Cultural	Estuarine Riprap / Artificial Shore	0.10 (0.04)	0.1%
Estuarine Subtidal	Tidal Wetland	0.86 (0.35)	0.85%
Terrestrial Open Uplands	Maritime Shrubland	0.08 (0.03)	0.08%
	Total	**101.02 (40.88)**	**100.0%**

D.5.3.2 Invasive Species

A total of 12 Part 575 Listed Species were identified during the terrestrial vegetation survey, including:

- *Ampelopsis brevipedunculata* (porcelain berry)
- *Artemisia vulgaris* (mugwort)
- *Celastrus orbiculatus* (Oriental bittersweet)
- *Lonicera japonica* (Japanese honeysuckle)
- *Phragmites australis* (common reed)
- *Robinia pseudoacacia* (black locust)
- *Rosa multiflora* (multiflora rose)
- *Clematis virginiana* (virgin's bower)
- *Reynoutria japonica* (Japanese knotweed)
- *Berberis thunbergia* (Japanese barberry)
- *Miscanthus sinensis* (Chinese silvergrass)
- *Lythrum salicaria* (Purple loosestrife)

Invasive species observations were concentrated within the onshore substation area and LIRR right-of-way, where 10 of the 12 above species were documented. In addition to the onshore substation site, three Part 575 Listed Species (mugwort, Oriental bittersweet, and common reed) were observed near the southern bank of Reynolds Channel and two Part 575 Listed Species (mugwort and common reed) were observed on the southern shoulder of Daly Boulevard and throughout the LIRR right-of-way in Island Park. Additionally, although not recorded in the field geodatabase, expansive stands of common reed grass were observed in the northern portion of the Study Area southwest of intersection of Daly Boulevard and Long Beach Road. This common reed grass corresponds with the NWI-mapped freshwater wetland complex discussed in Section D.3.1. This entire area was obscured by a privacy fence, so the extent of the common reed, and the presence of additional Part 575 Listed Species, could not be determined.

Considering portions of the terrestrial vegetation survey were conducted outside of the peak flowering season, this list may not be comprehensive for the entire Study Area, and will be updated as applicable.

D.6 Summary and Conclusion

Tetra Tech conducted various field efforts of the 99.51-ac (40.27-ha) Study Area on November 4, 2021, June 28, August 18, and September 26, 2022, and June 16, 2023, which included a formal wetland delineation of the proposed onshore landfall and cable routes, onshore substation, Hampton Road substation, interconnection cable route, and loop-in / loop-out line route, and a verification of wetland and surface waterbodies from publicly accessible areas within and adjacent to portions of the Study Area. Terrestrial vegetation was characterized concurrently during the wetland delineation and verification effort.

A combined total of 12.28 ac (4.97 ha) of wetland habitat was delineated during all field efforts. Only a total of 4.45 acres of wetland habitat overlaps the Study Area as shown in **Table D-1**. A total of 1,474.7 ft (449.5 m) of the delineated tidal wetland boundary comprises wooden bulkheading, another 8,230.6 ft (2508.68 m) is comprised of natural shoreline, and approximately 990.3 ft (301.8 m) of shoreline comprises riprap within the total Study Area. These measurements include 760.6 ft (231.8 m) of wooden bulkhead along the shoreline of the onshore substation site, with 11.54 ft (3.5 m) of natural shoreline at the eastern edge, and 35.48 ft (10.8 m) at the western edge of the onshore substation shoreline (**Figure D-3**).

A total of five NYSDEC-mapped tidal wetlands were field-verified within the Study Area along the onshore export and interconnection cable routes. These include four NYSDEC-mapped tidal wetlands adjacent to, and within 300 ft (91 m) of the onshore export and interconnection cable routes; and one NYSDEC-mapped tidal wetland adjacent to within 300 ft (91 m) of the interconnection cable route.

A total of 11 Edinger ecological communities categorized under two larger systems (Estuarine and Terrestrial) were identified within the Study Area as part of the terrestrial vegetation survey. The most prevalent ecological communities were Paved Road / Path [67.56 ac (27.34 ha), or 66.88 percent of Study Area], Tidal Wetland [0.86 ac (0.35 ha)], and Urban Structure Exterior / Urban Vacant Lot [9.21 ac (3.77 ha), or 9.12 percent of Study Area]. This is consistent with the developed nature of the Study Area. No portions of the Study Area remain unassessed.

A total of 12 Part 575 Listed Species were identified during the terrestrial vegetation survey. Invasive species observations were concentrated within the onshore substation area, where 10 of the 12 above species were documented; however, this is more a function of survey access and survey timing, than actual invasive species distribution within the Study Area and the actual total number of invasive species may be larger.

Considering that the terrestrial vegetation survey was conducted outside of the peak flowering season, the list of invasive species documented in this report is not comprehensive for the entire Study Area. If it is determined that a formal invasive species survey is required, additional and comprehensive efforts will be needed.

D.7 References

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Attachment D-1
Photographic Log

Photograph 01 **Northern bank of wetland TW1 (Reynolds Channel) showing bulkhead. Facing west from floating dock (November 4, 2021).**

Photograph 02 **Northern bank of wetland TW1 (Reynolds Channel) showing bulkhead. Facing west northwest (November 4, 2021).**

Photograph 03 **Northern bank of wetland TW1 (Reynolds Channel) showing natural shoreline at western edge of onshore substation site. Facing northeast (November 4, 2021).**

Photograph 04 **Northern bank of wetland TW1 (Reynolds Channel) showing natural shoreline at western edge of onshore substation site. Facing northeast (November 4, 2021).**

Photograph 05 **Southeast portion of onshore substation site. Taken from Railroad Place facing south toward parking lot with Reynolds Channel in background (November 4, 2021).**

Photograph 06 **Southwest portion of onshore substation site. Facing north northeast showing active marina with LIRR right-of-way to the left (out of view) (November 4, 2021).**

Photograph 07 **Northern portion of onshore substation site. Taken from Railroad Place facing north toward large stockpile area (November 4, 2021).**

Photograph 08 **Northern portion of onshore substation site. Taken from top of large stockpile mound. Facing northeast showing dense invasive species, including black locust (*Robinia pseudoacacia*), mugwort (*Artemisia vulgaris*), and Japanese knotweed (*Reynoutria japonica*) (November 4, 2021).**

Photograph 09 **Proposed Cable Landfall (Alternative A). Taken from Riverside Boulevard facing northwest toward fenced gravel lot (November 4, 2021).**

Photograph 10 **Proposed Cable Landfall (Alternative A). Facing east along Broadway (November 4, 2021).**

Photograph 11 **Onshore export cable route corridor west of Cable Landfall Alternative C. Facing east at Broadway and Mitchel Avenue showing ornamental plantings in median (November 4, 2021).**

Photograph 12 **NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing west near intersection of Chester Street and Doyle Street showing bulkheaded bank on all sides. Chester Street left of image (out of view) (November 4, 2021).**

Photograph 13 **NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing west near intersection of Chester Street and Heron Street showing bulkheaded bank on all sides. Chester Street in left of image (November 4, 2021).**

Photograph 14 **NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing southwest near intersection of Chester Street and Clark Street showing bulkheaded bank on all sides. Chester Street in background (November 4, 2021).**

Photograph 15 **Southern bank of Reynolds Channel at end of Riverside Boulevard. Facing northeast with onshore substation site in distance (November 4, 2021).**

Photograph 16 **Southern bank of Reynolds Channel at end of Riverside Boulevard. Facing west (November 4, 2021).**

Photograph 17 **NYSDEC-mapped tidal wetland east of interconnection cable route corridor. Facing southwest from California Place North showing rip-rap bank (November 4, 2021).**

Photograph 18 **Invasive *Phragmites australis* along the western edge of the LIRR right-of-way, facing south in the Village of Island Park, NY. (August 18, 2022).**

Photograph 19 **NYSDEC-mapped tidal wetland of Barnums Channel east of LIRR bridge over Barnums Channel. Facing northeast from the railroad bridge with the Barrett Generating Station in the background. (August 18, 2022).**

Photograph 20 **NYSDEC-mapped tidal wetland of Barnums Channel with bulkhead shoreline west of LIRR Bridge and south of Costco. Facing northwest from the railroad bridge (August 18, 2022).**

Photograph 21 **Village of Island Park Department of Public Works lot, adjacent to LIRR right of way, west of interconnection cable corridor. Facing south. (August 18, 2022).**

Photograph 22 **Hampton Road substation property, bordered by the LIRR to the east, Daly Blvd. to the south and Hampton Road to the west. Photo taken from Daly Blvd. entrance gate, facing north. (August 18, 2022).**

Photograph 23 **Bulkhead along TW1 (NYSDEC-mapped tidal wetlands of Hog Island Channel) west of Hampton Road, across from proposed Hampton Road Substation, Facing west. (August 18, 2022).**

Photograph 24 **Tidal wetland (TW1) dominated by *Spartina alterniflora* and *Phragmites australis* east of Long Beach Road at the Oceanside Transfer Facility. The landfill cap is seen in the background, with the Town of Hempstead Sanitation Department parking lot out of frame to the right. Facing north. (September 26, 2022).**

Photograph 25 **Tidal wetland (TW1) dominated by *Spartina alterniflora* and *Phragmites australis* east of Long Beach Road at the Oceanside Transfer Facility. Barnums Channel is seen in the background flowing next to Peter's Clam Bar, Facing south. (September 26, 2022).**

Photograph 26 **Tidal wetland north of the intersection of Lawson and Daly Boulevard. Picture taken from the Oceanside Cove residential complex parcel. Facing south. (September 26, 2022).**

Photograph 27 **Tidal wetland west of Barrett Station tank farm dominated by *Spartina alterniflora* and *Phragmites australis*, with Hog Island Channel abutting the property to the west, facing south. (June 16, 2023).**

Photograph 28 **Tidal wetland south of Barrett Station Tank Farm with Hog island Channel to the west, as seen from access road, facing north. (July 16, 2023).**

Photograph 29 **Proposed location of interconnection cable bridge over Barnums Channel, north of Barrett Station tank farm with the LIRR track bridge in the background. Facing north east. (June 16, 2023).**