SOUTHCOAST WIND

SouthCoast Wind 1 Project

Joint Application for a State Water Quality Certificate and Marine Dredging Permit

March 2023

ATTACHMENTS – Book 2 of 2

Submitted to: Rhode Island Department of Environmental Managemen

Location: Rhode Island State Waters and Portsmouth, Rhode Island

Project Proponent: SouthCoast Wind Energy LLC

Preparer: POWER Engineers, Inc.

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SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment A: Project Figures

Revised: February 2023

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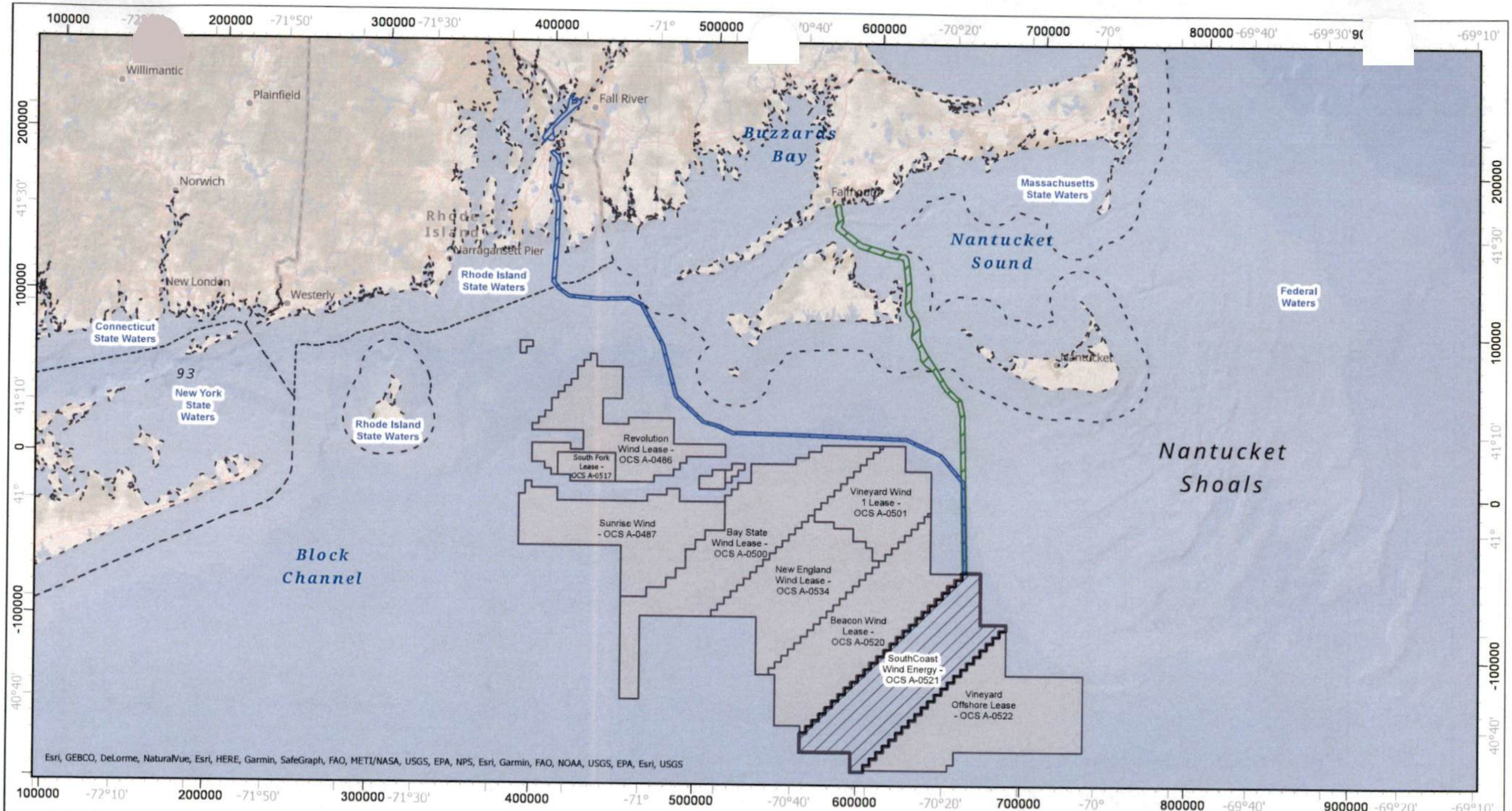

LEGEND

- Brayton Point Export Cable Corridor
- Falmouth Offshore Export Cable Corridor
- SouthCoast Wind Energy LLC OCS A-0521
- Wind Lease Area
- State Water Boundary

SOUTHCOAST WIND

FIGURE 1-1
PROJECT OVERVIEW

Date: 2/20/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:1,000,000

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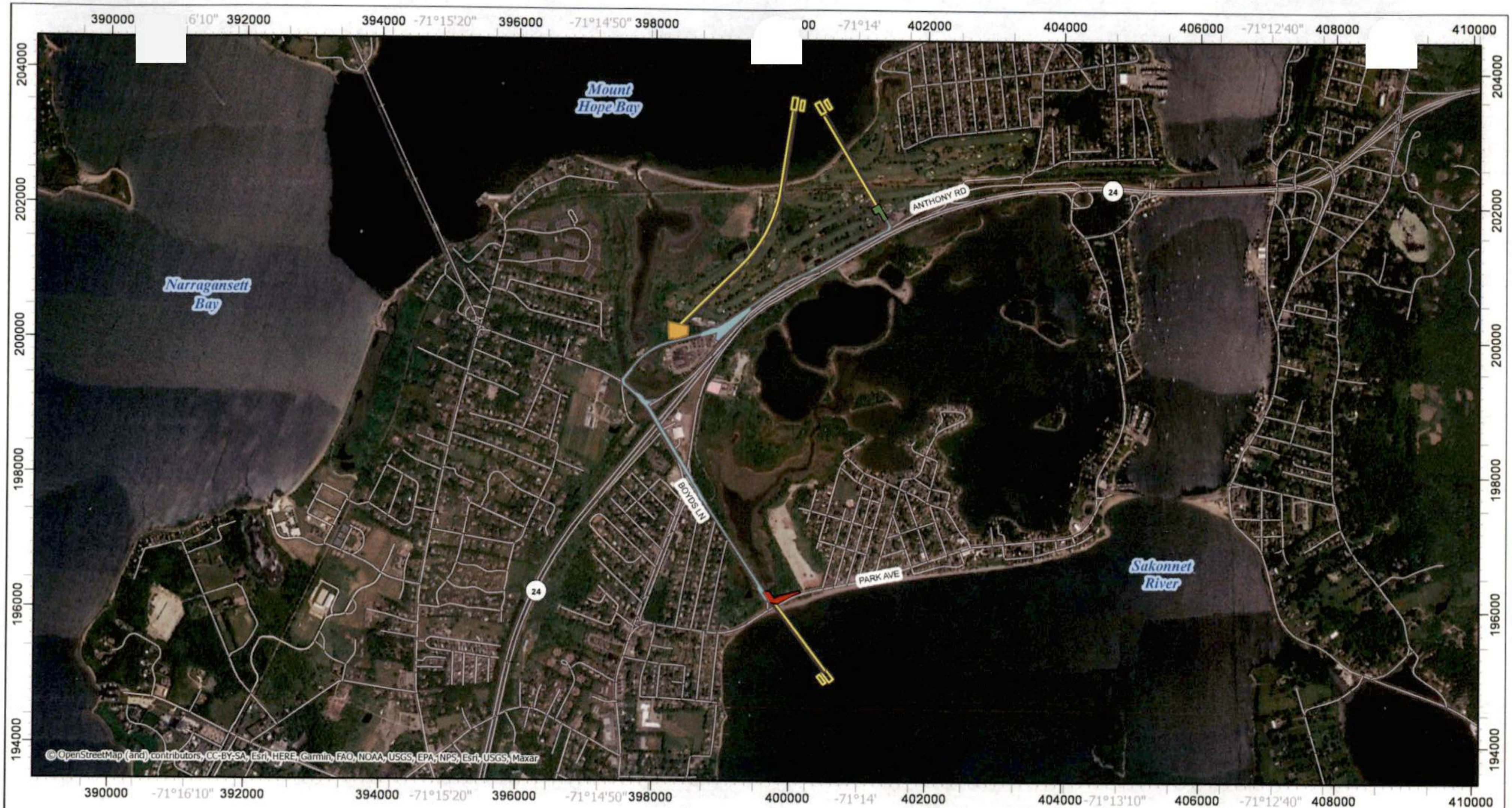

LEGEND

- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- Boyds Lane Horizontal Directional Drill Staging Area
- Montaup Horizontal Directional Drill Staging Area
- RWU North Parcel Horizontal Directional Drill Construction Area
- Potential Additional Staging Area
- Road

SOUTHCOAST WIND

FIGURE 1-2
ONSHORE CONSTRUCTION CORRIDOR

Date: 2/21/2023
NAD 1983 StatePlane Rhode Island FIPS 3800 Feet
Scale: 1:24,000

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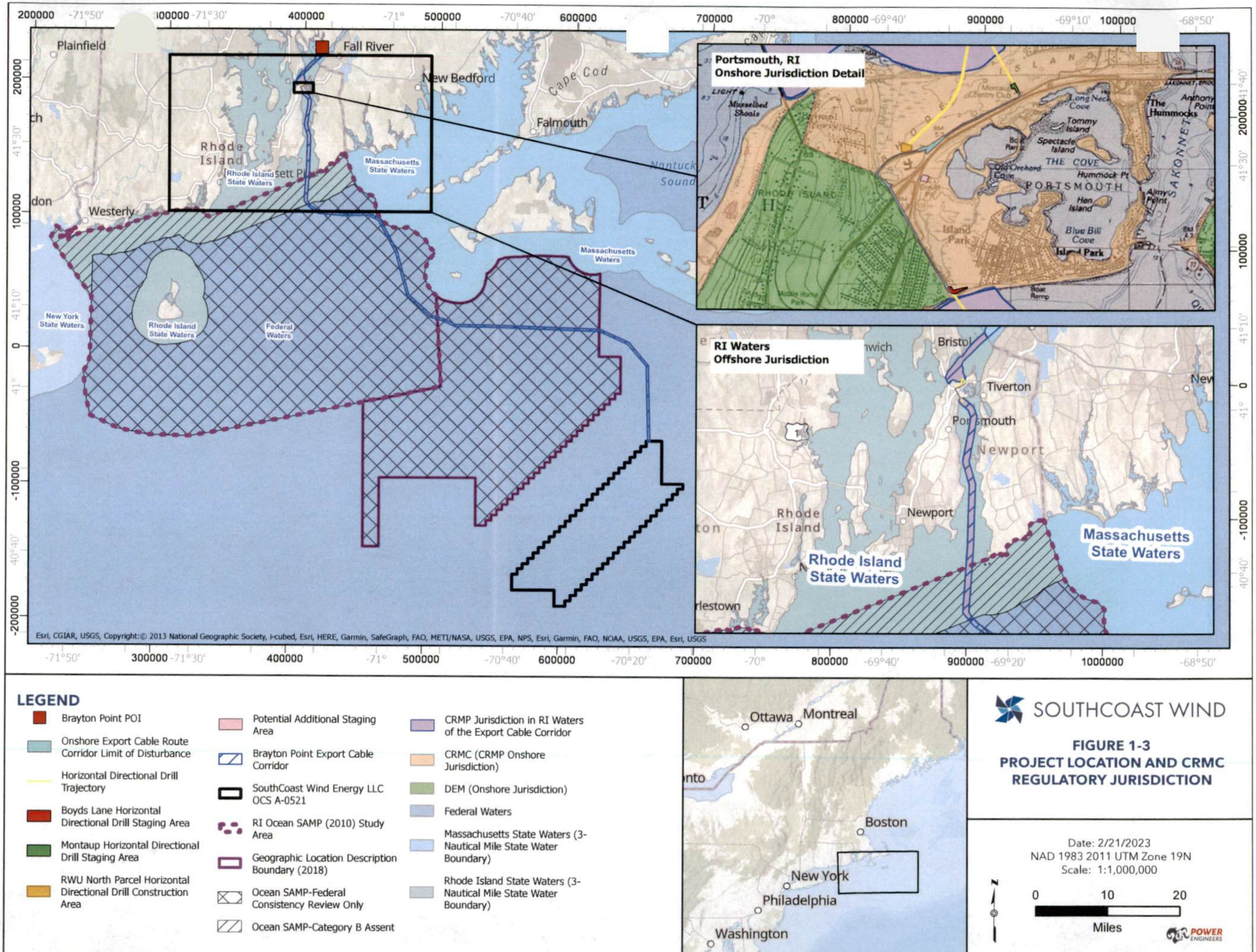
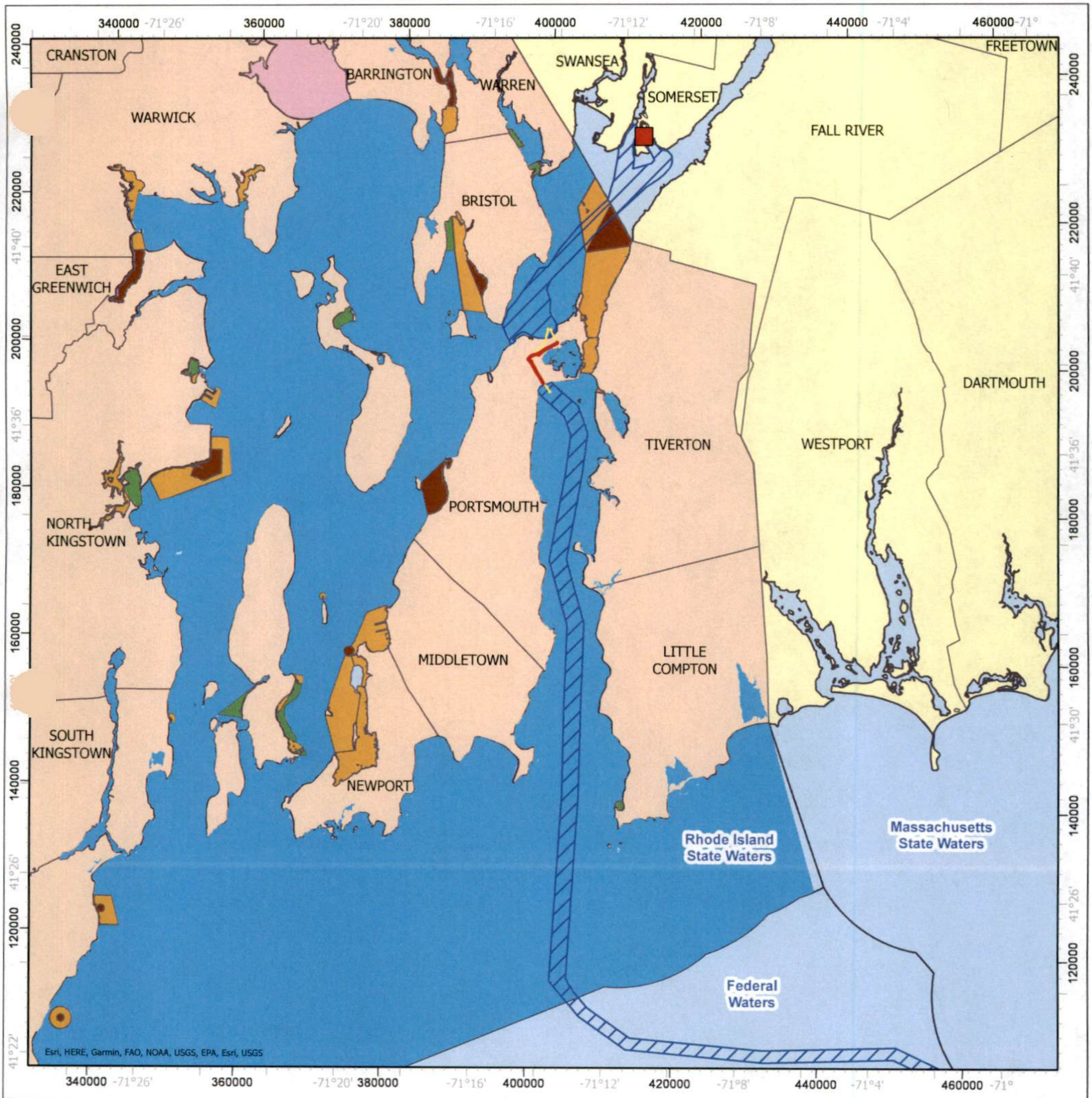


FIGURE 1-3
PROJECT LOCATION AND CRMC REGULATORY JURISDICTION



LEGEND

- Brayton Point POI
- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- rayton Point Export Cable orridor
- ederal and State Waters
- Rhode Island Town Boundary
- Massachusetts Town Boundary

Water Quality Standard Class (RIDEM 2020)

- SA
- SA{b}
- SB
- SB1
- SB{a}

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FIGURE 1-4
RIDEM SURFACE WATER CLASSES (2020)

Date: 2/21/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:210,000

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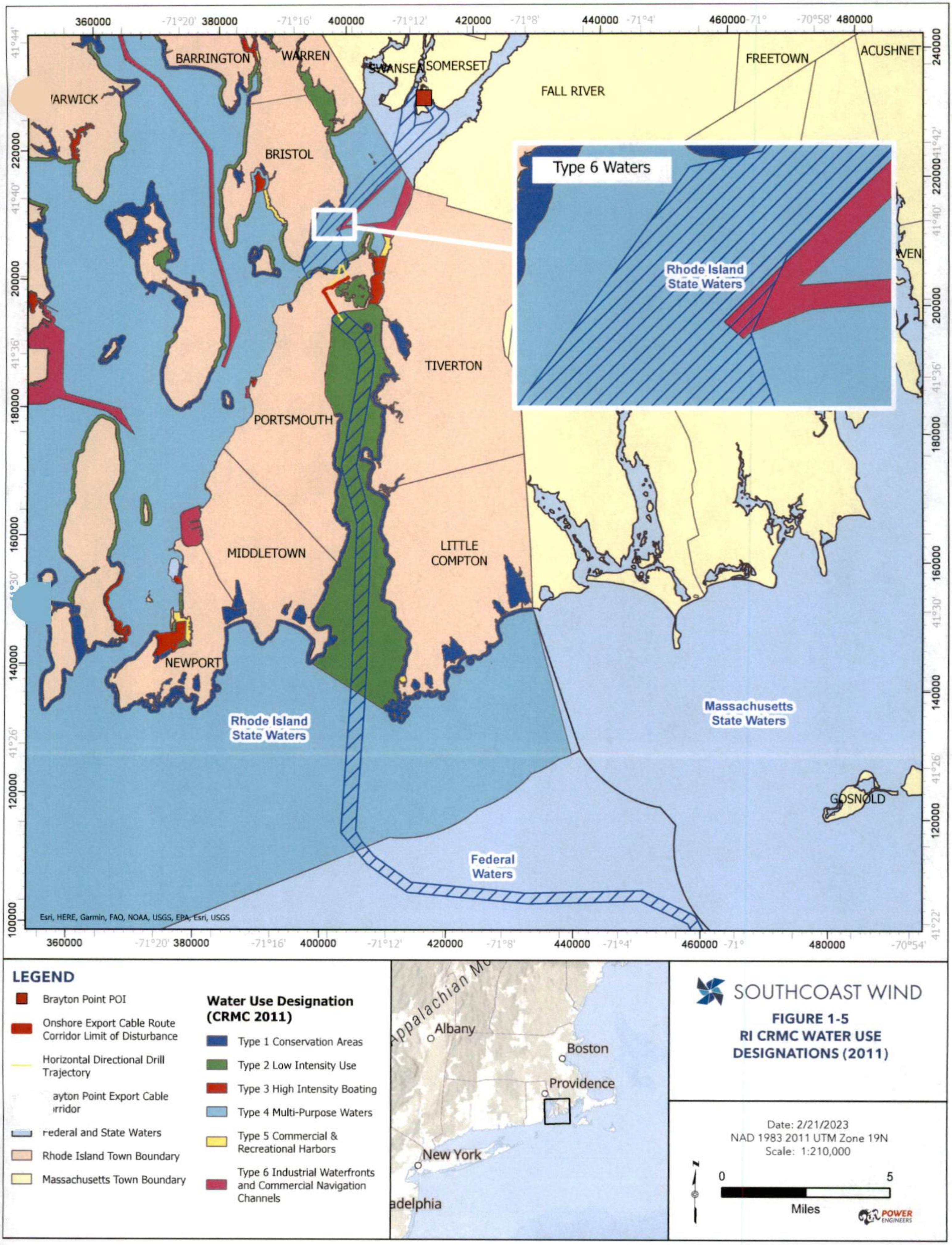
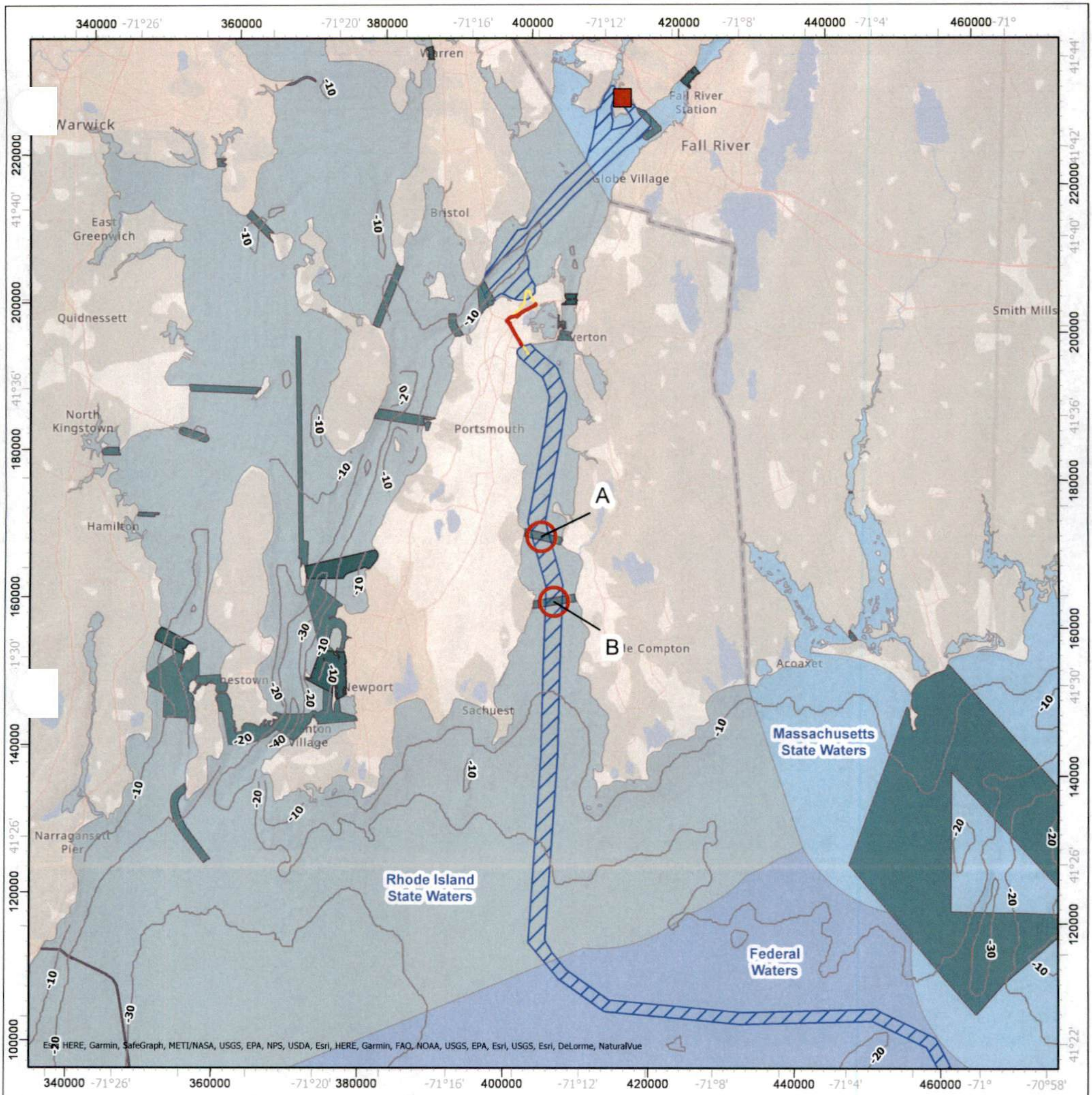


SOUTHCOAST WIND

FIGURE 1-5
RI CRMC WATER USE DESIGNATIONS (2011)



LEGEND

- Brayton Point POI
- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- Brayton Point Export Cable Corridor
- Depth (meters)
- Potential Crossings
- Cable/Pipeline Areas (NOAA 2020)
- Federal Waters
- Massachusetts State Waters
- Rhode Island State Waters

SOUTHCOAST WIND

FIGURE 2-1
POTENTIAL CABLE AND PIPELINE CROSSINGS

Date: 2/21/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:210,000

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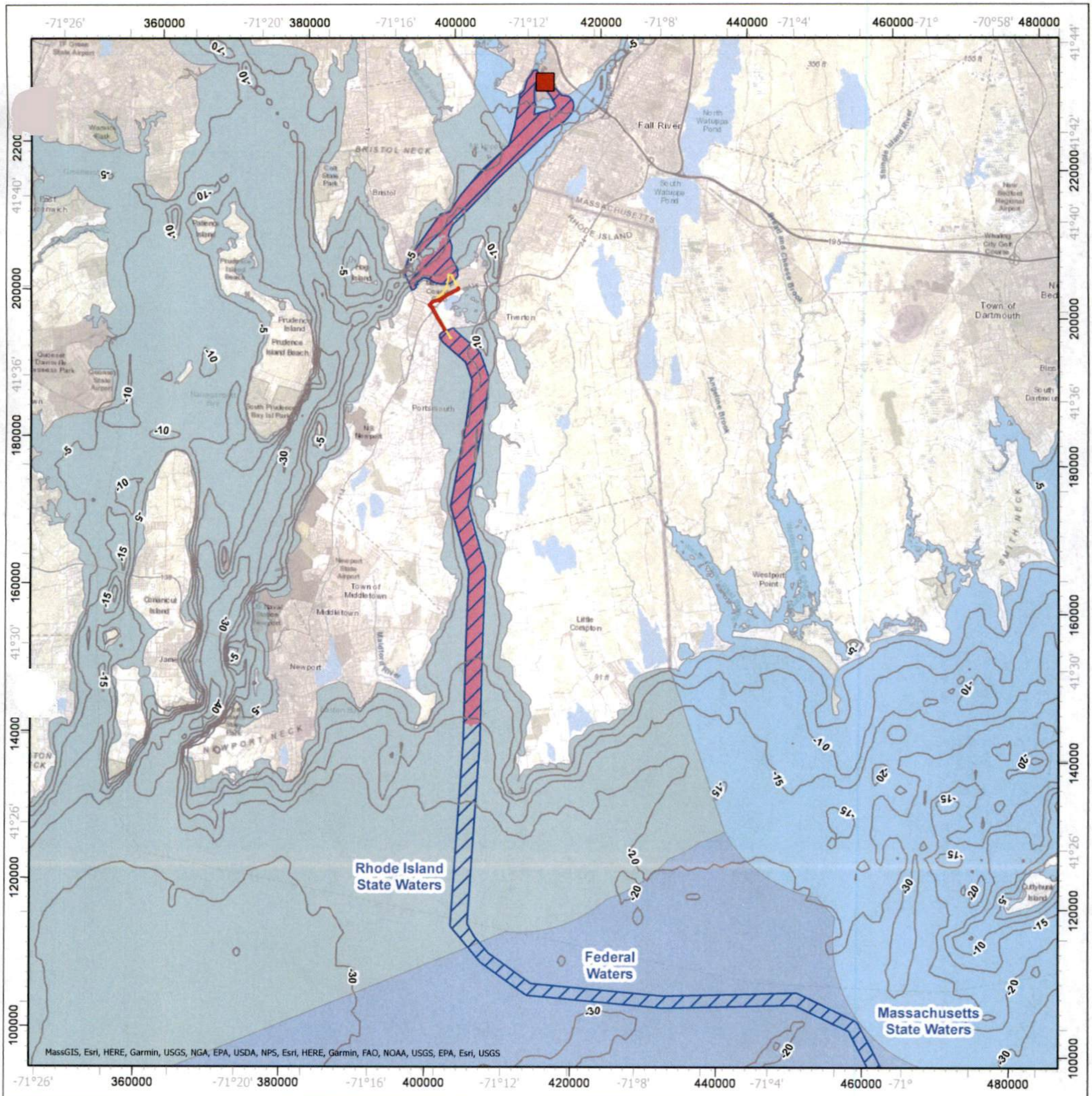

LEGEND

- Brayton Point POI
- Onshore Export Cable Route Corridor
- Horizontal Directional Drill Trajectory
- Brayton Point Export Cable Corridor
- Depth (meters)
- Potential Area for Anchoring
- Federal Waters
- Massachusetts State Waters
- Rhode Island State Waters

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FIGURE 2-2
POTENTIAL AREAS FOR ANCHORING INSIDE THE BRAYTON POINT EXPORT CABLE CORRIDOR

Date: 2/23/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:210,000

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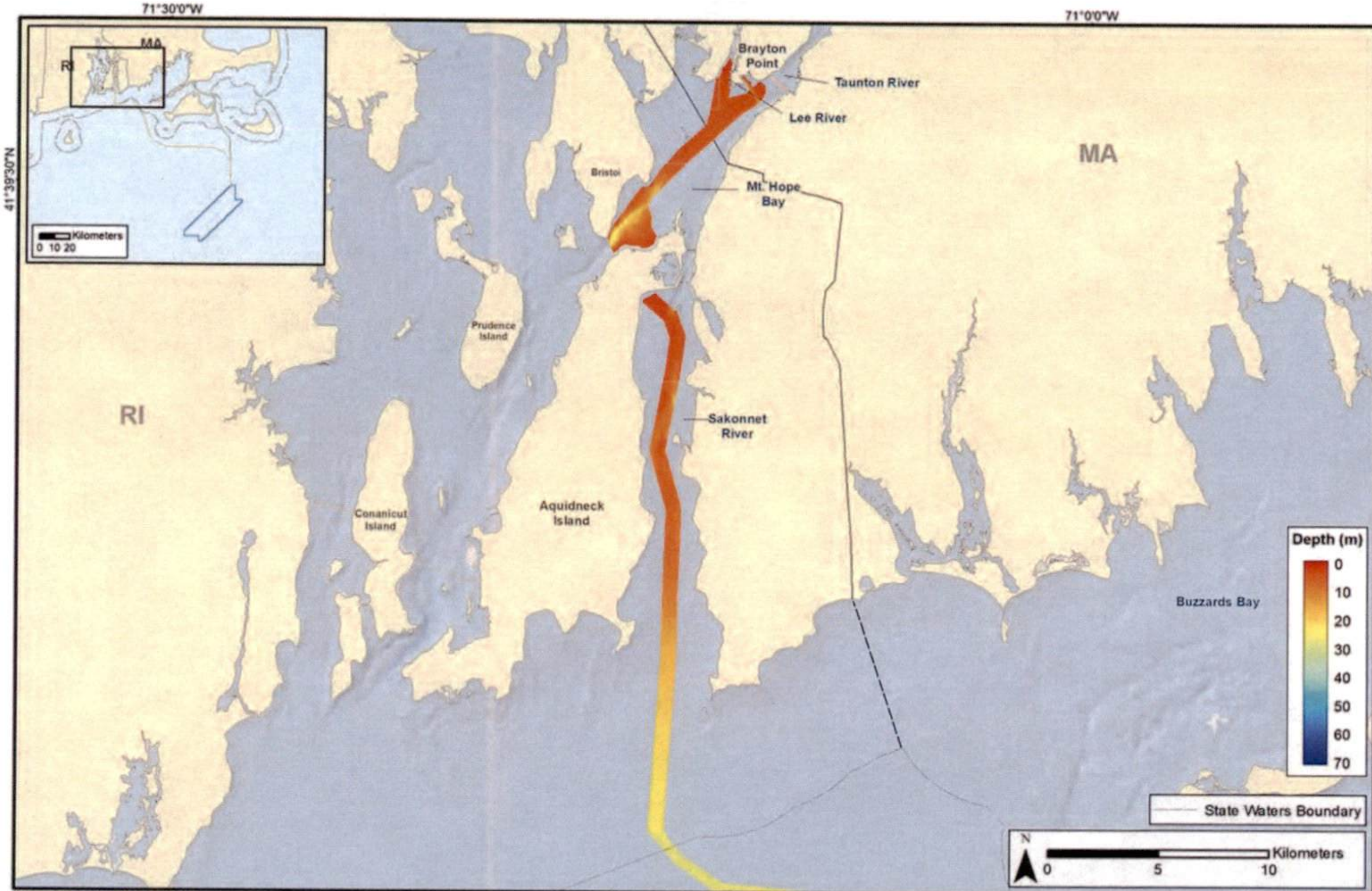

Bathymetry: 2020/2021, 50 cm resolution

Document Name: MW_2022_S02_ECC_Brayton_Nearshore_Bathy

Coordinate System: NAD 1983 UTM Zone 19N

Date: 10/14/2022

DATA SOURCE: Inspire Environmental. 2022. Benthic Habitat Mapping to Support State Permitting Applications – Brayton Point ECC for RI State Waters and GLD

SOUTHCOAST WIND

FIGURE 3-1
BATHYMETRIC DATA AT THE BRAYTON POINT EXPORT CABLE CORRIDOR

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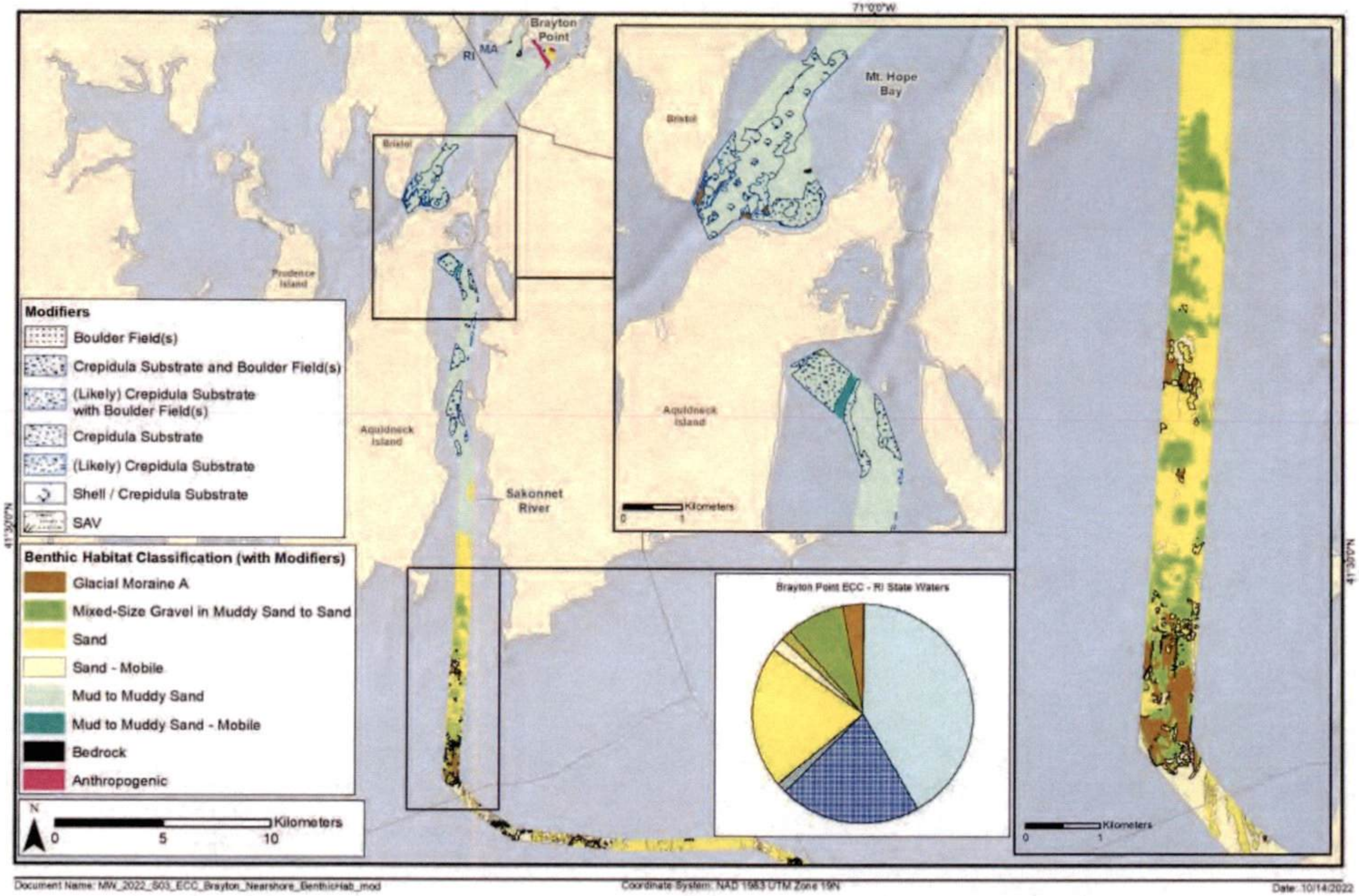

DATA SOURCE: Inspire Environmental. 2022. Benthic Habitat Mapping to Support State Permitting Applications – Brayton Point ECC for RI State Waters and GLD.

Fugro USA Marine Inc. 2019, 2020 and 2021. Marine Site Investigation Report. Construction and Operations Report, Appendix E."

SOUTHCOAST WIND

FIGURE 3-2
BENTHIC HABITAT TYPES WITH MODIFIERS AT THE BRAYTON POINT EXPORT CABLE CORRIDOR

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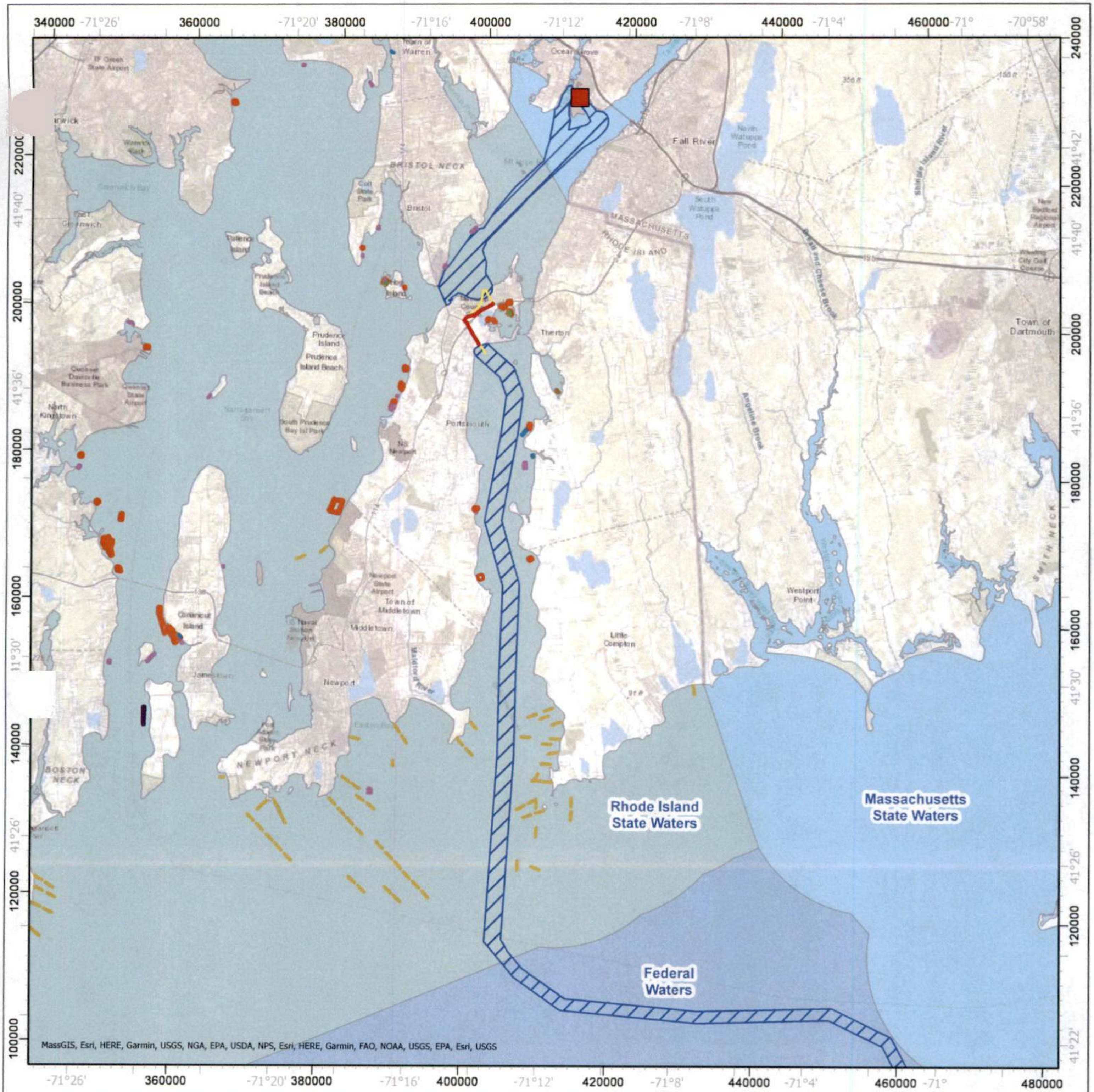

LEGEND

- Brayton Point POI
- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- Brayton Point Export Cable Corridor
- Federal Waters
- Massachusetts State Waters
- Rhode Island State Waters
- Potential Locations of Floating Fish Traps (RIDEM Marine Fisheries 2020)

Aquaculture Leases (RIDEM Marine Fisheries 2021)

- Approved
- Expanded
- Preliminary Determination Application (PD App)
- Public Notice Application (PN App)
- Proposed
- Withdrawn/Expired

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FIGURE 3-3
AQUACULTURE LEASES NEAR THE BRAYTON POINT EXPORT CABLE CORRIDOR

Date: 3/9/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:210,000

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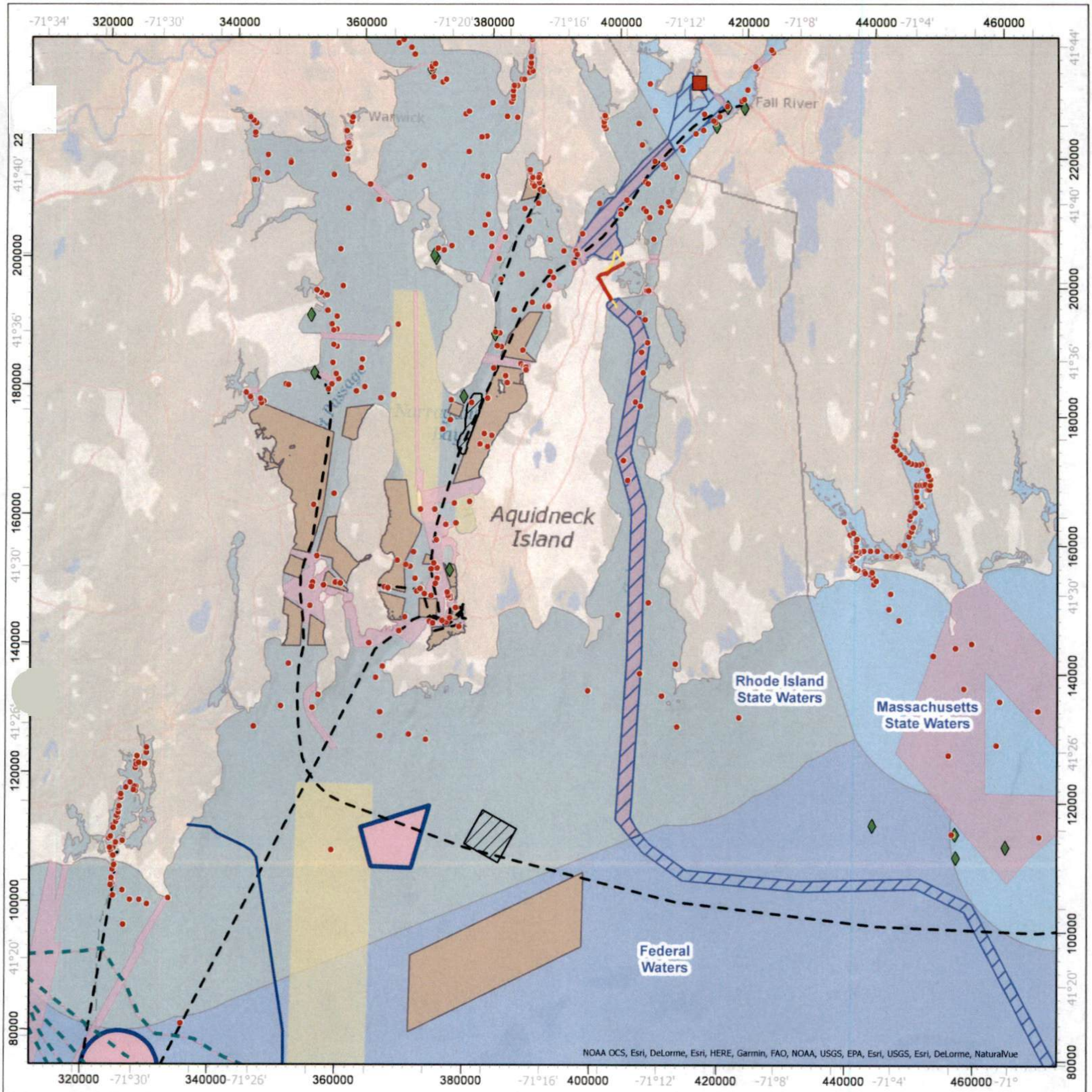

LEGEND

- Brayton Point POI
- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- Brayton Point Export Cable Corridor
- CRMP Jurisdiction in RI Waters
- Submarine Cable (NOAA 2020)
- Block Island Transmission Cable (Northeast Ocean Data 2019)
- RI Ferry Route (RIGIS 2015)
- Buoy (NOAA and DOC 2020)
- Aid To Navigation (NOAA 2020)
- Anchorage Area (NOAA 2017)
- Ocean Disposal Site (NOAA 2022)
- Pilot Boarding Area (NOAA 2018)
- Submarine Cable Area (NOAA 2021)

Danger Zone and Restricted Area (NOAA 2022)

- Restricted Area
- Federal Waters
- Massachusetts State Waters
- Rhode Island State Waters

SOUTHCOAST WIND

FIGURE 3-4
OTHER MARINE USES

Date: 3/9/2023
NAD 1983 2011 UTM Zone 19N
Scale: 1:240,000

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Miles

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SouthCoast Wind 1 Project

Attachment B: Route Alternatives Assessment

Revised: February 2023

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TABLE OF ACRONYMS

Acronym	Definition
ACP	Areas of Potential Concern
BOEM	Bureau of Ocean Energy Management
ECC	Export cable corridor
ft	Feet
HDD	Horizontal directional drilling
HVDC	High voltage direct current
ID	Identifier
ISO-NE	Independent System Operator for New England
km	Kilometer
MA	Massachusetts
MassDOT	Massachusetts Department of Transportation
mi	Mile
MW	Megawatt
NOAA	National Oceanic and Atmospheric Administration
PAPE	Preliminary Area of Potential Effects
POI	Point of interconnection
RI	Rhode Island
RI CRMC	Rhode Island Coastal Resources Management Council
RIDEM	Rhode Island Department of Environmental Management
RIDOT	Rhode Island Department of Transportation
RIGIS	Rhode Island Geographic Information System
RWU	Roger Williams University
SAMP	Special Area Management Plan

Executive Summary

SouthCoast Wind Energy LLC (SouthCoast Wind) is developing an offshore wind generation facility (Offshore Generation Facility) with capacity to generate 2,400 MW of clean, renewable energy. Transmission cables and interconnection facilities are necessary to deliver electricity from the SouthCoast Wind Offshore Generation Facility to the regional electric grid.

SouthCoast Wind considered and evaluated alternative potential points of interconnection (POIs) to the grid, offshore export cable corridors (ECCs), landfall site alternatives, onshore export cable routes, and transmission technologies. Some of these alternatives were eliminated based on technical or commercial feasibility assessments, or the inability of the alternative to address the identified interconnection need. Other alternatives that were found to be feasible and capable of addressing the identified need were further examined on the basis of constructability, operability, environmental impacts, estimated costs, and reliability assessments.

Brayton Point is the selected POI for 1,200 MW of clean, renewable energy because it is a robust interconnection point that can accommodate 1,200 MW, and it is a previously disturbed brownfield site formerly occupied by a coal burning power generation plant. SouthCoast Wind has power purchase agreements to deliver energy to Brayton Point. This analysis focuses on the siting process and alternatives assessment for the export cable routing from the Offshore Generation Facility to the onshore POI at Brayton Point.

SouthCoast Wind considered fourteen onshore and offshore export cable route combinations to reach Brayton Point, including:

- Overland route alternatives that would avoid cable installation in Narragansett Bay and the Sakonnet River, although they do require cable installation in Mt. Hope Bay:
  - Three routes landing in Middletown, RI
  - Two routes landing in Little Compton, RI
  - One route landing in Westport, MA
- Marine route alternatives:
  - Sakonnet River route:
    - "Selected Alternative" with an approximately 2.0-mile (mi) (3.2-kilometer [km]) intermediate onshore underground crossing in Portsmouth, RI
    - Sakonnet River North route (bypassing the Portsmouth, RI crossing)
  - Narragansett Bay East Passage route
  - Narragansett Bay West Passage route

The onshore route alternatives landing in Middletown and Little Compton were not selected due to the extended duration of construction, use conflicts, potential for effects on the local economy, lack of sufficient space on small roads, and potential environmental and cultural effects in sensitive areas. The onshore route alternative landing in Westport, MA was not selected due to fatal flaws crossing Westport Harbor via HDD or bridge-suspended cables.

As a result of the alternatives analysis screening process, SouthCoast Wind selected a proposed Project route (the Selected Alternative) that traverses approximately 5.3 mi (8.6 km) in Rhode Island Sound, approximately 11.0 mi (17.7 km) in the Sakonnet River, approximately 2.0 mi (3.2 km) underground, onshore in Portsmouth, and approximately 4.0 mi (6.4 km) in Mount Hope Bay (portion in Rhode Island state waters).

The proposed route would enable SouthCoast Wind to achieve the best balance between reasonable construction timeline and cost while not causing unacceptable harm to the social and natural environment. Based on the enclosed analysis, SouthCoast Wind has determined the proposed route would result in the least impacts and would allow for safe, practical, and long-term cable installation, maintenance, and operation as compared to the alternatives considered. Construction of the Project, as proposed, will provide access to a major renewable clean energy resource and will not cause unacceptable harm to the environment.

1 Introduction

SouthCoast Wind Energy LLC (SouthCoast Wind) is developing an offshore wind renewable energy generation facility (Offshore Generation Facility) in federal waters designated by the Bureau of Ocean Energy Management (BOEM) as OCS-A 0521. When fully built out, and with continuing advancements in wind technology, the SouthCoast Wind Offshore Generation Facility will supply an estimated 2,400 megawatts (MW) of offshore wind energy, enough to power more than a million homes.

Transmission and interconnection facilities are necessary to deliver electricity from the SouthCoast Wind Offshore Generation Facility to the regional electric grid. SouthCoast Wind considered and evaluated alternative potential points of interconnection (POIs) to the grid, offshore export cable corridors (ECCs), landfall site alternatives, onshore export cable routes, and transmission technologies. Some of these alternatives were eliminated based on technical or commercial feasibility assessments, or the inability of the alternative to address the identified interconnection need. Other alternatives that were found to be feasible and capable of addressing the identified need were further examined on the basis of constructability, operability, environmental impacts, estimated costs and reliability assessments.

Delivery of an estimated 2,400 MW of clean power will necessitate multiple POIs for several reasons, most notably that individual connections to the regional transmission system are limited by the Independent System Operator for New England (ISO-NE) to 1,200 MW maximum for reliability reasons. SouthCoast Wind considered multiple coastal interconnection points with suitable electrical characteristics, accessibility, and potential nearby land for the required substation/converter station facilities. Two POIs were selected: one at Brayton Point in Somerset, MA and one in Falmouth, MA. This analysis focuses on the export cable routing from the Offshore Generation Facility to the onshore POI at Brayton Point for the SouthCoast Wind 1 Project.

SouthCoast Wind has power purchase agreements to deliver 1,200 MW of offshore wind energy to Brayton Point in Somerset, Massachusetts. Brayton Point is a robust interconnection point that can accommodate 1,200 MW, and it is a previously disturbed brownfield site formerly occupied by a coal burning power generation plant. The first 1,200 MW delivered from the Offshore Generation Facility will be the SouthCoast Wind 1 Project.

2 Route Siting Factors

SouthCoast Wind's routing analysis, environmental assessment of alternatives, and route selection involved significant efforts to evaluate a wide range of routing alternatives. The following steps were taken during the route selection process:

- Identify potential landfall locations capable of providing suitable areas for horizontal directional drilling (HDD) and installation of transition joint bays, where offshore export cable is spliced to onshore export cable.
- Identify a geographic area that incorporates the offshore route(s), the potential onshore route(s), the landfall location(s) the high voltage direct current (HVDC) converter station location, and the POI with the regional transmission system.
- Assess potential routing options within the geographic area that would best connect these routing elements.
- Evaluate each routing option for fatal flaws and only move forward with feasible options.
- Inventory and evaluate each route option based on engineering, environmental impact, constructability, permitting, reliability, and cost criteria.

2.1 Siting Factors Offshore and at Landfall

Identifying ECCs requires careful planning and route optimization, with considerations including:

- Offshore physical hazards, such as shipwrecks, unexploded ordnance, other existing and planned cables, and sea floor and subsurface obstructions,
- Economic and recreational use areas, such as commercial or recreational fishing, recreational boating and tourism, and anchoring,
- Protected marine areas, areas protected for biological, cultural, or historical purposes, and
- Available interconnection points.

Many factors were evaluated when selecting landfall locations. The selected landfall location needs to balance:

- Avoidance of marine and coastal resources such as submerged aquatic vegetation and coastal wetlands,
- Risk of cable exposure due to wave action and sediment migration, and
- Requirements for sea-to-shore HDD installation operations, such as onshore and offshore space, seabed conditions, and use conflicts.

Availability of physical space was evaluated for construction and installation activities within onshore HDD staging areas. SouthCoast Wind assessed land uses adjacent to potential landfall locations to inventory and avoid/minimize adverse environmental effects, identify potential for use of existing infrastructure, minimize disturbances to residential areas, avoid protected lands, and avoid adverse effects to historic districts, conservation districts, and businesses that could be impacted including nearby marine uses (i.e., fisheries, shellfish beds, marinas, beaches).

Water depth at the landfall approach was also an important factor because the drafts of the vessels to be used to support the HDD operations need to be considered as well as the effects from sea-state conditions, wave action, and surf zone on the vessels and cable assets. At the HDD punchout ("entry" and "exit") locations, where the offshore export cables will begin the approach to shore, the HDD offshore exit locations are likely to be on the order of 6.6 to 32.8 feet (ft) (2.0 to 10.0 m) in depth below mean sea level.

2.2 Siting Factors Onshore

Onshore export cable routes considered by SouthCoast Wind would be constructed underground, primarily along existing public road right-of-way. At the request of the Rhode Island Department of Environmental Management (RIDEM), overhead transmission lines were considered, in addition to underground transmission, which is SouthCoast Wind's preferred approach. This is discussed further in Section 4.2. Considerations for siting onshore export cables include the following:

- System operability and reliability – access for future inspection, operation, and maintenance.
- Engineering feasibility – route length, route bends and hard angles, adequate space to accommodate underground duct bank, manholes and transition joint bays.
- Construction feasibility – congestion with existing utility infrastructure, complex and trenchless crossings.

- Human/built environment – residential areas, environmental justice populations, densely developed areas, traffic congestion, potential for economic disruption, historic and archaeologic resources, sensitive cultural areas.
- Environmental Setting – conservation and public lands, flood hazard areas, freshwater and coastal wetlands and waters, state-listed rare species, public water supplies, and tree removal.

3 UNIVERSE OF ROUTES CONSIDERED

A summary of fourteen onshore and offshore export cable route combinations considered by SouthCoast Wind is presented below in Table 1 and shown on the Universe of Routes (Figure 1 below and Figure 5-2 in Attachment 1). The list captures a representative array of overland and in-water routes to the Brayton Point POI.

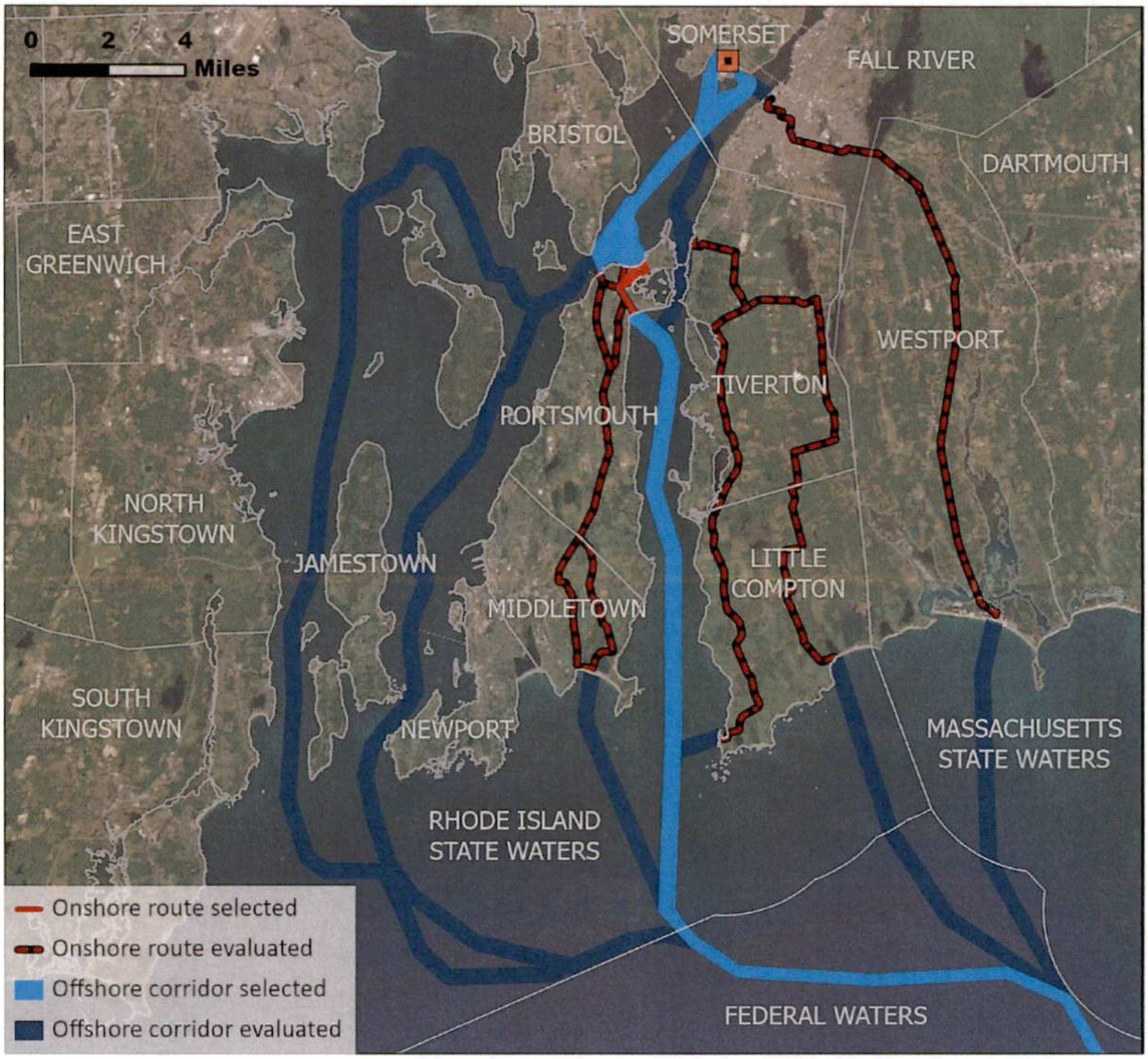


FIGURE 1. OVERVIEW OF UNIVERSE OF ROUTES CONSIDERED TO BRAYTON POINT

TABLE 1. OFFSHORE AND ONSHORE EXPORT CABLE ROUTES CONSIDERED [a]

Route Category	Route ID	Route Description	1st Intermediate Landfall	2nd Intermediate Landfall	Brayton Point Landfall	Length mi (km)							
						Offshore				Onshore			Total
						Federal waters [b]	RI state waters	MA state waters	Total	RI jurisdiction	MA jurisdiction	Total	
Sakonnet River with intermediate onshore crossing at Portsmouth	1	Sakonnet River to Boyds Ln. to Roger Williams University (RWU)	Boyds Ln. (Portsmouth, RI)	RWU (Portsmouth, RI)	Lee River	90.1 (145.0)	20.9 (33.7)	2.1 (3.4)	**113.2 (182.1)**	1.0 (1.6)	0.6 (0.9)	**1.5 (2.4)**	**114.7 (184.5)**
	2	Sakonnet River to Boyds Ln. to Montaup Country Club	Boyds Ln. (Portsmouth, RI)	Montaup Country Club (Portsmouth, RI)	Lee River	90.1 (145.0)	20.6 (33.2)	2.1 (3.4)	**112.9 (181.6)**	1.7 (2.7)	0.6 (0.9)	**2.2 (3.6)**	**115.1 (185.2)**
	3	Sakonnet River to Boyds Ln. to RIDEM/ Aquidneck Land Trust	Boyds Ln. (Portsmouth, RI)	DEM/Aquidneck Land Trust (Portsmouth, RI)	Lee River	90.1 (145.0)	20.8 (33.5)	2.1 (3.4)	**113.0 (181.9)**	1.0 (1.7)	0.6 (0.9)	**1.6 (2.6)**	**114.6 (184.5)**
	4	Sakonnet River to Boyds Ln. to Mt. Hope Bridge	Boyds Ln. (Portsmouth, RI)	Mt. Hope Bridge (Portsmouth, RI)	Lee River	90.1 (145.0)	21.2 (34.0)	2.1 (3.4)	**113.4 (182.5)**	1.2 (2)	0.6 (0.9)	**1.8 (2.9)**	**115.2 (185.3)**
	5	Sakonnet River to Boyds Ln. to RWU	Boyds Ln. (Portsmouth, RI)	RWU (Portsmouth, RI)	Taunton River	90.1 (145.0)	20.9 (33.7)	2.4 (3.9)	**113.5 (182.6)**	1.0 (1.6)	0.4 (0.7)	**1.4 (2.3)**	**114.9 (184.8)**
Offshore routes to Brayton Point	6	Sakonnet River north	--	--	Lee River	90.1 (145.0)	20.7 (33.3)	2.4 (3.9)	**113.2 (182.2)**	0	0.6 (0.9)	**0.6 (0.9)**	**113.8 (183.1)**
	7	Narragansett Bay East Passage	--	--	Lee River	90.4 (145.4)	30.4 (48.9)	2.1 (3.4)	**122.9 (197.7)**	0	0.6 (0.9)	**0.6 (0.9)**	**123.4 (198.6)**
	8	Narragansett Bay West Passage	--	--	Lee River	90.4 (145.4)	41.9 (67.4)	2.1 (3.4)	**134.4 (216.2)**	0	0.6 (0.9)	**0.6 (0.9)**	**134.9 (217.1)**
Routes with intermediate RI onshore crossing bypassing the Sakonnet River	9	Second Beach, Paradise Ave., & Rte. 138 to RWU	Second Beach (Middletown, RI)	RWU (Portsmouth, RI)	Lee River	90.1 (145.0)	11.8 (18.9)	2.1 (3.4)	**104.0 (167.3)**	11.0 (17.7)	0.6 (0.9)	**11.6 (18.6)**	**115.6 (185.9)**
	10	Second Beach, Paradise Ave., & Rte. 138 to Mt. Hope Bridge	Second Beach (Middletown, RI)	Mt. Hope Bridge (Portsmouth, RI)	Lee River	90.1 (145.0)	12.0 (19.3)	2.1 (3.4)	**104.2 (167.7)**	10.9 (17.6)	0.6 (0.9)	**11.5 (18.5)**	**115.7 (186.2)**
	11	Second Beach, Mitchell's Ln., & Rte. 138 to RWU	Second Beach (Middletown, RI)	RWU (Portsmouth, RI)	Lee River	90.1 (145.0)	11.8 (18.9)	2.1 (3.4)	**104.0 (167.3)**	11 (17.7)	0.6 (0.9)	**11.5 (18.5)**	**115.5 (185.9)**
	12	Rte. 77, Rte. 177, Fish Rd., & Souza Rd. to Schooner Dr.	Sakonnet Point (Little Compton, RI)	Schooner Dr. (Tiverton, RI)	Lee River	90.1 (145.0)	8.7 (14.1)	2.4 (3.9)	**101.3 (163)**	15.8 (25.4)	0.6 (0.9)	**16.3 (26.3)**	**117.6 (189.3)**
	13	South Shore Beach, Rte. 81, Rte. 177, Fish Rd., & Souza Rd. to Schooner Dr.	South Shore Beach (Little Compton, RI)	Schooner Dr. (Tiverton, RI)	Lee River	86.1 (138.5)	2.7 (4.4)	7.1 (11.4)	**95.9 (154.3)**	16.3 (26.3)	0.6 (0.9)	**16.9 (27.2)**	**112.8 (181.5)**
Massachusetts-only route	14	Horseneck Beach, Rte. 88, Rte. 6, Brayton Ave., & S. Main St. to Ferry St.	Horseneck Beach (Westport, MA)	Ferry St. (Fall River, MA)	Taunton River	83.8 (134.8)	0	7.6 (12.3)	**91.4 (147.1)**	0	17.3 (27.9)	**17.3 (27.9)**	**108.7 (174.9)**

Notes: Abbreviations are defined on the Abbreviation Table at the beginning of this document. Numbers may not compute precisely due to rounding.

- [a] *This table summarizes 14 export cable routes considered, many of which were deselected. The list captures a representative array of route segment combinations considered by SouthCoast Wind.*
- [b] *Offshore export cable route length in federal waters is subject to adjustment based on selection of final offshore substation platform location(s) in the Offshore Generation Facility. This will not impact the cable route lengths in RI state waters or MA state waters or any route comparisons presented here.*

3.1 Onshore Underground Export Cable Route Alternatives (Bypassing the Sakonnet River)

SouthCoast Wind evaluated the following cable landing and onshore route alternatives that would avoid cable installation in Narragansett Bay and the Sakonnet River (refer to Figure 1 and Figure 5-2 in Attachment 1):

- Three routes landing in Middletown, RI
- Two routes landing in Little Compton, RI
- One route landing in Westport, MA

Key evaluation factors for the onshore routes included:

- Environmental resources and conservation areas
- Archaeological resources and cultural resource areas
- Conflicts with residential uses
- Potential socioeconomic effects due to use and space conflicts in heavily developed commercial and tourism areas
- Avoidance of existing infrastructure and potential for effects on local communities, including environmental justice communities
- Space limitation for construction adjacent to small, two-lane roads
- Duration of construction activities and increased impacts with longer duration construction periods

These onshore routes would pass through sensitive environmental resources (multiple residential areas and conservation areas), increase traffic congestion over a greater length of onshore routing, and cost significantly more than equivalent distances of offshore cabling. There are also significant engineering and construction constraints that would be encountered along these routes, as described below.

Several narrow roads along these routes would require full-lane road closures during the installation phase, causing traffic congestion impacting multiple residential areas. Winding and narrow roadways may also present engineering constraints for the cable design due to the severe turns and angles in portions of the routes. Several historic candidate sites and historic cemeteries are located along the routes in Middletown and Little Compton. These routes would encounter culverted stream crossings and bridge crossings over abandoned railroad right-of-way, which would require more complex trenchless methods for conduit installation. For these reasons, onshore Route Identifiers (IDs) 9-11 (see Table 1) were dismissed from further consideration as impractical route alternatives.

These onshore export cable route alternatives are described in more detail below.

3.1.1 Routes Landing at Second Beach in Middletown, RI (Route IDs 9-11)

SouthCoast Wind evaluated three onshore underground routes landing in Middletown, RI. All three alternatives (Route ID 9, Route ID 10, and Route ID 11) would make landfall at the parking lot for Second Beach in Middletown via HDD under the municipal public beach from Sachuest Bay. An indicative landfall trajectory is shown in Figure 2, along with two potential onshore paths from the landfall site.

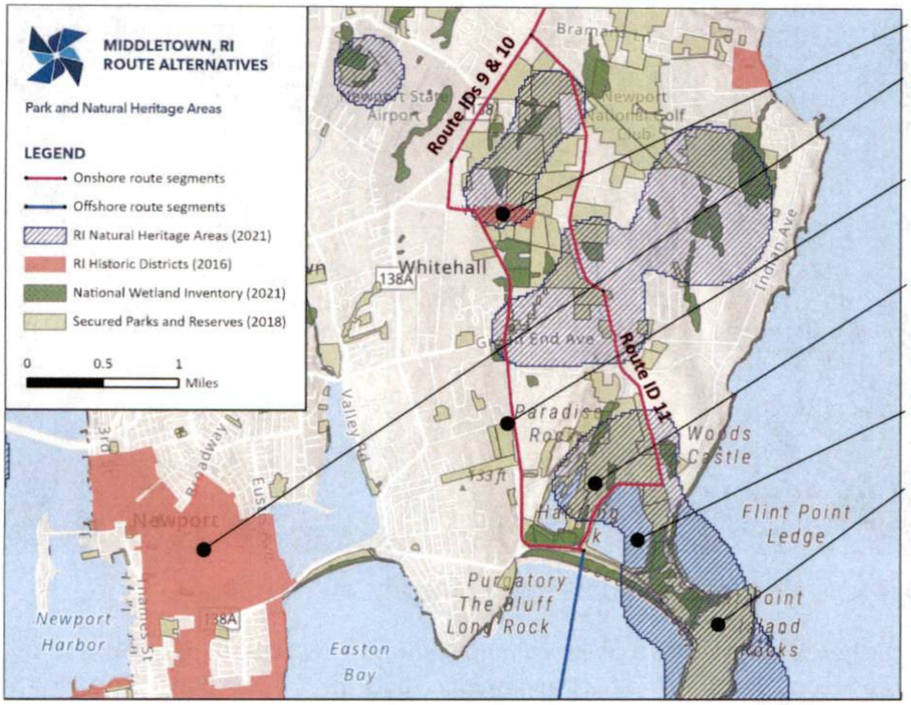
FIGURE 2. SECOND BEACH, MIDDLETOWN LANDFALL ALTERNATIVE

Second Beach is a dynamic beach system with mobile sediments, surrounded by wetlands, parks, and natural heritage areas. The Second Beach landfall site and routing abuts the Norman Bird Sanctuary, a 325-acre bird sanctuary, nature preserve, environmental education center, and museum. To the east is Sachuest Point National Wildlife Refuge, another nature preserve, occupying 242 acres which serve as an important stopover and wintering area for migratory birds, as well as a popular tourist destination for more than 65,000 annual visitors. To the west is Newport, a popular, year-round tourist destination and a designated Rhode Island historic district.

The route alternatives from the Second Beach landfall site would include approximately 11.0 miles (mi) (17.7 kilometer [km]) of onshore routing across Aquidneck Island through Middletown and Portsmouth, passing through multiple residential areas. Figure 3 maps the wetlands (dark green), parks and reserves (light green), natural heritage areas (blue hatch), and historic districts (pink) along Route IDs 9-11 through Middletown. Along these routes, there are fifteen aboveground cultural resources located within the Project's Preliminary Area of Potential Effects (PAPE), of which six are listed on the National Register.[1] The routes pass through High Value / High Vulnerability Habitat and Natural Heritage Areas 216 and 209 according to RIDEM and Rhode Island Geographic Information System (RIGIS). Additional sensitive receptors abut the routes, including wetlands, parks, reserves, emergency and rescue services facilities, schools, and government facilities, including but not limited to:

- Aquidneck Land Trust's Spruce Acres Farm
- Bloom Preschool
- The Island Child Care Center and Day School
- St. Mary's Rectory, St Mary's Episcopal Church
- Sea Rose Montessori School
- Aquidneck Island Christian Academy
- Portsmouth Historical Society
- Countryside Children's Center
- St. Barnabas Church
- Portsmouth Water and Fire District
- Portsmouth Town Hall
- Portsmouth Police Department
- Portsmouth Fire Department
- Paradise Ave, which parallels Maidford River

[1] *BOEM Alternative C-1 and C-2 Cultural Resource Due Diligence Report*



- **Bailey Farm**, a 45-acre 19th century farm.
- **Newport,** a popular, year-round tourist destination and a designated historic district.
- **Paradise School**, a historic property built in 1875, which sits on the edge of **Paradise Valley Park.**
- **Norman Bird Sanctuary**, a 325-acre bird sanctuary, nature preserve, environmental ed center, and museum.
- **Gardiner Pond**, a City of Newport drinking water supply area.
- **Sachuest Point National Wildlife Refuge,** a 242-acre nature preserve and important stopover and wintering area for migratory birds, also a popular tourist destination for more than 65,000 annual visitors.

FIGURE 3. MIDDLETOWN PARK AND NATURAL HERITAGE AREAS

All three route alternatives proceed north on Route 138, a busy four-lane road without a paved shoulder, abutted by commercial properties and some residences. It is important to note that Newport is a popular year-round tourist destination on the southwest corner of Aquidneck Island, and with the tourism comes accompanying traffic congestion. There are limited roads traversing Aquidneck Island, with Route 138 and Route 114 as the only major north-south routes, as shown in Figure 4. Installation of cables along one side of Aquidneck Island would likely impact traffic across the island.

Additional considerations distinguishing Route ID 9, Route ID 10, and Route ID 11 are described in the following subsections.

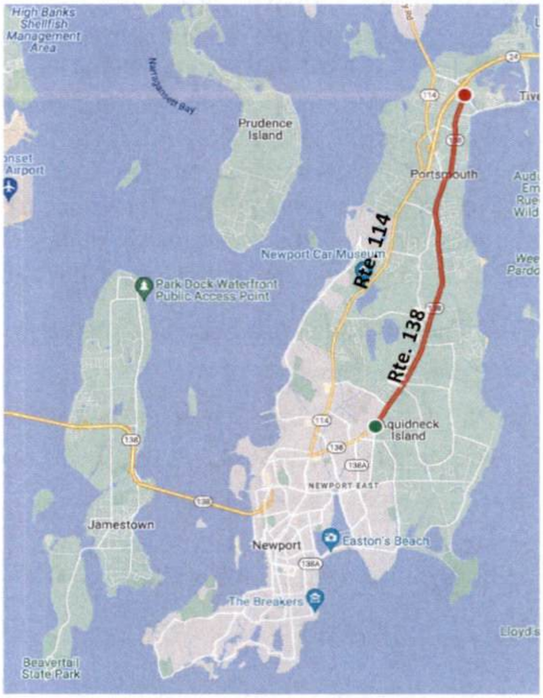


FIGURE 4. ROUTE 138, AQUIDNECK, RI

3.1.1.1 Paradise Ave., Rte. 138, Turnpike Ave, Rte. 114 (Route ID 9)

From the landfall at Second Beach, Route ID 9 would proceed inland through Middletown via Paradise Avenue and Route 138, crossing into Portsmouth to rejoin the Selected Alternative discussed in Section 3.2.1.1 (refer to Figure 5).

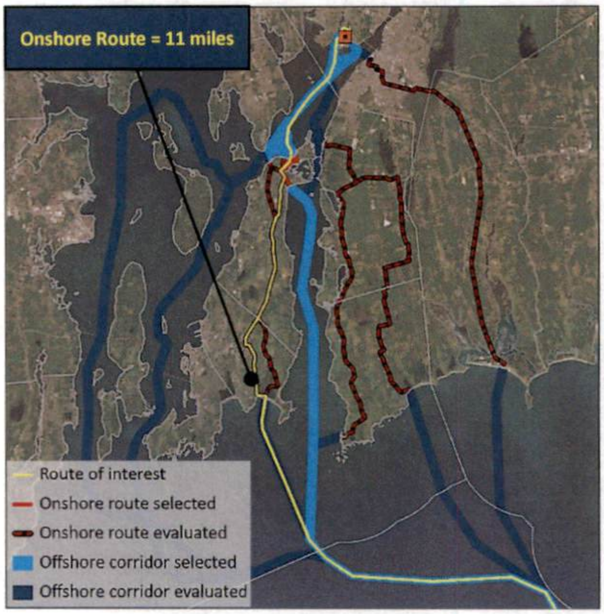


FIGURE 5. ROUTE ID 9 LOCUS

In addition to the abutting habitat, heritage areas, and sensitive receptors described in Section 3.1.1, Route ID 9 would also pass Paradise School, a historic property located along the route. Additional sensitive receptors that would abut Route ID 9 include:

- Paradise Valley Park
- Middletown Historical Society
- Portsmouth Free Public Library
- Middletown Public Works
- Middletown Fire Department
- Beth Olam Cemetery
- Calvary United Methodist Church and Calvary Christian School
- Middletown Cemetery
- JH Gaudet Middle School and JH Gaudet Field
- St. Paul's Episcopal Church
- Portsmouth Nursery School
- Bradley School
- St. Anthony's Church
- Heritage Baptist Church
- U.S. Postal Service Post Office
- Rhode Island Department of Transportation (RIDOT) Portsmouth Maintenance Facility
- Aquidneck Island Land Trust Town Pond Trail

Based on a preliminary engineering review of the routes, the roadways along Paradise Avenue and Berkely Avenue do not appear to have many underground utilities. They are predominantly local, two-lane roads without a paved shoulder that provide limited space for construction without disturbing the abutting sensitive resources. The roads are frequently abutted by old stone walls, large trees with canopies overhanging the road, and overhead utility poles (see Figure 6 photos), and they pass through multiple residential areas.

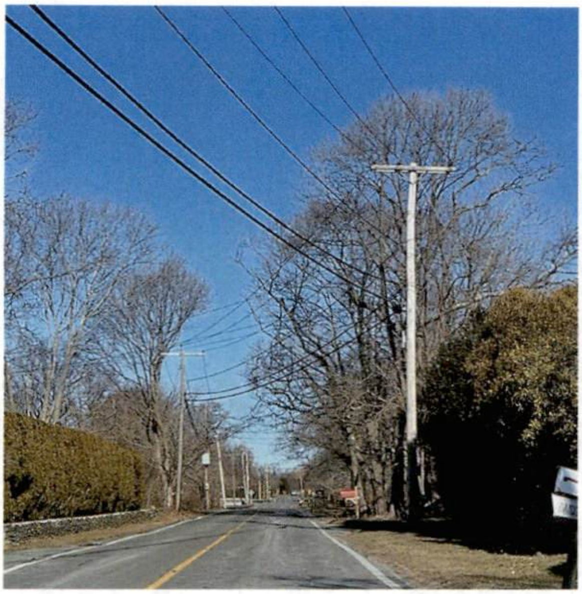


FIGURE 6: PHOTOS ALONG PARADISE AVE (LEFT) AND BERKELEY AVE (RIGHT), MIDDLETOWN, RI

3.1.1.2 Paradise Ave., Rte. 138 (Route ID 10)

From the landfall at Second Beach, Route ID 10 would proceed inland through Middletown via Paradise Avenue until joining Route 138, like Route ID 9. Refer to Section 3.1.1 for additional considerations pertaining to all three route alternatives making landfall in Middletown.

Route ID 10 turns off Route 138 to continue north on Route 114, finally reaching the Mount Hope Bridge HDD staging area (refer to Figure 7). Turnpike Avenue and Bristol Ferry Road are busy, wide roadways with two to three travel lanes, paved shoulders, and sidewalks. The intersection at the approach to Mount Hope Bridge is also heavily used and construction activity would likely lead to traffic congestion near the HDD staging area.

In addition to the abutting habitat, heritage areas, and sensitive receptors described in Section 3.1.1, Route ID 10 would also pass through High Value / High Vulnerability Habitat and Natural Heritage Area 149 according to RIDEM and RIGIS mapping. Paradise School and Mount Hope Bridge, historic properties, are located on the route, which also would pass through the Revolutionary War Battle for Rhode Island Historic District.

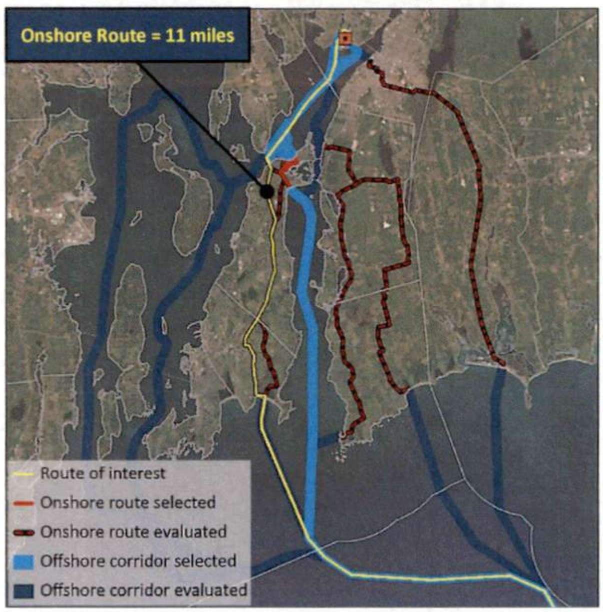


FIGURE 7. ROUTE ID 10 LOCUS

Additional sensitive receptors that would abut Route ID 10 include:

- Paradise Valley Park
- Middletown Historical Society
- Middletown Public Works
- Middletown Fire Department
- Beth Olam Cemetery
- Calvary United Methodist Church and Calvary Christian School
- Middletown Cemetery
- JH Gaudet Middle School and JH Gaudet Field
- Tripp Property Historical Landmark
- Turnpike Avenue Playground

3.1.1.3 Mitchell's Ln., Rte. 138 (Route ID 11)

From the landfall at Second Beach, Route ID 11 would head east along Hanging Rock Road, then travel via Mitchell's Lane to Route 138, rejoining the Selected Alternative (see Figure 8). Refer to Section 3.1.1 for additional considerations pertaining to all three route alternatives making landfall in Middletown.

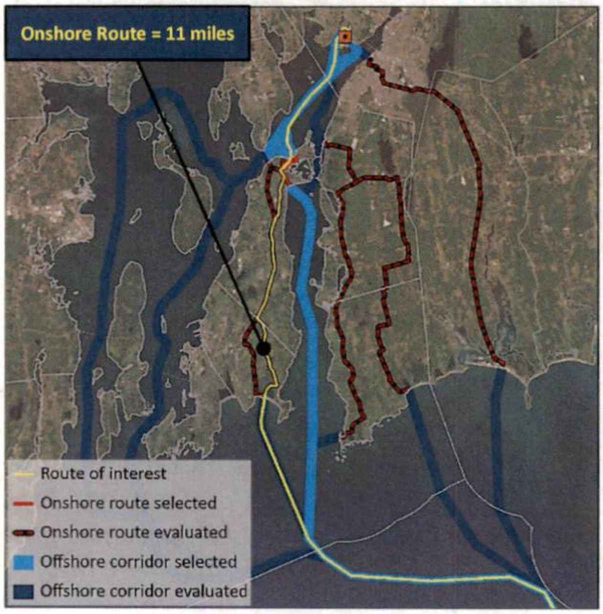


FIGURE 8. ROUTE ID 11 LOCUS

In addition to the abutting habitat, heritage areas, and sensitive receptors described in Section 3.1.1, Route ID 11 would pass through High Value / High Vulnerability Habitat and Natural Heritage Area 237 according to RIDEM and RIGIS mapping. This route would also pass Gardiner Pond, a City of Newport drinking water supply area, and Paradise Brook. Historic properties along the route would include Gardiner Pond Shell Midden and Union Church and Southernmost Schoolhouse. Additional sensitive receptors that would abut Route ID 11 include:

- Portsmouth Free Public Library
- Portsmouth Nursery School
- Bradley School
- St. Anthony's Church
- Heritage Baptist Church
- U.S. Postal Service Post Office
- RIDOT Portsmouth Maintenance Facility
- Aquidneck Island Land Trust Town Pond Trail
- Albro Woods Trailhead
- Howland Park
- Little Creek Preserve
- Norman Bird Sanctuary
- Newport Equestrian Academy
- Sakonnet Greenway Trail and Trailhead
- Newport National Golf Club

Based on a preliminary engineering review of the routes, Mitchell's Lane does not appear to have many underground utilities. It is a local, two-lane road without a paved shoulder that provides limited space for construction without disturbing the abutting sensitive resources. The road is frequently abutted by old stone walls, large trees with canopies overhanging the road, and overhead utility poles. As compared to Paradise Ave (associated with Route ID 9 and Route ID 10), Mitchell's Lane appears slightly narrower and has less developed surroundings, passing by more nature reserves and natural heritage areas (see Figure 3 mapping and Figure 9 photos).

FIGURE 9: PHOTOS ALONG MITCHELL'S LANE, MIDDLETOWN, RI

For all three route alternatives (Route IDs 9-11), the southern portions in Middletown would be the most challenging to site and construct given the narrow roads and high prevalence of natural and historical resource areas. Due to the extended duration of construction, use conflicts, potential for effects on the local economy, lack of sufficient space on small roads, and potential effects on sensitive environmental, historic and cultural areas, Route ID 9, Route ID 10, and Route ID 11 were not selected.

3.1.2 Routes in Little Compton and Tiverton, RI (Route IDs 12-13)

The southeastern, ocean-facing coast of Little Compton was evaluated to identify suitable sites for cable landfall. The coastline alternates between residential properties along steep, rocky shoreline and uninhabited marsh and mudflats. There are very few areas providing a suitable approach, available land, or sufficient space to support onshore HDD activities and underground cabling. Two potential landfall sites were identified for evaluation at Sakonnet Point and South Beach. The routes starting in Little Compton (Route IDs 12-13) would be longer with lower feasibility than those starting in Middletown (Route IDs 9-11).

3.1.2.1 Sakonnet Point, Rte. 77 (Route ID 12)

Route ID 12 would make intermediate landfall at Sakonnet Point in Little Compton then travel via Route 77 to reach Schooner Drive in Tiverton (refer to Figure 10). An indicative landfall trajectory to Sakonnet Point surfacing in a 0.9-acre parking lot across from the Sakonnet Harbor is shown in Figure 11. The area is constrained, with the parking lot separated from water by only a narrow strip of riprap coast. The surface grades may not allow for sufficient HDD burial depth in the approach to the onshore HDD pit. Due to proximity to the marina and harbor, vessel traffic in this area is expected to be high.

This onshore route would be 15.8 mi (25.4 km) long and pass through multiple residential areas. Figure 12 maps the wetlands (dark green), parks and reserves (light green), natural heritage areas (blue hatch), and historic districts (pink) along Route ID 12 through Little Compton and Tiverton.

After making landfall, the onshore route would immediately pass by and temporarily restrict access to the public boat ramp. It also abuts the Haffenreffer Wildlife refuge, which is a destination for birding. Figure 12 shows how dense Little Compton is with wetlands, park and preserve land. Much of the area is preserved woodland and agricultural area.

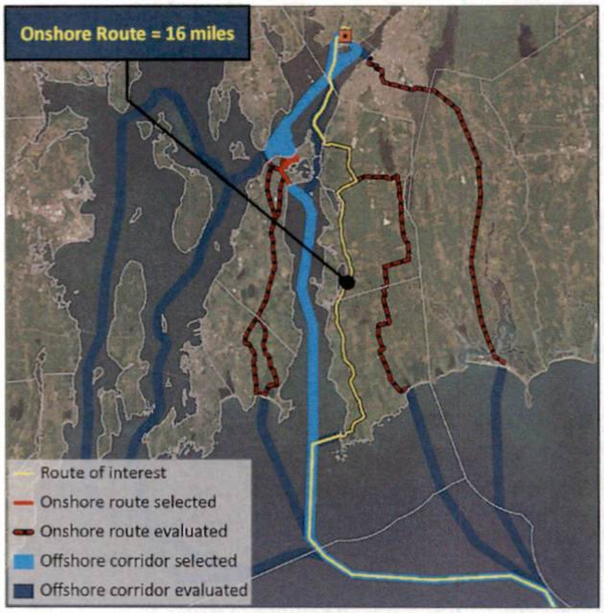


FIGURE 10. ROUTE ID 12 LOCUS

FIGURE 11. SAKONNET POINT, LITTLE COMPTON LANDFALL ALTERNATIVE

From the Sakonnet Point landfall, the route would head east and turns north, following Route 77 along the Sakonnet River coast through Little Compton and into Tiverton. Once in Tiverton, the route would turn east onto Route 177. Both Route 77 and Route 177 are busy two-lane roads with minimal paved shoulders, passing a very high prevalence of protected natural, historical, and agricultural areas. In Tiverton, Route 77 passes within 500 ft of Nonquit Pond and through the Tiverton Four Corners Historic District. The route would also pass adjacent to preserved woodland and agricultural land. Along this route, there are fifteen aboveground cultural resources located within the Project's PAPE, of which four are listed on the National Register.[2] The route would head north on Fish Road and then turns northwest on Souza Road. Both Fish Road and Souza Road are narrow two-lane roads without paved shoulders.

Souza Road turns into Schooner Drive, which is a steep access road to the dense residential Village at Mount Hope Bay and Boat House Waterfront Dining Restaurant. There are no other access roads to the restaurant, meaning that construction activities would impact not only the commercial operations at the Boat House but the residential Village at Mount Hope Bay, particularly if there is a road closure. Schooner Drive includes a bridge over an abandoned railroad right-of-way, which would require a trenchless installation method. Route ID 12 would re-enter the water from private property near where Mount Hope Bay and the Sakonnet River meet, north of the State Route 24 Bridge, shown in Figure 13.

This route would pass through Natural Heritage Areas 245, 219, 174, and 151 according to RIDEM and RIGIS mapping. Additional sensitive receptors would abut Route ID 12, including wetlands, parks, reserves, emergency and rescue services facilities, schools, and government facilities, such as:

- Sakonnet Point Marina
- Sakonnet Harbor Put In
- Town Landing Hiking Area
- Sakonnet Yacht Club
- Sakonnet Golf Course
- Wilbor House Museum
- John C Whitehead Preserve – Hope's Path
- Donovan Marsh
- Pachet Brook
- Borden Brook
- Amicable Church
- Audubon Emilie Ruecker Wildlife Reserve
- Pardon Gray Preserve and Trailhead
- West Place Animal Sanctuary
- Tiverton Town Farm Recreation Area
- Quaket Creek
- Pocasset Ridge Conservation Area
- Nanaquaket Pond
- White Wine Brook
- The Gathering Place Church
- Sin and Flesh Brook
- Tiverton Police Department
- Tiverton Public Works Department
- Fish Road Park and Ride Bus Station
- Village at Mount Hope Bay - Housing Development

Due to the extended duration of construction, use conflicts, potential for effects on the local economy, lack of sufficient space on small roads, and potential effects on sensitive environmental, historic, and cultural areas, this route was not selected.

[2] *BOEM Alternative C-1 and C-2 Cultural Resource Due Diligence Report*

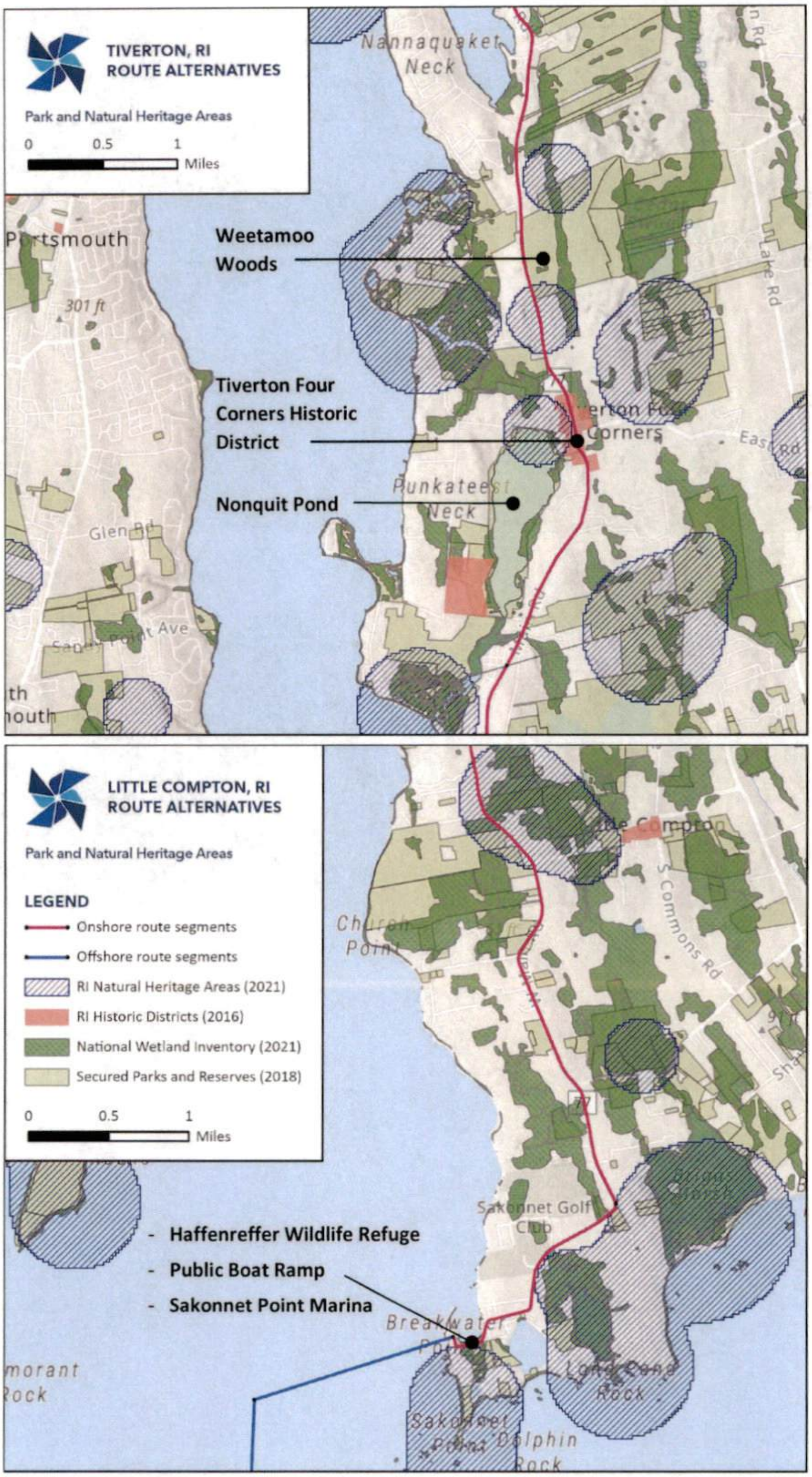


FIGURE 12. LITTLE COMPTON & TIVERTON PARKS, WETLANDS AND NATURAL HERITAGE AREAS (ROUTE ID 12)

FIGURE 13. SCHOONER DR, TIVERTON LANDFALL ALTERNATIVE

3.1.2.2 South Shore Beach, Rte. 81 (Route ID 13)

Route ID 13 would make landfall at the parking lot at South Shore Beach in Little Compton then travel via Route 81 to reach Schooner Drive in Tiverton (refer to Figure 14). This route would be 16.3 mi (26.3 km) long and pass through multiple residential areas. The routes identified through Little Compton and Tiverton represent longer intermediate onshore crossings with lower feasibility than those through Middletown and Portsmouth.

This route would pass through Natural Heritage Areas 226, 183, and 151 according to RIDEM and RIGIS mapping. Additional sensitive receptors would abut Route ID 13, including wetlands, parks, reserves, emergency and rescue services facilities, schools, and government facilities, such as:

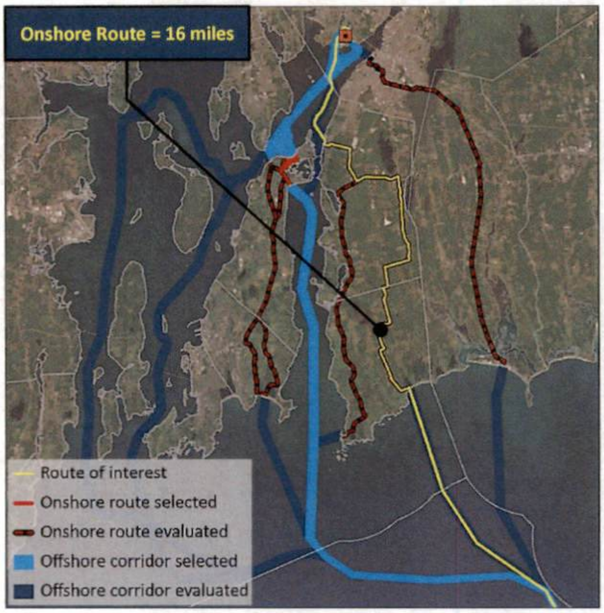


FIGURE 14. ROUTE ID 13 LOCUS

- Round Meadows Campground
- Tunipus Pond
- P. T. Marvell Preserve
- Goosewing Beach Preserve
- Henry Head Cemetery
- Sisson Brook
- Simmons Mill Management Area
- Little Compton Assistance Association – Food Distribution Center
- National Forest
- Victory Church RI, Inc
- Tiverton Public Library
- Community of Christ
- Town Farm Recreational Park
- Sin and Flesh Brook
- Tiverton Police Department
- Tiverton Public Works Department
- Fish Road Park and Ride Bus Station
- Sakonnet Early Learning Center
- Village at Mount Hope Bay Housing Development

Route ID 13 would make landfall in the parking area for South Shore Beach. An indicative landfall trajectory to South Shore Beach is shown in Figure 15. This is a low-lying area adjacent to Tunipus Pond and the P.T. Marvell Preserve, which is an ecosystem conservation area with walking trails for birding and wildlife observation. From landfall, the route would head west then northwest along South Shore Road.

This landfall and onshore route combination are not an ideal option for Project siting due to the proximity to conservation land and the narrow corridor of previously disturbed area. Project installation activities would necessitate full closure of South Shore Road and could bleed into shoulder areas. Road shoulders are narrow and often closely abutted by wetland vegetation or stone walls.

FIGURE 15. SOUTH SHORE BEACH, LITTLE COMPTON LANDFALL ALTERNATIVE (ROUTE ID 13)

From South Shore Road, the route would head north, crossing into Tiverton and periodically turning east toward Route 81. The roads through Little Compton and southern Tiverton are narrow, local two-lane roads without a paved shoulder that pass through multiple residential areas along this route. These local roads are frequently abutted by old stone walls, large trees with canopies overhanging the road, and overhead utility poles. The route would turn north onto Route 81 then west onto Route 177. Both Route 81 and Route 177 are busy two-lane roads. Route 81 has a wide paved shoulder. The route would head north on Fish Road and then turn northwest on Souza Road toward the Schooner Drive HDD site described with Route ID 12 and shown in Figure 13.

Due to the extended duration of construction, use conflicts, potential for effects on the local economy, lack of sufficient space on small roads, and potential effects on sensitive environmental, historic, and cultural areas, this route was not selected.

3.1.3 Massachusetts-Only Route Alternative (Route ID 14)

SouthCoast Wind evaluated an ECC from federal waters, through Buzzards Bay in Massachusetts to a landfall at Horseneck Beach, and an onshore export cable route through Westport and Fall River, Massachusetts (Route ID 14, refer to Figure 16).

The Westport onshore route alternative would commence with the offshore export cables making landfall at the Horseneck Beach parking lot in Westport via HDD. An indicative landfall trajectory to Horseneck Beach is shown in Figure 17. There are several restrictions to landing the export cables at the Horseneck Beach parking lot. Horseneck Beach is a high-energy, dynamic barrier system with mobile sediments. An extensive marsh system and the Westport River extend behind the barrier beach front (shown in Figure 18). The beach is also a popular seasonal recreation destination.

Once the export cables make landfall, the onshore export cables would continue underground onto John Reed Road and would need to cross Westport Harbor by HDD. Suspending the cables from the Norman Edward Fontaine Bridge was evaluated but was deemed infeasible. The bridge is a bascule bridge (also referred to as a drawbridge or a lifting bridge) that spans 75 ft (23 m) across the East Branch of the Westport River. Because the bridge is designed to open and close to accommodate vessels, it is not possible to suspend a continuous stretch of cable along the bridge deck. HDD is infeasible because there is no suitable place to land the cables on the north side of the Westport River. A landing at Westport Village was evaluated, but there is insufficient space, and this is a historical district with dense residential and commercial development (including a commercial fishing dock). In addition, Westport Harbor has extensive eelgrass and shellfish areas, which could not be avoided, as shown in Figure 18.

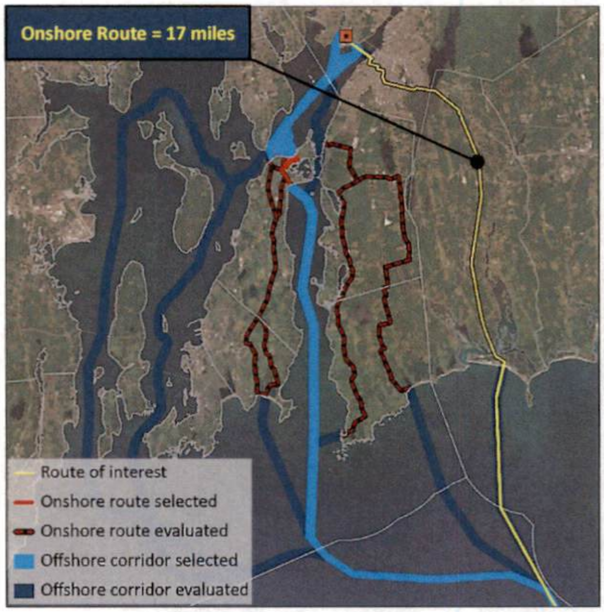


FIGURE 16. ROUTE ID 14 LOCUS

FIGURE 17. HORSENECK BEACH, WESTPORT LANDFALL ALTERNATIVE (ROUTE ID 14)

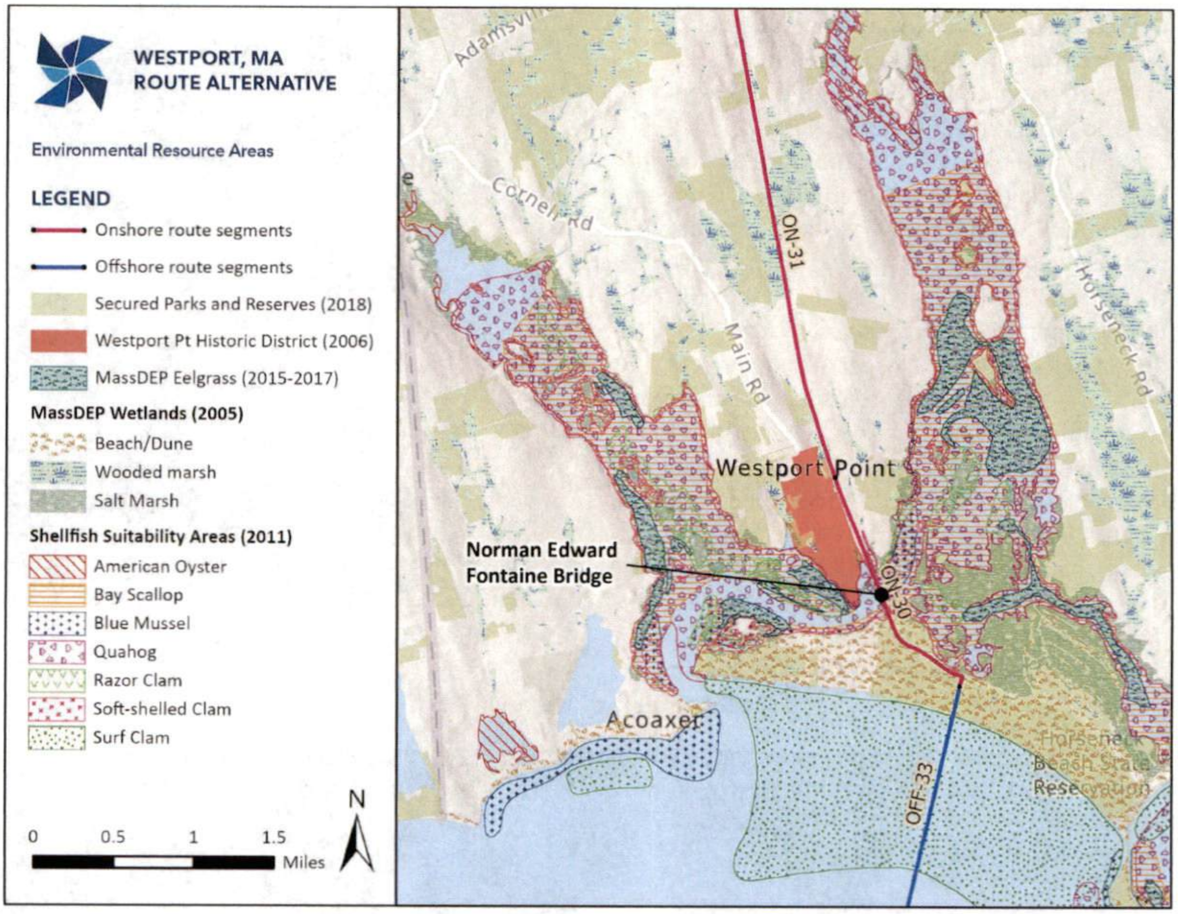


FIGURE 18. WESTPORT ENVIRONMENTAL RESOURCE AREAS (ROUTE ID 14)

Once on Route 88, the onshore export cable route would head north along Route 88 for approximately 12 mi (19 km) through Westport to the intersection with State Route 6. From Westport, Route 88 is a two-lane highway that eventually turns into four lanes as it approaches State Route 6. Large mature trees hang over the highway, and there would be a potential need for tree trimming or tree removal along the highway to accommodate construction. The onshore export cable route would then head in a westerly direction following State Route 6 for 1.2 mi (1.9 km) into the City of Fall River, where it would continue for 0.6 mi (1.0 km) to Brayton Avenue. The route would then merge onto Brayton Avenue in Fall River and continue west for approximately 1.5 mi (2.4 km). There are on- and off-ramps for State Route 24 located along Brayton Avenue, with high volumes of traffic that would require significant traffic management planning. The route would then head in a northwesterly direction following a network of Fall River municipal roadways including 0.3 mi (0.5 km) along Stafford Road, approximately 0.1 mi (0.2 km) along Plymouth Avenue, approximately 0.2 mi (0.3 km) along Second Street, approximately 0.3 mi (0.5 km) along Middle Street, 0.1 mi (0.2 km) along South Main Street, continue for 0.3 mi (0.5 km) following Bradford Avenue, merge onto Almond Street for 0.2 mi (0.3 km), and then ending at the Ferry Street parcel located one street crossing from the Taunton River.

Limiting the onshore routing to a minimal distance is preferred, as underground construction within public roadways can be disruptive and time consuming, and underground construction and materials are very costly. Any effects to sensitive environmental and cultural resources increase with increasing duration of a project. The same is true for socioeconomics, including any affected local businesses.

The potential intermediate site for the onshore export cables would be located at the intersection of Almond Street and Ferry Street in Fall River, Massachusetts. This segment of the route would require routing through densely populated city neighborhoods identified as environmental justice populations (see Figure 19). This segment also passes by other sensitive receptors including Saint Anne's Hospital, St. Anne's Shrine and a large recreational field at Kennedy Park, among others.

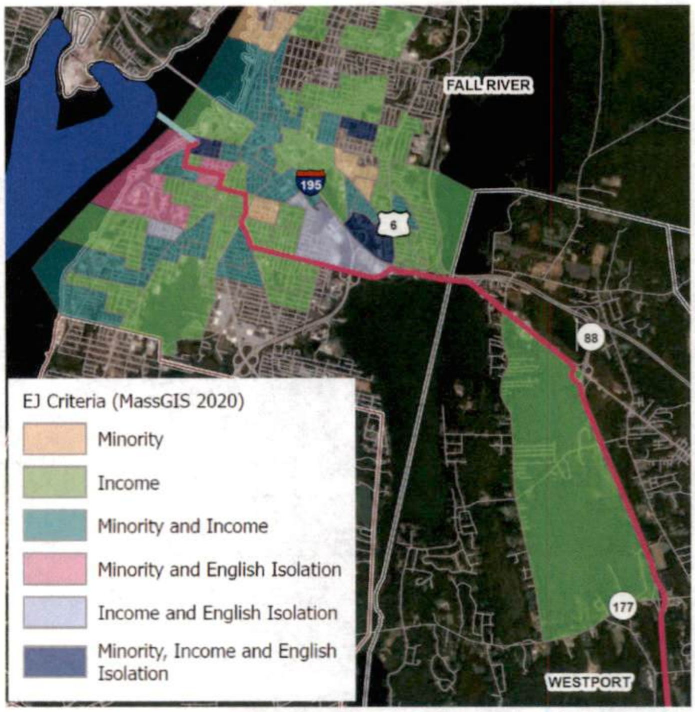


FIGURE 19. ENVIRONMENTAL JUSTICE POPULATIONS IN FALL RIVER & WESTPORT, MA (ROUTE ID 14)

As shown in Figure 20, a parcel on Ferry Street could serve as a potential HDD staging area to cross the Taunton River to make landfall at Brayton Point. The cables would need to pass from Fall River to Brayton Point via submarine cabling across the mouth of the Taunton River south of the Interstate Route 195 Braga Bridge. The submarine route across the Taunton River would cross a federal shipping/navigation channel and extend approximately 1.3 mi (2.1 km), which would overextend the length for a single continuous HDD. This would result in SouthCoast Wind implementing supplementary offshore cable installation techniques to bury the remainder of the export cables within the Taunton River beneath a federal shipping/navigation channel.

SouthCoast Wind determined that installing the cable system on the underside of the Braga Bridge to cross the Taunton River was infeasible due to Massachusetts Department of Transportation (MassDOT) requirements, bridge loading, and lack of adequate space underneath the bridge.[3]

This route alternative was dismissed due to a variety of engineering, construction, environmental, and other stakeholder concerns.

[3] According to the MassDOT Utility Accommodation Policy on State Highway ROW states, high-voltage electric power transmission line installations on bridge structures shall generally not be permitted except in extraordinary circumstances. Link Volume (mass.gov).

FIGURE 20. FERRY STREET, FALL RIVER LANDFALL ALTERNATIVE (ROUTE ID 14)

3.2 Export Cable Corridor Alternatives

The Brayton Point POI was selected for the Project due to its robust capacity for energy injection into the existing electrical grid and the opportunity to redevelop the previously disturbed area of the former coal-fired power station property. SouthCoast Wind considered three marine route alternatives that proceed from the Offshore Generation Facility to Brayton Point, discussed in detail in the following sections:

- Sakonnet River
- Narragansett Bay East Passage
- Narragansett Bay West Passage

A summary of the route alternatives evaluated by SouthCoast Wind (and corresponding Route ID) is presented in Table 1 and the Universe of Routes considered is shown on (Figure 1 and Figure 5-2 in Attachment 1).

As discussed in Section 2.1, identifying ECCs requires careful planning and route optimization. Considerations include offshore physical hazards (such as shipwrecks and other submerged cultural resources, unexploded ordnance, other existing and planned cables, and sea floor and subsurface obstructions), economic and recreational use areas (such as commercial or recreational fishing, recreational boating and tourism, and anchoring), and areas protected for biological, cultural, or historical purposes.

3.2.1 Sakonnet River Routes

3.2.1.1 Intermediate Crossing at Portsmouth (Selected Alternative)

As a result of the alternatives analysis screening process, SouthCoast Wind selected a proposed Project route that traverses approximately 5.3 mi (8.6 km) in Rhode Island Sound, approximately 11.0 mi (17.7 km) in the Sakonnet River, approximately 2.0 mi (3.2 km) underground, onshore in Portsmouth, and approximately 4.0 mi (6.4 km) in Mount Hope Bay (portion in Rhode Island state waters). The Selected Alternative is shown in Figure 21.

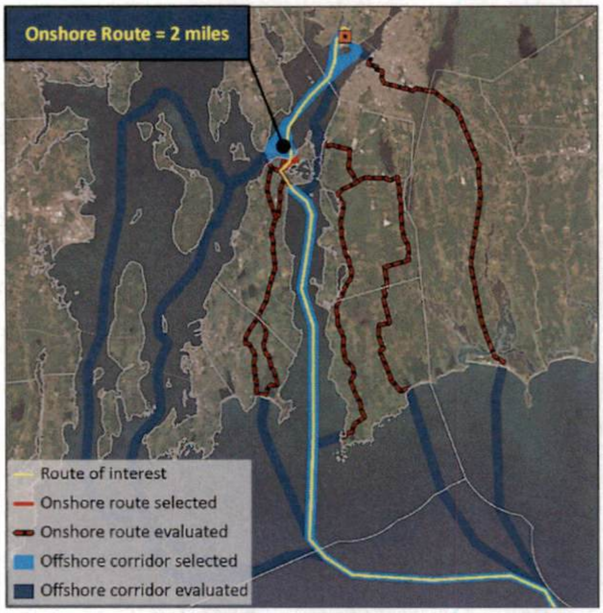


FIGURE 21. SELECTED ALTERNATIVE ROUTE LOCUS

The Selected Alternative avoids the constricted area in the Sakonnet River referred to as "The Hummocks" near the Stone Bridge, the former Sakonnet River Bridge, and the former railroad swing bridge. This route is the shortest overland route under Aquidneck Island that allows siting primarily along developed public ways and minimization of routing through residential areas. Limiting the onshore routing to a minimal distance is preferred, as underground construction within public roadways can be disruptive, time consuming, and underground construction and materials are very costly.

3.2.1.2 Sakonnet River North Route (Route ID 6)

Route ID 6 is an all-offshore/nearshore route from the Offshore Generation Facility to Brayton Point through the Sakonnet River, omitting any intermediate onshore crossings (refer to Figure 22), and proceeding north up the Sakonnet River through the Hummocks. The Hummocks consists of a ridge on the northeastern shore of Portsmouth between the Sakonnet River Bridge and the former Escape Road Bridge between Portsmouth and Tiverton.

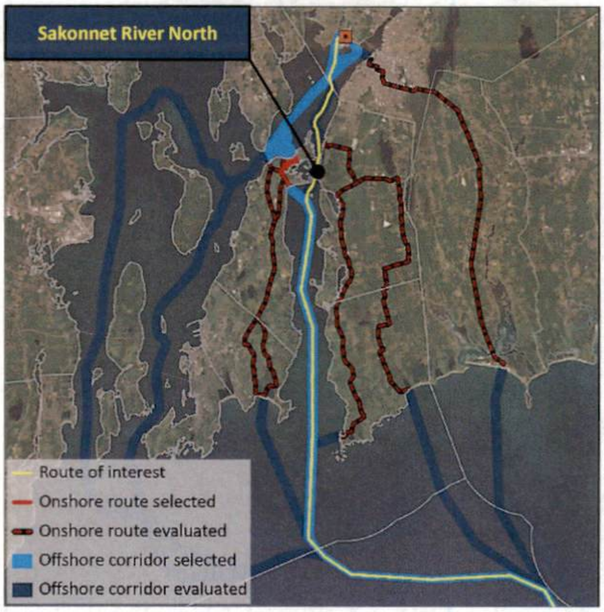


FIGURE 22. ROUTE ID 6 LOCUS

The approximate length of Route ID 6 would be 113.2 mi (182.2 km) offshore. Of the offshore length, 20.7 mi (33.3 km) would be in Rhode Island state waters.

There would be significant constraints and physical obstacles posed by this northern Sakonnet River route option. These include a narrow river channel with strong and swift currents and submerged obstacles and debris; the Stone Bridge located between Teddy's Beach in Portsmouth and Grinnell's Beach in Tiverton; a high volume of recreational moorings; two charted submarine cable/pipeline crossing areas; crossing under the Sakonnet River Bridge (Routes 138 and 24); traversing around the concrete abutments which supported the former Sakonnet River Bridge; and maneuvering through the ruins charted on the National Oceanic and Atmospheric Administration (NOAA) nautical chart which are remnants from the removal of the Sakonnet River rail swing bridge last owned and operated by the Providence and Worcester Railroad.

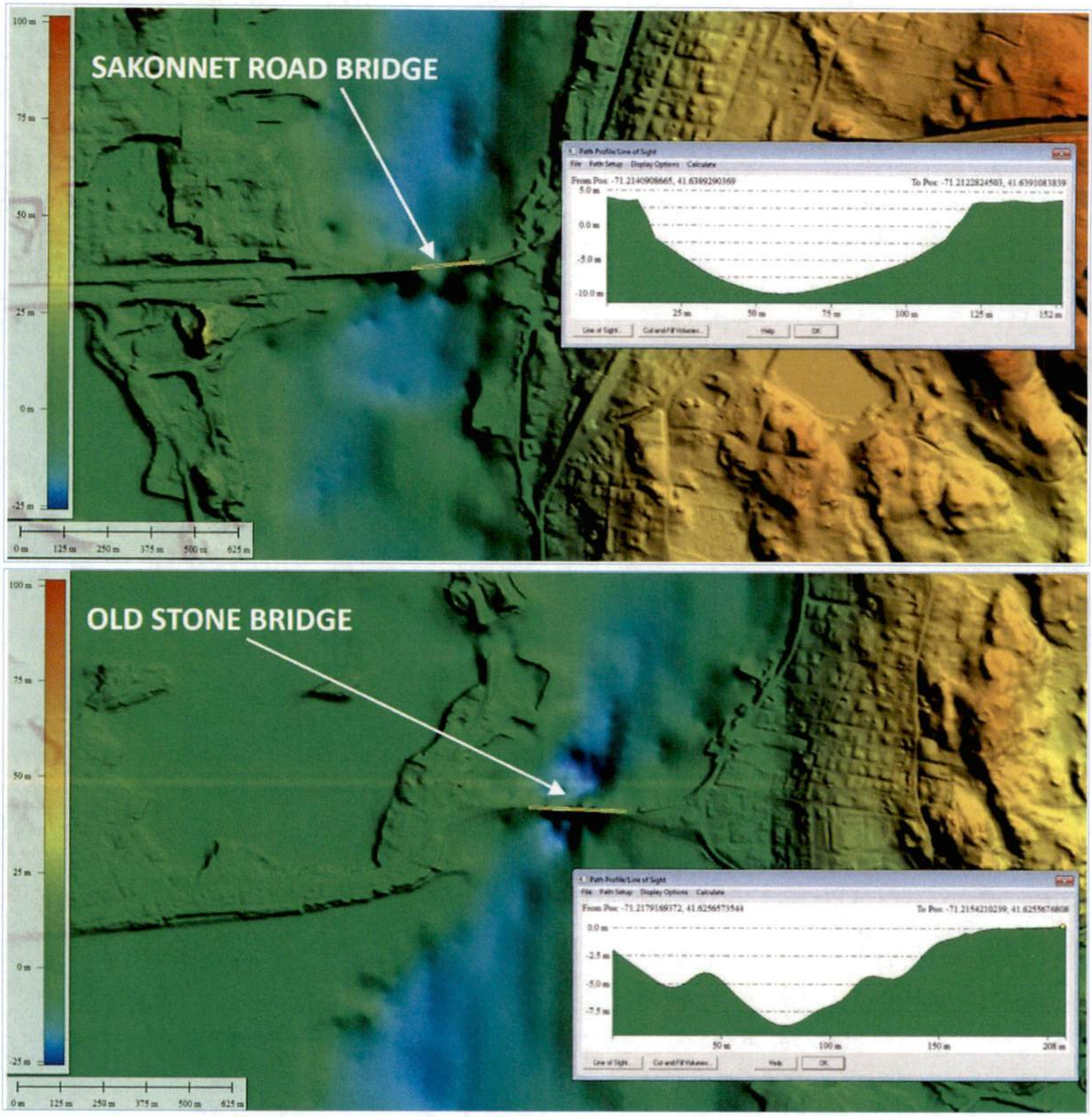


FIGURE 23. SAKONNET RIVER BATHYMETRY AT BRIDGE CONSTRICTIONS (2014/2015 NOAA/PUBLIC DATA)

This highly constrained portion of Route ID 6 contains rock and debris, including remains of the aforementioned former railroad bridge of Route ID 6. This area of the route also features heavily scoured seabed and strong currents. In addition to posing a risk to safe installation (which would likely also be disruptive to marine stakeholders detailed above), these characteristics are not suitable for burying cables to suitable depth and maintaining that burial depth, or for maintaining secondary cable protection on top of the cables (which may include placement of rock and/or mattresses). The strong and concentrated tidal currents within The Hummocks area of the Sakonnet River could potentially expose the buried cables by eroding away the sediment cover over the cables, undermining the cables and creating a section of cable that is "suspended" above the seabed, and/or displacing secondary cable protection material. As a result, the cables would be at risk of becoming exposed and may require regular and disruptive maintenance to re-establish cable cover and protection over the operational life of the cables.

Route ID 6 was deselected from further consideration as a route for the offshore export cables due to the technical complexity, potential marine stakeholder interactions (e.g., recreational moorings; this area of the route experiences significant transit and mooring by recreational vessels), and hazards to safe, practical, and long-term cable installation, maintenance, and operation associated with routing the cables through the constricted area as described above.

3.2.2 Narragansett Bay East Passage Route (Route ID 7)

Route ID 7 would travel from the Offshore Generation Facility through the East Passage of Narragansett Bay and into Mount Hope Bay to reach Brayton Point (refer to Figure 24). The ECC in the East Passage would be aligned to the west of Rose Island, Gould Island and Dyer Island, and to the east of Spar Island. Constraints and physical obstacles that would be encountered would include:

- Relatively longer traverse through RI waters
- Crossing ten charted submarine cable/pipeline crossings and
- Use conflicts, including traversing areas with Navy restrictions, heavily used navigational channels, and Newport Harbor (heavily used recreational area)
- Crossing through a portion of a designated offshore disposal area before crossing under the Mount Hope Bridge (Route 114) into Mount Hope Bay, as depicted on the NOAA Nautical Chart.[4]
- Challenging seabed conditions and relatively longer traverse through RI areas with high potential for moraine Areas of Potential Concern (ACP)[5]
- Crossing the recreational boating Areas of Potential Concern

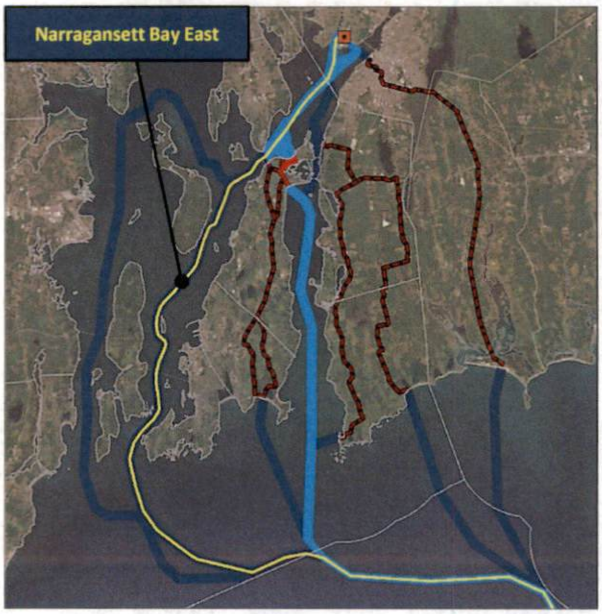


FIGURE 24. ROUTE ID 7 LOCUS

The approximate length of Route ID 7 would be 122.9 mi (197.8 km) offshore. Of the offshore length, 30.4 mi (48.9 km) would be in Rhode Island state waters. Route ID 7 was deselected due primarily to the potential conflicts with other marine stakeholders, including the United States (U.S.) Navy, which has a

[4] NOAA National Ocean Service Coast Survey. 2019. Chart 13221 Narragansett Bay, 63rd edition. https://charts.noaa.gov/PDFs/13221.pdf. June 2019.

[5] Areas of Potential Concern (ACPs) are identified and regulated by Rhode Island Coast Resources Management Council (RI CRMC) under the Ocean Special Area Management Plan (SAMP)

significant presence (U.S. Naval Station, U.S. Naval War College, Surface Warfare Officer School) and operations within the waters surrounding Newport (which would be traversed by this export cable route alternative), and are designated as restricted areas, regulated navigation areas, and naval anchorage. SouthCoast Wind engaged with the U.S. Navy during route planning stages to discuss route options under consideration. During this meeting, SouthCoast Wind was advised that the U.S. Navy would have conflicts with a route traversing the East Passage of Narragansett Bay (such as the Narragansett Bay East Passage Route [Route ID 7]) but would not have conflicts with the Selected Alternative.

Additionally, the area traversed by Route ID 7 is a commonly used navigational route that passes under the Claiborne Pell/Newport Bridge (Route 138) to Rhode Island Sound and contains numerous charted anchorages. The East Passage channel has a depth of approximately 60 ft and is used by all deep draft vessels and most tug and barge traffic entering and departing Narragansett Bay.[6] Newport Harbor and the federally established and maintained anchorage area nearby also receive significant marine traffic.[7] Because of these conflicts with navigation and other maritime uses, SouthCoast Wind deselected the East Passage as a feasible alternative for routing an ECC.

3.2.3 Narragansett Bay West Passage Route (Route ID 8)

Route ID 8 would travel from the Offshore Generation Facility through the West Passage of Narragansett Bay, then head east near Patience Island, ultimately reaching Brayton Point through Mount Hope Bay (refer to Figure 25). The approximate length of Route ID 8 would be 134.4 mi (216.3 km). Of the offshore length, 41.9 mi (67.4 km) would be in Rhode Island state waters. An ECC in the West Passage would be aligned to the west of Dutch Island, cross under the Jamestown Verrazzano Bridge (Route 138), to the east of the Plum Beach Light House, travel west of Hope Island, proceed to the north of Patience Island and Prudence Island, and then head southwesterly around Hog Island to the Mount Hope Bridge.

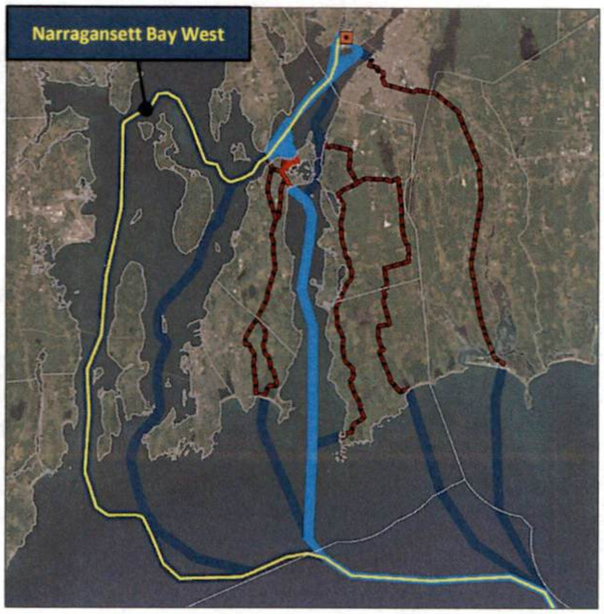


FIGURE 25. ROUTE ID 8 LOCUS

Route ID 8 was dismissed from further consideration due to a number of factors including:

- This is the longest route through RI waters evaluated – resulting in potential for impacts to sensitive resources and other ocean users from increased area occupied during construction and time to complete construction

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[6] Rhode Island Coastal Resources Management Council (RI CRMC). 2010. Ocean Special Area Management Plan Chapter 7 Marine Transportation, Navigation and Infrastructure. July 23, 2010. http://www.crmc.ri.gov/samp_ocean/archive/700_marinetrans__7_23_fullsamp.pdf.

[7] RI CRMC. n.d. "Maps of Water Use Categories." http://www.crmc.ri.gov/maps/maps_wateruse.html. Accessed April 23, 2022.

- Crossing of the federally maintained 40-ft (12-m) navigation channel to Providence, regulated navigation areas
- Challenging seabed conditions and relatively longer traverse through areas with high potential for moraine ACP
- Crossing the recreational boating ACP
- Known unexploded ordnance areas recently identified in the lower West Passage of Narragansett Bay

Route ID 8 would involve crossing of several more existing cables/pipelines than the Selected Alternative. Route ID 8 would require crossing of six charted cable areas and one charted cable and pipeline area, while the Selected Alternative only crosses two charted pipeline areas (three crossings; see Table 4-2). At each cable crossing, secondary cable protection (in the form of mattresses and/or rock placement) is required, so the Roue ID 8 results in greater permanent seabed impacts in this way.

Route ID 8 would involve routing cables under multiple bridges, including the Jamestown Verrazzano Bridge which the proposed/planned Revolution Wind export cables are also planned to traverse beneath. In addition to proposing general cable routing hazards (i.e., due to scour, seabed debris, and old foundations), the Jamestown Verrazzano Bridge specifically would present a significant cable spacing bottleneck if multiple sets of planned cables were to be installed, resulting in challenges (including risk of cable damage) during cable installation and operations.

Other key constraints and physical obstacles that would be encountered by the route up the West Passage include the risks associated with burying and maintaining the offshore export cables within regulated navigation areas and anchorage areas, installing the cables within multiple shellfish management areas, and the requirement to cross through the Narragansett Bay National Estuarine Research Reserve surrounding Patience Island.

For these reasons, including feedback received from key stakeholders, conflicts with navigation and sensitive marine habitats, SouthCoast Wind deselected the West Passage as a feasible alternative for routing an ECC.

4 Construction Considerations

4.1 Schedule Comparison

The Project schedule for the both the planning/development and construction phases were considered in the route alternatives assessment. The planning/development phase would include field surveys, community engagement and coordination, permitting, and site control. Of particular concern would be coordination with local communities, engagement with and responding to concerns of local stakeholders, and acquiring necessary real estate easements. In terms of environmental and socioeconomic impacts, the longer the duration of construction activities, the higher potential for impacts, and installing cable onshore takes longer than in water.

The overland route alternatives presented in Section 3.1 would require longer construction duration due to the complexity of working in developed areas with local abutters, traffic, and existing infrastructure to navigate. The estimated rate of installation for the onshore export cable duct bank is approximately 50 – 100 ft per day, depending on the number of active crews, available workspace, and the extent of existing underground utility congestion. Offshore cable installation would progress substantially faster, at a rate of up to 1 mile per day for installation of one cable bundle under typical conditions.[8]

The overland route alternatives pass through coastal communities that are popular tourist destinations, particularly in the summer months. Constructing exclusively in the off-season (Labor Day to Memorial Day) could be a requirement of any community agreement. In-water construction will also have seasonal construction limitations due to use conflicts and environmental considerations, but because of the quicker progression of cable installation in water, multiple construction seasons are likely not required. The combination of slower rate of progress and seasonal restrictions would result in a significantly longer construction period for onshore cable runs (i.e., additional years), potentially resulting in increased environmental impacts, negatively affecting the host communities and delaying delivery of much-needed renewable energy to the region.

4.2 Onshore Underground vs. Onshore Overhead Construction

Electric utility companies typically favor installing new transmission lines overhead, either within existing utility right-of-way corridors or alongside roads. If there is space within the existing utility right-of-way corridor, this approach is more cost-effective, and the construction is often considered less disruptive to host communities than work within roadway. Although onshore underground construction has some challenges, SouthCoast Wind has determined that it is the most appropriate solution for the onshore selected route alternative crossing approximately two miles of Portsmouth, Rhode Island.

SouthCoast Wind does not propose to use overhead transmission for the Project's export cable system, for the reasons discussed below.

4.2.1 Need for Additional Infrastructure at Landing

The transition from underground (or submarine) cable to overhead line would require a transition station. The transition station would contain the cable terminations, disconnect and ground switches, cable monitoring, and other high voltage components. It is expected that each transition station would require a parcel of at least 0.9 acres for the equipment noted above.

4.2.2 Overhead Support Structures and Right-of-Way Requirements

The support structures required for HVDC transmission lines are substantial, ranging from approximately 80 ft to 120 ft in height. These structures require a clear right-of-way that is 100 ft to 150 ft in width. Attachment 2 to this report shows two conceptual overhead line and tower configurations. The right-of-way shown on the drawings needs to remain clear of permanent structures and vegetation more than 10 ft tall within the right-of-way limits. This "clear area" is for line maintenance, reliability, and safety reasons.

Visual and viewshed impacts are important concerns for these structures, as is finding available right-of-way space. The South Coast communities where the Project could make landfall have strong historic character and a high-density of preservation areas. Establishing a right-of-way corridor that meets the requirements of an HVDC overhead system is not viable. As such, no overhead transmission lines are currently envisioned for the Project.

[8] Soil conditions encountered and the magnitude of required pre- and post-installation works (including any remedial burial and secondary protection) may extend the overall offshore cable installation time.

5 Summary of Selected Alternative And Conclusions

SouthCoast Wind evaluated multiple alternatives for both offshore and onshore components of the Project. The Brayton Point POI was selected for the Project due to its robust capacity for energy injection into the existing electrical grid and the opportunity to revitalize the brownfield site and use it for clean energy purposes. SouthCoast Wind performed a routing analysis to best connect the Offshore Generation Facility to the Brayton Point POI. Longer onshore crossings of Rhode Island and Massachusetts (through Middletown, Portsmouth, Little Compton, Tiverton, and Westport) as well as offshore routes through the East Passage and West Passage of Narragansett Bay and through the Sakonnet River with no intermediate crossing were deselected and later dismissed due to a variety of engineering, construction, environmental, and other concerns and impacts.

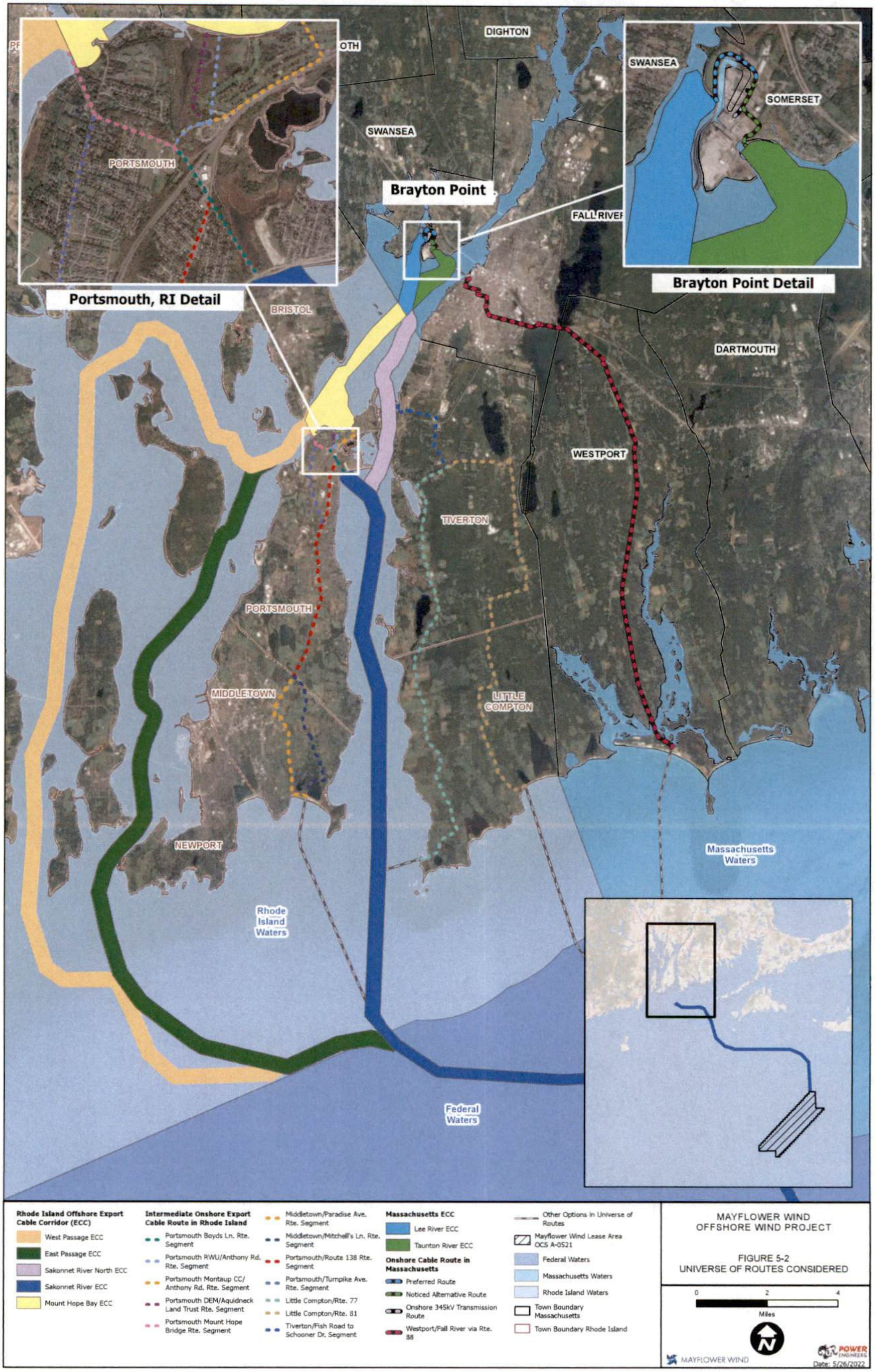
As a result of the alternatives analysis screening process, SouthCoast Wind selected the following proposed route:

- ECC routed north up the Sakonnet River with an intermediate onshore landfall and underground crossing of Portsmouth.
- Landfall in Portsmouth for the intermediate underground crossing of Aquidneck Island using HDD installation methods.
- Approximately 2.0 mi (3.4 km) of onshore, underground export cable route in Portsmouth from the intersection of Boyds Lane and Park Avenue running north on Boyds Lane and turning east on Anthony Road, re-entering the water via HDD installation methods.
- ECC routed through Mount Hope Bay from Rhode Island State waters to Massachusetts State waters.
- Final landfall from Mount Hope Bay to Brayton Point and interconnection to the POI at Brayton Point in Somerset, Massachusetts.
- POI at the existing Brayton Point onshore 345-kilovolt substation, and new HVDC converter station to be constructed at Brayton Point.

Based on the analysis performed, SouthCoast Wind undertook a thorough route selection process for both offshore and onshore components of the Project to evaluate the environmental impacts, social impacts, costs, and long-term maintainability to deliver energy from the Offshore Generation Facility to the regional transmission system at Brayton Point. SouthCoast Wind has determined the Selected Alternative would result in the least impacts to the social and natural environment and would allow for safe, practical, and long-term cable installation, maintenance, and operation as compared to the alternatives considered. Construction of the Project, as proposed, will provide access to a major renewable clean energy resource and will not cause unacceptable harm to the environment.

ATTACHMENT 1

UNIVERSE OF ROUTES CONSIDERED (FIGURE 5-2)

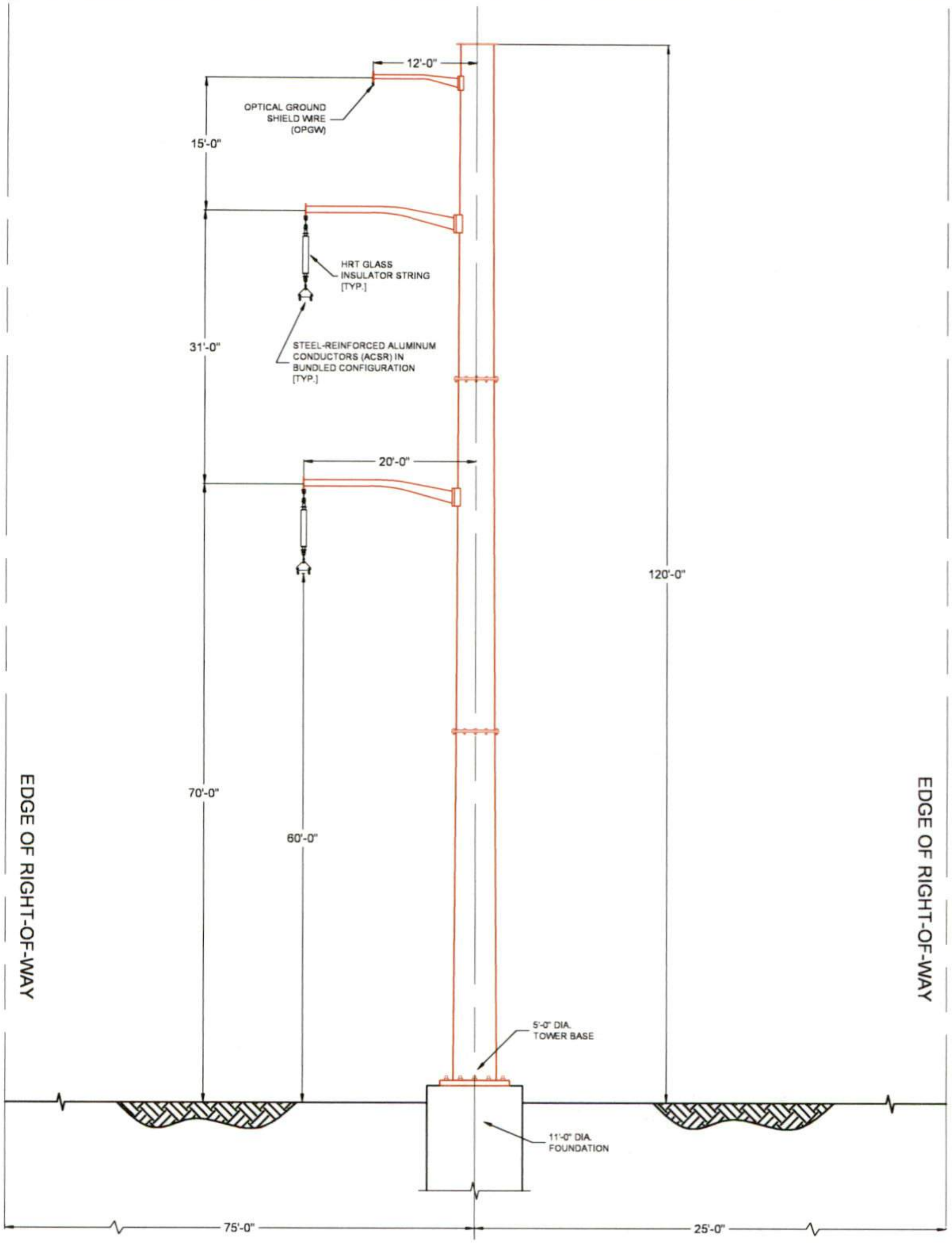


MAYFLOWER WIND
OFFSHORE WIND PROJECT

FIGURE 5-2
UNIVERSE OF ROUTES CONSIDERED

Date: 5/26/2022

ATTACHMENT 2
INDICATIVE HVDC OVERHEAD STRUCTURES



COMPACT TOWER DESIGN

SCALE: NONE

NOTES:

1. PROPOSED STRUCTURE CONFIGURATION, R.O.W. WIDTH, AND DIMENSIONS ARE CONSIDERED 'INDICATIVE' AND ARE SUBJECT TO CHANGE DURING DETAILED ENGINEERING.
2. PROPOSED DESIGN IS BASED ON 'GOOD UTILITY PRACTICE' AND OTHER APPLICABLE REQUIREMENTS

PSC

CONCEPTUAL
HIGH VOLTAGE DIRECT CURRENT
OVERHEAD LINE

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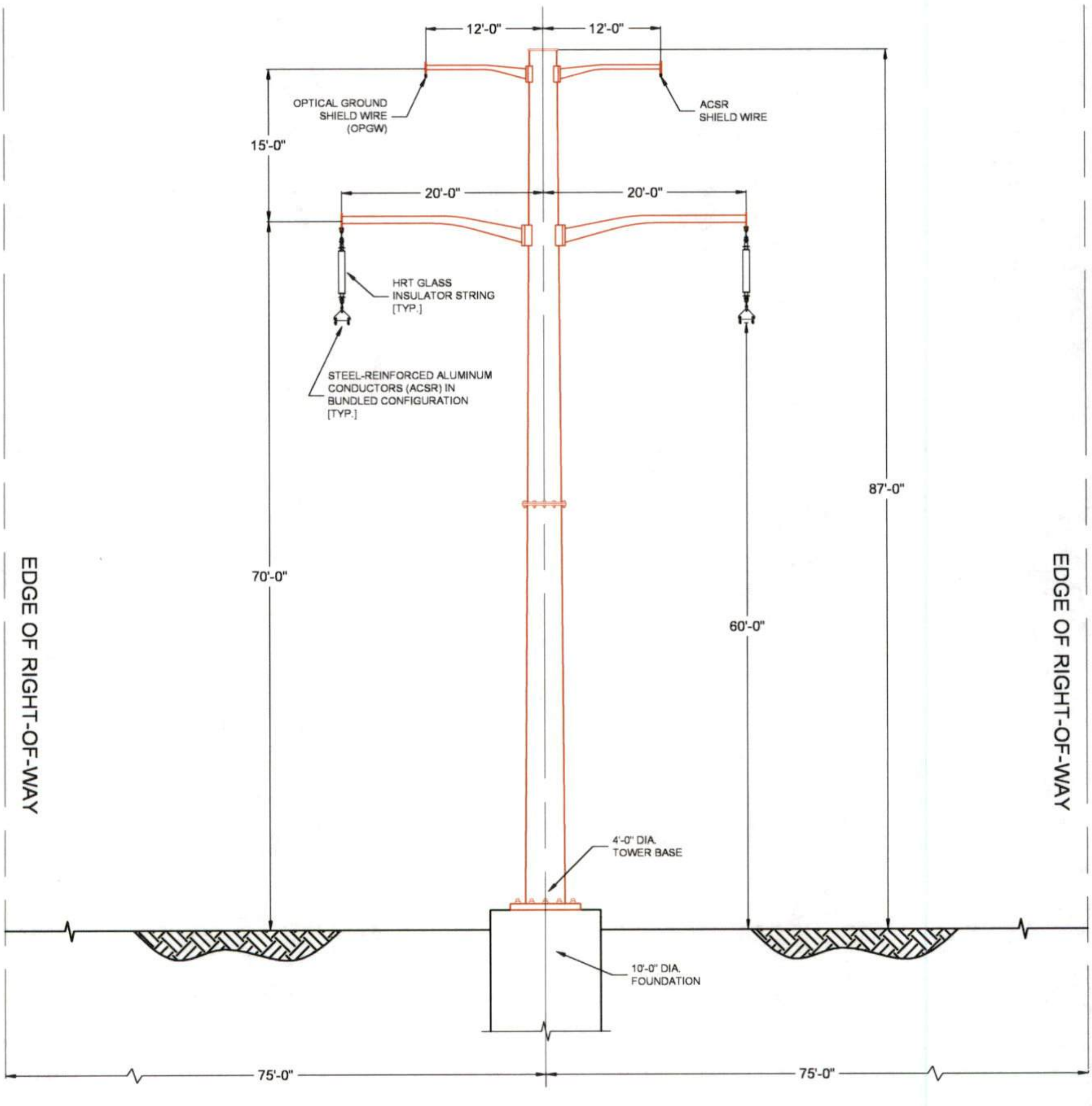

STANDARD TOWER DESIGN

SCALE: NONE

-
-

NOTES:
1. PROPOSED STRUCTURE CONFIGURATION, R.O.W. WIDTH, AND DIMENSIONS ARE CONSIDERED 'INDICATIVE' AND ARE SUBJECT TO CHANGE DURING DETAILED ENGINEERING.
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PSC

CONCEPTUAL
HIGH VOLTAGE DIRECT CURRENT
OVERHEAD LINE

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SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment C-1: Offshore Export Cable Engineering Drawings

Revised: February 2023

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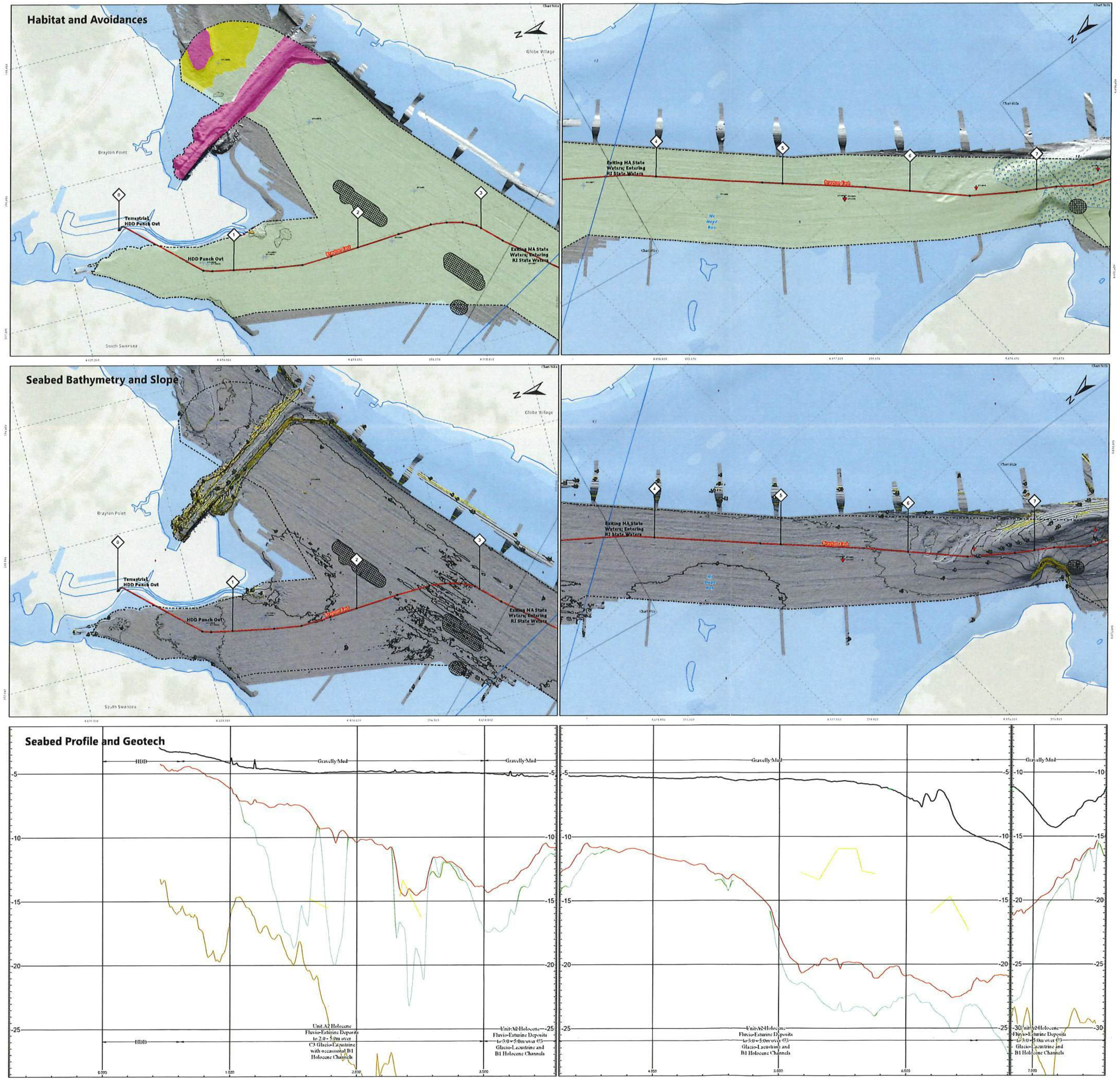

SOUTHCOAST WIND

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OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 0.000 TO 7.588

2022 — Chart No. 001c - 019c

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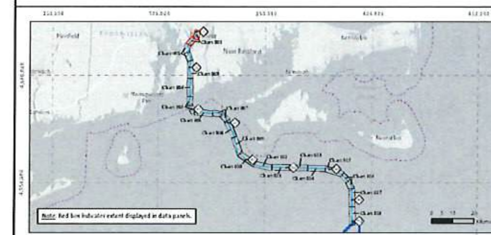
Boston, Massachusetts
Tel: +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
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SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

Scale 1:10,000

0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
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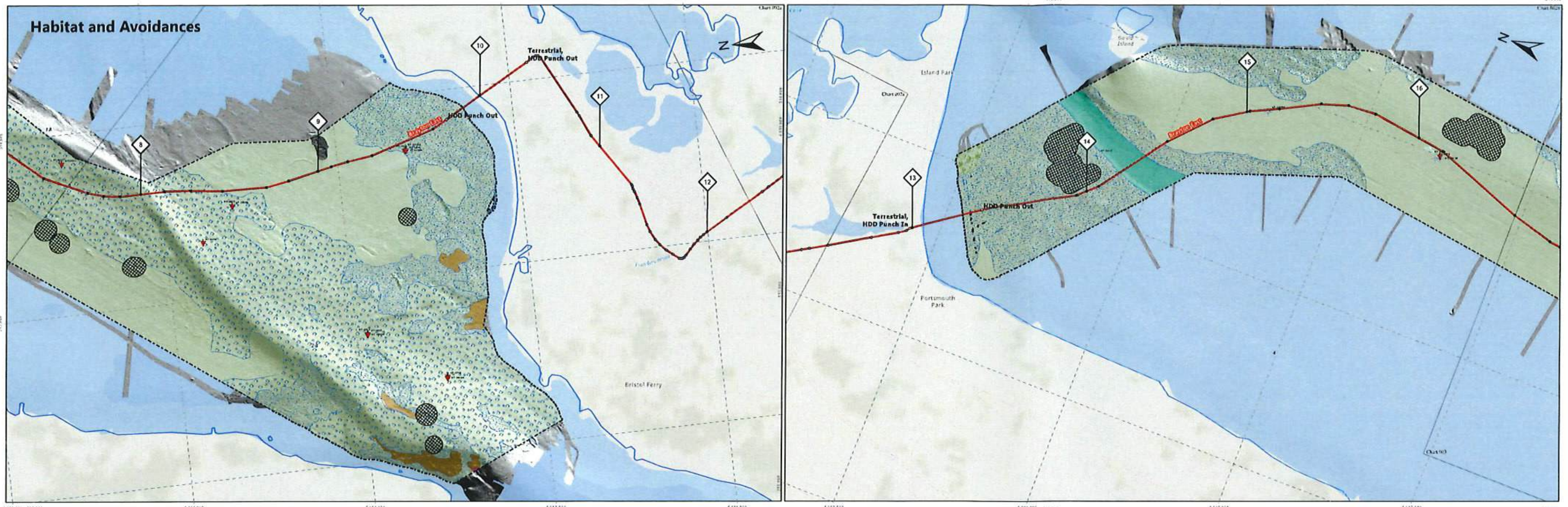
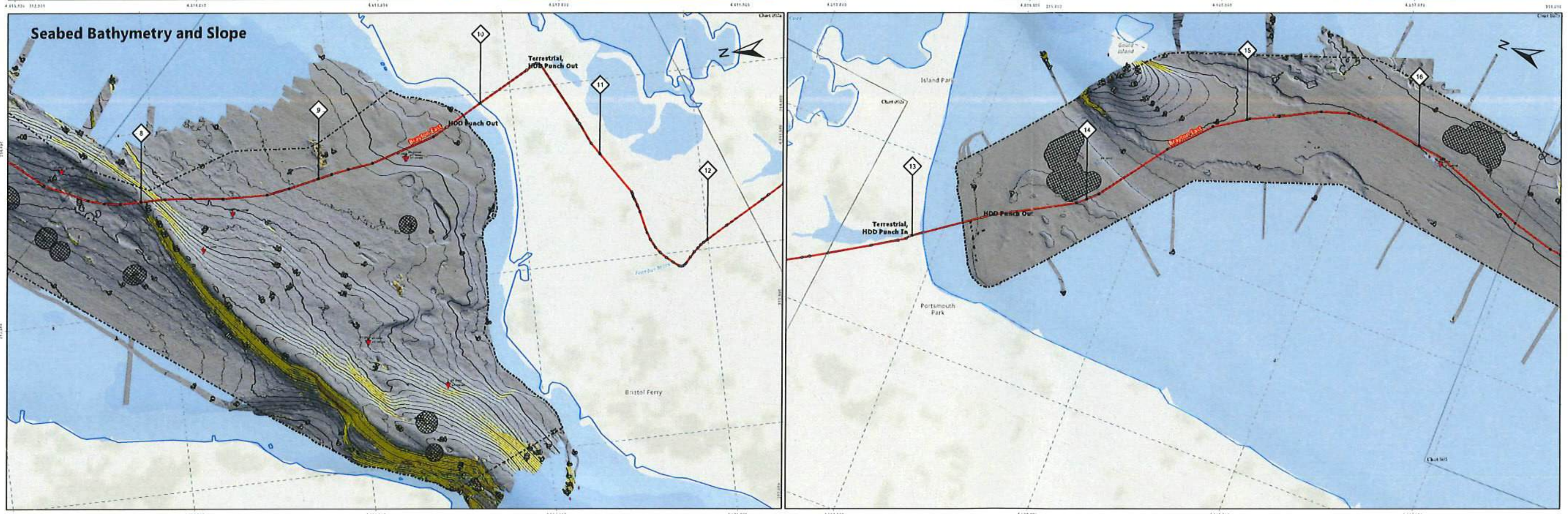
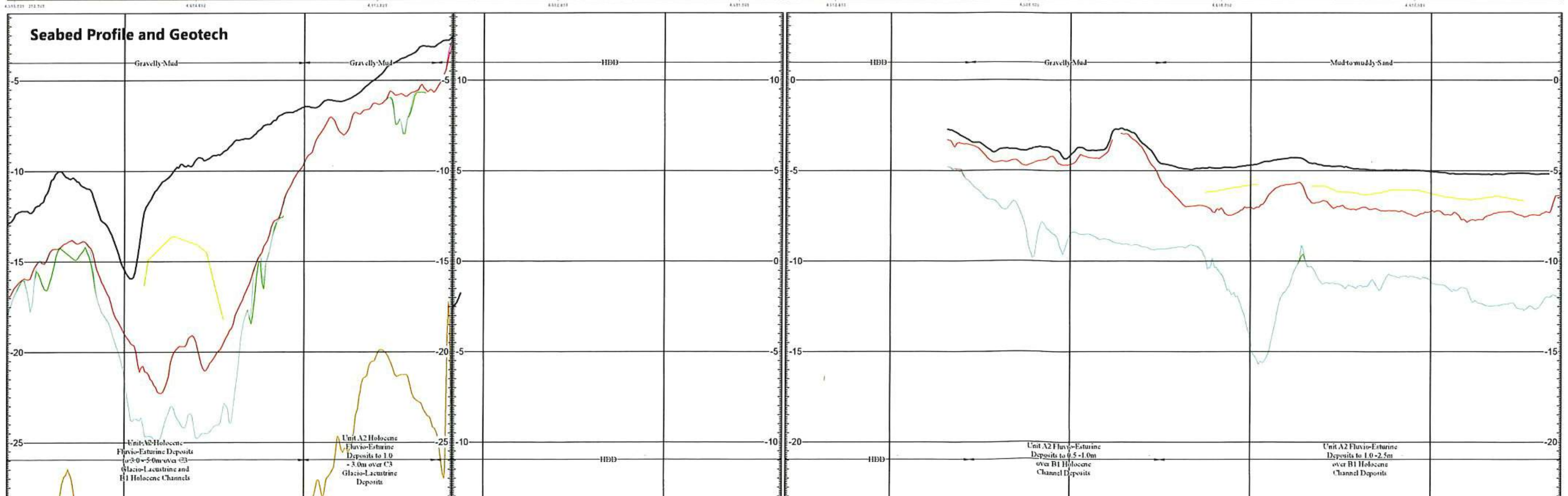
Project No: 2022 - 529 — Chart No: 001c - 018c







SOUTHCOAST WIND

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OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 7.199 TO 17.000

2022 — Chart No. 002c - 019c

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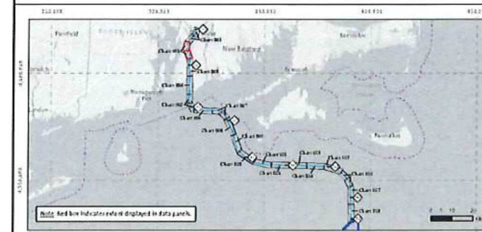
Tel. +1 857-263-1772

XODUS



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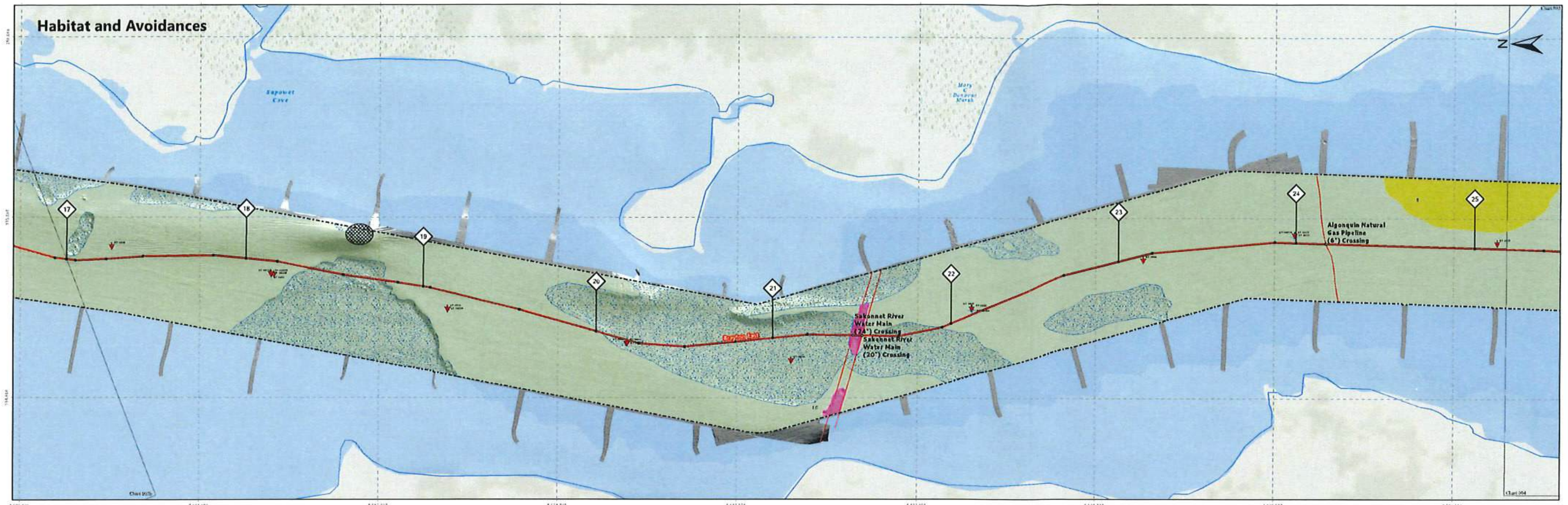
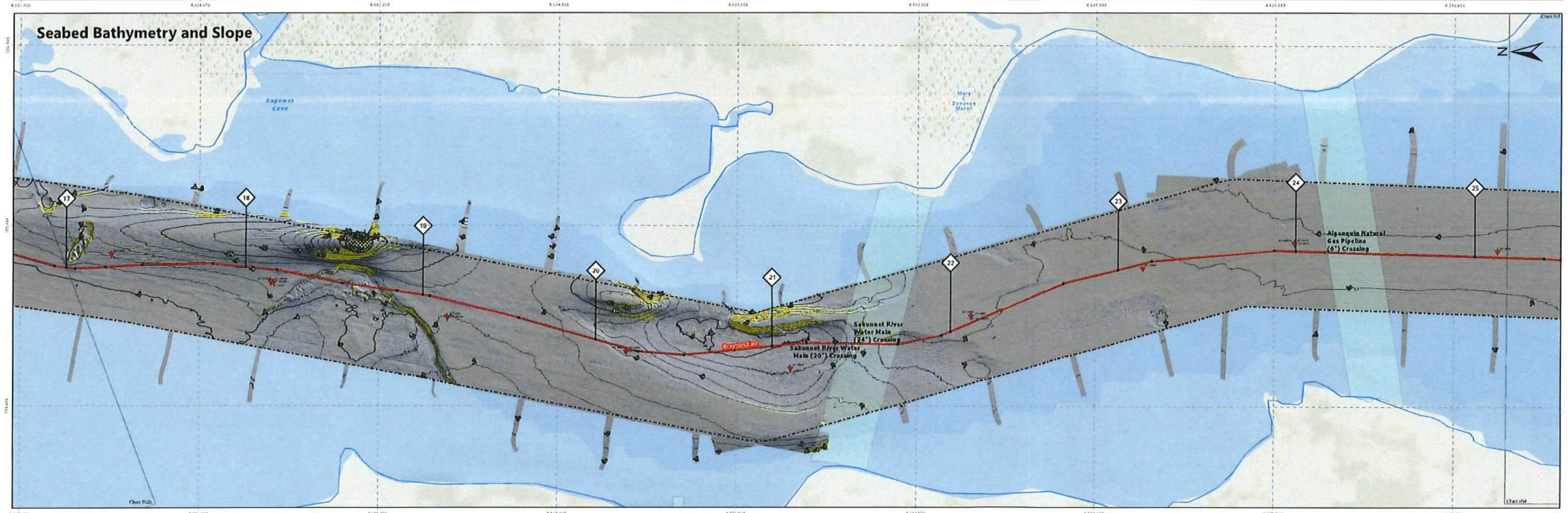
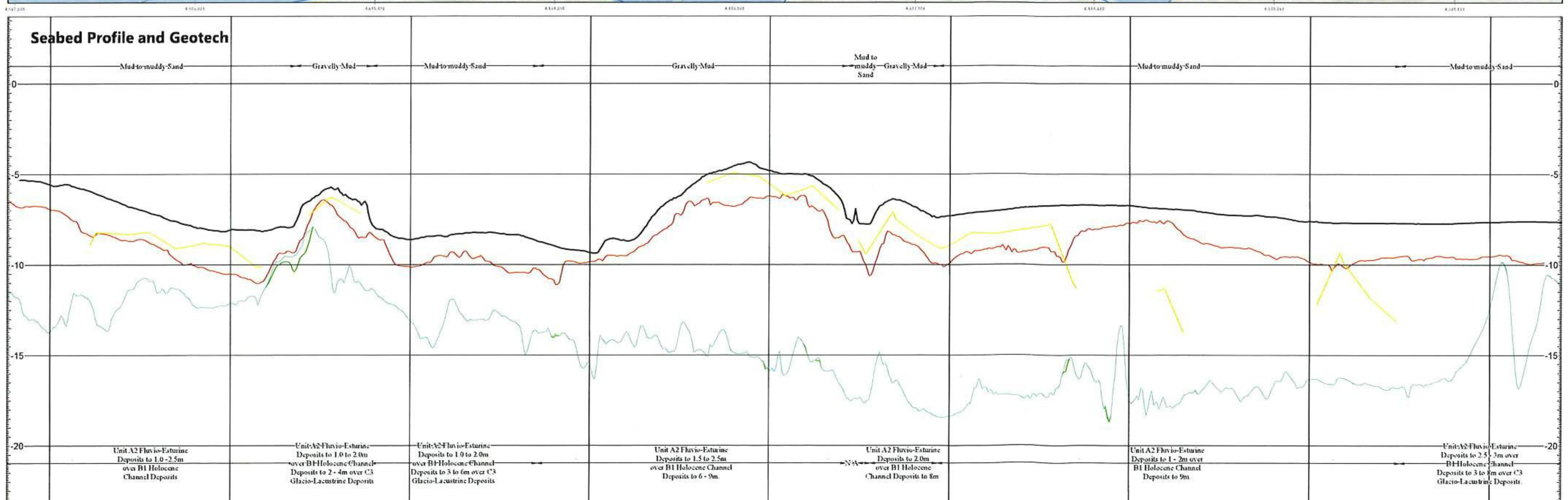
REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529 — Chart No: 002c - 018c







SOUTHCOAST WIND

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OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 16.693 TO 25.480

2022 — Chart No. 003c - 018c

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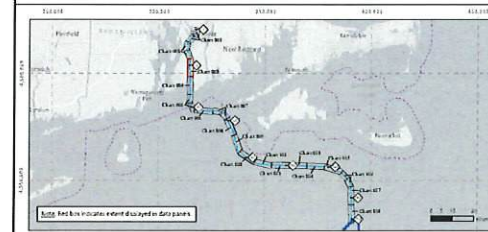

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- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES

SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

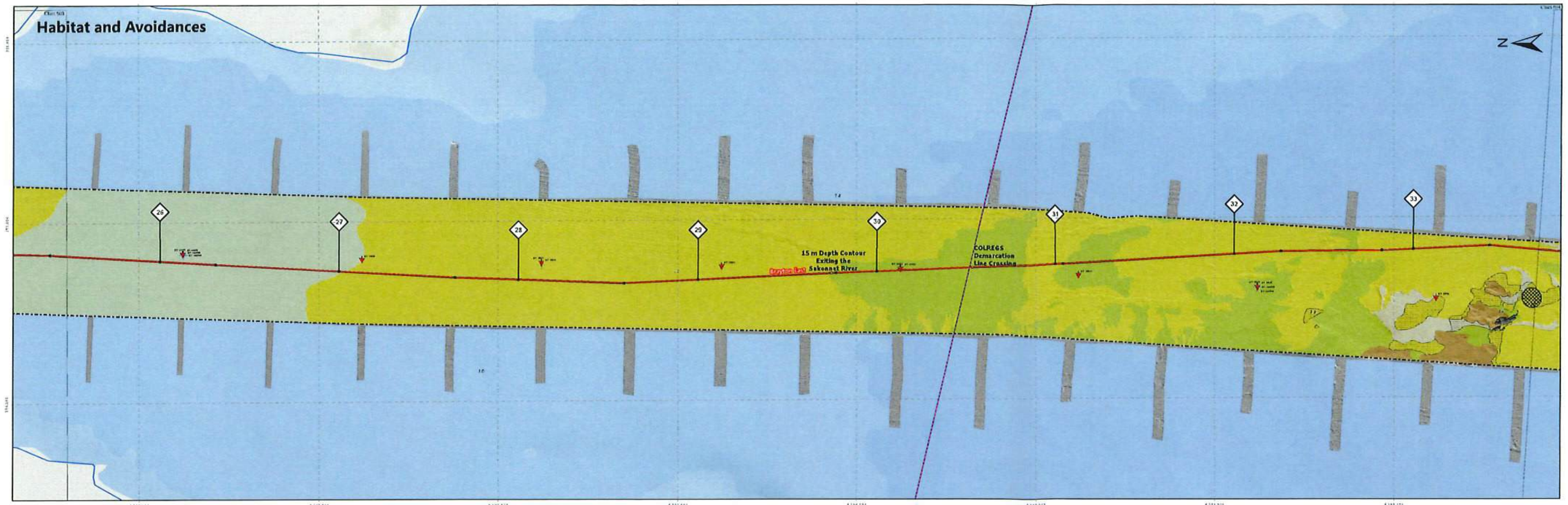
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

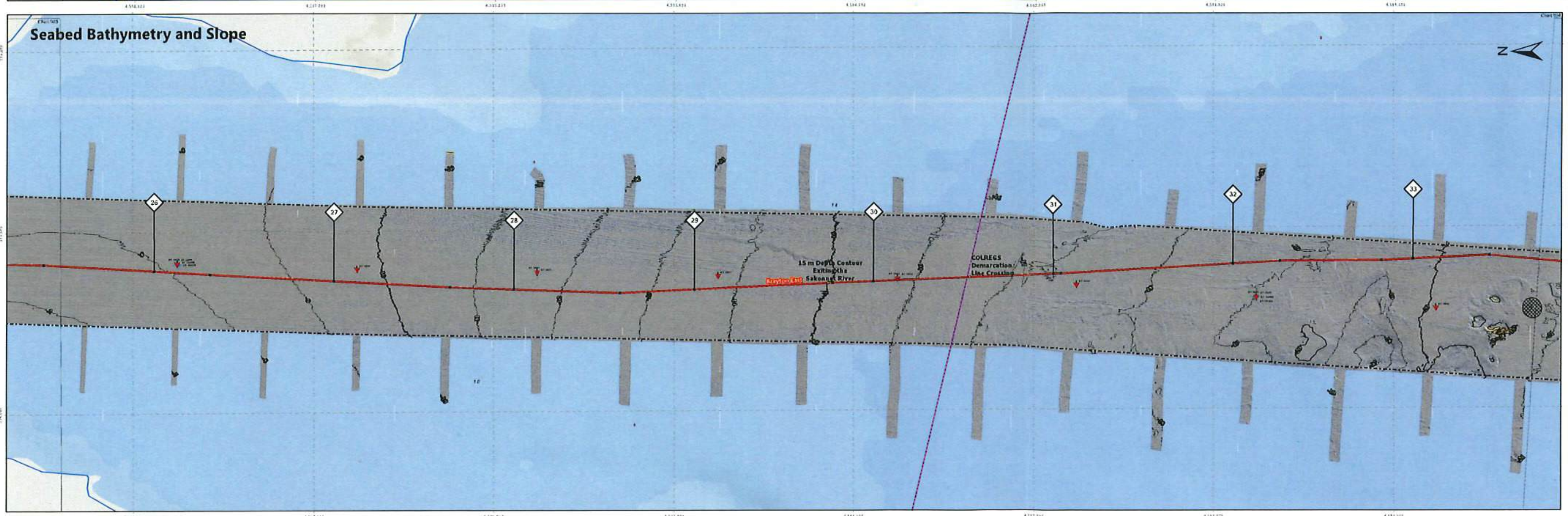
Scale 1:10,000

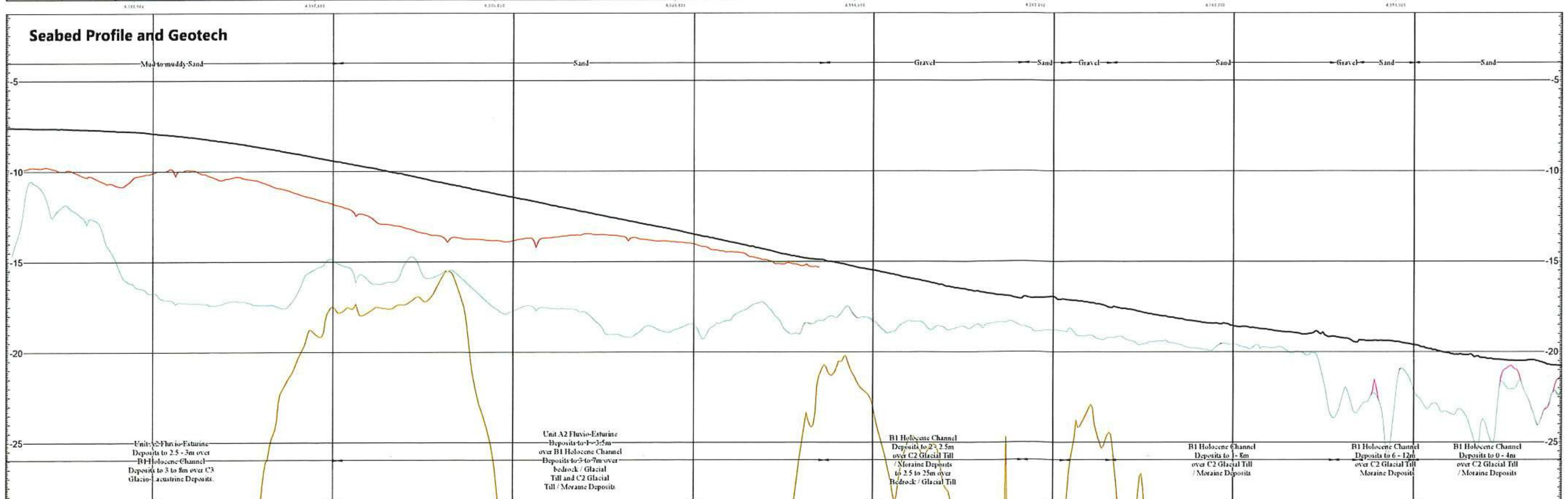
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529 — Chart No: 003c - 018c







SOUTHCOAST WIND

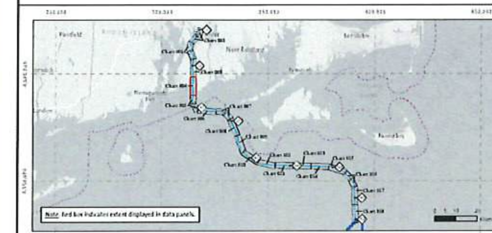
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 25.180 TO 33.827

2022 — Chart No: 004c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel: +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
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SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

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EPSG: 26919
Projection: Transverse Mercator
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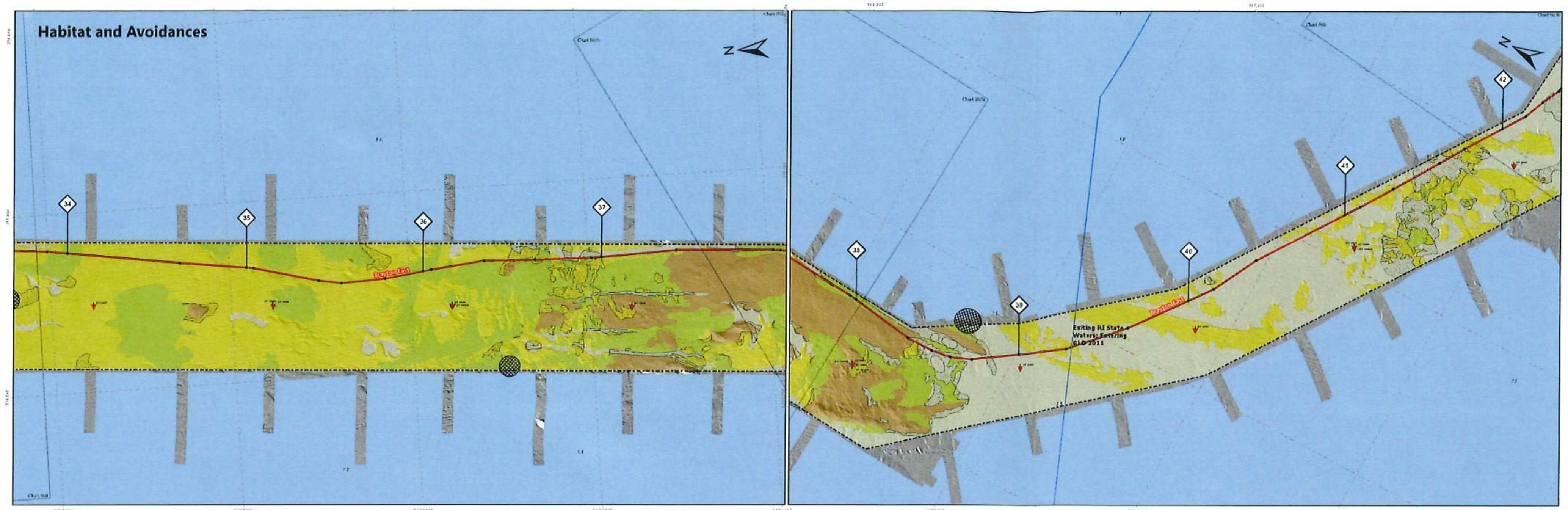
Scale Factor: 0.9996

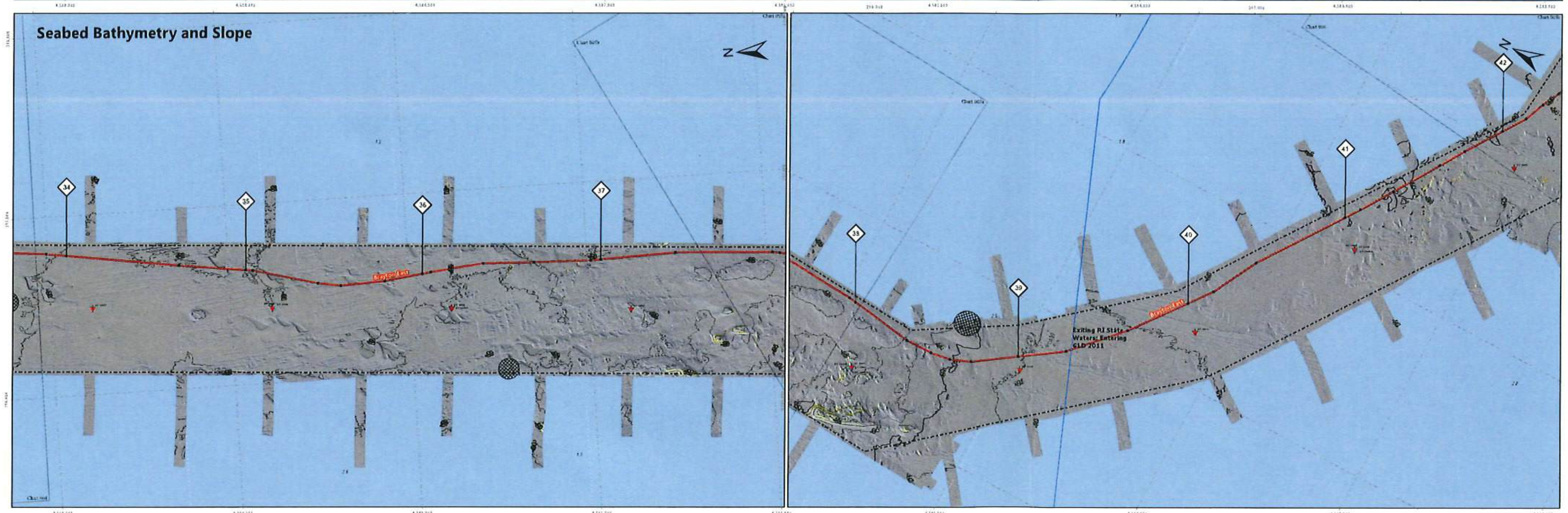
Scale 1:10,000

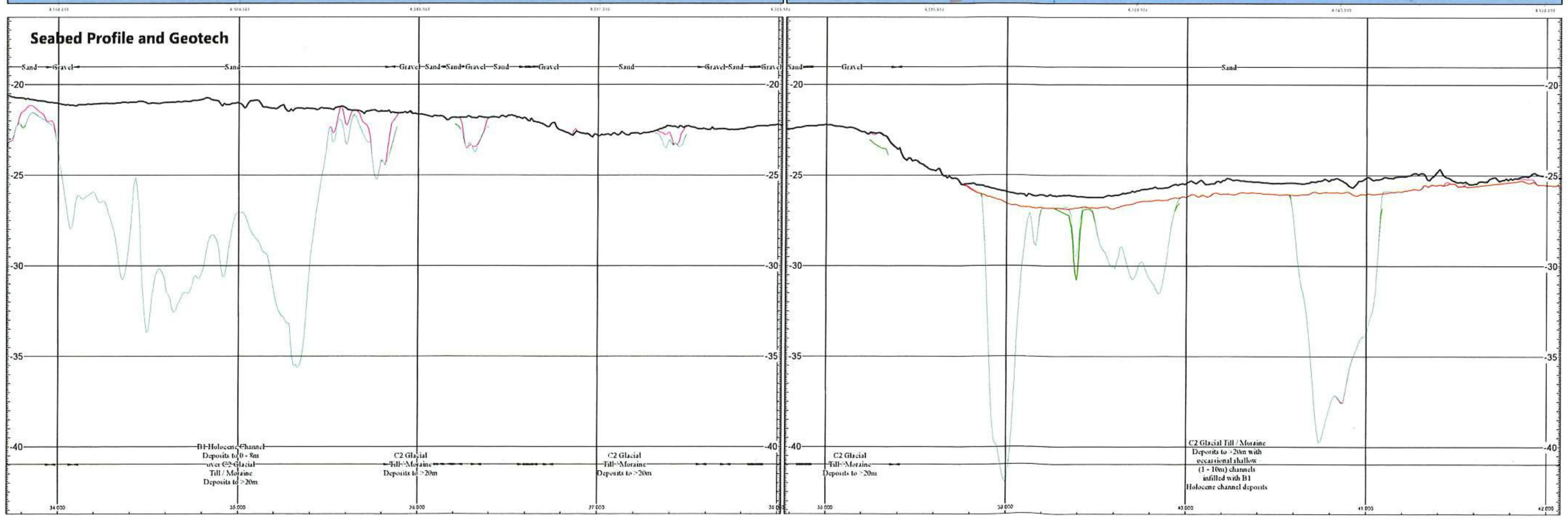
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529 — Chart No: 004c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

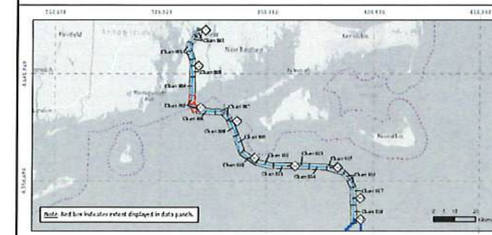
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 33.701 TO 42.396

2022

Chart No. 005c - 018c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
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- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
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False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

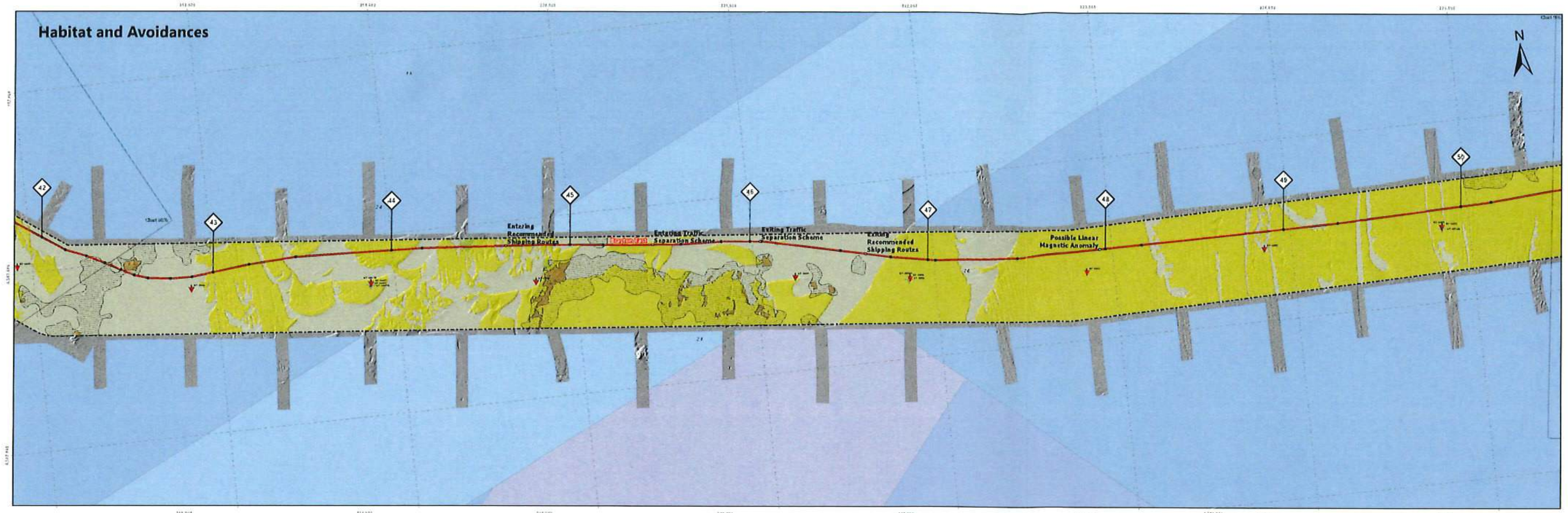
Scale 1:10,000

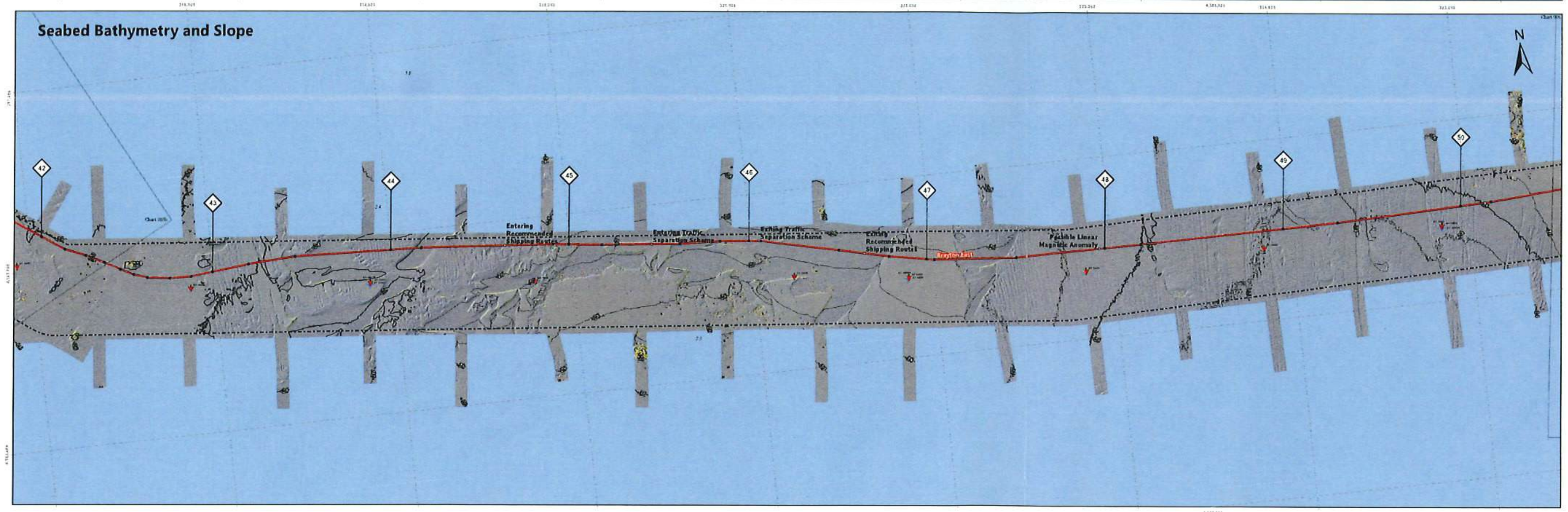
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

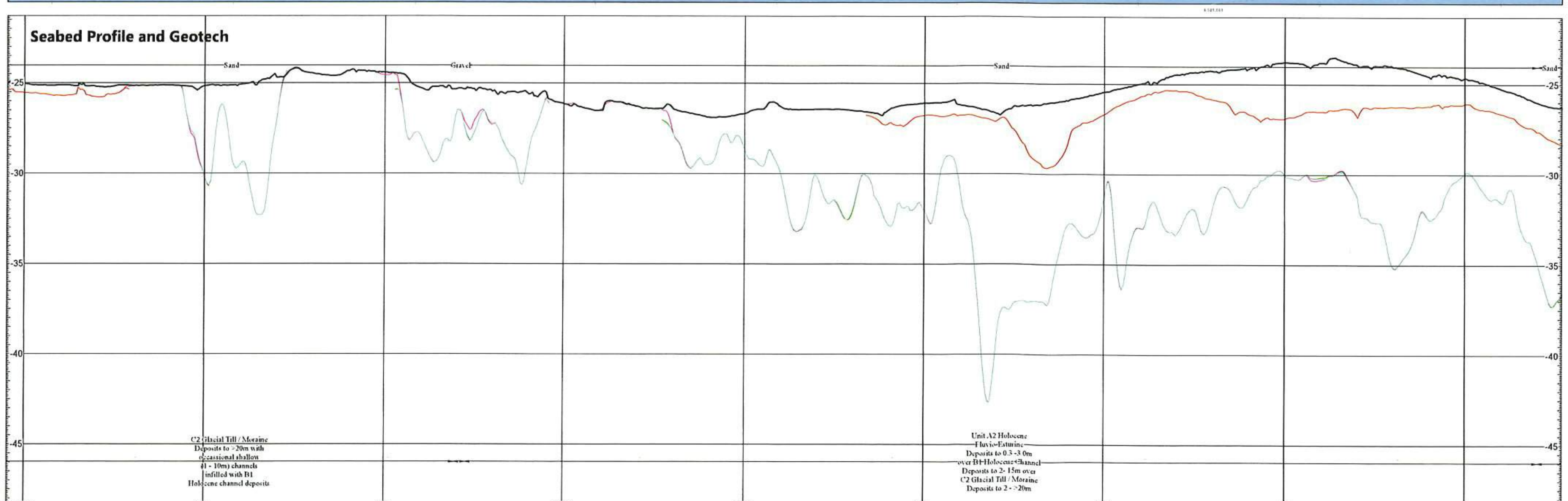
REV.	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529

Chart No: 005c - 018c







SOUTHCOAST WIND

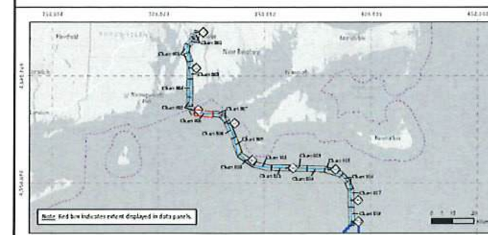
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 41.824 TO 50.570

2022 | Chart No. 006c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel: +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
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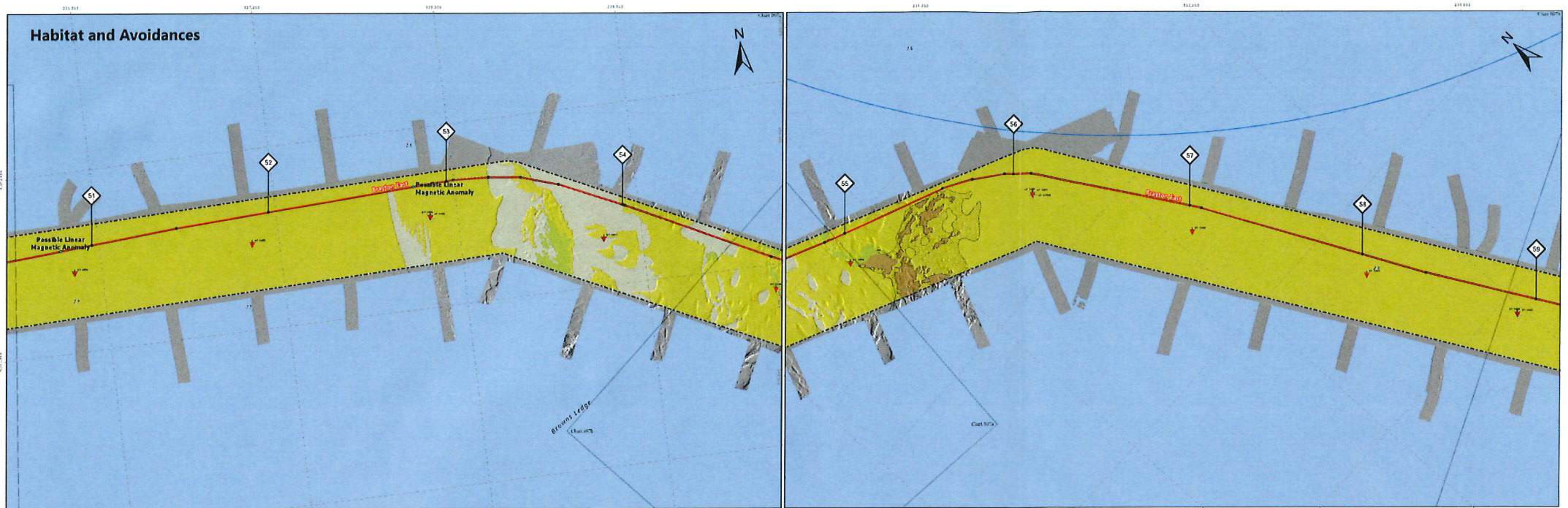
Central Meridian: -69.0000
Scale Factor: 0.9996

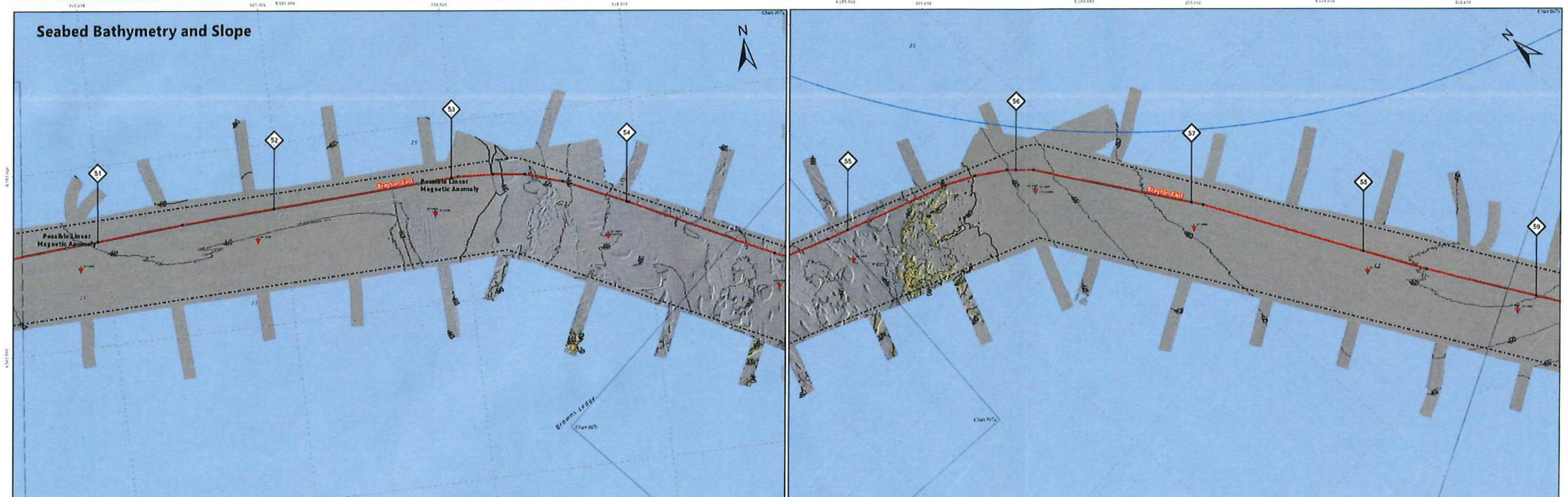
Scale 1:10,000

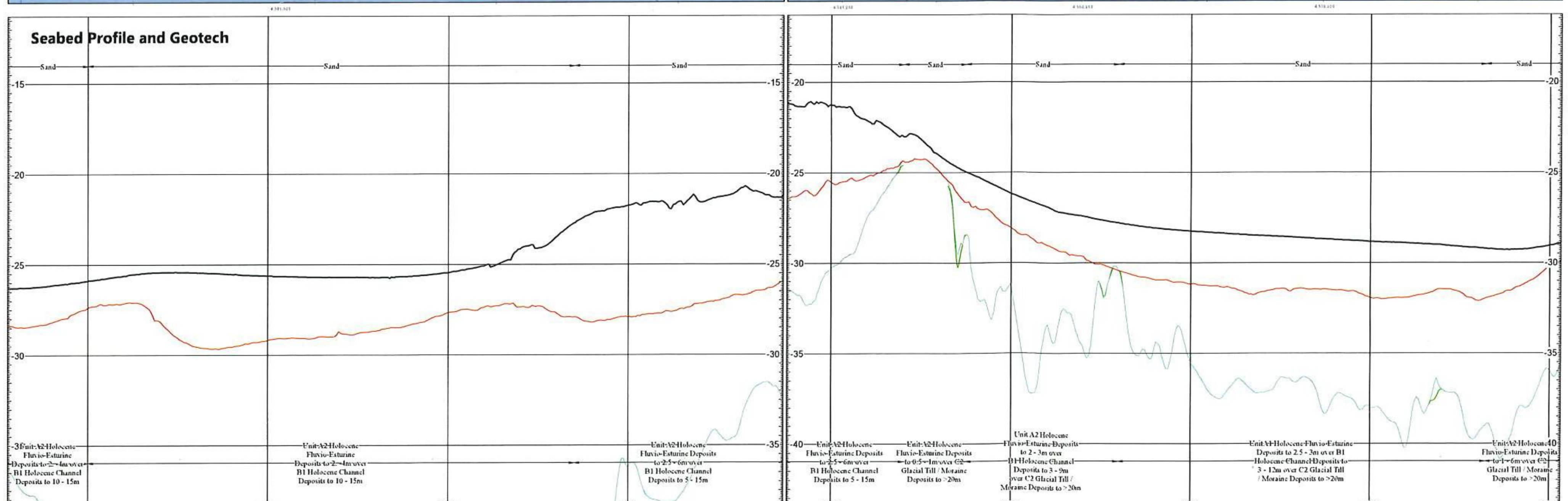
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV.	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529 | Chart No: 006c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

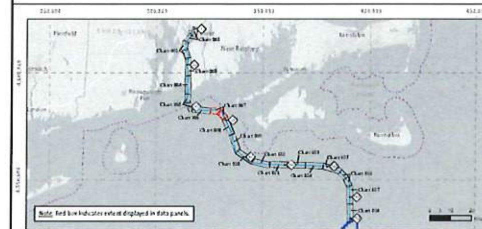
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 50.519 TO 59.138

2022

Chart No. 007c - 019c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
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- Mud to Muddy Sand - Mobile
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- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
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SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
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- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
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- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

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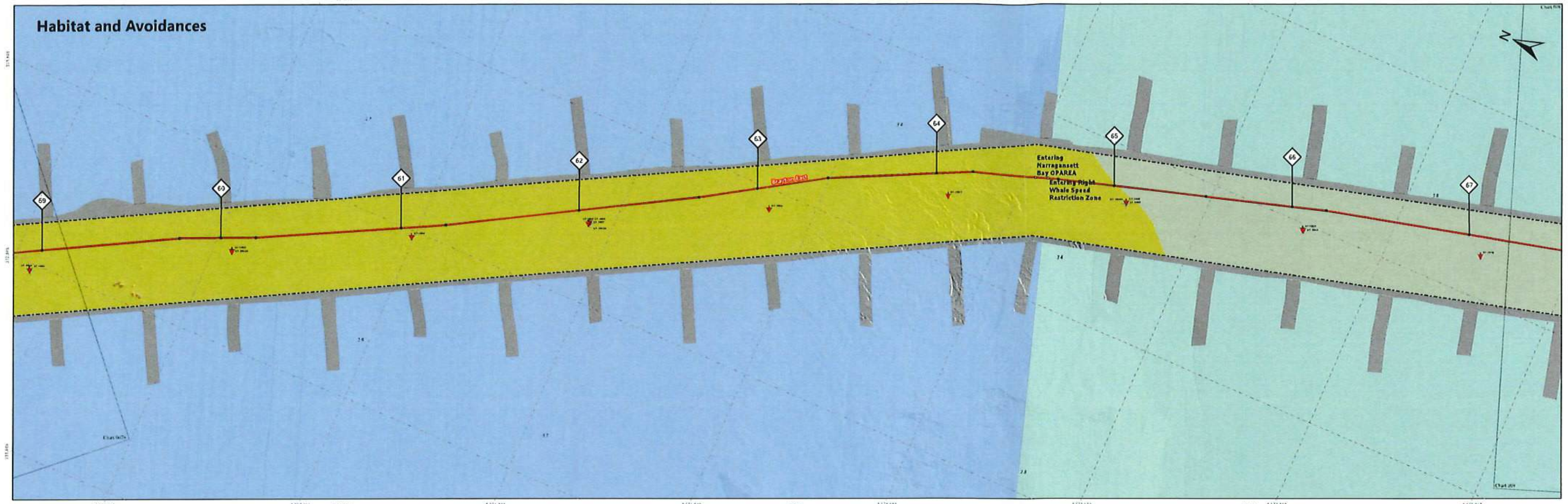
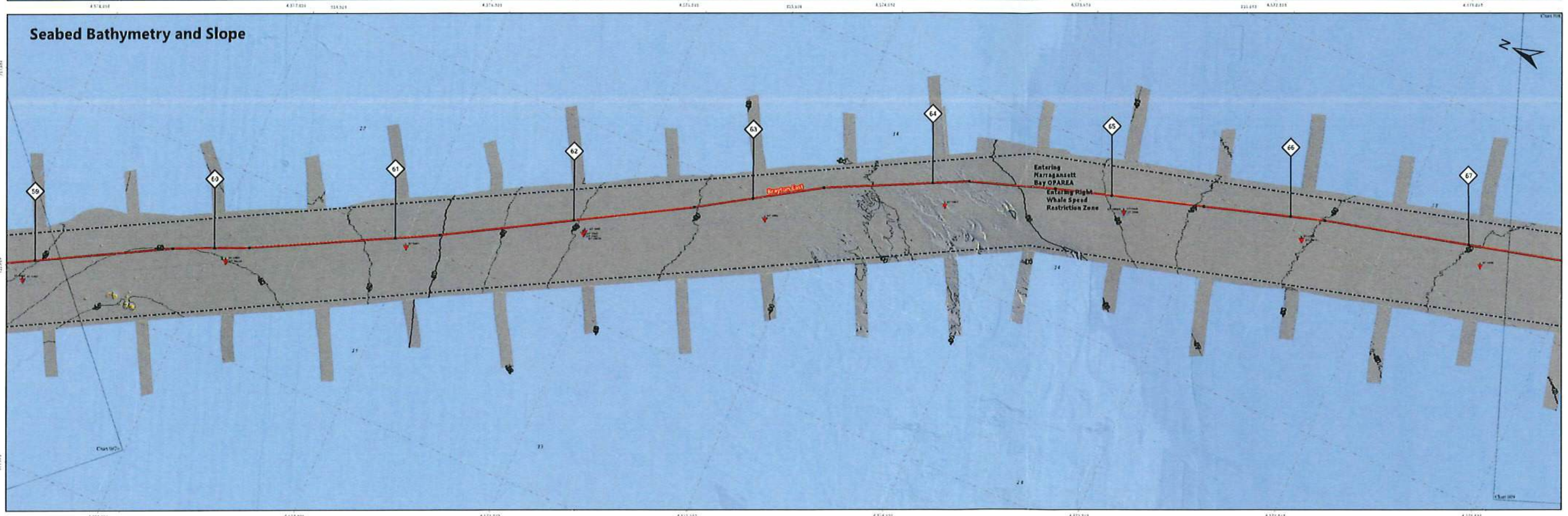
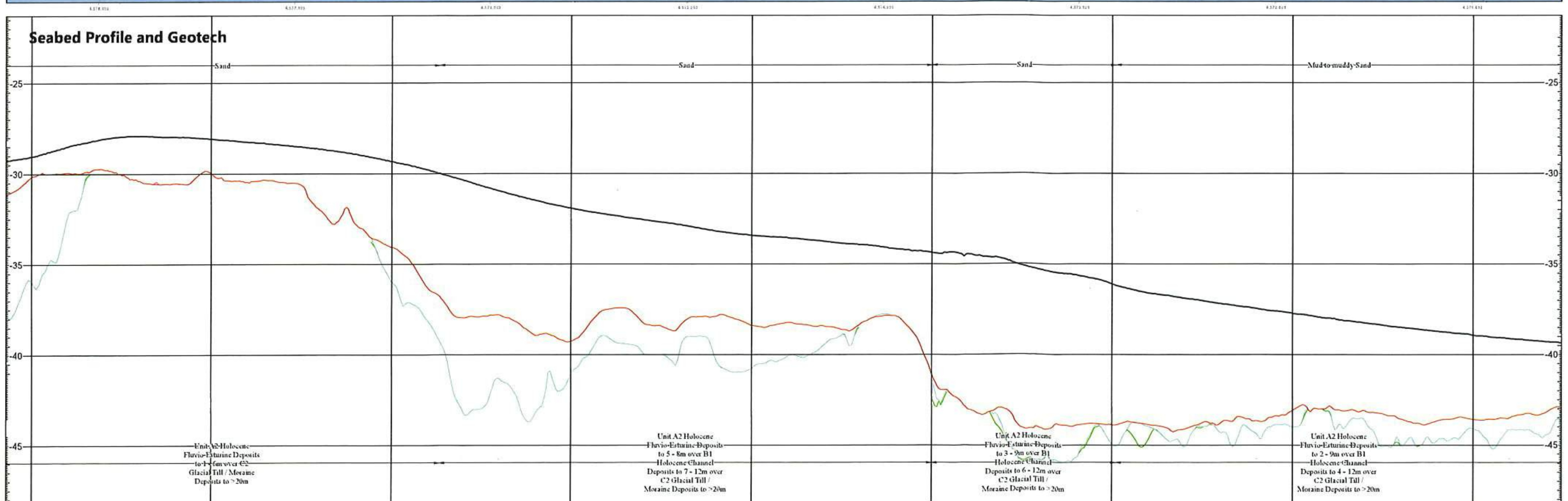
REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/23/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529

Chart No: 007c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

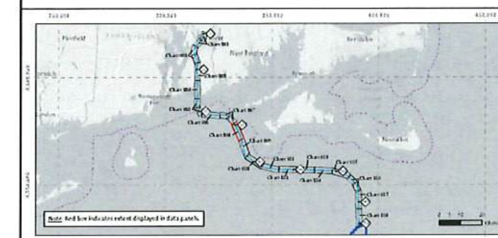
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 58.838 TO 67.527

2022

Chart No. 008c - 018c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
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Benthic Habitat Modifier
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- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
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- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
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- Particularly Sensitive Sea Area
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- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
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- Traffic Separations Schemes
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SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
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SEABED PROFILE AND GEOTECH

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- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

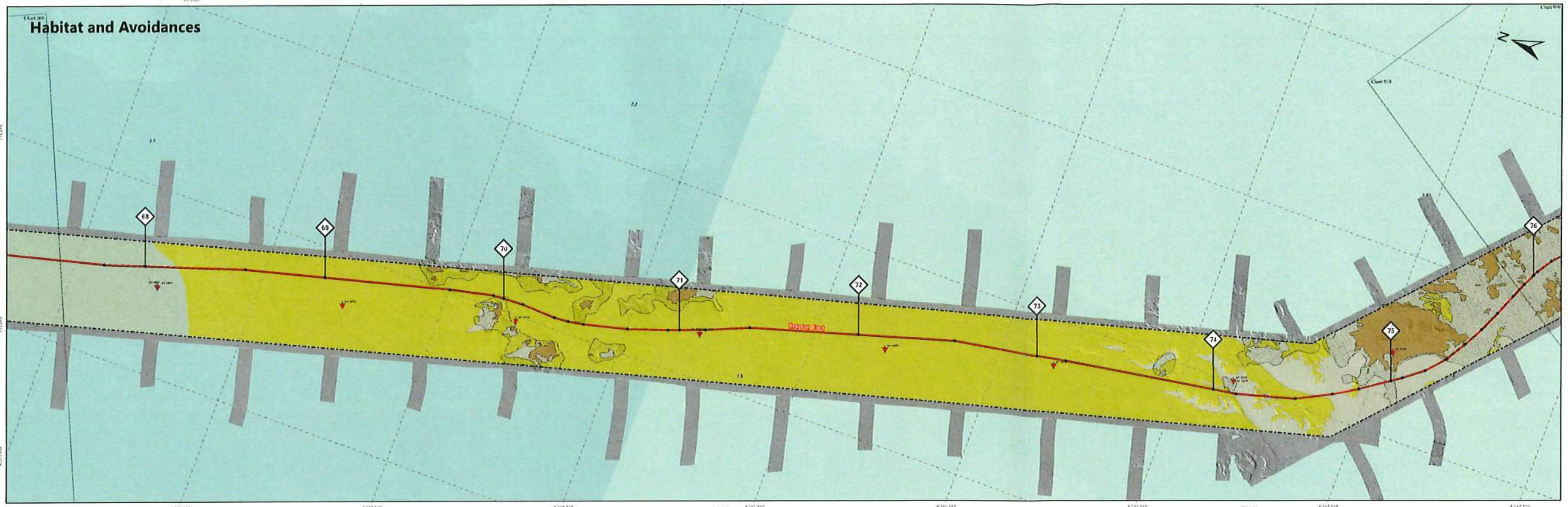
Scale 1:10,000

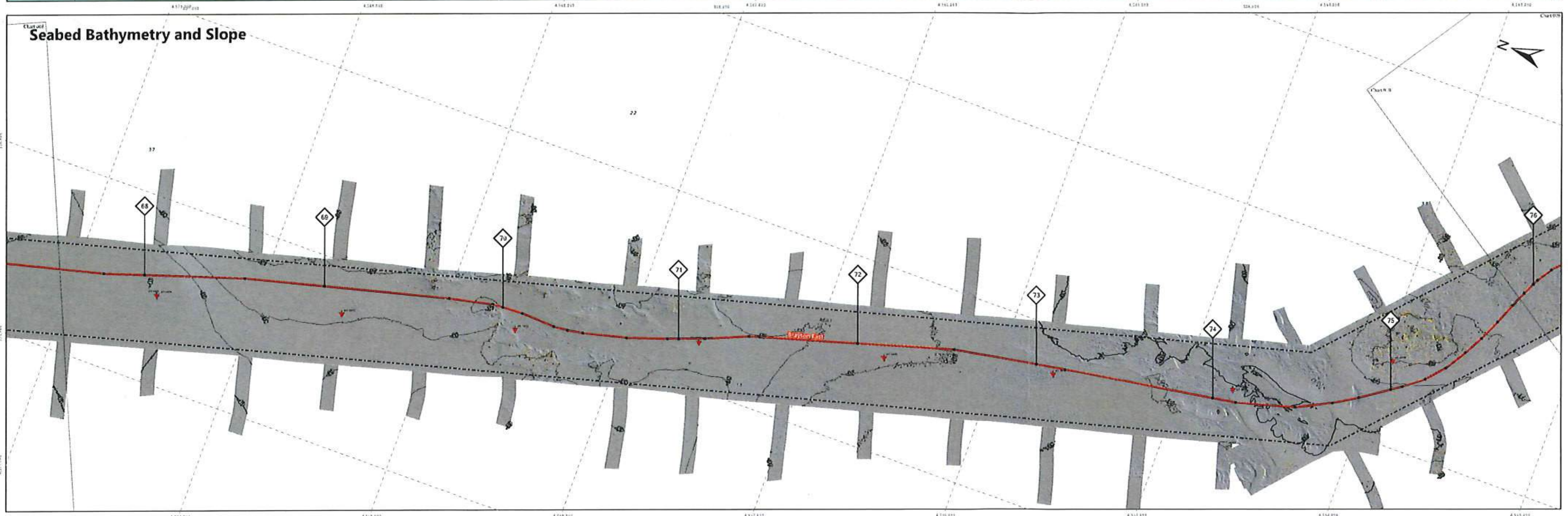
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

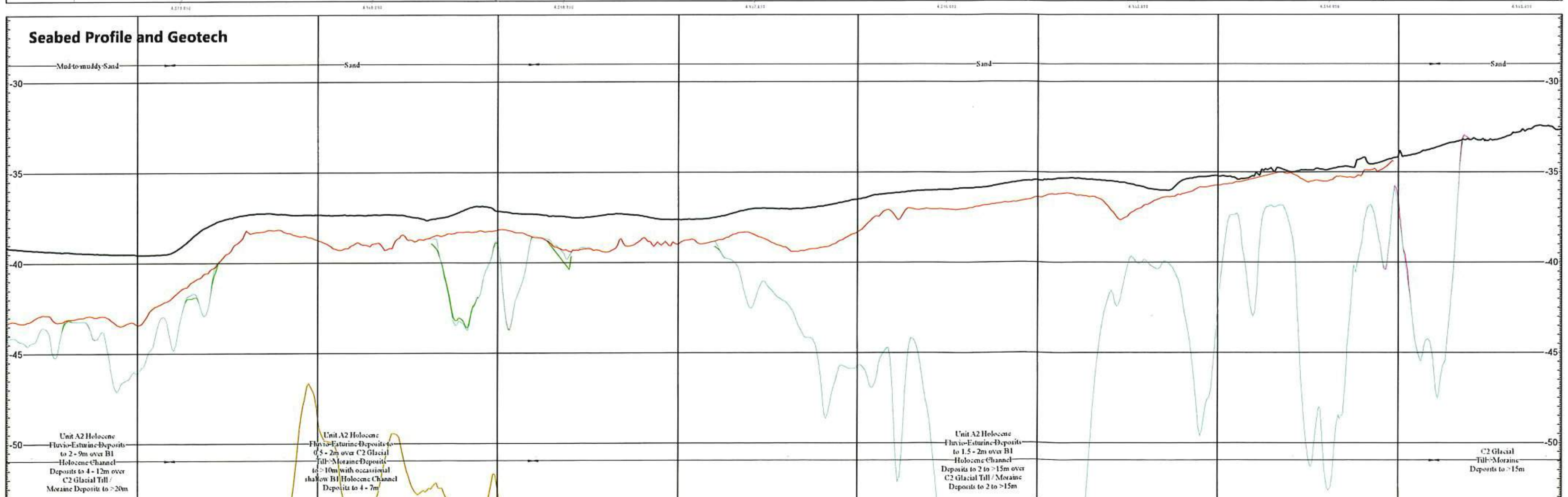
REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529

Chart No: 008c - 018c







SOUTHCOAST WIND

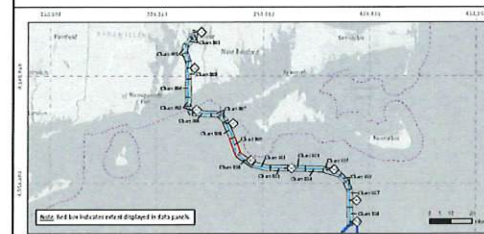
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 67.227 TO 76.189

2022 Chart No. 009c - 018c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES
1.) Fugro collected geophysical for the Brayton Point ECC from 7/14/21 to 12/14/21 and geotechnical data (vibracores and CPTs) was collected by Fugro from [illegible] and by Alpine from [illegible]
2.) Obstructions and shipwrecks are provided by the Automated Wrecks and Obstructions Information Systems (AWOIS) NOAA [illegible]
3.) Maritime Boundaries are provided by NOAA Nautical Charts [illegible]
4.) [illegible] (MORIS, 2022)
5.) Data is underlain by a shaded relief rendering of MBES bathymetry in the background
SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
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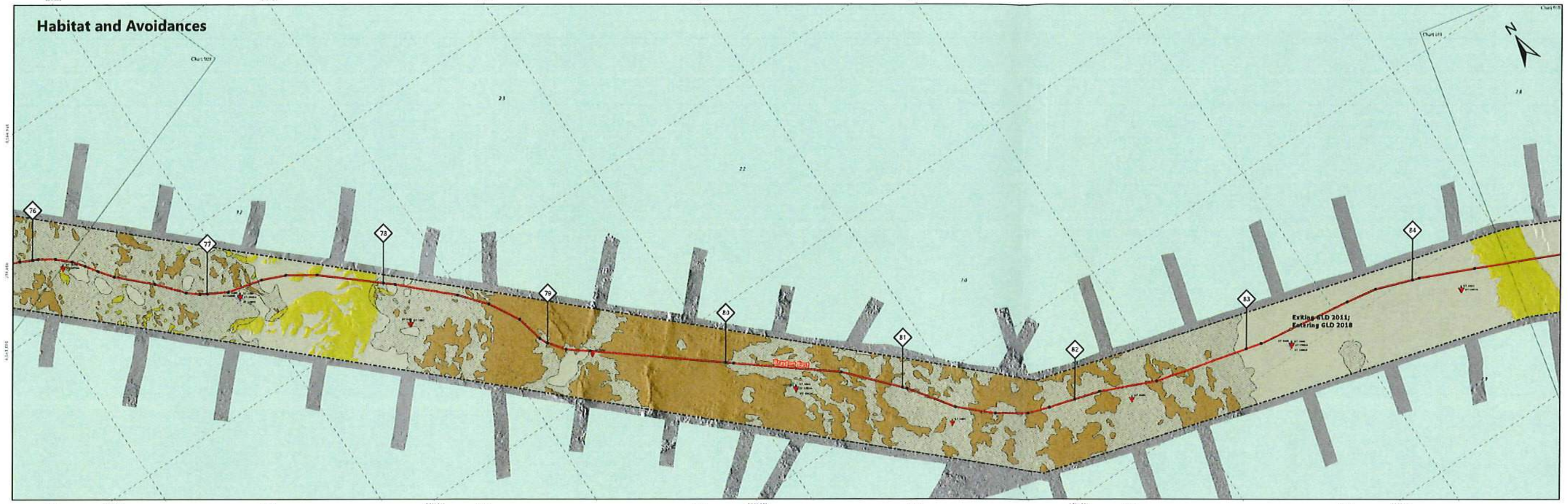
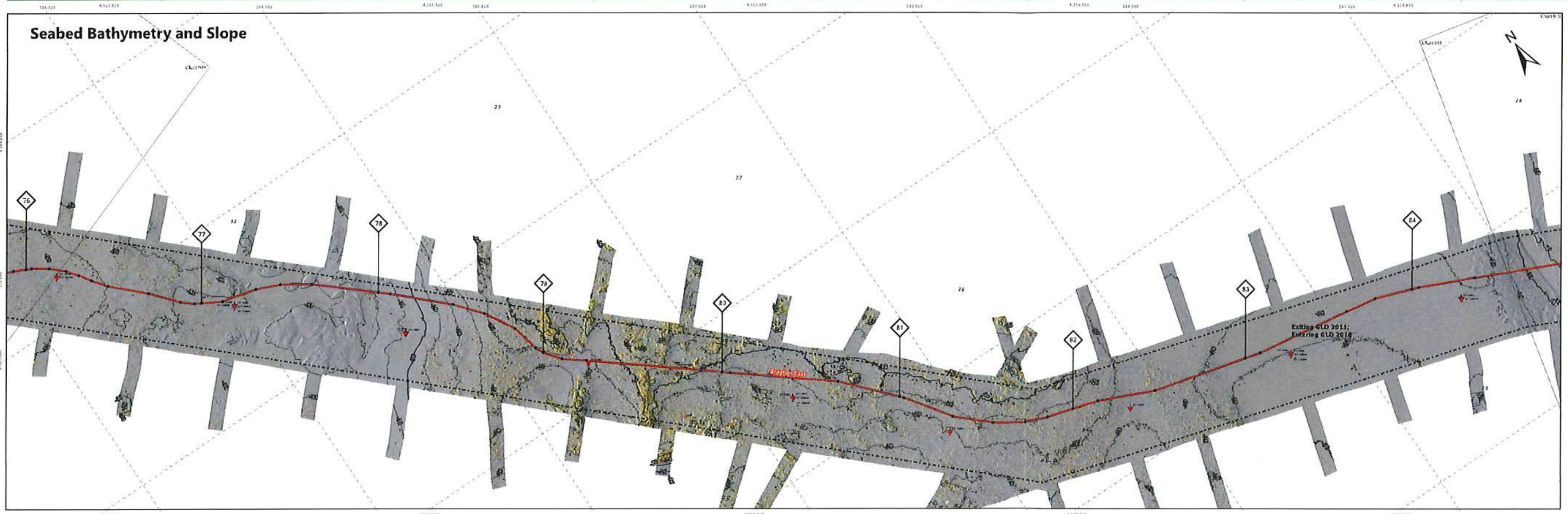
Scale 1:10,000

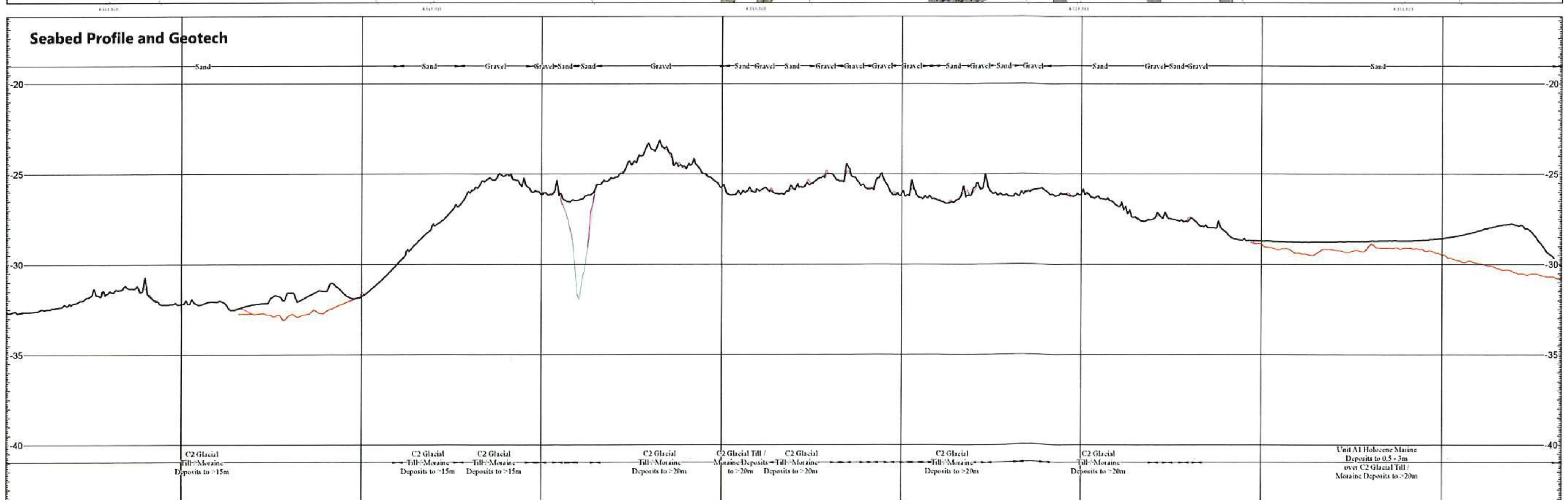
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / EQ	AN

Project No: 2022 - 529 Chart No: 009c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 75.891 TO 84.843

2022

Chart No. 010c - 019c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel: +1 857-263-1772

XODUS

LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
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SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

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Projection: Transverse Mercator
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False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

Scale 1:10,000

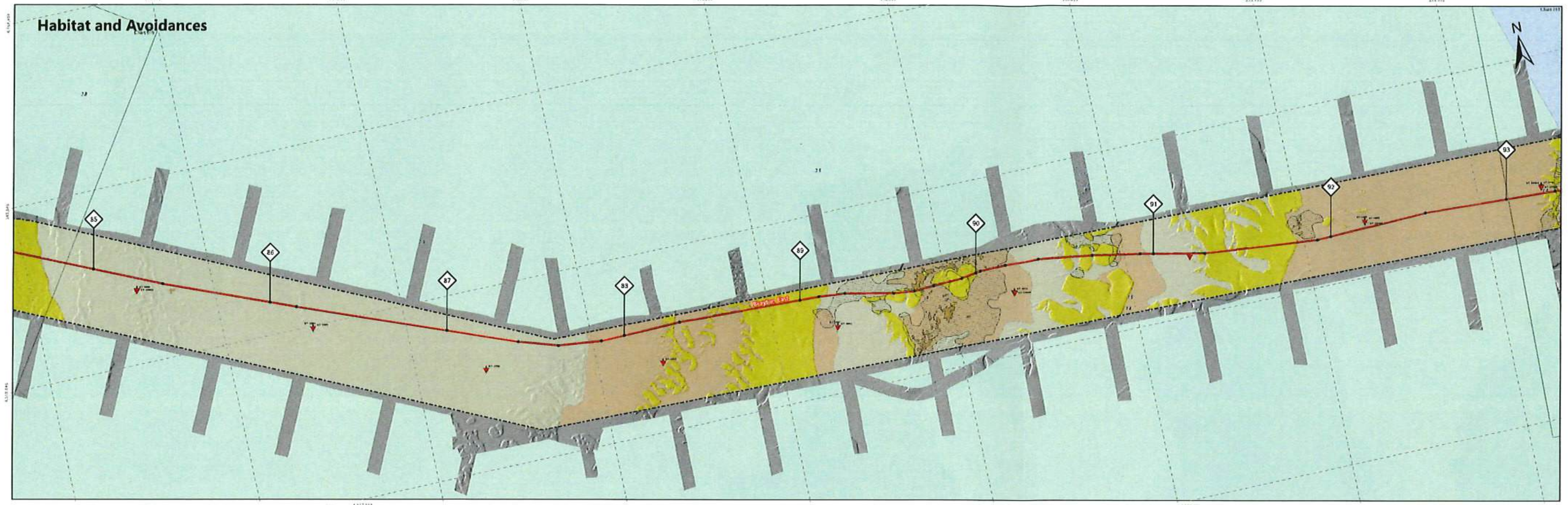
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

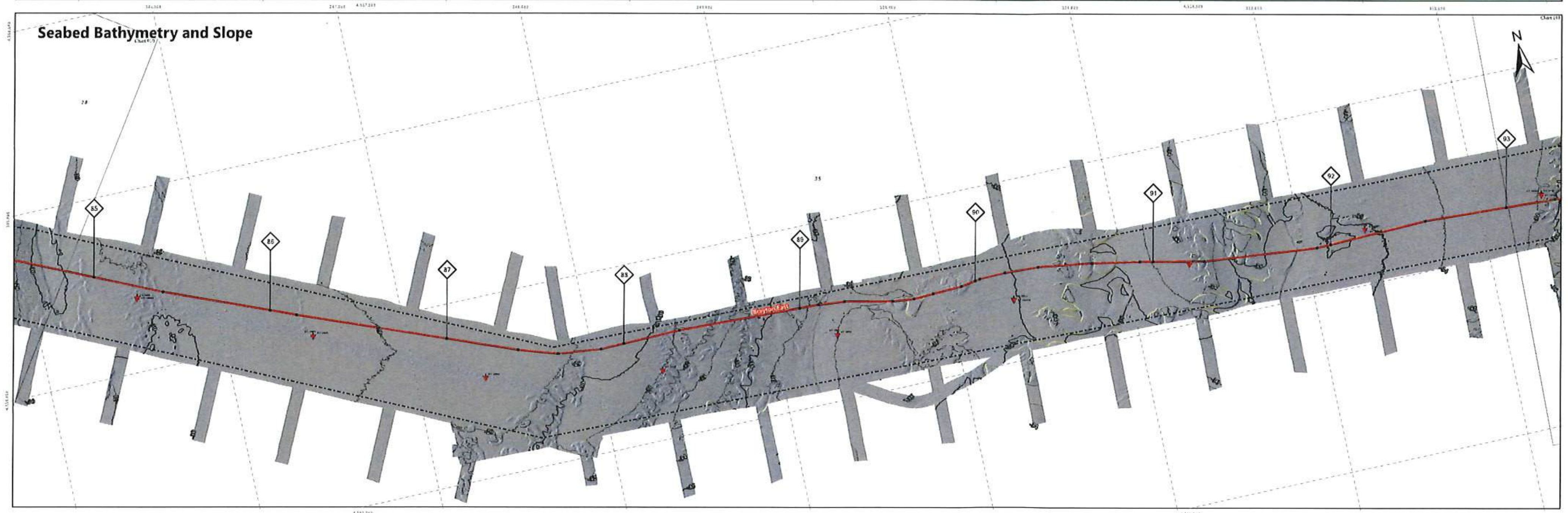
Project No: 2022 - 529

Chart No: 010c - 018c

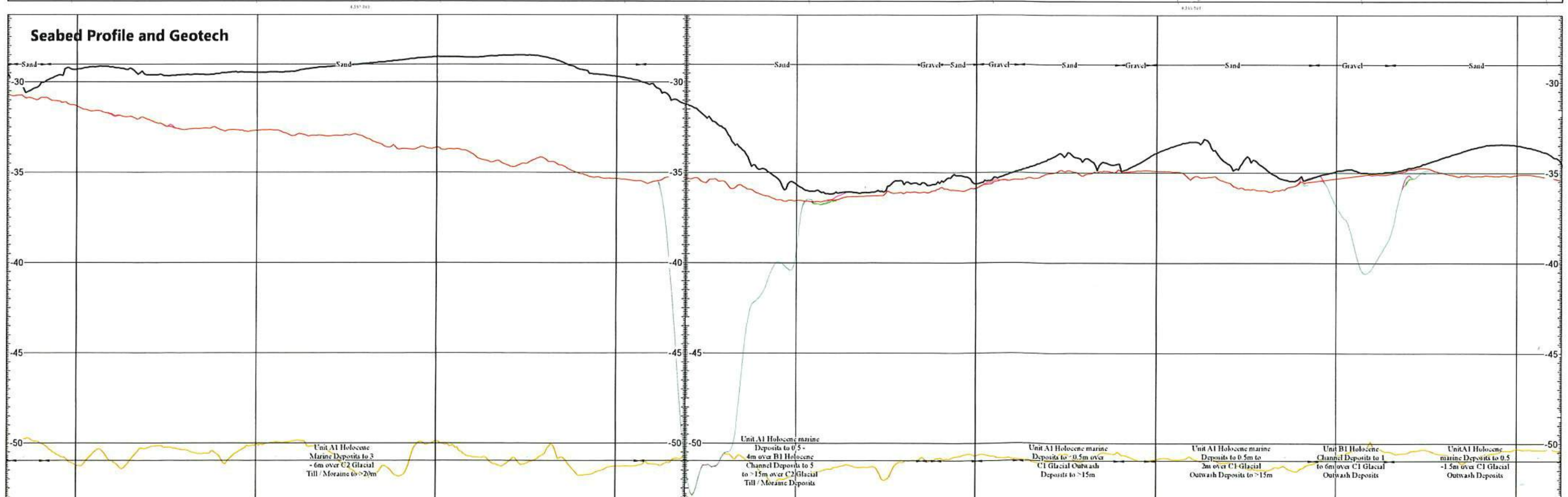
Habitat and Avoidances



Seabed Bathymetry and Slope



Seabed Profile and Geotech



SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

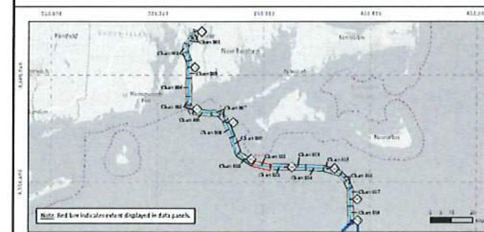
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 84.543 TO 93.312

2022

Chart No. 011c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 357-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
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- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

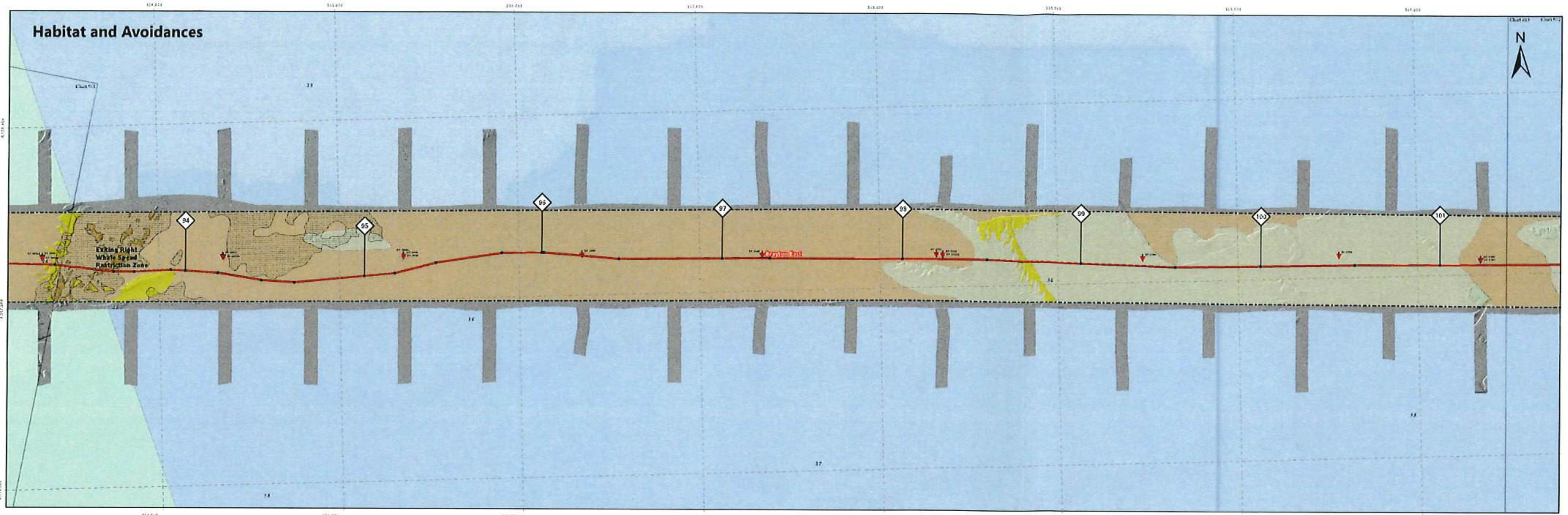
Scale 1:10,000

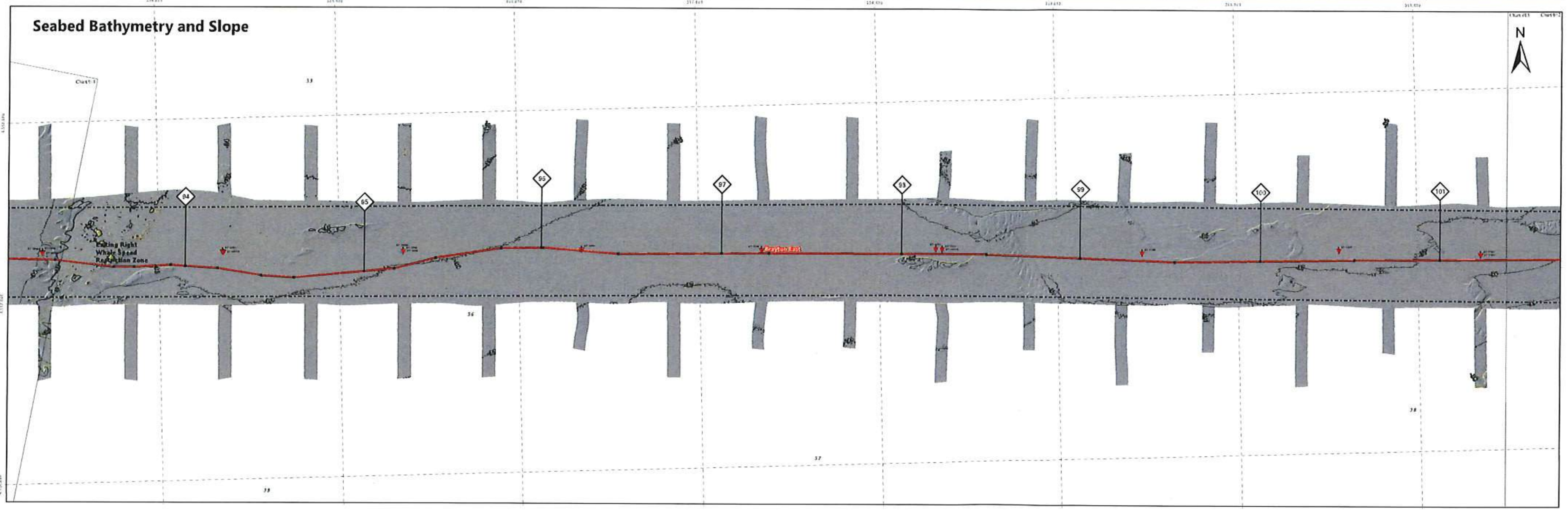
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

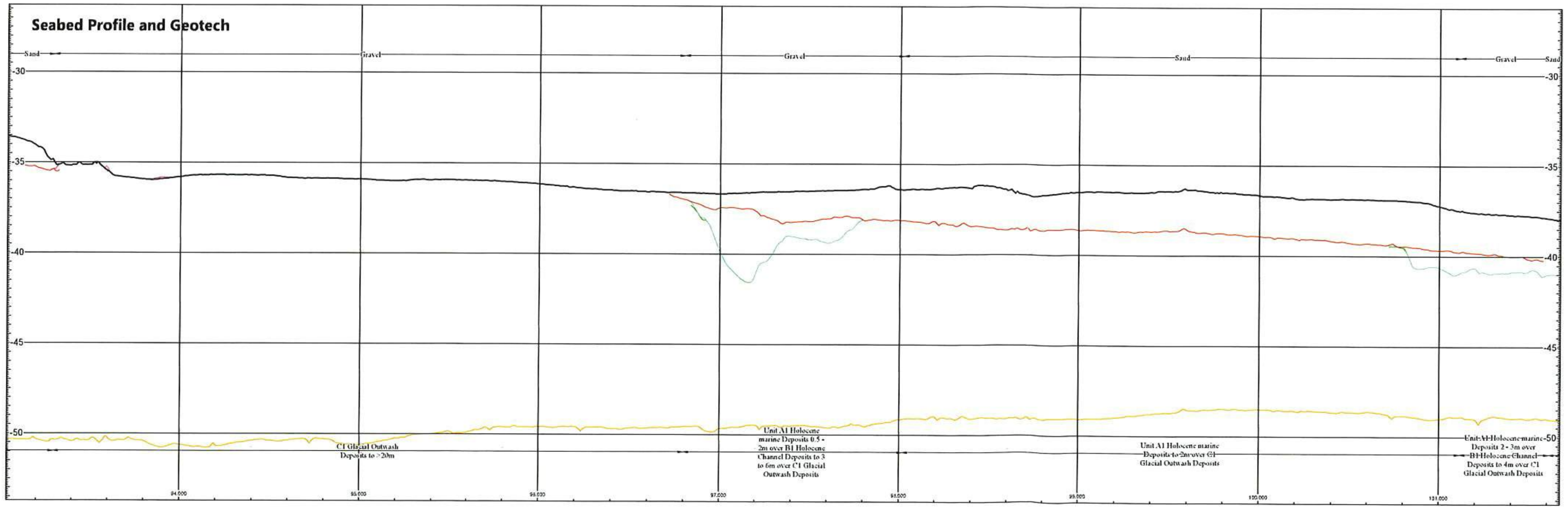
REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 529

Chart No: 011c - 018c







SOUTHCOAST WIND

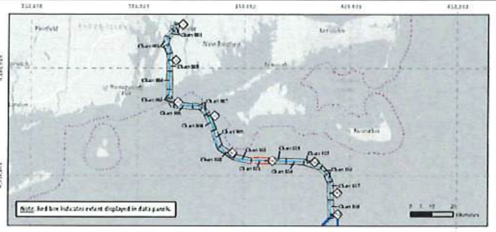
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 93.014 TO 101.674

2022 Chart No. 012c - 018c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
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- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
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SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
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- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES

SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

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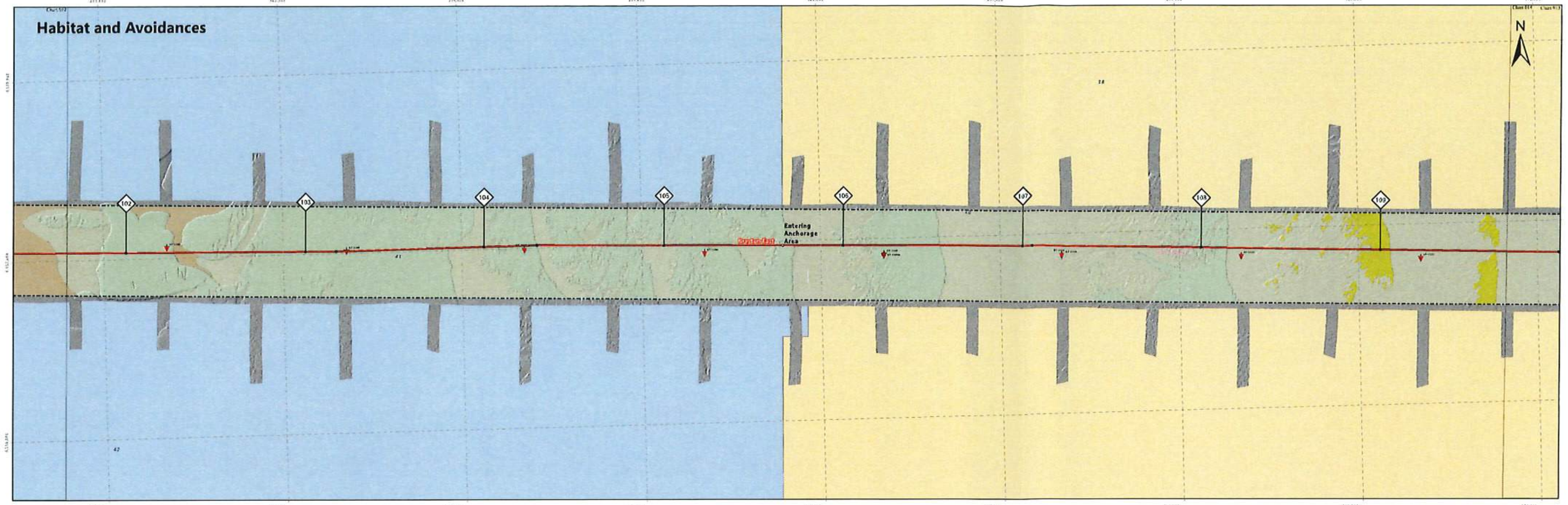
Scale Factor: 0.9996

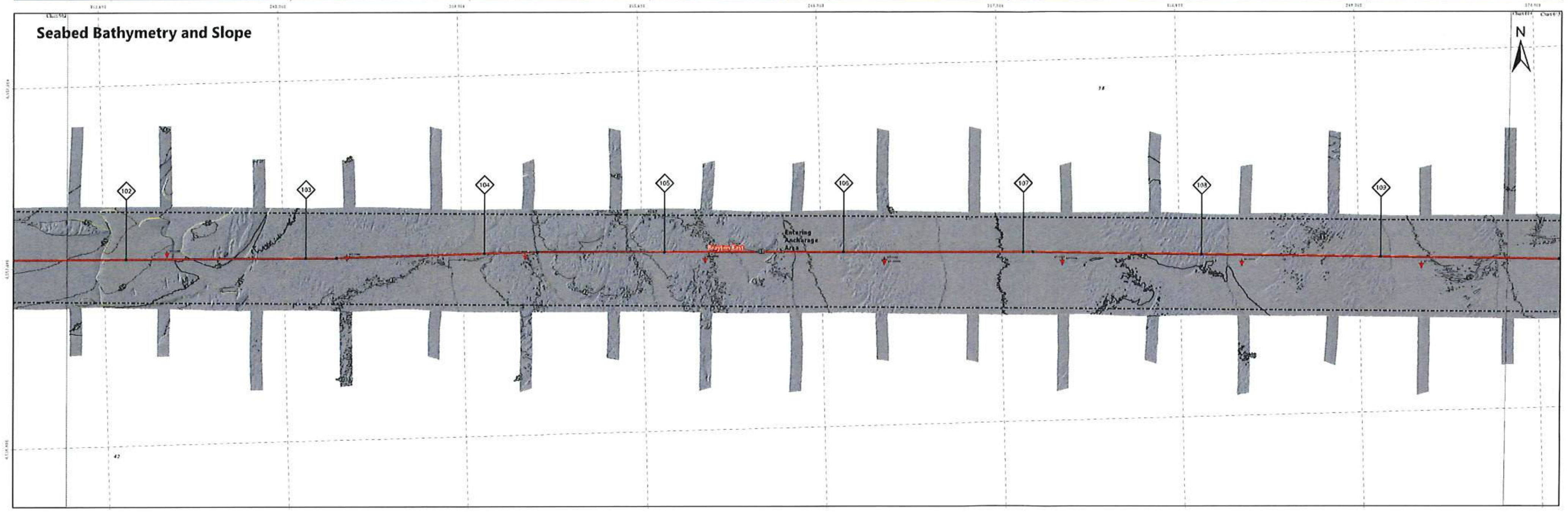
Scale 1:10,000

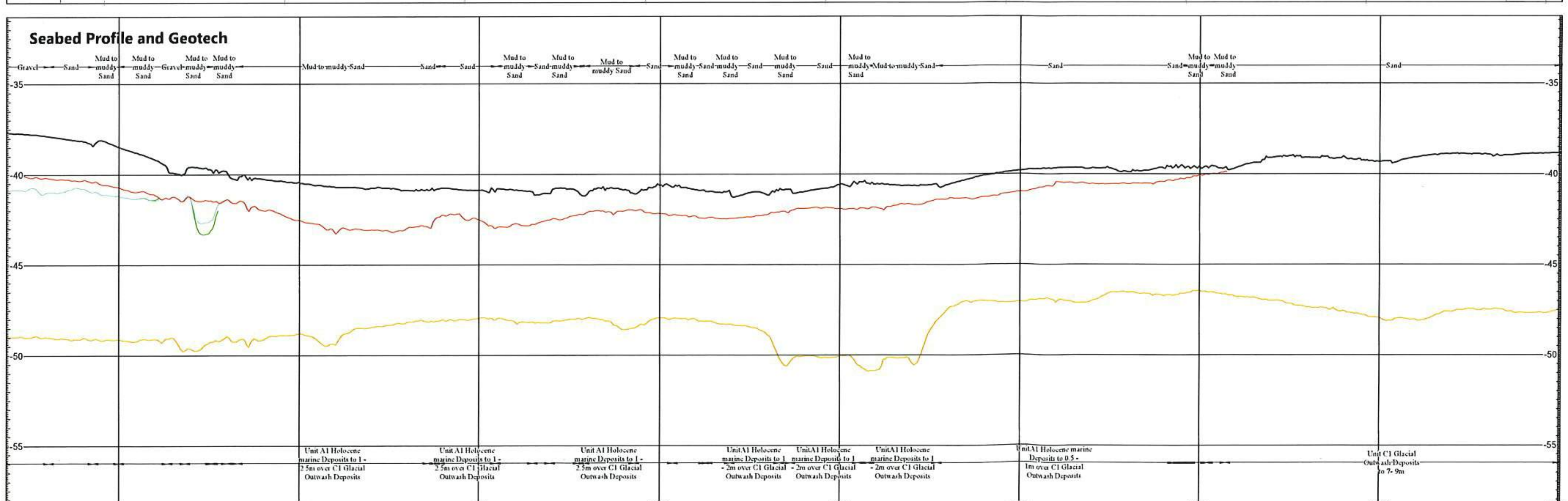
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 519 Chart No: 012c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

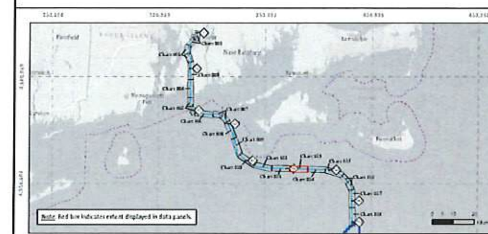
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 101.374 TO 110.012

2022

Chart No. 013c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
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- Maritime Boundary
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- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
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HABITAT AND AVOIDANCES

Benthic Habitat
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- Bedrock
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Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
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Utility Alignments
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Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
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- Anchorage Areas
- Vineyard Wind Corridor
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- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
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- Minor Contours
- Pipeline Areas

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NOTES

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Scale 1:10,000

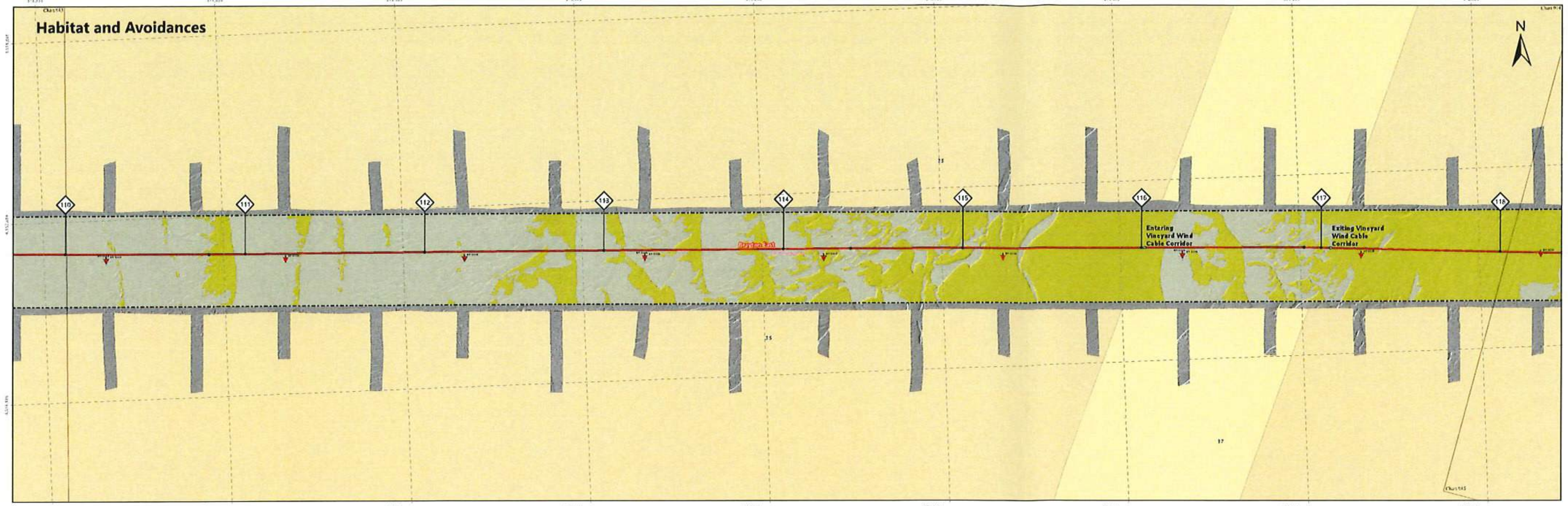
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

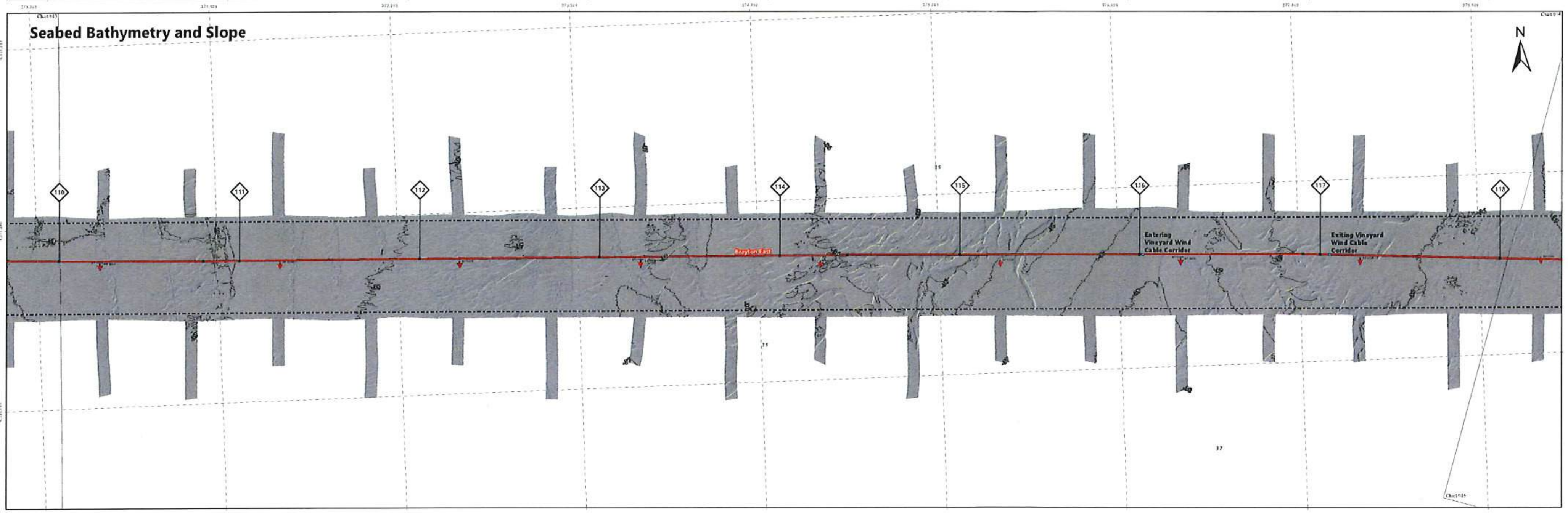
Project No: 2022 - 529

Chart No: 013c - 018c

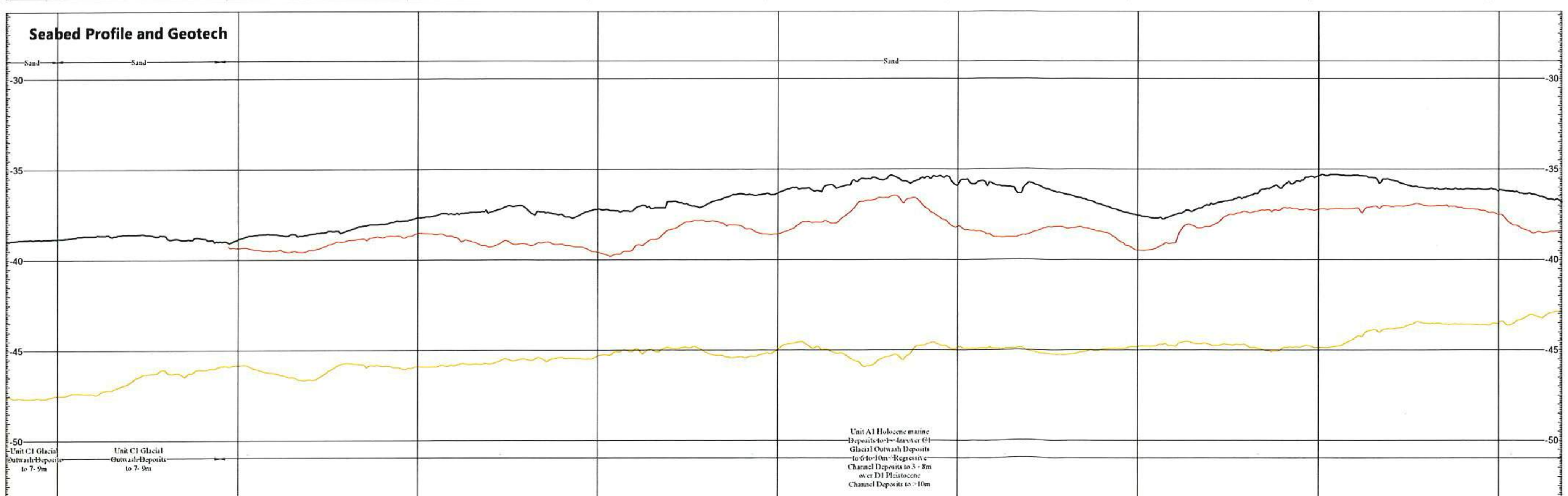
Habitat and Avoidances



Seabed Bathymetry and Slope



Seabed Profile and Geotech



SOUTHCOAST WIND

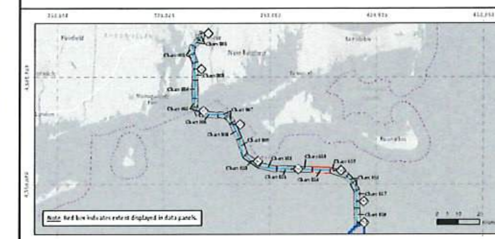
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 109.712 TO 118.350

2022 — Chart No. 014c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES
1.) Fugro collected geophysical for the Brayton Point ECC from 7/14/21 to 12/14/21 and geotechnical data (vibracores and CPTs) was collected by Fugro from 9/30/21 to 10/18/21 and by Alpine from 10/?/21 to 11/10/21.
2.) Obstructions and shipwrecks are provided by the Automated Wrecks and Obstructions Information Systems (AWOIS) NOAA (2021) and NOAA raster nautical charts (RNC) 13003 (2021). Submarine cables, regulated areas, designated shipping lanes, anchorages, dumping grounds, potential UXO locations, farms, and other ocean usage features are derived from NOAA electronic nautical charts (ENC) US4MA13M and US5NY0.M (2020).
3.) Maritime Boundaries are provided by NOAA Nautical Charts (2013). Federal/State Boundaries are provided by BOEM Digital Offshore Cadastre (DOC) Atlantic, Submerged Lands Act (SLA) Boundary.
4.) Nonroute Supplemental Cables sourced from 2021 Massachusetts Ocean Management Plan Data Viewer via the Massachusetts Ocean Resource Information System (MORIS 2021).
5.) Data is underlain by a shaded relief rendering of MBES bathymetry in the background.
SOURCE - All survey data was provided by SouthCoast Wind.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

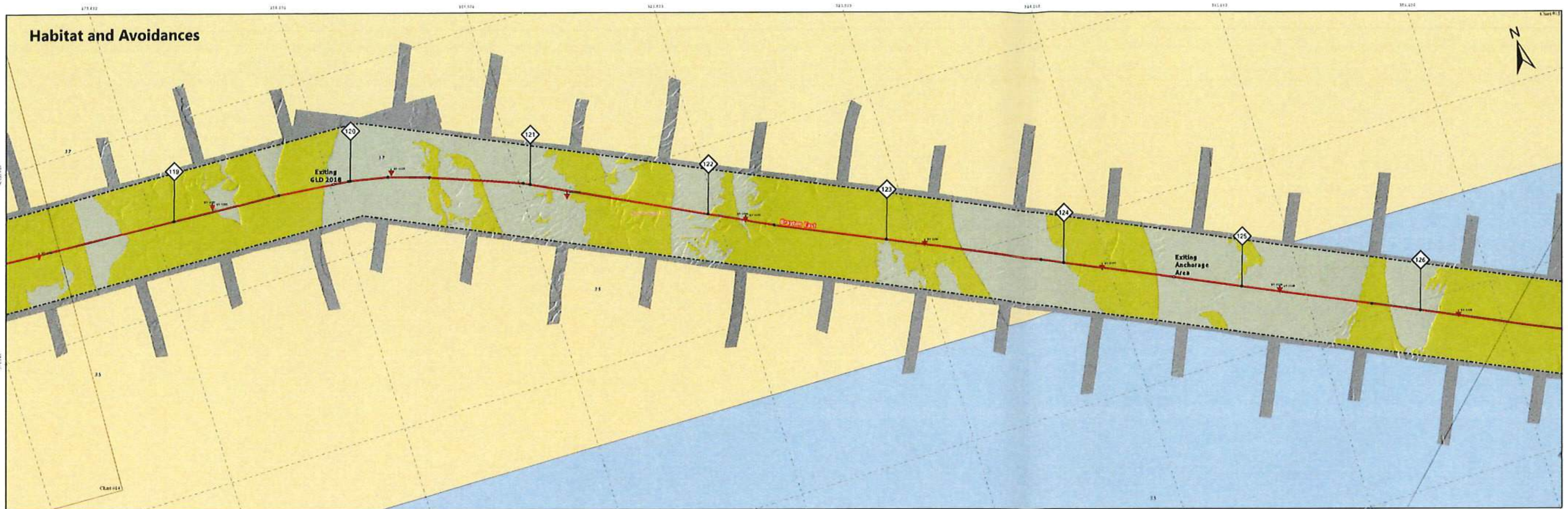
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

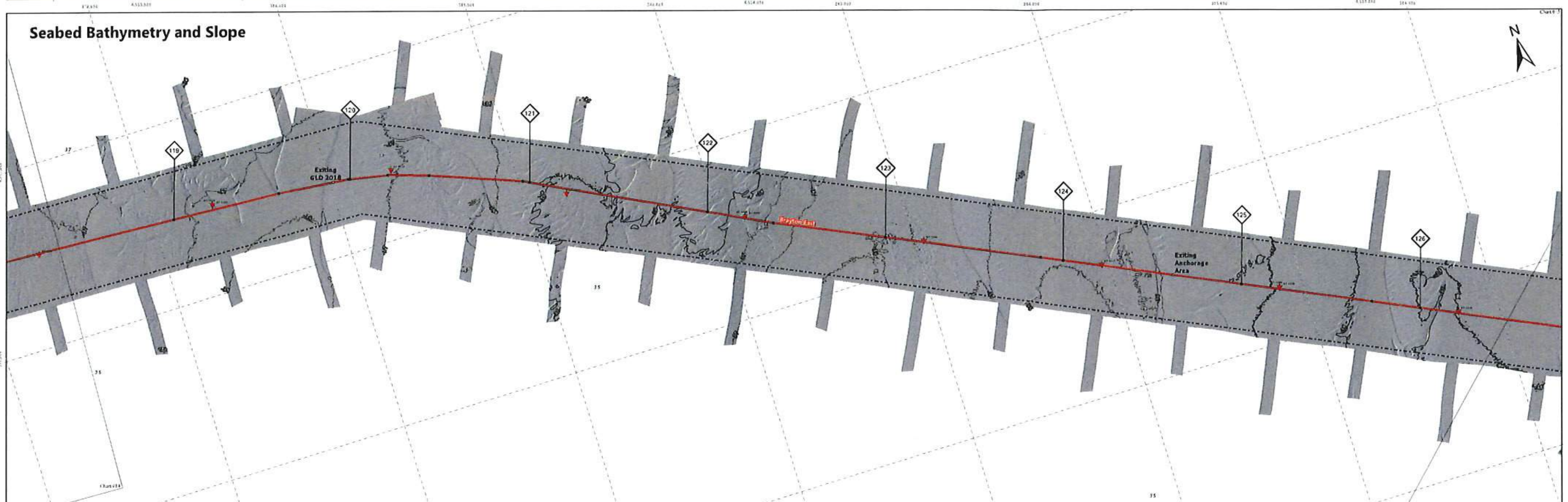
Scale 1:10,000

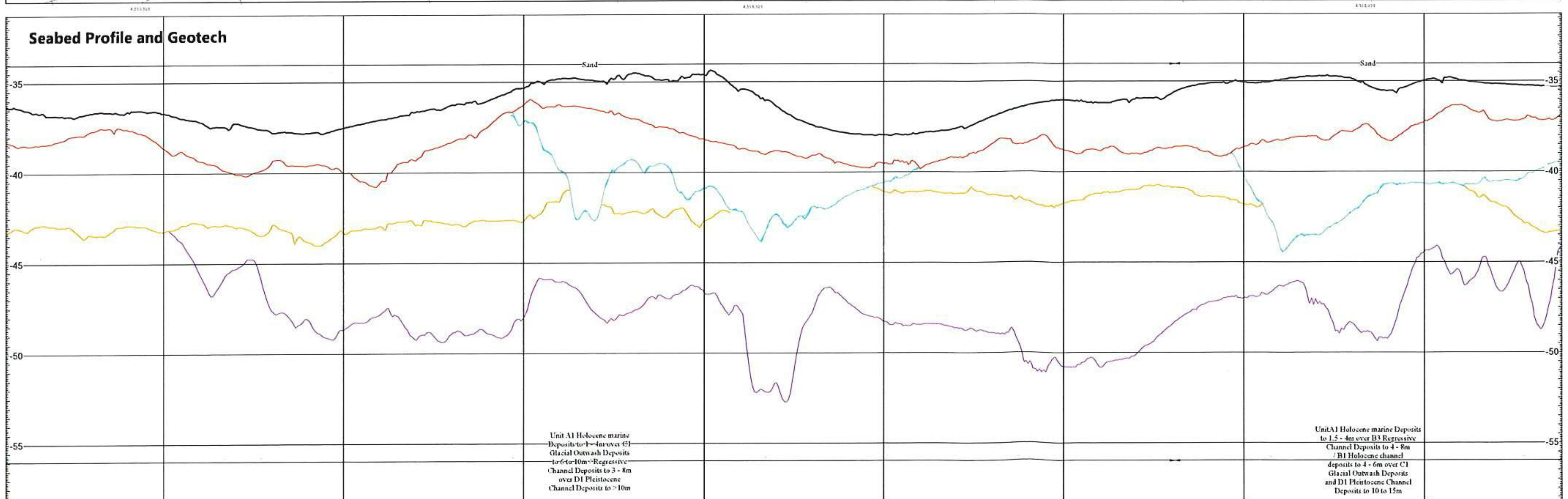
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 519 — Chart No: 014c - 018c







SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 118.050 TO 126.800

2022

Chart No. 015c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS

LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs

- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points

- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat

- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier

- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments

- Cable and/or Pipeline

Shipping Lanes

- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours

- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)

- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

Scale 1:10,000

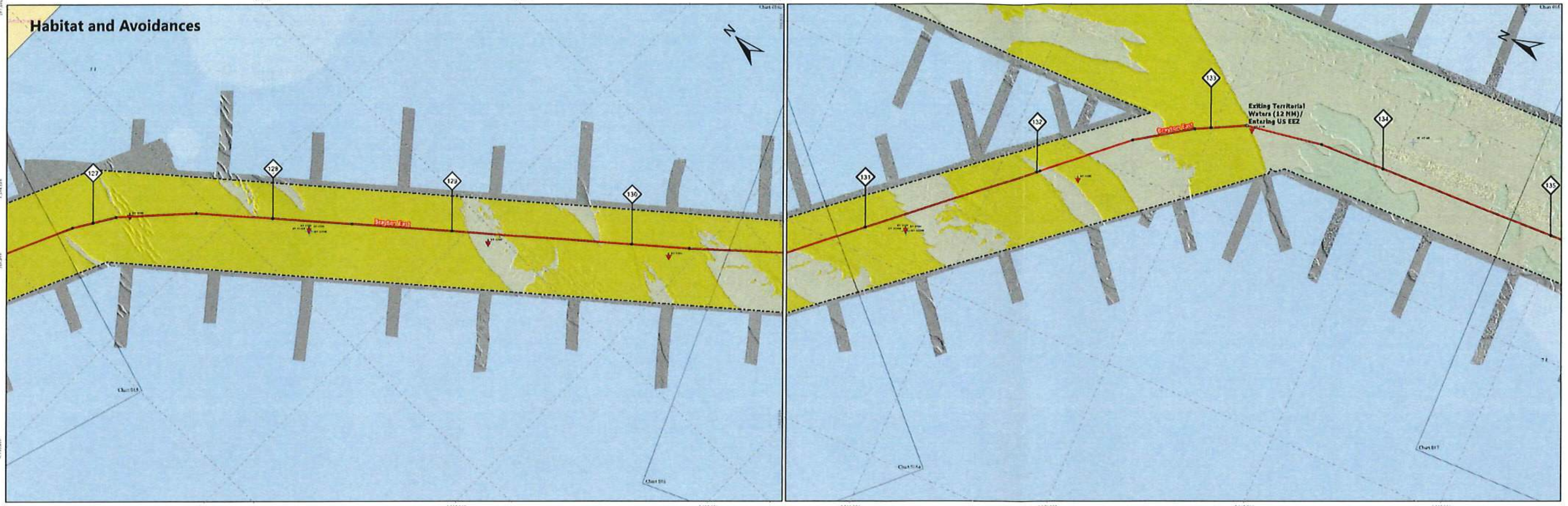
0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

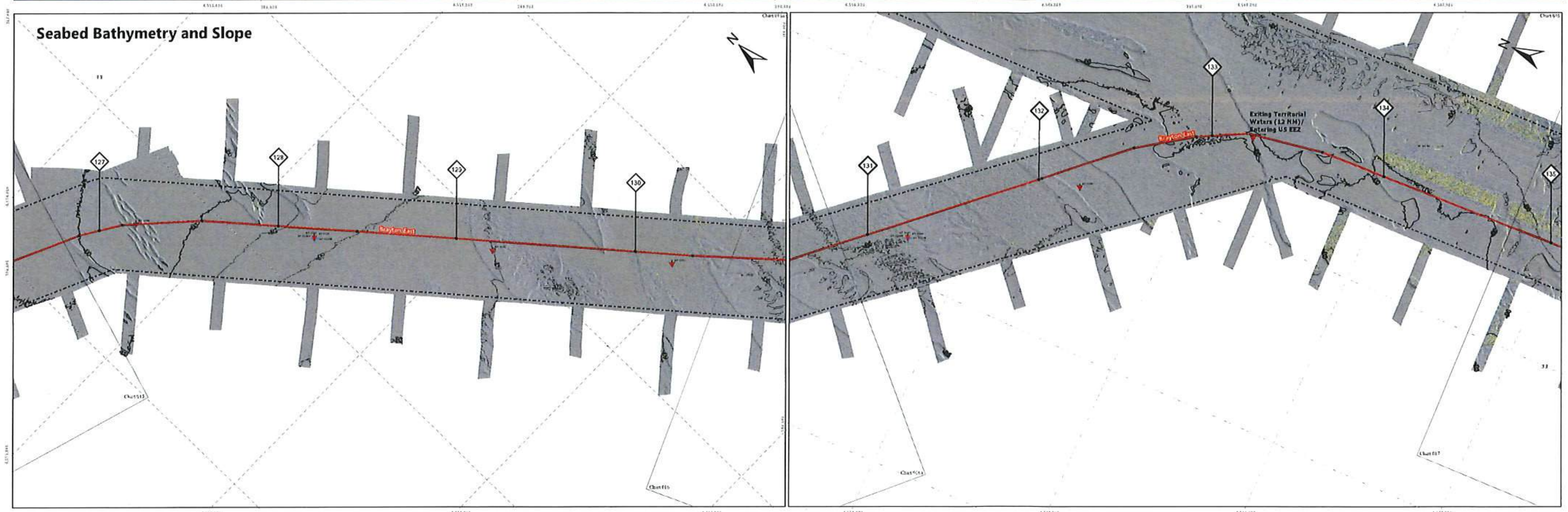
Project No: 2022 - 529

Chart No: 015c - 018c

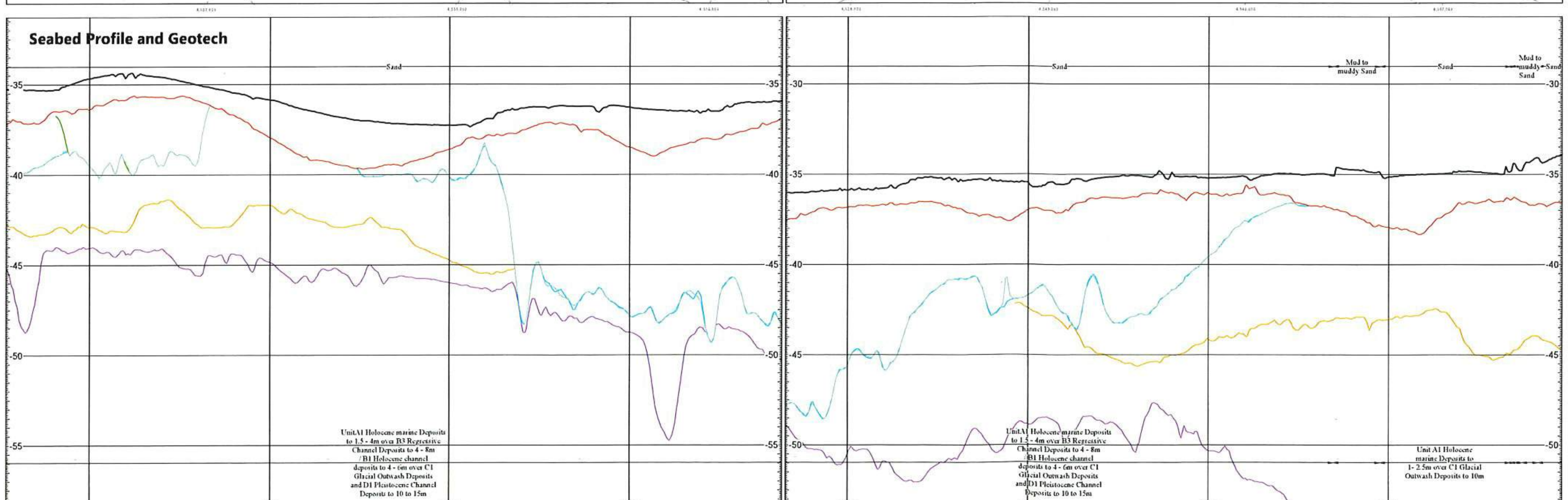
Habitat and Avoidances



Seabed Bathymetry and Slope



Seabed Profile and Geotech



SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 126.500 TO 135.077

2022 | Chart No. 016c - 018c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS

LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

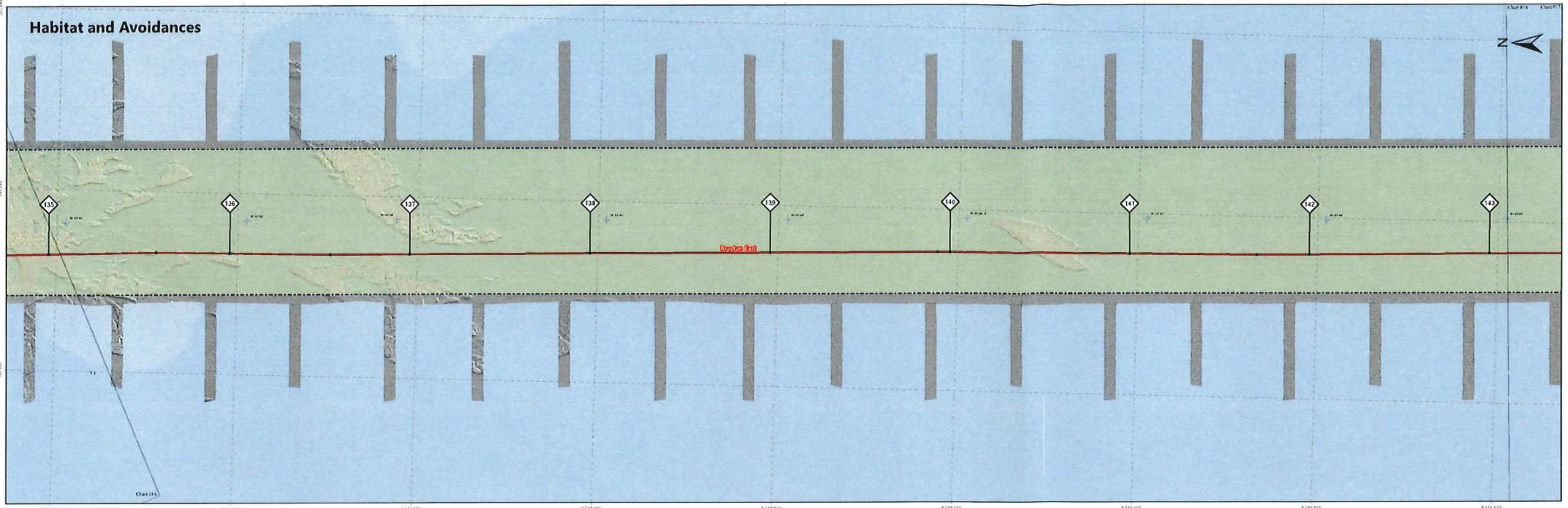
Scale 1:10,000

0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

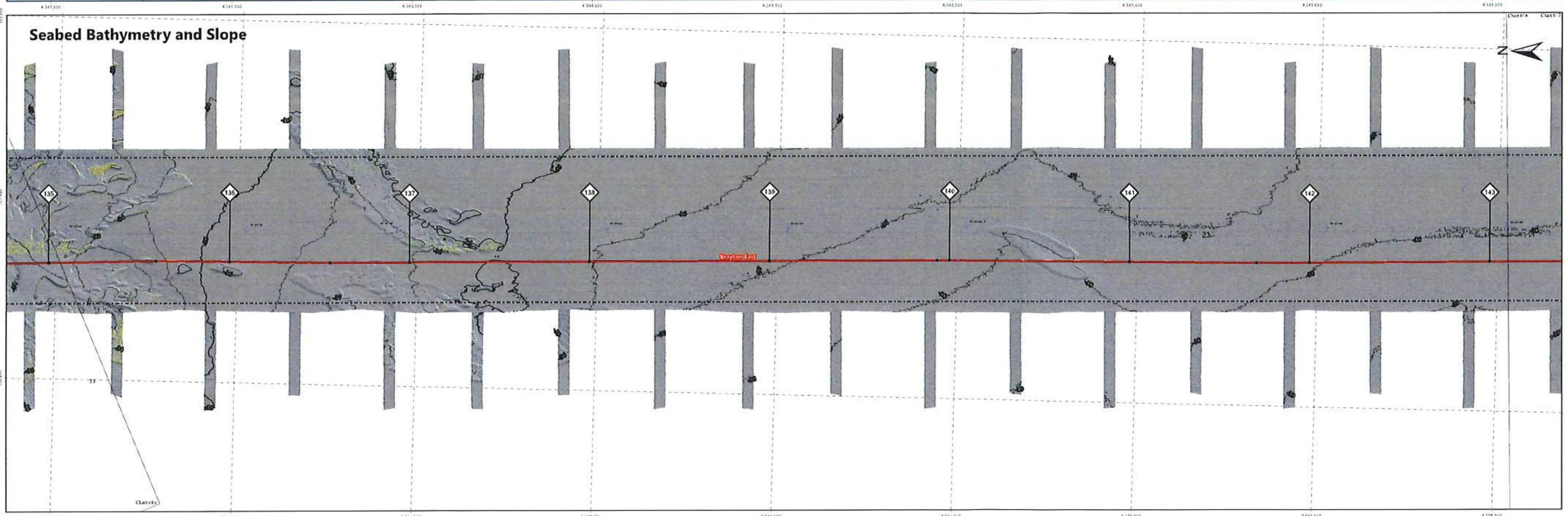
REV.	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 519 | Chart No: 016c - 018c

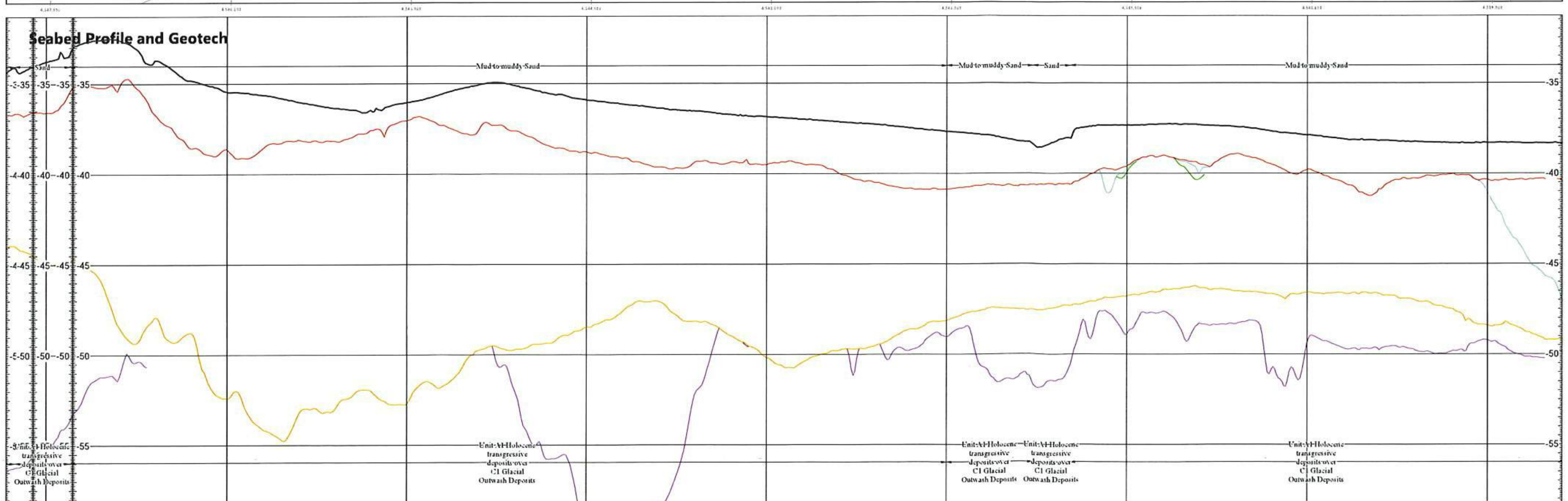
Habitat and Avoidances



Seabed Bathymetry and Slope



Seabed Profile and Geotech



SOUTHCOAST WIND

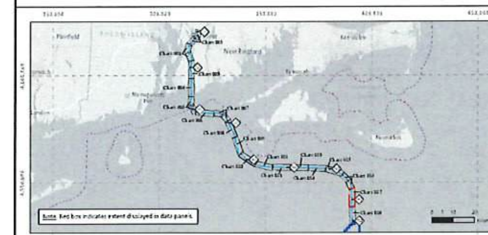
SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 134.776 TO 143.415

2022 | Chart No. 017c - 019c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

- Generated KP Scheme - Brayton East Route
- Brayton East Route
- Brayton West Route
- Chart Panels
- Survey Corridor
- Maritime Boundary
- Avoidance Zones
- Lease Area
- State Waters
- COLREGS Demarcation Line Crossing
- Navigation Buoy

Brayton East RPLs
- Alter Course
- Possible Linear Magnetic Anomaly
- HDD
- Maritime Boundary
- Onshore
- Pipeline Crossing
- Water Depth of Note

Geotechnical Sample Points
- Seabed CPT
- Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat
- Anthropogenic
- Bedrock
- Coarse Sediment
- Coarse Sediment - Mobile
- Glacial Moraine A
- Mixed-Size Gravel in Muddy Sand to Sand
- Mud to Muddy Sand
- Mud to Muddy Sand - Mobile
- Sand
- Sand - Mobile

Benthic Habitat Modifier
- (Likely) Crepidula Substrate
- (Likely) Crepidula Substrate with Boulder Field(s)
- Boulder Field(s)
- Crepidula Substrate
- Crepidula Substrate and Boulder Field(s)
- None
- Potential SAV
- SAV

Utility Alignments
- Cable and/or Pipeline

Shipping Lanes
- Areas to be Avoided
- Particularly Sensitive Sea Area
- Precautionary Areas
- Recommended Routes
- Anchorage Areas
- Vineyard Wind Corridor
- Shipping Fairways Lanes and Zones
- Speed Restrictions/Right Whales
- Traffic Separations Schemes
- Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours
- Major Contours
- Minor Contours
- Pipeline Areas

Survey Slope Grid (degrees from horizontal)
- <1 - Very Gentle (not shown)
- 1 to 4.9 - Gentle
- 5 to 9.9 - Moderate
- 10 to 14.9 - Steep
- >15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

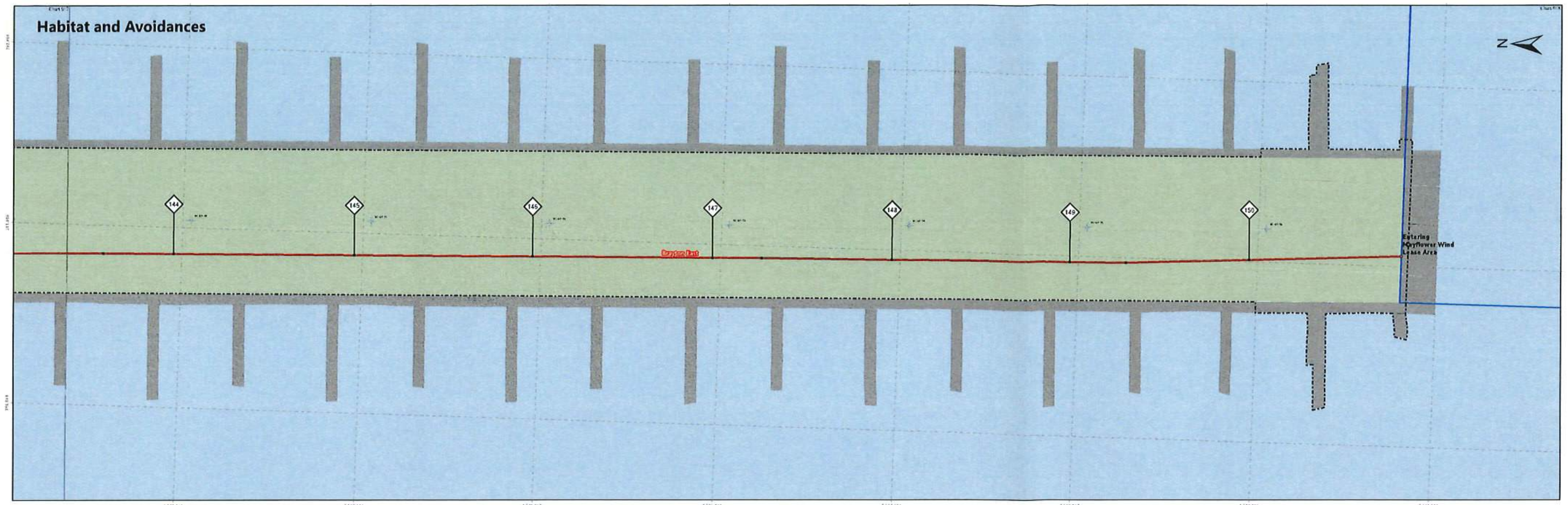
Scale 1:10,000

0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

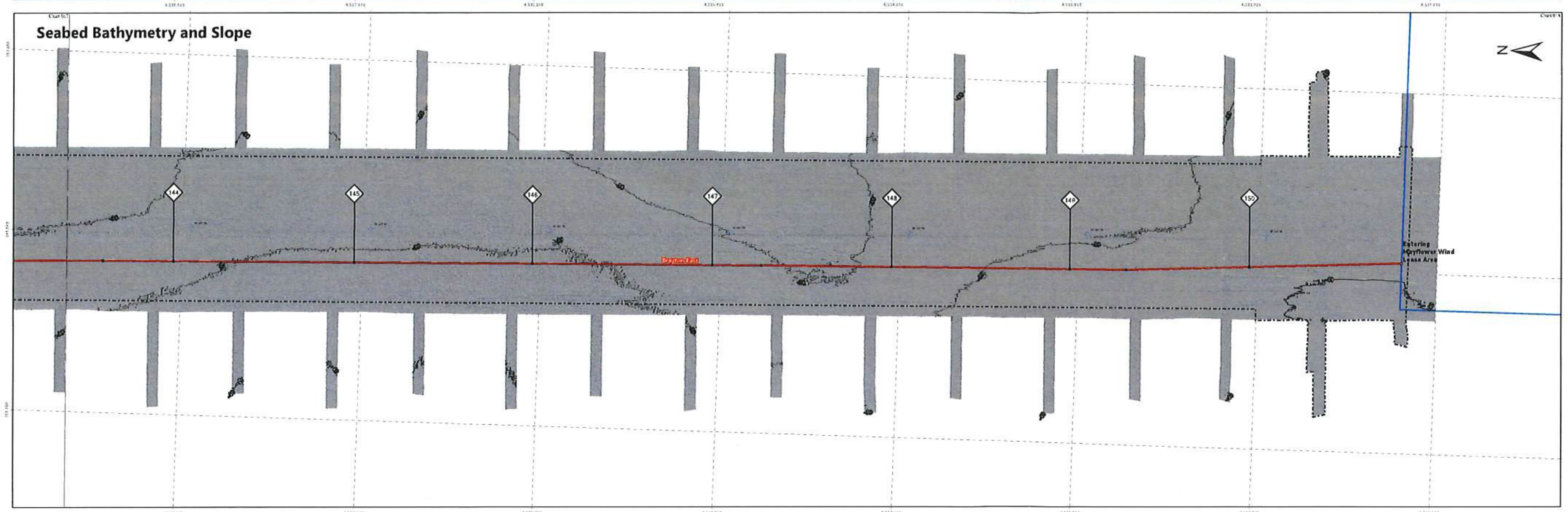
REV.	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/20/2022	Draft	AFH / RS	SN / BQ	AN

Project No: 2022 - 529 | Chart No: 017c - 018c

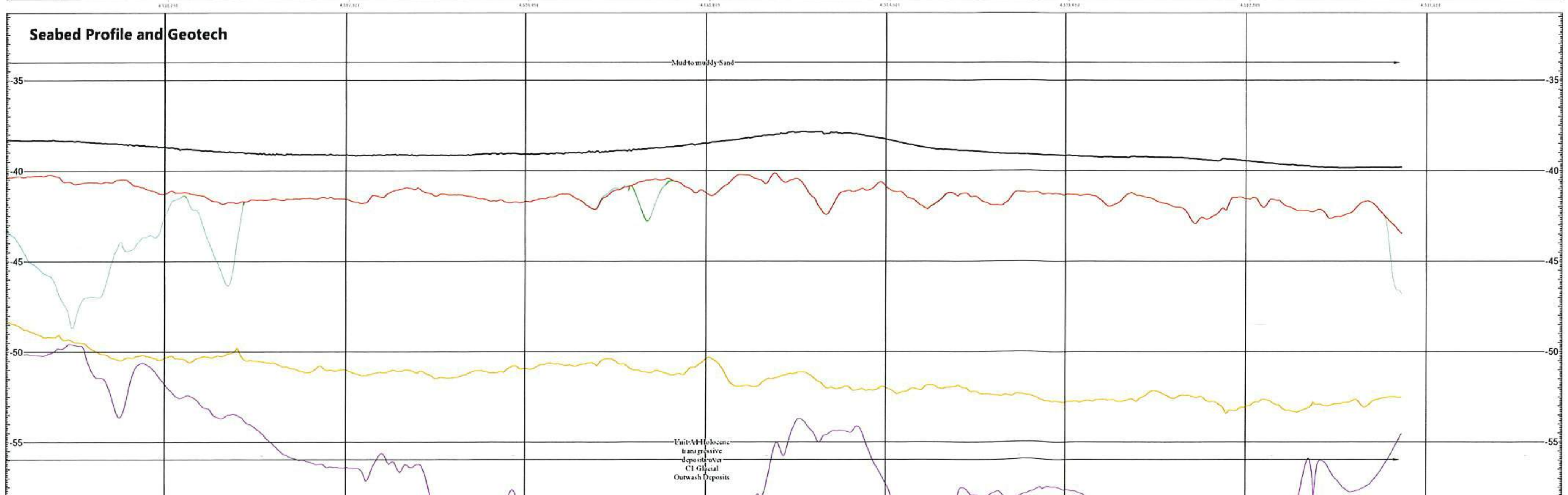
Habitat and Avoidances



Seabed Bathymetry and Slope



Seabed Profile and Geotech



SOUTHCOAST WIND

SOUTHCOAST WIND ENERGY LLC
PRELIMINARY MICRO-ROUTING AND CABLE BURIAL RISK ASSESSMENT (CBRA)
OFFSHORE MASSACHUSETTS

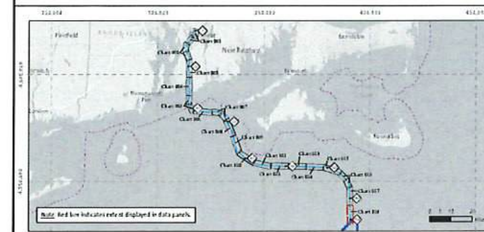
PRELIMINARY EXPORT CABLE ALIGNMENT CHART
KP 143.115 TO 150.863

2022

Chart No: 015c - 015c

XODUS GROUP, LLC.
Boston, Massachusetts
Tel. +1 857-263-1772

XODUS



LEGEND

Generated KP Scheme - Brayton East Route	**Brayton East RPLs**
Brayton East Route	Alter Course
Brayton West Route	Possible Linear Magnetic Anomaly
Chart Panels	HDD
Survey Corridor	Maritime Boundary
Maritime Boundary	Onshore
Avoidance Zones	Pipeline Crossing
Lease Area	Water Depth of Note
State Waters	**Geotechnical Sample Points**
COLREGS Demarcation Line Crossing	Seabed CPT
Navigation Buoy	Vibro Core

HABITAT AND AVOIDANCES

Benthic Habitat	Benthic Habitat Modifier
Anthropogenic	(Likely) Crepidula Substrate
Bedrock	(Likely) Crepidula Substrate with Boulder Field(s)
Coarse Sediment	Boulder Field(s)
Coarse Sediment - Mobile	Crepidula Substrate
Glacial Moraine A	Crepidula Substrate and Boulder Field(s)
Mixed-Size Gravel in Muddy Sand to Sand	None
Mud to Muddy Sand	Potential SAV
Mud to Muddy Sand - Mobile	SAV
Sand	**Utility Alignments**
Sand - Mobile	Cable and/or Pipeline

Shipping Lanes	
Areas to be Avoided	Vineyard Wind Corridor
Particularly Sensitive Sea Area	Shipping Fairways Lanes and Zones
Precautionary Areas	Speed Restrictions/Right Whales
Recommended Routes	Traffic Separations Schemes
Anchorage Areas	Traffic Separation Schemes/Traffic Lanes

SEABED BATHYMETRY AND SLOPE

Bathymetry Contours	Survey Slope Grid (degrees from horizontal)
Major Contours	<1 - Very Gentle (not shown)
Minor Contours	1 to 4.9 - Gentle
Pipeline Areas	5 to 9.9 - Moderate
	10 to 14.9 - Steep
	>15 - Very Steep

SEABED PROFILE AND GEOTECH

- Seabed Profile
- H01 Shallow Gas
- H10 Base of Unit A1 (Transgressive Marine Sands) and Unit A2 (Fluvio-Estuarine Deposits)
- H20 Base of Unit B1 (Holocene Channels)
- H21 Base of Unit B3 (Pleistocene Channels)
- H30 Base of Unit C1 (Pleistocene Glacial Outwash Sands)
- H40 Base of Unit D1 (Pleistocene Channels)
- H99 Interpreted Top of Bedrock/Glacial Till
- Depth to Top Glacial Deposits
- Depth to HP Boundary
- Primary Sediment & Subsurface Geology zones along the route

Note: Seafloor and sub-seafloor horizons extracted directly at proposed route from supplied multibeam bathymetry and horizon grids.
100x Vertical Exaggeration.

NOTES

SOURCE - All survey data was provided by SouthCoast Wind

GEODETIC INFORMATION

Coordinate System: NAD 1983 UTM Zone 19N
EPSG: 26919
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -69.0000
Scale Factor: 0.9996

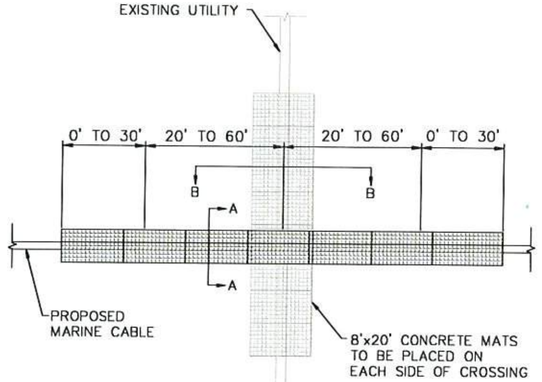
Scale 1:10,000

0 125 250 500 750 1,000 1,250 1,500 1,750 Meters

REV.	DATE	REMARKS	ORIGINATOR	DRAWN	CHECKED
0	12/23/2022	Draft	ARH / RS	SN / BQ	AN

Project No: 2022 - 519

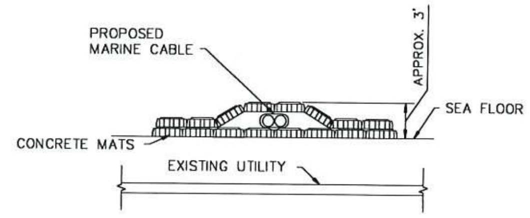
Chart No: 018c - 018c



PLAN VIEW

EXISTING UTILITY CROSSING

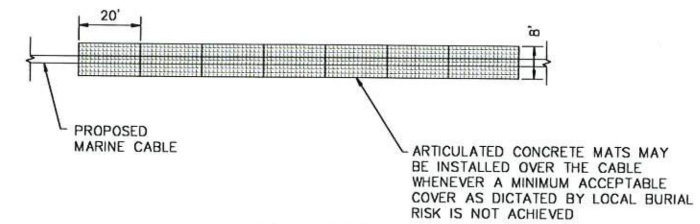
SCALE N.T.S.



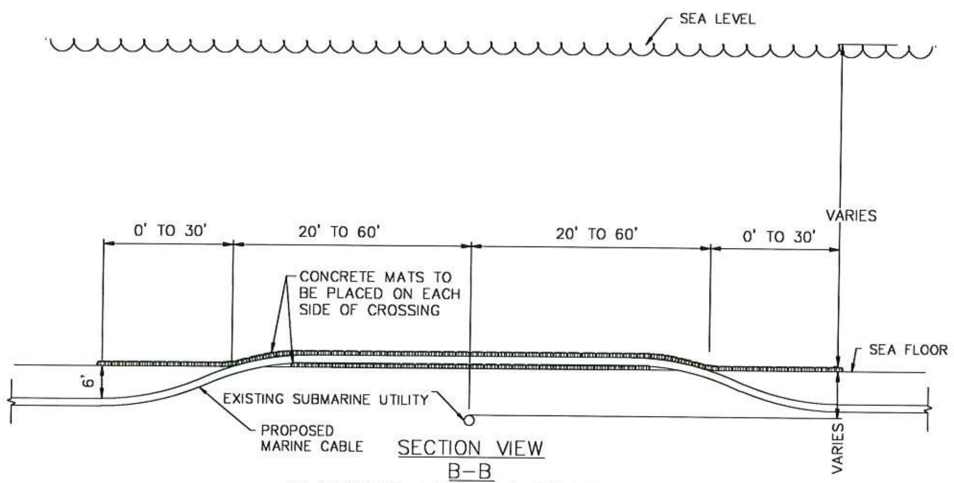
SECTION VIEW A–A

EXISTING UTILITY CROSSING

SCALE N.T.S.



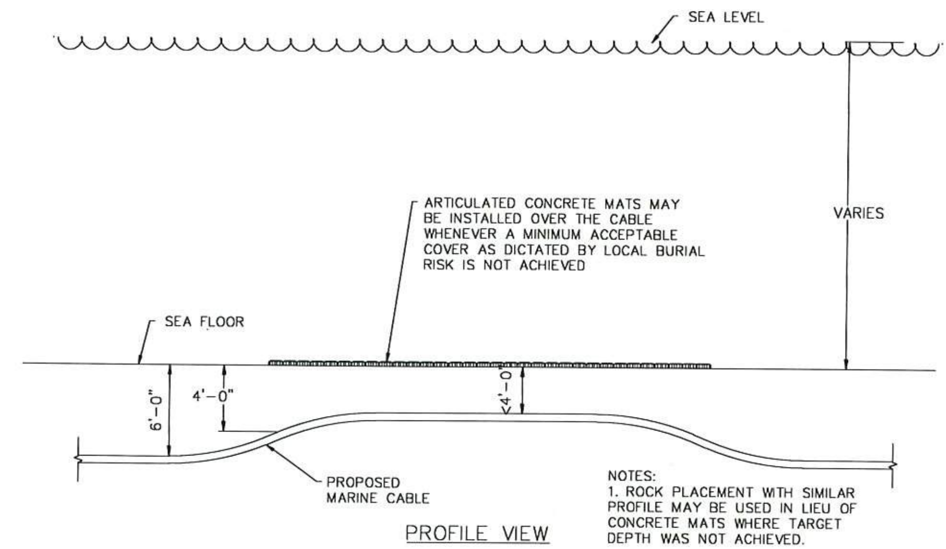
PLAN VIEW



SECTION VIEW B–B

EXISTING UTILITY CROSSING

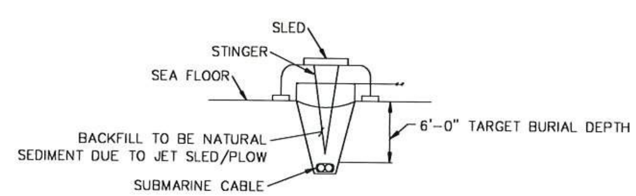
SCALE N.T.S.



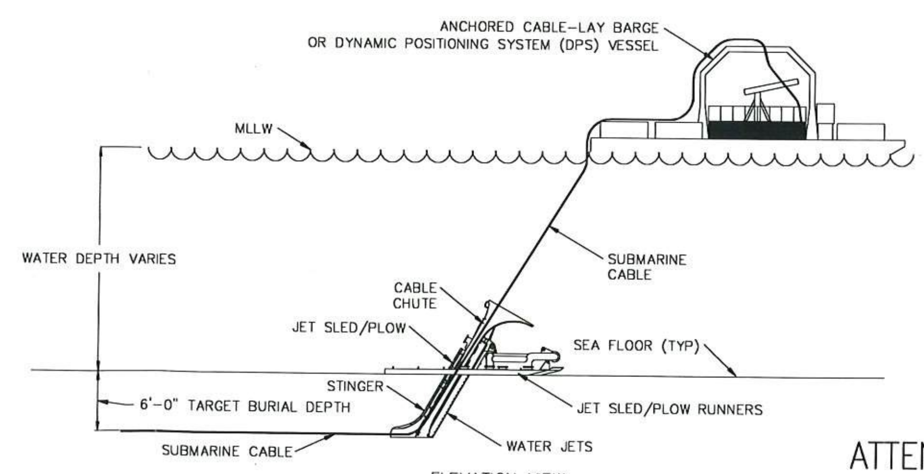
PROFILE VIEW

SHALLOW PENETRATION DETAIL

SCALE N.T.S.



SECTION VIEW



ELEVATION VIEW

SUBMARINE CABLE INSTALLATION DETAIL

SCALE N.T.S.

ATTENTION: FOR CLEANER TEXT AND LINE FEATURES WHEN USING ADOBE TO VIEW THESE PDFS, TURN OFF THE "SMOOTH LINE ART" AND "ENHANCE THIN LINES" OPTIONS UNDER EDIT–PREFERENCES–PAGE DISPLAY

NOTES:
1. DRAWING ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.
2. PRELIMINARY CROSSING DESIGN. DIMENSIONS AND QUANTITIES OF MATTRESSES TO BE FINALIZED IN CONSULTATION WITH UTILITY OWNERS.

SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	LAS	JD	JD	
B	ISSUED FOR REVIEW	02/03/2023	BAJ	JD	JD	
A	ISSUED FOR REVIEW	01/14/2023	BAJ	TSG	TSG	

REFERENCE DRAWINGS

DSGN	JD	09/28/22
DRN	BAJ	09/22/22
CKD	TSG	09/22/22

SCALE: N.T.S.

FOR 22x34 DWG ONLY

POWER ENGINEERS

SOUTHCOAST WIND
PERMIT DRAWINGS
SUBMARINE DETAILS

JOB NUMBER 172033
REV C
DRAWING NUMBER 1

172033 – Submarine Details – Environmental Permit.dwg

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment C-2: 30% HDD Engineering Drawings and Dredge Calculations

March 2023

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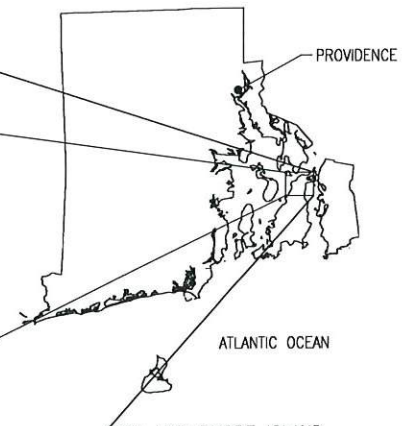
SOUTHCOAST WIND
30% HDD ENGINEERING DRAWINGS AND DREDGE CALCULATIONS

VICINITY MAP

0 500 1000 1500FEET
HORIZONTAL SCALE 1"= 500'



AREA MAP RHODE ISLAND
N.T.S.

PLANS: ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION
DATE ISSUED: FEBRUARY 2023

OWNER/APPLICANT:
SOUTHCOAST WIND ENERGY LLC
101 FEDERAL STREET
BOSTON, MA 02110

PREPARER:
POWER ENGINEERS CONSULTING, PC
2 HAMPSHIRE STREET, SUITE 301
FOXBOROUGH , MA 02035

NOTE: DRAWINGS ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

ATTENTION: FOR CLEANER TEXT AND LINE FEATURES WHEN USING ADOBE TO VIEW THESE PDFS, TURN OFF THE "SMOOTH LINE ART" AND "ENHANCE THIN LINES" OPTIONS UNDER EDIT-PREFERENCES-PAGE DISPLAY

Know what's **below.** **Call** before you dig.

POWER ENGINEERS
PROJECT ENGINEER: TODD GOYETTE

POWER ENGINEERS
PROJECT NUMBER: 172033

SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	BAJ	TSG	TSG	
A	ISSUED FOR REVIEW	12/16/2022	BAJ	TSG	TSG	

REFERENCE DRAWINGS

DSGN	JD	09/28/22
DRN	BAJ	09/22/22
CKD	TSG	09/22/22
SCALE:	AS SHOWN	

FOR 22x34 DWG ONLY

POWER ENGINEERS

SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK
PERMIT DRAWINGS
SOIL EROSION & SEDIMENT CONTROL PLANS
COVER SHEET

JOB NUMBER: 172033
REV: C
DRAWING NUMBER: G0-1

172033 - Mayflower Cover And Manifest Option 2 - Environmental Permit_HDD Only.dwg

ENVIRONMENTAL FIELD ISSUE PLAN SET GENERAL NOTES

GENERAL NOTES:

1. DRAWINGS ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.
2. PROPERTY AND BOUNDARY INFORMATION AND EXISTING UNDERGROUND UTILITIES SHOWN ARE FROM PUBLICLY AVAILABLE DATA AND ARE PROVIDED FOR REFERENCE PURPOSES ONLY. POWER ENGINEERS MAKES NO REPRESENTATION OR WARRANTY AS TO THE ACCURACY OR LOCATION OF THE INFORMATION SHOWN.
3. LIMITS OF DISTURBANCE (TYP) ARE DEPICTED AS A TYPICAL WORK CORRIDOR AND MAY SHIFT OR EXPAND TO ACCOMMODATE EXISTING UTILITY CROSSINGS, ROADWAY RESTRICTIONS, OR OTHER SAFETY CONSIDERATIONS.
4. SPLICE VAULT LOCATIONS ARE PRELIMINARY AND SUBJECT TO CHANGE BASED ON A DETAILED CABLE SYSTEM DESIGN.

EROSION AND SEDIMENT CONTROL GENERAL NOTES:

1. AREAS INSIDE THE LIMITS OF DISTURBANCE WILL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE, TO THE SATISFACTION OF SOUTHCOAST WIND.
2. CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. ALL CONSTRUCTION ACTIVITY WILL BE IN ACCORDANCE WITH OSHA REGULATIONS AND LOCAL AND STATE REQUIREMENTS.
3. ALL MATERIALS ARE TO BE DISPOSED OF PER APPLICABLE LAWS AND REGULATIONS
4. DEWATERING ACTIVITIES WILL OCCUR OUTSIDE OF WETLANDS AND WATERCOURSES WITH APPROVED DEWATERING CONTROLS SUCH AS FILTER BAGS, FILTER SOCKS, WEIR TANKS OR DEWATERING BASINS. WHERE THIS IS NOT POSSIBLE, DEWATERING EFFLUENT WILL BE TRANSPORTED OFFSITE.
5. ALL WETLANDS AND WATERWAYS WILL BE FLAGGED PRIOR TO COMMENCING WORK ACTIVITIES AT THE SITE.
6. MAINTAIN UNDISTURBED VEGETATED BUFFERS BETWEEN WORK AREAS AND WETLANDS/WATERWAYS WHEREVER POSSIBLE.
7. LIMIT REMOVAL OF, AND DAMAGE TO, EXISTING VEGETATION WHEREVER POSSIBLE.
8. AVOID UNNECESSARY DISTURBANCE OF SITE SOILS WHEREVER POSSIBLE.
9. UPON COMPLETION OF CONSTRUCTION IN A GIVEN LOCATION (STRUCTURE, WORK AREA, ETC.), DISTURBED OR EXPOSED SOILS WILL BE STABILIZED WITH MULCH, BLANKETS OR SIMILAR TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICE ADEQUATE FOR PROVIDING TEMPORARY STABILIZATION WHILE VEGETATION BECOMES ESTABLISHED.
10. WHERE TEMPORARY EROSION CONTROL, OR PERMANENT SEED MIXES ARE PLACED, APPROPRIATE TEMPORARY MEASURES WILL BE TAKEN TO PREVENT SOIL EROSION WHILE SEED IS GERMINATING.
11. MULCH WILL NOT BE USED AS A TEMPORARY EROSION CONTROL PRACTICE IN DRAINAGEWAYS. MULCH PLACEMENT ON STEEP SLOPES (>3:1) WILL BE LIMITED TO HYDRAULIC MULCH OR ROLLED EROSION CONTROL PRODUCTS (E.G., EROSION CONTROL BLANKETS, ETC.).
12. SEEDING WILL OCCUR ONLY DURING SPECIFIED PLANTING SEASONS UNLESS OTHERWISE DIRECTED BY SOUTHCOAST WIND.
13. SEED MIXES WILL BE APPROVED BY THE SOUTHCOAST WIND ENVIRONMENTAL COMPLIANCE MONITOR PRIOR TO PLACEMENT. SEED MIXES WILL BE APPROPRIATE FOR THE SITE CONDITIONS (E.G. WETLAND, UPLAND, ETC.).
14. LOW GROWING, WOODY PLANT SPECIES AND ROOT SYSTEMS WILL BE RETAINED IN LOCATIONS WHERE WORK PADS AND ACCESS ROADS ARE NOT PROPOSED. CARE WILL BE TAKEN TO PROTECT SUCH PLANTS AND THEIR ROOT SYSTEMS FROM DAMAGE AND COMPACTION.
15. PERIMETER SEDIMENT CONTROL LOCATIONS SHOWN ON THE PLANS CONTAINED HEREIN ARE APPROXIMATIONS, AND MAY CHANGE DEPENDING ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION OR AS DIRECTED BY THE SOUTHCOAST WIND ENVIRONMENTAL COMPLIANCE MONITOR. PERIMETER SEDIMENT CONTROLS WILL NOT BE INSTALLED DIRECTLY IN WETLANDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE SOUTHCOAST WIND ENVIRONMENTAL COMPLIANCE MONITOR.
16. WHERE RESOURCE AREAS OCCUR IMMEDIATELY ADJACENT TO AND DOWN GRADIENT FROM THE WORK, SEDIMENT PERIMETER CONTROLS (E.G. STRAW WATTLES, COMPOST FILTER SOCKS, EXCELSIOR SEDIMENT LOGS, STRAW BALES, REINFORCED SILT FENCE, ETC.) WILL BE PLACED BETWEEN THE RESOURCE AREA AND THE WORK ZONE PRIOR TO THE COMMENCEMENT OF WORK. PERIMETER CONTROLS WILL BE INSTALLED AS CLOSE TO THE AREA OF DISTURBANCE AS POSSIBLE. PERIMETER CONTROL SELECTION SHOULD OCCUR IN COORDINATION WITH THE SOUTHCOAST WIND ENVIRONMENTAL COMPLIANCE MONITOR.
17. PERIMETER SEDIMENT CONTROLS WILL BE PLACED ALONG THE DOWN SLOPE EDGE OF UNPAVED ACCESS ROADS AS INDICATED ON THE PLANS WHEREVER WETLANDS RESOURCES ARE CLOSER THAN 50' TO THE EDGE OF ROAD AND/OR ADJACENT TO SLOPES EXCEEDING A GRADE OF 3:1, OR AS DIRECTED BY THE SOUTHCOAST WIND ENVIRONMENTAL COMPLIANCE MONITOR.
18. DEWATERING AREAS, CONCRETE WASHOUT AREAS, AND TEMPORARY SOIL STOCKPILE AREAS SHOWN ON THE PLAN INDICATE ONLY THAT SUCH DEVICES AND PRACTICES MAY BE REQUIRED AND DO NOT APPROXIMATE LOCATIONS. FINAL LOCATIONS FOR SUCH DEVICES AND PRACTICES WILL BE DETERMINED DURING CONSTRUCTION AS FIELD CONDITIONS REQUIRE AND ALLOW. DEWATERING MAY BE REQUIRED IN ADDITIONAL LOCATIONS DEPENDING ON FIELD CONDITIONS DURING CONSTRUCTION.
19. INSTALL INLET PROTECTION IF CATCH BASINS PRESENT.
20. ALL EROSION AND SEDIMENT CONTROLS, DEVICES, AND PRACTICES WILL BE PROPERLY MAINTAINED, REPLACED, SUPPLEMENTED, OR MODIFIED AS NECESSARY THROUGHOUT THE LIFE OF THE PROJECT IN ORDER TO MINIMIZE SOIL EROSION AND TO PREVENT SEDIMENT FROM BEING DEPOSITED IN ANY WETLANDS OR COASTAL FEATURES.
21. SOIL STOCKPILES WILL BE CONTAINED WITHIN APPROVED CONSTRUCTION WORK ZONES OR DESIGNATED STOCKPILING AREAS.
22. WHERE POSSIBLE, SOIL STOCKPILES WILL NOT EXCEED 5 FEET HIGH IN HEIGHT. SOIL STOCKPILES WILL BE COVERED WITH MATTING, TARP, OR OTHER SIMILAR MATERIAL AND WEIGHTS AT THE END OF EACH CONSTRUCTION DAY IF NECESSARY. INSTALL PERIMETER CONTROLS AROUND ALL STOCKPILES IN CLOSE PROXIMITY TO WETLANDS CONTIGUOUS AREAS.
23. STONE, SOIL, OR OTHER FILL MATERIALS WILL NOT BE PLACED IN ANY WETLANDS, WATERBODIES, OR WATERWAYS BEYOND PERMITTED AREAS.
24. UPON PERMANENT STABILIZATION OF ALL DISTURBED SOILS, TEMPORARY EROSION AND/OR SEDIMENT CONTROLS WILL BE REMOVED FROM, AND DISPOSED OF PROPERLY, OFF-SITE.
25. ANY POTENTIALLY IMPACTED SOILS OR WATER ENCOUNTERED DURING CONSTRUCTION ACTIVITIES WILL BE MANAGED IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

EROSION AND SEDIMENT CONTROL MAINTENANCE DURING CONSTRUCTION:

1. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED FOR STABILITY AND PROPER FUNCTION AFTER EVERY RUNOFF PRODUCING STORM EVENT, OR AT LEAST WEEKLY. ALL NECESSARY REPAIRS WILL BE MADE IMMEDIATELY.
2. TRAPPED SEDIMENT WILL BE REMOVED FROM BEHIND PERIMETER CONTROL DEVICES BEFORE THE DEPOSITS REACH 50 PERCENT (1/2) OF THE ABOVE-GROUND HEIGHT OF THE DEVICE, UNLESS OTHERWISE NOTED, OR ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. IN DISTURBED AREAS WHERE ADEQUATE SEED STOCK IS NOT PRESENT, OR WHERE TOPSOIL HAS BEEN DISPLACED, SOILS WILL BE PREPARED IN A MANNER SUITABLE FOR SUPPORTING PLANT GROWTH PRIOR TO PLACING SEED, MULCH, AND OR OTHER EROSION CONTROL PRACTICES APPROPRIATE FOR THE SITE.

GENERAL CONSTRUCTION NOTES:

1. ONSHORE CONSTRUCTION PRACTICES WILL BE PERFORMED IN COMPLIANCE WITH THE FOLLOWING STANDARDS, AS APPLICABLE:
   - RHODE ISLAND SOIL EROSION AND SEDIMENT CONTROL HANDBOOK
   - RHODE ISLAND STORMWATER DESIGN AND INSTALLATION STANDARDS MANUAL
   - RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT WETLAND BMP MANUAL

811 Know what's below. Call before you dig.

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL
3/14/23

SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD	REFERENCE DRAWINGS
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG		
B	ISSUED FOR REVIEW	02/03/2023	BAJ	JD	TSG		
A	ISSUED FOR REVIEW	12/16/2022	BAJ	JD	TSG		

DSGN	JD	09/28/22
DRN	BAJ	09/22/22
CKD	TSG	09/22/22
SCALE:	NONE	

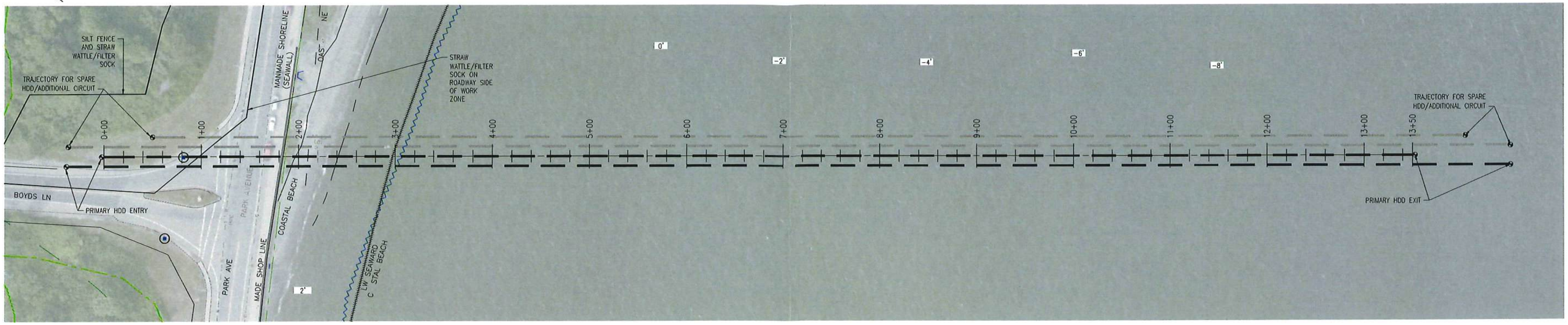
FOR 22x34 DWG ONLY

POWER ENGINEERS

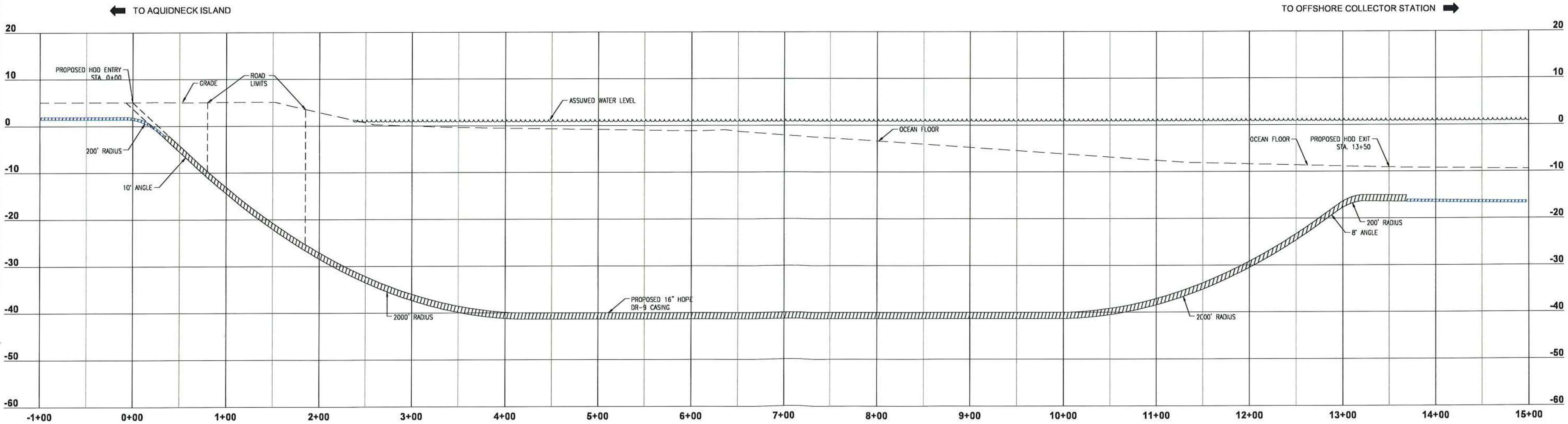
SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK
PERMIT DRAWINGS
SOIL EROSION & SEDIMENT CONTROL PLANS
GENERAL NOTES

JOB NUMBER: 172033 | REV: C
DRAWING NUMBER: G1-2

172033 - PLAN & PROFILE - OPTION 2 - Environmental Permit.dwg



PLAN VIEW



PROFILE VIEW

Know what's below. Call before you dig.

NOTES:

1. THE UTILITIES AND NATURAL FEATURES SHOWN HEREON ARE BASED ON FIELD SURVEYS, AERIAL PHOTOGRAPHY AND RECORD DOCUMENTS. OTHER FACILITIES MAY EXIST NOT DISCOVERED THROUGH THE RECORD CHECK. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, BOTH HORIZONTAL AND VERTICAL, OF ALL UTILITIES THROUGH THE APPROPRIATE UTILITY COMPANIES. CALL BEFORE YOU DIG, 811 OR 1-800-344-7233.
2. PLAN AND PROFILE ALIGNMENT IS CONCEPTUAL AND NOT BASED ON PROJECT SPECIFIC FIELD SURVEY OR GEOTECHNICAL INVESTIGATION.
3. THE UTILITIES AND NATURAL FEAUTRES SHOWN HEREON ARE BASED ON:
   • GOOGLE EARTH 2020
   • TOWN OF PORTSMOUTH WEB GIS MAPS AND ONLINE PROPERTY INFORMATION
4. PROPERTY LINES ARE APPROXIMATE FOR DISCUSSION PURPOSES.

0 50 100 150 FEET — HORIZONTAL SCALE 1"= 50'

0 4 8 16 24 FEET — VERTICAL SCALE: 1"= 8'

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

ATTENTION: FOR CLEANER TEXT AND LINE FEATURES WHEN USING ADOBE TO VIEW THESE PDFS, TURN OFF THE "SMOOTH LINE ART" AND "ENHANCE THIN LINES" OPTIONS UNDER EDIT-PREFERENCES-PAGE DISPLAY

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SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	ASW	JD	TSG	
A	ISSUED FOR REVIEW	12/16/2022	ASW	JD	TSG	

REFERENCE DRAWINGS

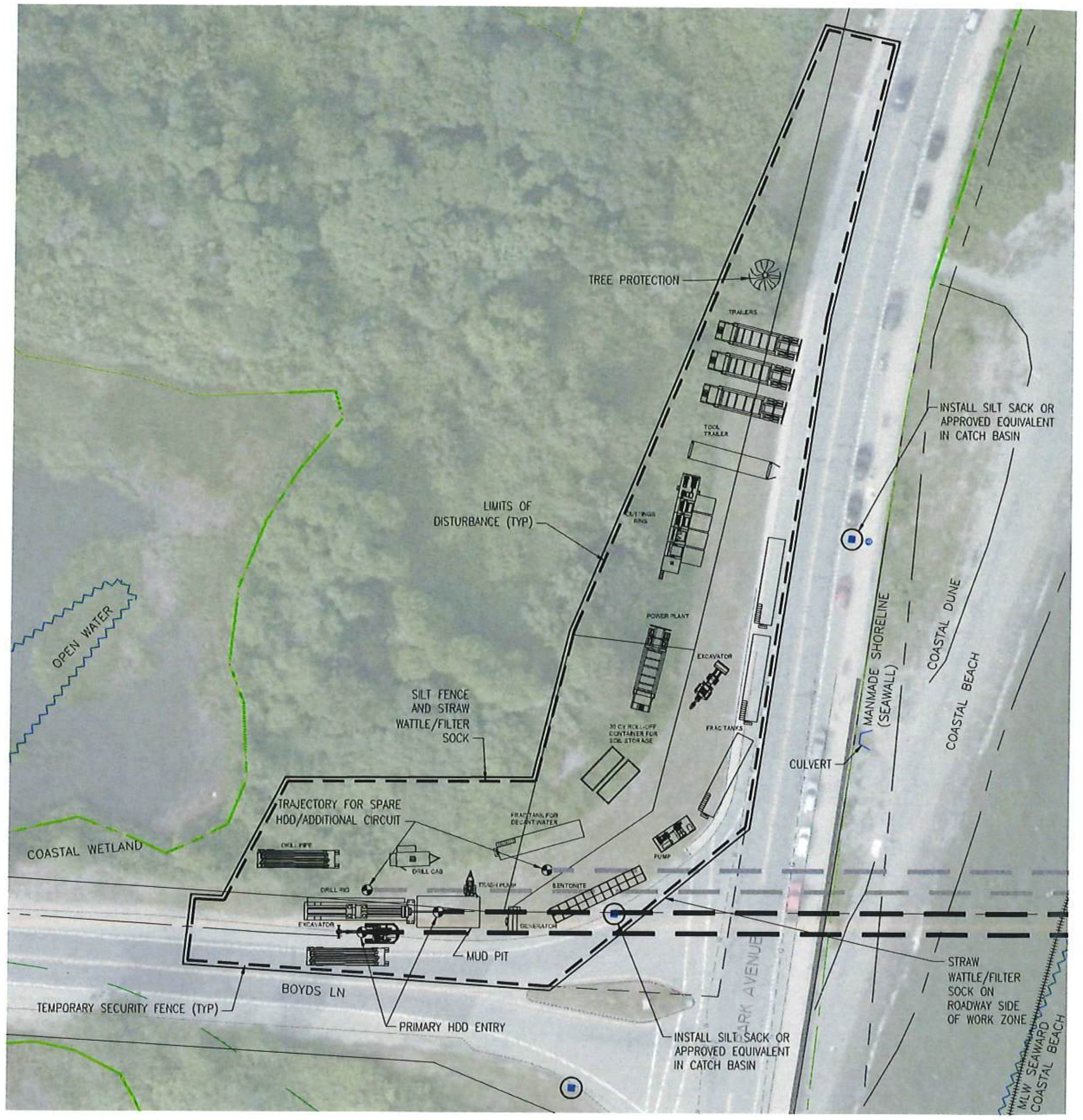
DSGN	TSG	08/10/2021
DRN	ASW	08/10/2021
CKD	TSG	08/10/2021
SCALE:	AS SHOWN	

FOR 24x36 DWG ONLY

POWER ENGINEERS

SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK PERMIT DRAWINGS
BOYDS LN HDD PLAN AND PROFILE

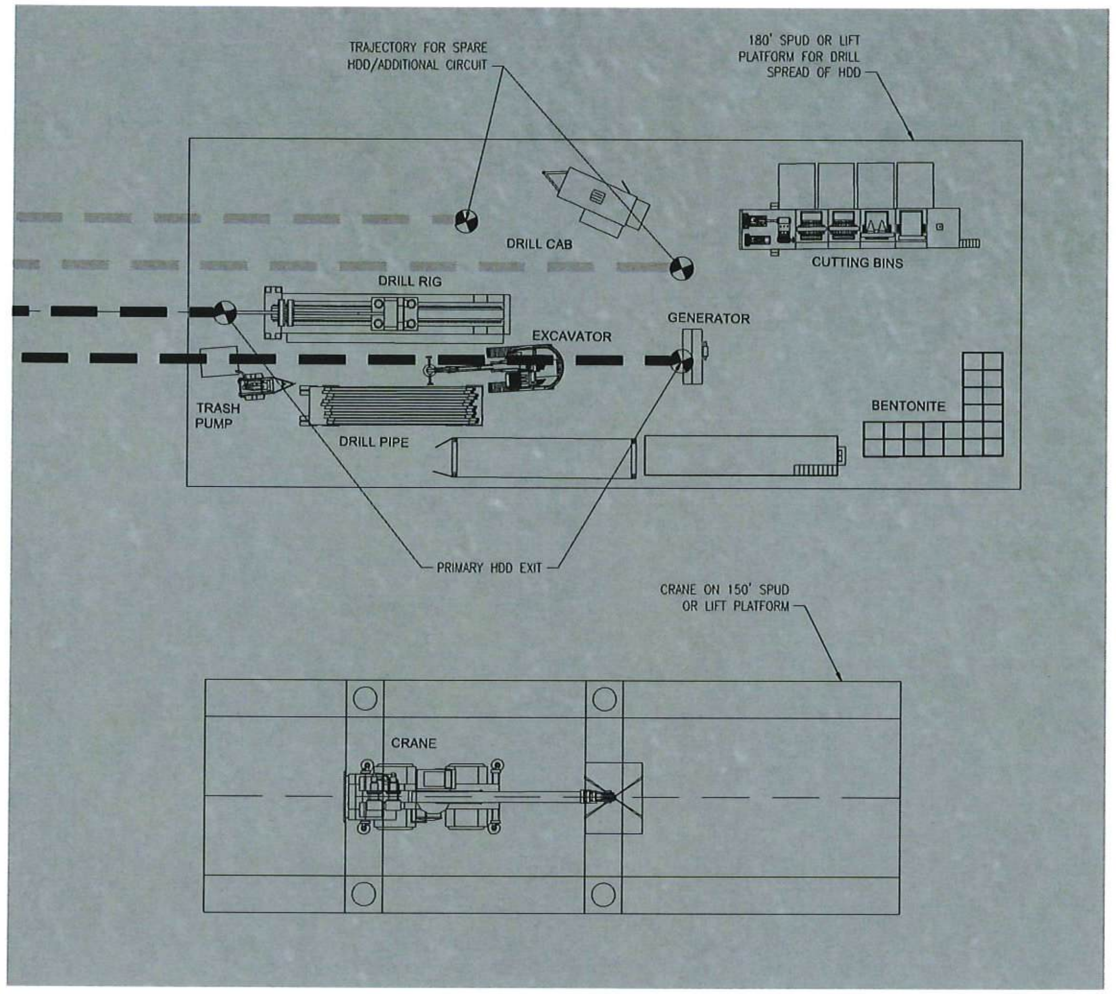
JOB NUMBER 172033
REV C
DRAWING NUMBER P2-1



ONSHORE HDD SETUP (TYP)

0 20 40 80 120 FEET

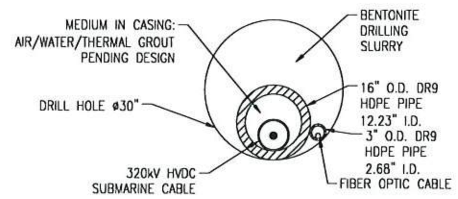
HORIZONTAL SCALE: 1"= 40'



OFFSHORE HDD SETUP (TYP)

0 10 20 40 60 FEET

HORIZONTAL SCALE: 1"= 20'



PROPOSED BORE DETAIL - OPTION 1 &2

N.T.S.

NOTES:

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   - TOWN OF PORTSMOUTH WEB GIS MAPS AND ONLINE PROPERTY INFORMATION
4. PROPERTY LINES ARE APPROXIMATE FOR DISCUSSION PURPOSES.
5. DRAWINGS ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.
6. BOUNDARY OF ONSHORE WORK AREA IS PENDING FIELD VERIFICATION OF WETLANDS.

811 Know what's below. Call before you dig.

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

ATTENTION: FOR CLEANER TEXT AND LINE FEATURES WHEN USING ADOBE TO VIEW THESE PDFS, TURN OFF THE "SMOOTH LINE ART" AND "ENHANCE THIN LINES" OPTIONS UNDER EDIT-PREFERENCES-PAGE DISPLAY

SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	ASW	JD	TSG	
A	ISSUED FOR REVIEW	12/16/2022	ASW	JD	TSG	

REFERENCE DRAWINGS

DSGN	JD	09/28/22
DRN	BAJ	09/22/22
CKD	TSG	09/22/22
SCALE:	AS SHOWN	

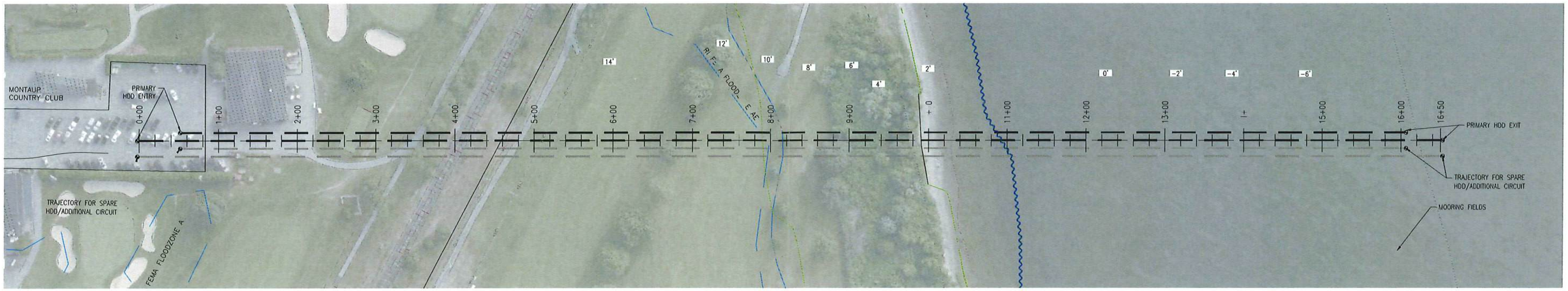
FOR 22x34 DWG ONLY

POWER ENGINEERS

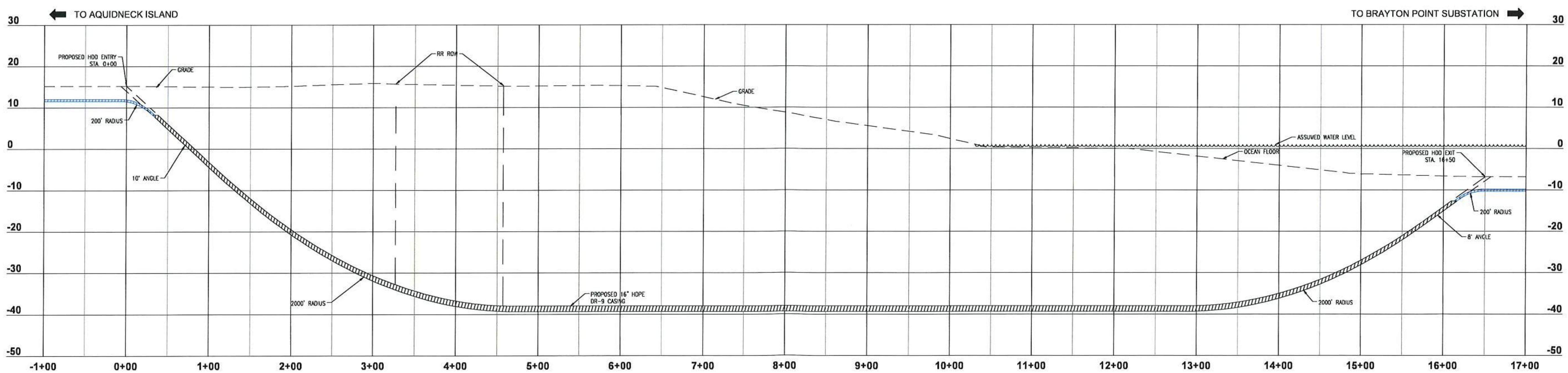
SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK
PERMIT DRAWINGS
SOIL EROSION & SEDIMENT CONTROL PLANS
BOYDS LN
HDD LAYOUTS

JOB NUMBER 172033
REV C
DRAWING NUMBER U1-1

172033 - Aquidneck Island Boyds Ln HDD - Environmental Permit.dwg



PLAN VIEW



PROFILE VIEW

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

NOTES:

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2. PLAN AND PROFILE ALIGNMENT IS CONCEPTUAL AND NOT BASED ON PROJECT SPECIFIC FIELD SURVEY OR GEOTECHNICAL INVESTIGATION.
3. THE UTILITIES AND NATURAL FEAUTRES SHOWN HEREON ARE BASED ON:
   - GOOGLE EARTH 2020
   - TOWN OF PORTSMOUTH WEB GIS MAPS AND ONLINE PROPERTY INFORMATION
4. PROPERTY LINES ARE APPROXIMATE FOR DISCUSSION PURPOSES.

HORIZONTAL SCALE 1"= 60' (0, 60, 120, 180 FEET)

VERTICAL SCALE 1"= 12' (0, 12, 24, 36 FEET)

Know what's below. Call before you dig.

ATTENTION: FOR CLEANER TEXT AND LINE FEATURES WHEN USING ADOBE TO VIEW THESE PDFS, TURN OFF THE "SMOOTH LINE ART" AND "ENHANCE THIN LINES" OPTIONS UNDER EDIT-PREFERENCES-PAGE DISPLAY

SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	ASW	TSG	TSG	
A	ISSUED FOR REVIEW	12/16/2022	ASW	TSG	TSG	

REFERENCE DRAWINGS

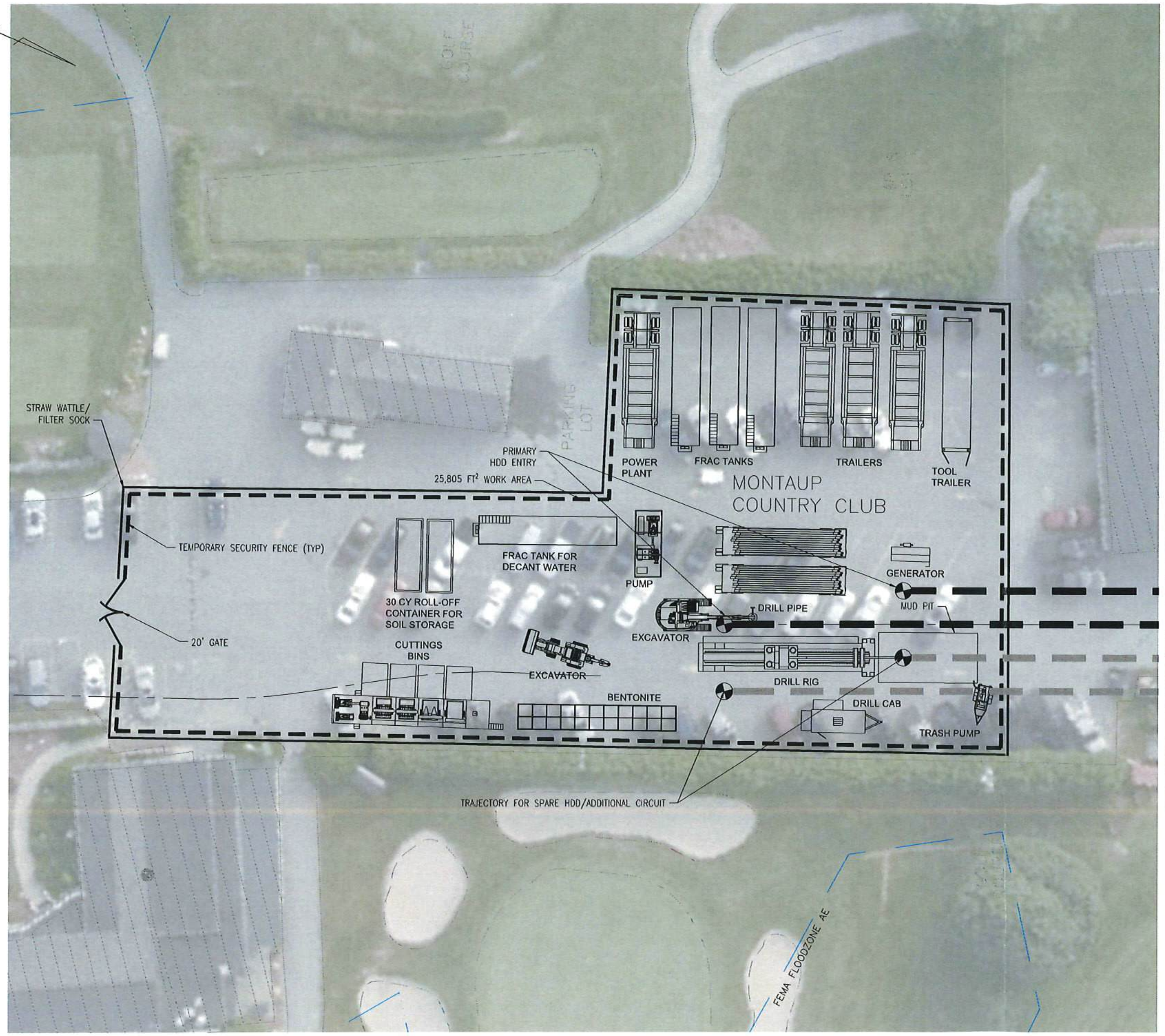
DSGN	TSG	08/13/2021
DRN	ASW	08/13/2021
CKD	TSG	08/13/2021
SCALE:	AS SHOWN	

FOR 24x36 DWG ONLY

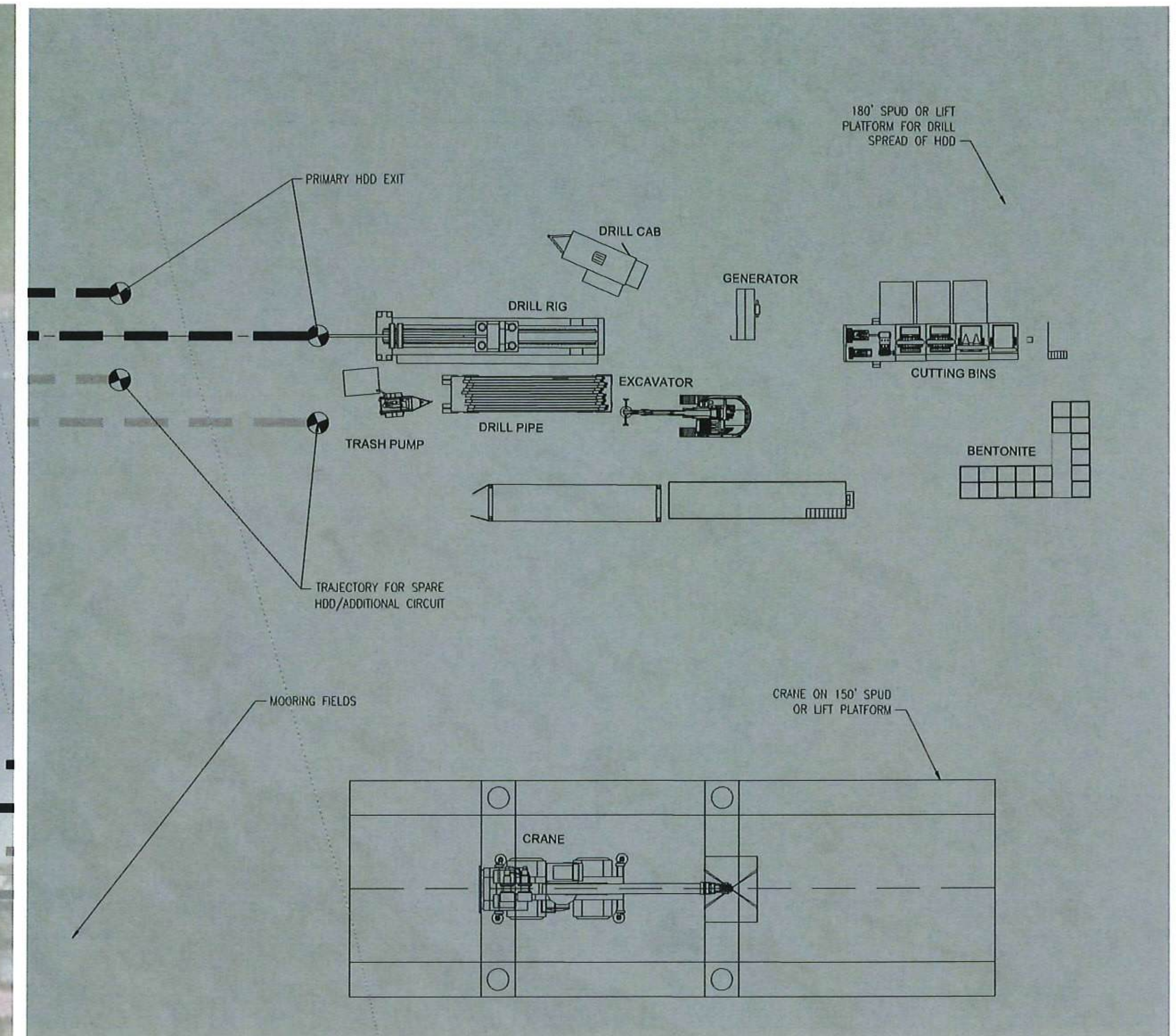
POWER ENGINEERS

SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK PERMIT DRAWINGS
MONTAUP COUNTRY CLUB PARKING LOT PLAN AND PROFILE

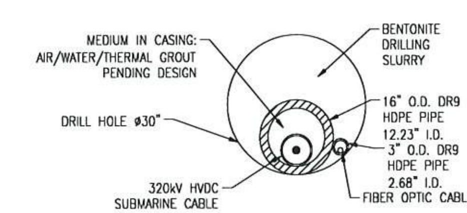
JOB NUMBER: 172033
REV: C
DRAWING NUMBER: P2-2



ONSHORE HDD SETUP (TYP)



OFFSHORE HDD SETUP (TYP)



PROPOSED BORE DETAIL

N.T.S.

NOTES:

1. THE UTILITIES AND NATURAL FEATURES SHOWN HEREON ARE BASED ON FIELD SURVEYS, AERIAL PHOTOGRAPHY AND RECORD DOCUMENTS. OTHER FACILITIES MAY EXIST NOT DISCOVERED THROUGH THE RECORD CHECK. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, BOTH HORIZONTAL AND VERTICAL, OF ALL UTILITIES THROUGH THE APPROPRIATE UTILITY COMPANIES. CALL BEFORE YOU DIG, 811 OR 1-800-344-7233.
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   - TOWN OF PORTSMOUTH WEB GIS MAPS AND ONLINE PROPERTY INFORMATION
4. PROPERTY LINES ARE APPROXIMATE FOR DISCUSSION PURPOSES.
5. DRAWINGS ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.

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0 20 40 60 FEET
HORIZONTAL SCALE 1"= 20'

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

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SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	ASW	TSG	TSG	
A	ISSUED FOR REVIEW	12/16/2022	ASW	TSG	TSG	

REFERENCE DRAWINGS

DSGN	JD	09/28/22
DRN	BAJ	09/22/22
CKD	TSG	09/22/22
SCALE:	AS SHOWN	

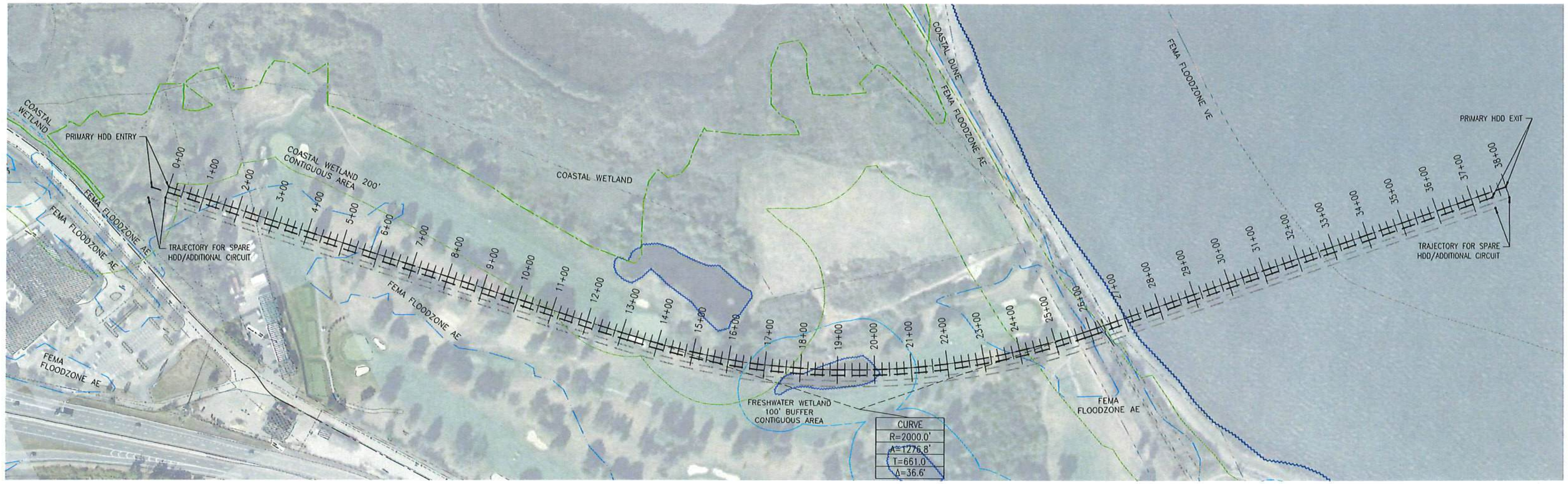
FOR 22x34 DWG ONLY

POWER ENGINEERS

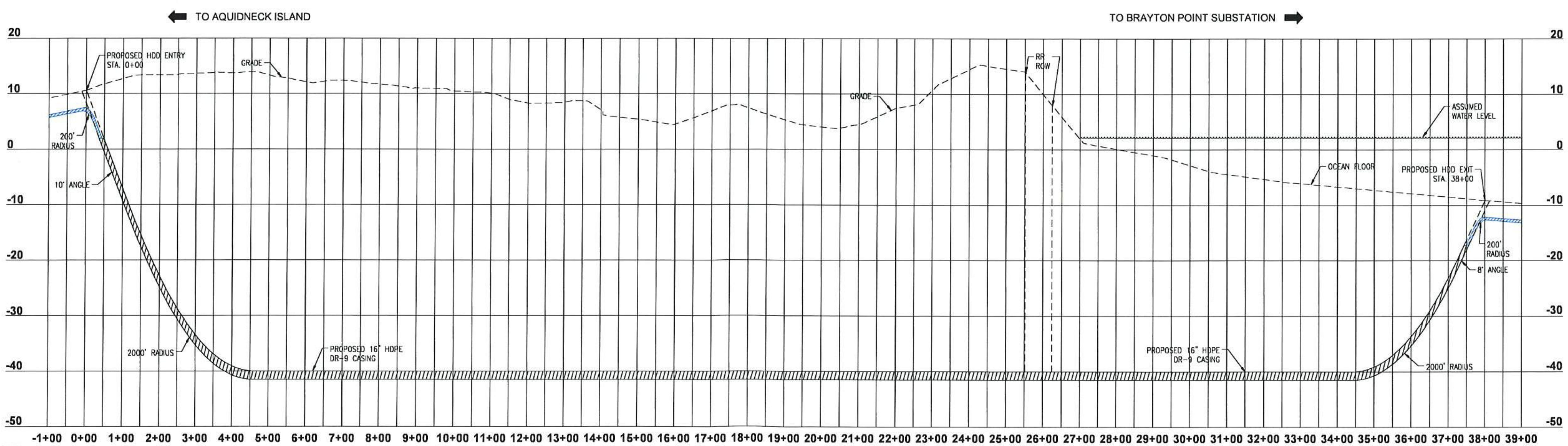
SOUTHCOAST WIND
AQUIDNECK ISLAND DUCT BANK
PERMIT DRAWINGS
SOIL EROSION & SEDIMENT CONTROL PLANS
MONTAUP COUNTRY CLUB PARKING LOT
HDD LAYOUTS

JOB NUMBER 172033
REV C
DRAWING NUMBER U1-2

172033 – Aquidneck Island Golf Course Parking Lot HDD – Environmental Permit.dwg



PLAN VIEW



PROFILE VIEW

NOTES:

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4. PROPERTY LINES ARE APPROXIMATE FOR DISCUSSION PURPOSES.
5. BOUNDARY OF ONSHORE WORK AREA IS PENDING FIELD VERIFICATION OF WETLANDS.
6. ROGER WILLIAMS UNIVERSITY IS AN ALTERNATIVE SITE

HORIZONTAL SCALE 1"= 150' (0, 150, 300, 450 FEET)

VERTICAL SCALE 1"= 10' (0, 10, 20, 30 FEET)

811 Know what's **below.** **Call** before you dig.

TODD GOYETTE — REGISTERED PROFESSIONAL ENGINEER ELECTRICAL — No. 11401

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SOUTHCOAST WIND ENERGY LLC
SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD	REFERENCE DRAWINGS
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A	ISSUED FOR REVIEW	01/20/2023	ASW	TSG	TSG		

DSGN	TSG	12/10/2021
DRN	ASW	12/10/2021
CKD	TSG	12/10/2021
SCALE:	AS SHOWN	

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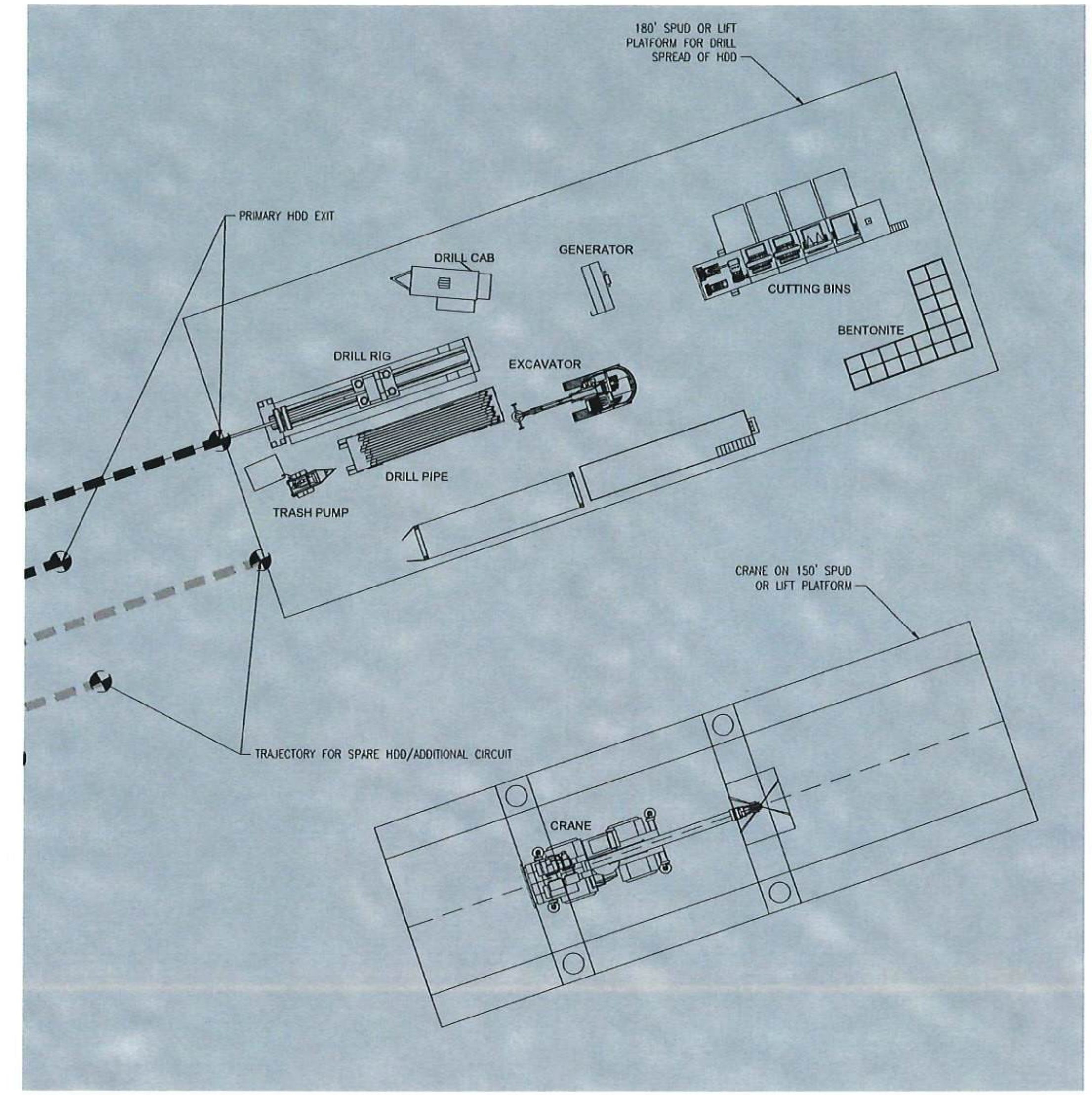
POWER ENGINEERS

SOUTHCOAST WIND
AQUIDNECK ISLAND HDD
ROGER WILLIAMS UNIVERSITY PLAN AND PROFILE

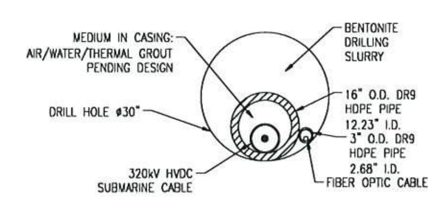
JOB NUMBER 172033 — REV C
DRAWING NUMBER P2-3

172033 – Aquidneck Island Residence Hall HDD – Environmental Permit.dwg

ONSHORE HDD SETUP (TYP)



OFFSHORE HDD SETUP (TYP)



PROPOSED BORE DETAIL
N.T.S.

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SOUTHCOAST WIND 1 PROJECT
PORTSMOUTH, RHODE ISLAND

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A	ISSUED FOR REVIEW	01/20/2023	ASW	TSG	TSG	

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DRN	ASW	12/10/2021
CKD	TSG	12/10/2021
SCALE:	AS SHOWN	

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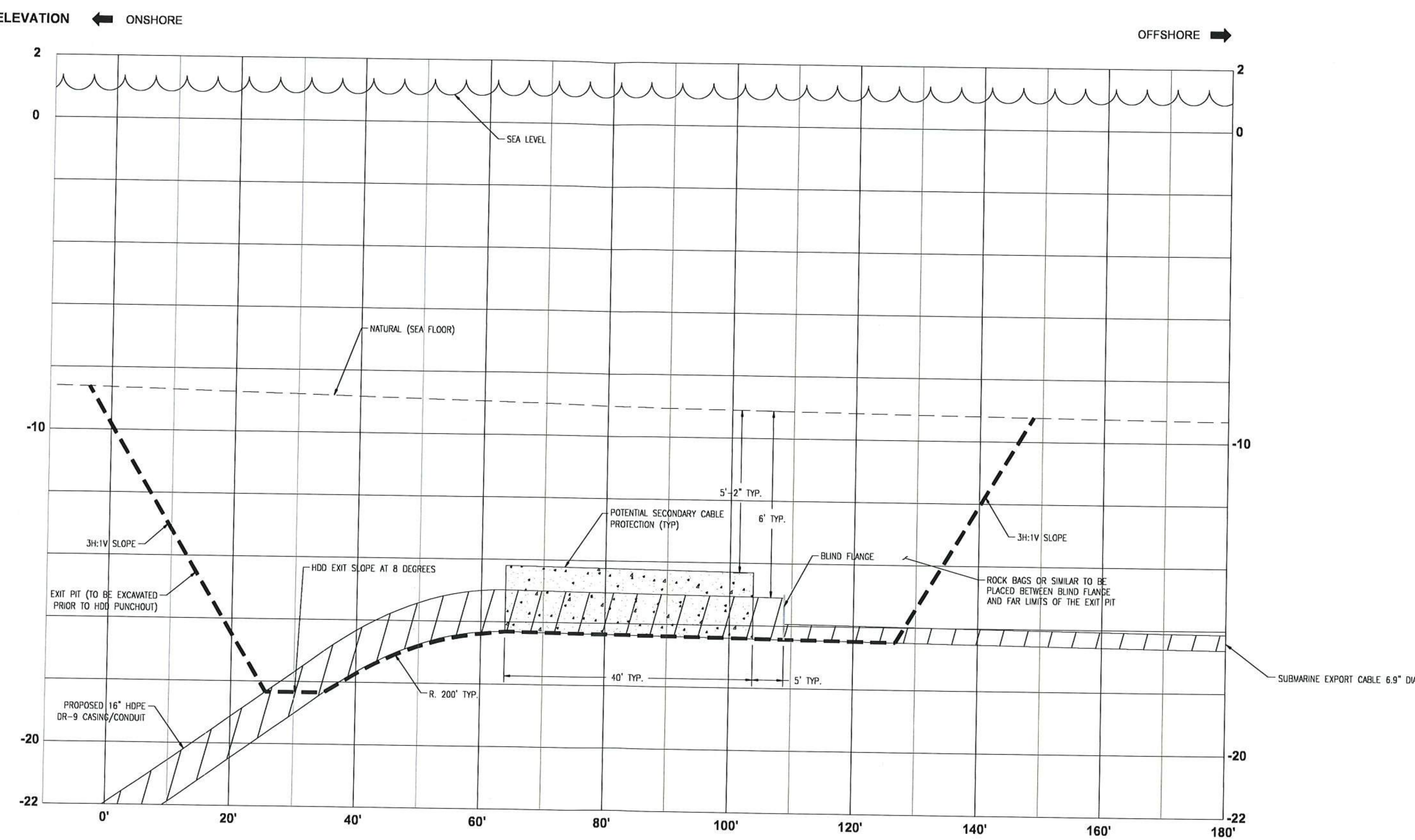
POWER ENGINEERS

SOUTHCOAST WIND
AQUIDNECK ISLAND HDD
ROGER WILLIAMS UNIVERSITY
HDD LAYOUTS

JOB NUMBER 172033 REV C
DRAWING NUMBER U1-3

172033 - Aquidneck Island Residence Hall HDD - Environmental Permit.dwg



PROFILE VIEW
HORIZONTAL DIRECTIONAL DRILL (HDD) OFFSHORE PIT (TYP)

APPROXIMATE TOTAL VOLUME OF DREDGE AREA		
PER EXIT PIT		
	1638	cu yd
	1252	cu m
LANDFALL TOTALS (4 PITS TOTAL)		
	6552	cu yd
	5009	cu m
TOTAL VOLUME (2 LANDFALLS)		
	13104	cu yd
	10019	cu m

NOTES:

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2. DRAWINGS ISSUED FOR PERMITTING, NOT FOR CONSTRUCTION.
3. SEDIMENTS TO BE DREDGED/EXCAVATED WILL BE SIDE-CAST ADJACENT TO THE EXCAVATION AND RETURNED TO THE EXCAVATION AS BACKFILL ONCE THE PROPOSED HDPE CONDUIT AND CABLE IS INSTALLED.
4. IN LIEU OF OPEN PIT, CONTRACTOR MAY ELECT TO USE GRAVITY CELL.
5. WATER DEPTH MAY VARY BASED ON SPECIFIC SITE CONDITIONS AND TIDAL RANGE.
6. TYPICAL HDD ASSEMBLY WILL INCLUDE 6.9" EXPORT CABLE WITHIN 16" HDPE DR-9 CASING/CONDUIT INSIDE OF A 30" BORE.

0 10 20 30 FEET
HORIZONTAL SCALE 1"= 10'

0 1 2 4 6 FEET
VERTICAL SCALE: 1"= 2'

TODD GOYETTE
No. 11401
REGISTERED PROFESSIONAL ENGINEER ELECTRICAL

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SOUTHCOAST WIND 1 PROJECT

REV	REVISIONS	DATE	DRN	DSGN	CKD	APPD
C	ISSUED FOR REVIEW	02/13/2023	BAJ	TSG	TSG	
B	ISSUED FOR REVIEW	02/03/2023	BAJ	JD	JD	
A	ISSUED FOR REVIEW	01/20/2023	ASW	JD	TSG	

REFERENCE DRAWINGS

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DRN	BAJ	01/20/23
CKD	TSG	01/20/23
SCALE:	AS SHOWN	

FOR 22x34 DWG ONLY

POWER ENGINEERS

SOUTHCOAST WIND
PERMIT DRAWINGS
TYPICAL HDD DETAIL

JOB NUMBER 172033
REV C
DRAWING NUMBER P1-1

172033 - Typical HDD Detail - Environmental Permit.dwg

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment D: Cable Burial Risk Assessment

(Confidential - Provided Under Separate Cover)

Revised: February 2023

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SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment E: Emergency Response Plan

Revision 1: March 2023

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1 EMERGENCY RESPONSE PLAN

SouthCoast Wind 1 Project contractors will be required to prepare emergency response plans (ERPs) applicable to each specific scope of work. The requirements for each of these plans are outlined below and will be included in the emergency response plans wherever relevant to the scope of work. The emergency response plans will be implemented along with the Project Oil Spill Response Plan (OSRP) [COP, Appendix AA].

The contractors will conduct all construction activities in a manner that will prevent a release of oil or hazardous material (OHM) to the environment and will be responsible for implementing oil spill prevention and response procedures for both onshore and offshore activities, including the following measures:

- Vessels, barges, equipment, and vehicles are to arrive on-site free of leaks. All hoses, spill control materials, and other oil or hydraulic components are to be inspected for wear and leaks.
- Spill prevention measures, including maintaining spill control materials onshore and onboard vessels and at the horizontal directional drilling (HDD) work sites, will be required based on the types and quantities of materials stored.
- Emergency spill control kits and placards will be maintained on-site and replenished, as needed.
- The contractor will provide an inventory of all oils, fuels, and lubricants to be stored on-site.
- The contractor will label and properly store and lock all potential OHM to avoid inadvertent spills or releases.
- Secondary containment devices will be required for all oil and fuel containing equipment that is either immobile or is be staged on-site.
- Any oil or fuel containers onboard vessels will be properly stored within leveled and secured cabinets.
- Secondary containment devices will be used during all refueling operations. Emergency spill kits, including oil absorbent booms during offshore construction, will be kept and maintained on-site through the construction-phase of the Project.
- If there is a spill of OHM, verbal notification must be given to SouthCoast Wind immediately after a release has occurred and is contained (after notification to first responders). As appropriate, the contractor will report the release to the United States Coast Guard (USCG) through the National Response Center (NRC), the RI CRMC, the RIDEM Hazardous Waste Division and the United States Environmental Protection Agency (USEPA) and/or appropriate regulatory agencies in accordance with all applicable regulations.
- The contractor is responsible for notifying the RIDEM, of any release onshore and receiving a Spill Release Tracking Number.
- The contractor is responsible for notifying the USCG through the NRC, as necessary, and the RIDEM of any release to the marine environment and receiving a Spill Release Tracking Number.

- A release in any amount may be reportable to the local fire department[1] (for onshore) and RIDEM.[2]
- The contractor will submit written spill information to SouthCoast Wind within one working day after a release has occurred.
- The contractor will supply SouthCoast Wind with a copy of all other documentation required by regulatory agencies related to the release, including documentation of soil, water, and solid surface clearance samples within five days of receipt by the contractor.

In the event of a release of OHM owned by the contractor (e.g., hydraulic fluid on a contractor-owned piece of equipment on onboard a vessel), the contractor is responsible for the following spill response steps:

1. Ensure safety – establish personal/public safety, warn people in the immediate vicinity, wear appropriate Personal Protective Equipment (PPE), assess the situation (never rush in and always determine the product spilled before taking action).
2. Ensure there are no ignition sources if spill is a flammable material, if necessary local fire department and the USCG can provide additional assistance.
3. Spill control – stop the flow at its source, stop the release, close valves, shut off pumps or plug holes/leaks.
4. Secure the area – limit access to the spill area, prevent unauthorized entry onto the site.
5. Spill containment – utilizing emergency spill control kits and other devices on-site, use spill absorbent material to contain the spill, if necessary, use a dike or any other method to prevent discharge into the water, if necessary, deploy floating boom around the vessel/barge to contain the spill to the local vicinity.
6. Spill clean-up – proper containment, place the waste material into a 55-gallon Uline Universal Drum (or similar) with a cover and label the container.
7. Spill reporting – as soon as the situation is under control, report incident to SouthCoast Wind and the appropriate authorities, complete a spill response reporting, report the spill to SouthCoast Wind within 24 hours. Reporting the spill to the applicable regulatory agencies (e.g., RIDEM and USCG, as necessary) within reporting timeline requirements may be immediately or as soon as two hours. Some examples include:
    - A sudden spill of OHM which exceeds a specified quantity (called a Reportable Quantity; such as more than 10 gallons of oil).
    - A spill of any amount of oil which results in a sheen on a surface water.

- The contractor is responsible for making all required notifications to regulatory agencies and to ensure that the release is properly responded to and in accordance with all applicable regulations.
- The contractor is responsible for notifying SouthCoast Wind's on-site environmental compliance monitor.

[1] Town of Portsmouth Fire Department – (401) 683-1200.
[2] RIDEM Emergency Response, 24-hour Spill/Emergency Line – 1-401-222-1360 (business hours) or 1-401-222-3070 (after hours). See, also, https://dem.ri.gov/programs/emergencyresponse/report-spill.php.

- The contractor is responsible for hiring contractors for the cleanup of releases of contractor-owned material, as needed.
- The contractor is responsible for disposing of OHM waste to a facility approved by SouthCoast Wind.
- Marine contractors conducting work activities within Rhode Island state waters will be responsible for finalizing a Spill Response Plan for marine activities consistent with SouthCoast Wind's plan and all applicable regulations.
- The contractor is responsible for instructing personnel on the operation and maintenance of equipment to prevent the accidental discharge or spill of OHM. Personnel will also be made aware of pollution control laws, rules, and regulations applicable to their work. The contractor will schedule and conduct spill prevention briefings with the construction crew to ensure adequate understanding of spill prevention measures. These briefings will highlight:
    - Precautionary measures to prevent spills.
    - Sources of spills, such as equipment failure or malfunction.
    - Standard operating procedures in case of a spill.
    - Equipment, materials, and supplies available for clean-up of a spill.
    - A list of known spill events.

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment F: Inadvertent Release of Drilling Muds Contingency Plan

Revision 1: March 2023

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TABLE OF CONTENTS

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1 INADVERTENT RELEASE OF DRILLING MUDS CONTINGENCY PLAN

This Inadvertent Release of Drilling Muds Contingency Plan (*aka* "frac-out plan") has been prepared by POWER Engineers Consulting in support of the SouthCoast Wind 1 Project. The intent is for the Contingency Plan to be further developed with additional details upon the selection of the contractor(s) and prior to the commencement of construction activities.

1.1 INTRODUCTION

Horizontal directional drilling (HDD) will be utilized during construction for the export cable sea-to-shore transitions from the Sakonnet River and Mount Hope Bay to Aquidneck Island in Portsmouth, RI. HDD operations have the potential to inadvertently release drilling fluids from a deep boring into the surface environment if fluids travel through overlying soils or bedrock fractures to the ground surface or surface waters, typically under high pressure conditions. The HDD contractor will implement the best management practices (BMPs) outlined in this plan to minimize the potential for adverse environmental impacts during the HDD activities.

1.2 INADVERTENT RELEASE PREVENTION

The drilling fluid is an essential element of HDD operations. The fluid serves many purposes including:

- Facilitating the installation of the HDD conduit.
- Removal of the drilled cuttings from the borehole.
- Maintaining the integrity of the borehole.
- Lubricating and cooling the drill bit.

SouthCoast Wind's HDD contractor will use a drilling fluid composed of bentonite clay or mud that will pose little to no threat to water quality or ecological resources should seepage occur. The main component of drilling fluids typically consists of naturally occurring bentonite clay (which is heavier than water with a density of ρ 1.10-1.40), other additives, and freshwater. Bentonite is a non-toxic, naturally occurring substance. The clay is insoluble and made-up of small particles that function as a "natural sealant" that fills the native formation surrounding the bore hole. Various non-toxic additives may be added to the drilling fluid to optimize the rheological properties (the deformation and flow of matter). The drilling fluids are recirculated and recycled throughout the HDD procedures.

Drilling fluids will be handled properly on-site and the disposal of the excess fluid properly at the completion of the Project. Prior to commencement of drilling operations, the drilling superintendent will establish an approved landfill or off-site facility for disposal of excess drilling fluids and drill cuttings.

1.2.1 Monitoring of Drill Operations

The HDD contractor will control an inadvertent release by careful monitoring of drilling fluid pressure, penetration rate, tooling/equipment selection and fluids design. The advancement of the drill string and down hole pressure will be continuously monitored to detect changes in pressure that could indicate an imminent inadvertent release of drilling muds. The circulation rate of drilling fluids and the bore path stability will also be monitored. During HDD operations, the HDD contractor will monitor ground surface conditions and surface waters along the drill path to check for evidence of an inadvertent release.

1.2.2 Best Management Practices and Erosion Controls

Prior to drilling operations, the HDD contractor will implement BMPs and sediment and erosion control procedures and containment measures for stormwater and drilling fluids within the HDD staging areas. The BMPs will be installed, monitored, repaired and replaced by the HDD contractor during drilling and back-reaming operations to prevent siltation and turbid discharges.

At the HDD staging areas, erosion controls will be implemented to contain and manage any drilling fluids. Methods may include, but are not limited to placement of turbidity screens, staked silt containment fence, straw bales, and/or earthen berms to contain and recycle drilling muds.

Other materials that will be provided as needed by the HDD contractor include, but are not limited to, the following: spill sorbent pads and booms, straw bales, sandbags, siltation fencing, polyethylene sheeting, extra pumps, hoses, 55-gallon drums, push brooms, sump pumps, vactor trucks, storage tanks and floating turbidity curtains for in-water use.

1.3 Response to an Inadvertent Release

Should an inadvertent release of drilling muds occur, the following measures will be taken by the HDD contractor:

- In the event of a loss of drilling fluid circulation, the HDD contractor will notify SouthCoast Wind and the environmental compliance monitor.
- Should an inadvertent release be detected and confirmed, the HDD contractor will:
    - Temporarily suspend advancement of the drill string, if safe to do so, and check the drill alignment for an inadvertent discharge to the ground surface or surface waters.
    - Temporarily suspend the pumping of drilling muds, if safe to do so.
    - If the return of drilling mud/fluid is less than the projected amount to be recovered, the HDD contractor will begin their search for the missing material. Once the drilling mud (release) is located, mud containment and recovery will be implemented.
- The HDD contractor will then evaluate the circumstances leading to the inadvertent return and make a determination on the response plan.

Alternative actions to ceasing circulation pressure may include, but are not limited to:

- Circulating the slurry lines.
- Adding non-toxic loss circulation materials pre-approved by the Project engineer to the drilling fluids mixture.
- Reducing drilling fluid pressures.
- Increasing the viscosity of the drilling fluids.
- Ceasing pumping and pulling the drill string back a few joints, allowing the existing drilling mud in the hole to solidify around the suspected fracture.

1.4 Mud Containment and Recovery

Should a release of drilling muds be confirmed, the HDD contractor will implement the following steps:

- Proceed to the inadvertent return location and perform an evaluation of the existing conditions.

- Identify whether the discharge has impacted a sensitive area such as a jurisdictional wetland or stream or a smaller drainage collector that leads directly to a jurisdictional wetland or stream and assess the amount and nature of the discharge.
- Should the release occur onshore, the contractor will contain the release by installing BMPs, erosion controls and other BMPs, and use a suction hose and/or vactor truck to remove the excess material.
- Should the release occur offshore in the marine environment, the contractor will assess if sea-state conditions allow for the deployment of divers to locate the release and to guide a suction hose of the pump to minimize both the removal of natural sea bottom and disturbance of any existing vegetation.
- Any released material will be carefully removed to avoid impacts to coastal, marine and freshwater resources.
- Any escaped drilling mud/fluid will be pumped into filter bags or directly into a vactor truck.
- If the release were to occur offshore, a barge will be used to transport a vactor truck should it be needed to respond to an in-water release.
- Clean-up with a vacuum system will commence within 24 hours of the detected release.
- Once the spill is contained, the escaped drilling mud/fluid will be properly disposed of in an approved upland disposal site, in accordance with local, state, and federal regulatory requirements. No drilling mud/fluid will be discharged in Rhode Island state waters.

1.5 REPORTING

After containment and recovery of the drilling material, a written report will be prepared by the HDD contractor. The report will indicate the location of the release, amount of drilling material discharged and the amount of drilling mud recovered, the process in which the drilling mud was recovered, and the area that was affected by the drilling discharge, including any recommended corrective actions that may need to be taken. SouthCoast Wind will make the appropriate notifications to the local, state and federal regulatory agencies (i.e., Rhode Island Department of Environmental Management (RIDEM) and Rhode Island Coastal Resources Management Council (RI CRMC)), in accordance with the permit stipulations.

1.6 TRAINING

Prior to the start of HDD operations, the HDD contractor will be responsible for training its operators, superintendent, mud system operator, and workers with respect to the prevention, monitoring, and response of inadvertent returns during the HDD operation. Training will include plan details, permitting conditions and requirements, locations of resource areas, lines of communication, lines of authority, contact names and phone numbers, and reporting procedures.

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment G: Hydrodynamics and Sediment Dispersion Modeling Report

Revised: February 2023

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MAYFLOWER WIND

Appendix F3. Hydrodynamic and Sediment Transport Modeling Draft Report

Brayton Point Export Cable Burial Assessment

Document Revision A

Issue Date March 1, 2022

Hydrodynamic and Sediment Transport Modeling for the Brayton Point Export Cable Burial Assessment

Mayflower Wind Energy LLC | USA

01 March 2022 - Final Report

Daniel L. Mendelsohn, Innovative Environmental Science
J. Craig Swanson, Swanson Environmental

Swanson Environmental

IES Innovative Environmental Science

EXECUTIVE SUMMARY

Mayflower Wind Energy LLC (Mayflower Wind) is in the process of developing an offshore wind renewable energy generation project (Project) located in federal waters off the southern coast of Massachusetts in the Outer Continental Shelf (OCS) Lease Area OCS-A 0521 (Lease Area). The Project will deliver electricity to the grid via subsea export cables installed within the Brayton Point Export Cable Corridor (ECC) that will make landfall at Brayton Point in Somerset, Massachusetts and via subsea export cables installed within the Falmouth ECC that will make landfall in Falmouth, Massachusetts.

The Brayton Point ECC, which is the focus of this report, has been defined through which the export cables will run from the Lease Area to landfall at Brayton Point. For this study, it is assumed that the cables will be buried with a trench depth of approximately 3 m (9.8 ft) using one or more of several burial methods, which may include use of jet trenching and mechanical trenching. For purposes of this study, jet trenching is considered as the worst-case representative burial scenario. A jet-trencher uses high pressure jets to fluidize the seabed sediments forcing some fraction of them into the water column through the burial process. This report presents an assessment of sediment plume dispersion (Total Suspended Solids [TSS] in the water column and seabed deposits) associated with the installation of the export cables between the Lease Area and Brayton Point landing(s), including the nearshore horizontal directional drilling (HDD) entry points that will be used to bring the cable ashore. In alignment with the Bureau of Ocean Energy Management (BOEM) guidelines, for the Construction and Operations Plan (COP) (BOEM, 2020), this study addresses the following:

- Concentrations of excess sediment suspended in the water column (as total suspended solids) following seafloor disturbance during cable installation
- Extent and thickness of sediment re-deposited to the seafloor following suspension.

A regional and local high-resolution, site-specific hydrodynamic model application was developed to simulate the metocean conditions over the extent of the offshore and nearshore / Narragansett Bay segments (i.e Mount Hope Bay and the Sakonnet River) of the Brayton Point ECC. The model was verified and validated against site-specific measurements and then applied to drive scenarios of the sediment plume dispersion from trenching and HDD-related dredging activities.

Surface sediment grab sample data was collected along the ECC at 23 sites used in the modeling. The data showed that the nearshore / Narragansett Bay segments were mostly characterized by high fractions of the fine grade silt and clay sediment classes. Offshore, the sediments tended to have higher fractions of fine sand to coarse sand classes with an occasional pocket of silt or very fine sand.

The results of the sediment dispersion modeling indicated that the water column concentration (TSS) and the sediment deposition pattern and thickness were most heavily influenced by the properties of the trench sediments (i.e. grain size distribution) disturbed during the jet trenching operations and localized current velocities. The dimensions of the trench, the advance rate, and the loss rate (a conservative loss rate of 25 percent representative of the jetting or mechanical trenching and 100 percent for the HDD pit dredging) to the water column, specified the total amount of sediments re-suspended, but the response was short lived for all but the finest grade sediments (silts and clays).

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Suspended Sediment Concentrations

The fine- grained classes settle more slowly than the larger grain size sediments meaning that the suspended silt and clay sediments tend to be transported farther with the tidal currents than coarser sediments, increasing higher water column concentrations and durations of plumes. The Mount Hope Bay and the Sakonnet River segments, where higher fractions of fine-grained silt and clay are found in the sediments, exhibit this impact. The higher- level concentrations (100 mg/L and up) were somewhat contained in the Sakonnet River but covered a larger area in Mount Hope Bay where a part of the export cables ran perpendicular to the currents which, combined with the fine grade resuspended sediments, increased the overall material transport extending the maximum 100 mg/L concentration a little over 1 km (0.62 mi). Concentrations reached levels of 500 mg/L but were short lived and persist for approximately 30 minutes to an hour. Concentrations in the range of 200 mg/L or more were not expected to endure for longer than about 2 hours, while the lowest concentrations, in the 10 mg/L range may last many hours after re-suspension.

In regions with large grain sizes, sediments quickly dropped back to the sea floor keeping concentrations low, and within a few meters of the Trenching tool. The associated deposition footprint area was also small. Concentrations of 100mg/L were predicted to be within 50 m (160 ft) of the route centerline and decreased rapidly (less than 15 minutes). The sections of the offshore ECC segment that had higher fractions of the fine grade sediments had higher transport of the model predicted TSS concentrations showing the 100 mg/L concentration extending to 300 m (984 ft). The 100 mg/L TSS concentration level or greater covered a total of 2,457 ha (6,070 ac) along the 152 km (94 mi) length of the Brayton Point ECC.

The HDD exit pit dredging impacts were smaller compared with the impact resulting from cable installation. The source was assumed to be at a single point and continuous over a 1-hour period, releasing 100 percent of the dredged material into the water column. The TSS concentrations exceeding 100 mg/L travelled a maximum distance of 0.32 km (0.2 mi) and dissipated in a little over an hour at the Brayton Point site but were half that at the Aquidneck Island sites. The area coverage of the 100 mg/L or greater level was contained within an average of 5 ha (12 ac).

Sediment Deposition Coverage and Thickness

The sediment deposition footprint resulting from the cable installation activities occurred relatively locally along the majority of the ECC route where the mass settles out quickly. Deposition thicknesses of 1 mm (0.04 in) and greater are generally limited to a corridor with a maximum width of 30 - 35 m (100 – 115 ft) around the cable centerline. In the areas where there are finer grain sediments, the 1 mm (0.04 in) thickness contour distance can increase locally to 165 m (540 ft) from the ECC indicative centerline .

The sedimentation footprint for HDD sites was very small with a maximum coverage of the 1 mm (0.04 in) thickness contour of only 0.5 ha (1.2 ac), extending a maximum distance of 95 m (312 ft) and 1 ha (2.5 ac) for the 0.5 mm (0.02 in) thickness contour, extending a maximum distance of 158 m (518 ft) from the HDD site. Deposition thicknesses are greater if the location of the release is fixed. Cable burial operations are mobile, and thus will produce smaller maximum deposit thicknesses. The total coverage of the 1 mm (0.04 in) and 0.5 mm (0.02 in) thickness levels along the entire ECC route was 361 ha (892 ac) and 531 ha (1,312 ac), respectively.

New sediment data received since the completion of the sediment transport and dispersion study indicates that in the lower Mount Hope Bay and upper Sakonnet River areas there is a divergence from the surface grabs used in the present study. New data points where vertical profiles of the sediments were taken near the East Passage entrance to Mount Hope Bay show considerably coarser material. The same is true for stations near the mid- to upper-mid portion of the Sakonnet River. The increased prevalence of coarser grain sizes in the distribution would have the effect of reducing the amount of material transported and therefore area of higher concentrations, also reducing deposition and thickness as reported in Section 4 and therefore have less of an impact. Model results should be considered very conservative for these areas.

In summary, despite conservative model assumptions, water column TSS concentrations and seabed deposition sediment thickness and extent as a result of the cable installation/burial operations and HDD exit pit dredging remain generally localized and of short duration.

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Abbreviations and Acronyms

ac	Acre(s)
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
COP	Construction and Operations Plan
ECC	Export Cable Corridor
ft	Foot/feet
ha	Hectare(s)
HDD	Horizontal Directional Drilling
km	Kilometer(s)
KP	Kilometer Point
kts	Knots
LiDAR	Light Detection And Ranging
m	Meter(s)
mi	Statute mile(s)
MLLW	Mean Lower Low Water
m^3/hr	Cubic meters per hour
mm	millimeter
mi/hr	Miles per hour
m/s	Meters per second
mg/L	Milligrams per liter
NCEP CFSR	National Centers for Environmental Prediction Climate Forecast System Reanalysis
NOAA	National Oceanic and Atmospheric Administration
nm	Nautical mile(s)
N/m^2	Newtons per meter squared
OCS	Outer Continental Shelf
OSP(s)	Offshore Substation Platform(s)
PSD	Particle Size Distribution
QQ	Quantile-Quantile
TSS	Total Suspended Solids
WTG	Wind Turbine Generator

Foxborough, Norfolk, MA

1 INTRODUCTION

Mayflower Wind Energy LLC (Mayflower Wind) proposes to develop an offshore wind renewable energy generation project (Project) located in federal waters off the southern coast of Massachusetts in the Outer Continental Shelf (OCS) Lease Area OCS-A 0521 (Lease Area). The Project will deliver electricity to the grid via subsea export cables installed within the Brayton Point Export Cable Corridor (ECC) that will make landfall at Brayton Point in Somerset, Massachusetts and via subsea export cables installed within the Falmouth ECC that will make landfall in Falmouth, Massachusetts.

The Brayton Point ECC, which is the focus of this report, has been defined through which export cables will run from the Lease Area to landfall at Brayton Point. The cables will be buried with a trench depth of approximately 3 m (9.8 ft) using one or more of several burial methods, which may include use of jet trenching and mechanical trenching which are considered as representative worst case burial scenarios for this study. A jet trenching system uses high pressure jets to fluidize the seabed sediments releasing some fraction of the sediments into the water column through the burial process and the stinger (arm with water jets along its length that is lowered into the sediment to create the trench) of the jet-trencher creates the trench within the bed to lay the cable. A similar process occurs with the mechanical trenching however a chain cutter is used instead of water jets. This report presents an assessment of sediment plume dispersion (Total Suspended Solids [TSS] and deposits) associated with the installation of the export cables between the Lease Area and landing(s), and the nearshore HDD entry/exit points used for subsurface cable installation for the shoreline landings.

1.1 PROJECT OBJECTIVE

The Bureau of Ocean Energy Management (BOEM) produced regulations and guidelines for preparing the Construction and Operations Plan (COP) and conducting specific technical studies to support COP development.

Consistent with BOEM's *Information Guidelines for a Renewable Energy Construction and Operations Plan (COP)* (BOEM, 2020), the objectives of this sediment plume dispersion assessment are to:

- Model disturbances associated with cable installation, including near shore HDD entry,and specifically the resulting:
    - Suspended sediments in the water column (TSS)
    - Redeposition of disturbed and suspended sediments including thickness and extenton the seabed

Results from the sediment plume dispersion assessment provide quantitative and qualitative information to support the Mayflower Wind COP.

1.2 PROJECT DESCRIPTION

The Mayflower Wind Lease Area is located offshore of the southern coast of Massachusetts, approximately 49 kilometers (km) [26 nautical miles (nm)] south of Martha's Vineyard and 37 km (20 nm) south of Nantucket shown in Figure 1-1.

The Project layout will align to a 1 nm x 1 nm grid with an east-west and north-south orientation, as agreed upon across the entire Massachusetts/Rhode Island (MA/RI) Wind Energy Areas. The Project will consist of up to 149 positions within the Lease Area, to be occupied by Wind Turbine Generators (WTGs) and Offshore Substation Platforms (OSPs), connected with inter-array cables. Power will be transmitted to shore via submarine offshore export cables installed within two export cable corridors, the Brayton Point ECC and the Falmouth ECC. Falmouth modeling is covered in a separate report.

The offshore export cables within the Brayton Point ECC will travel from the Lease Area in Federal waters, through Rhode Island Sound, and up the Sakonnet River to make an intermediate landfall at the north end of Aquidneck Island (Portsmouth, RI). The cables will then cross Aquidneck Island (Portsmouth, RI) onshore and exit the island in Mount Hope Bay to ultimately reach the Brayton Point landfall. The cables are planned to be buried within the seabed along the Brayton Point ECC.

Additional details regarding the Project description and construction and installation methods are available in Section 3 of the COP. Specific details regarding construction methods used in this assessment are provided in Section 4 of this report.

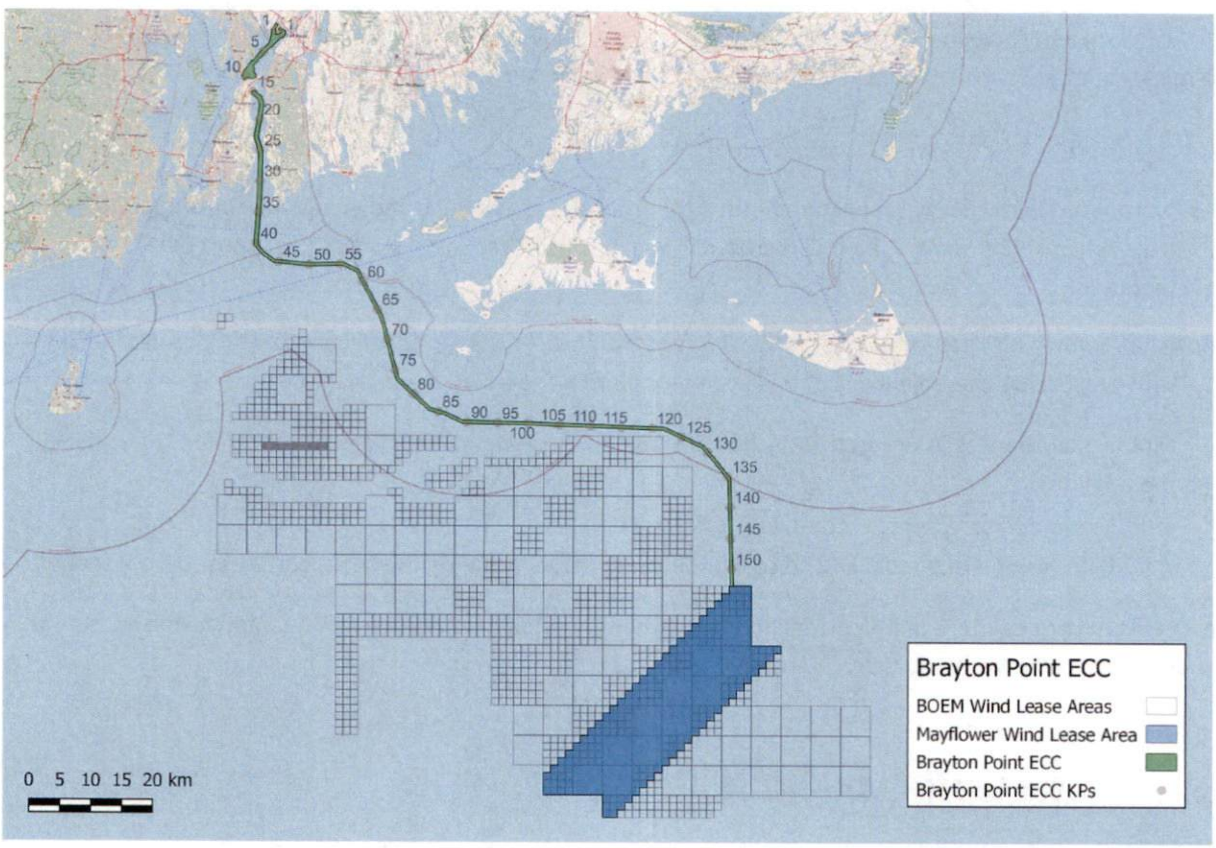

FIGURE 1-1. OVERVIEW OF THE PROJECT AREA AND BRAYTON POINT EXPORT CABLE CORRIDOR.

2 METHODOLOGY

The goal of this study was to determine the impacts of Mayflower Wind's proposed Brayton Point ECC export cable installation activities on the environment. The impacts were evaluated in terms of excess suspended sediment water column concentrations and sediment deposition footprint and thickness. The approach to evaluate the concentration and deposition impacts was to use two numerical models to simulate the hydrodynamics in the study area and the transport and dispersion of sediments resuspended from the cable burial activities during the construction phase of the Project, respectively.

The two models used have been developed over many years to perform this specific type of evaluation. The hydrodynamic model used was the Delft3D-FLOW model system (Deltaris, 2018a) which was applied to develop currents and circulation from the tides, winds, and river flow. The model was applied in two parts; a large-scale application to the offshore area from the New York Bight to east of Cape Cod to capture the dynamics along the Brayton Point ECC from the Mayflower Wind Lease Area to the entrance of the Sakonnet River and a second fine grid nested model application to Narragansett Bay with a focus on the Sakonnet River and Mount Hope Bay cable corridor portions. A more detailed description of the Delft3D model and its application is provided in Section 3.

The sediment transport model used was the Delft3D, D-WAQ PART (Deltaris, 2018b), particle transport model system. The PART model is integrated with the FLOW model allowing direct input of the hydrodynamic model predicted currents into the transport model. The model was used to simulate excess suspended sediment transport and dispersion, predicting the water column concentration and sediment deposition, resulting from the proposed cable embedment activities. A description of the D-WAQ PART model and its application is provided in Section 4.

The hydrodynamic model was set up and run to predict the tidal and wind driven currents in the region. A time period was selected that would be consistent with the likely allowable dredge windows, commonly during the late fall/early winter months, and where both currents and water surface elevation observations were available for comparison with the model predictions. The product of the hydrodynamic modeling was a time and space varying current field, predicted from the tide and wind forcing, capturing several spring (higher tidal amplitude/more energy) and neap (lower tidal amplitude/lower energy) conditions as well as weather systems passages. The simulations were run long enough to generate current predictions that would encompass the duration of the proposed cable burial activities.

Time series of model predicted water surface elevation was collected at the nested grid interface with the large-scale model and used to drive the Narragansett Bay fine resolution application to generate currents in the bay. The simulation was run for the same time period as the offshore large scale application simulation.

The simulations were specified to take the sediment characteristics (sediment grain size distribution as sampled along the route) and cable burial tool characteristics representative of jet trenching/mechanical trenching (volume of source sediments resuspended, cable burial advance rate etc.) as well as the environmental conditions (water depth, currents), into account. The cable burial simulations were initiated at the Brayton Point terminus of the ECC and run seaward. Because of the ECC design where the cable crosses land at the northern end of Aquidneck Island, the simulation was split in two sections; the Mount Hope Bay section and the Sakonnet River to offshore section. The analysis was performed assuming that all concentrations and deposited sediments were "excess sediments", i.e. in excess of natural conditions. Therefore, the effects are presented as isolated effects of the construction that occur, which would be added to the natural conditions.

The results of the sediment transport and dispersion simulations were predictions of the extent and duration of suspended sediment concentrations within the water column along the route and the final sediment deposition characteristics (pattern and thickness) associated with each proposed activity.

2.1 Hydrodynamic Model

The circulation characteristics are an important input to the sediment transport modeling. A hydrodynamic model application of the study area was developed using Delft3D-FLOW, a multi-dimensional model system that has been applied successfully in numerous circulation studies around the world. This section provides details of the Delft3D-FLOW model system.

2.2 Hydrodynamic Model Technical Description

The numerical hydrodynamic modeling system Delft3D-FLOW solves the unsteady shallow water equations in two (depth-averaged) or three dimensions. The systems of equations are based on the full Navier-Stokes equations with the shallow water approximation applied and consist of the horizontal equations of motion, the continuity equation, and the transport equations for conservative constituents. The equations are formulated in orthogonal curvilinear co-ordinates or in spherical co-ordinates on the globe.

In Delft3D-FLOW models with a rectangular grid (Cartesian frame of reference) are considered as a simplified form of a curvilinear grid. The hydrodynamic module applies the sigma co-ordinate transformation in the vertical, which maps both the water surface and bottom topography to the upper and lower grid boundaries, resulting in a smooth representation of each. This also results in a high computing efficiency because of the constant number of vertical layers over the whole computational domain.

The flow is forced by tide at the open boundaries, wind stress at the free surface, pressure gradients due to free surface gradients (barotropic) or density gradients (baroclinic). Source and sink terms are included in the equations to model the discharge and withdrawal of water.

The hydrodynamic module is based on the full Navier-Stokes equations with the shallow water approximation applied. The equations are solved with a highly accurate unconditionally stable solution procedure. The supported features are:

- two co-ordinate systems, i.e. Cartesian and spherical, in the horizontal directions;
- two grid systems in the vertical direction; the boundary fitted sigma grid and the horizontal layer Z-grid;
- domain decomposition both in the horizontal and vertical direction;
- tide generating forces (only in combination with spherical grids);
- simulation of drying and flooding of inter-tidal flats (moving boundaries);
- density gradients due to a non-uniform temperature and salinity concentration distribution (density driven flows);
- for 2D horizontal large eddy simulations the horizontal exchange coefficients due to circulations on a sub-grid scale (Smagorinsky concept);

- turbulence model to account for the vertical turbulent viscosity and diffusivity based on the eddy viscosity concept;
- selection from four turbulence closure models: k-", k-L, algebraic and constant coefficient;
- the effect of the Earth's rotation (Coriolis force).
- shear stresses exerted by the turbulent flow on the bottom based on a Chézy, Manning or White-Colebrook formulation;
- enhancement of the bottom stresses due to waves;
- automatic conversion of the 2D bottom-stress coefficient into a 3D coefficient;
- wind stresses on the water surface modelled by a quadratic friction law;
- space varying wind and barometric pressure (specified on the flow grid or on a coarser meteo grid), including the hydrostatic pressure correction at open boundaries (optional);
- simulation of the thermal discharge, effluent discharge and the intake of cooling water at any location and any depth in the computational field (advection-diffusion module);
- the effect of the heat flux through the free surface;
- online analysis of model parameters in terms of Fourier amplitudes and phases enabling the generation of co-tidal maps;
- drogue tracks;
- advection-diffusion of substances with a first order decay rate;
- online simulation of the transport of sediment (silt or sand) including formulations for erosion and deposition and feedback to the flow by the baroclinic pressure term, the turbulence closure model and the bed changes;
- the influence of spiral motion in the flow (i.e. in river bends). This phenomenon is especially important when sedimentation and erosion studies are performed;
- modeling of obstacles like 2D spillways, weirs, 3D gates, porous plates and floating structures;
- wave-current interaction, taking into account the distribution over the vertical;
- many options for boundary conditions, such as water level, velocity, discharge and weakly reflective conditions;
- several options to define boundary conditions, such as time series, harmonic and astronomical constituents;
- option for linear decay of conservative substances, and
- online visualization of model parameters enabling the production of animations.

2.3 Sediment Transport Model

Sediment transport associated with the cable burial activities was simulated using the Deltares Delft3D D-WAQ PART model. The model requires inputs defining the environment (e.g. water depths, currents) and the construction activity loading (e.g. sediment grain size, resuspended volume) and produces predictions of the associated sediment plume and seabed deposition. Details of the model and theory are provided in the following sections.

The particle tracking module, D-WAQ PART, is a 3-dimensional far-field water quality model. It estimates a dynamic concentration distribution by following the tracks of thousands of particles in time and space (in the water column). The model calculates TSS concentrations and sedimentation patterns resulting from activities that cause sediment resuspension. The model requires a spatial and time varying circulation field (typically from hydrodynamic model output as described in the last section), definition of the water column bathymetry, and parameterization of the sediment disturbance (source). The model predicts the transport, dispersion and settling of suspended sediment released to the water column.

The focus of the model is on the far-field (i.e. beyond the initial disturbance) processes affecting the fate of suspended sediment. The model uses a specification of the suspended sediment source strength (i.e. material resuspension volume/mass flux), initial vertical distribution of sediments and the sediment grain-size distribution to represent losses (loads) to the water column. The losses are developed from a parameterization of different types of mechanical or hydraulic dredges, sediment dumping practices or other sediment activities such as jetting or mechanical trenching for cable or pipeline burial. Multiple sediment types or grain size fractions can be simulated simultaneously and are tracked separately but can impact each if specified. In addition, multiple loads and locations can be simulated as can discharges from moving sources.

2.4 Sediment Model Technical Description

D-WAQ PART is a 3-dimensional particle tracking model that is particularly useful for mid- to far-field water quality modeling. It calculates a dynamic concentration distribution by following the tracks of thousands of particles with time. The model provides a detailed description of concentration distributions, resulting from instantaneous or continuous releases of materials such as salt, oil, temperature or sediments as in the present study. The materials can be simulated as conservative or simple decaying substances.

D-WAQ PART is a random walk particle tracking model, which is based on the principle that the movement of dissolved (or particulate) substances in water can be described by a limited (large) number of discrete particles that are subject to advection due to the currents and by horizontal and vertical dispersion. The movement of the particles consists therefore of two elements. For each time-step, the first step is the advection step due to the shear stresses from currents (bottom) and wind (surface). The second step is the random walk step in which the size and direction of the movement is a random process but is related to the horizontal and vertical dispersion.

The particle-based (Lagrangian) scheme represents the total mass of sediments suspended over time, and provides a method to track suspended sediment without any loss of mass as compared to Eulerian (continuous) models due to the nature of the numerical approximation used for the conservation equations. Thus, the method is not subject to artificial diffusion near sharp concentration gradients and can easily simulate all types of sediment sources.

In D-WAQ PART, two modules are available:

- Tracer module: simulation of conservative or first order decaying substances; and
- Oil spill module: simulation of oil spills with floating and dispersed oil fractions (special license required).

In this study only the tracer module was used. The tracer module is very flexible and is designed to be configured for sediment simulations of the user's design.

The physical components in the system are:

- discharges due to human activities or released naturally that may be instantaneous and/or continuous;
- settling and erosion of suspended matter;
- concentration- dependent settling velocity.

Physical processes or phenomena D-WAQ PART can represent include:

- the dynamics of patches close to an outfall location;
- simple first-order decay processes like the decay of several fractions of oil;
- vertical dispersion for well-mixed systems;
- horizontal dispersion due to turbulence. According to turbulence theory this dispersion increases in time.
- the effects of time-varying wind fields;
- the effects of bottom-friction;
- the existence of a plume at the outfall (rather than a point-source) by starting the simulation from a circular plume with an estimated or field-measured radius.
- settling of particles, where a concentration dependent settling, subject to a minimum and maximum settling velocity, can be specified;
- settled mass is collected in an additional bottom layer.

D-WAQ PART can in theory simulate an unlimited number of particles and substances. The only restriction is the available memory of the hardware. The coupling between the hydrodynamic module, Delft3D-FLOW, and D-WAQ PART is streamlined such that the current fields developed by the hydrodynamic model can be read directly into the particle model.

If detailed sediment data is available the sediments are broken out into 4 to 6 classes based on the grain size distribution, i.e. the fraction of the total sediment sample in each class. Each class is defined by a range of particle sizes and the density of that class material (Shelley, 1988; CERC, 1984; Wentworth, 1922). The system used in the sediment model is the Wentworth scale as presented in Table 2-1. Sediment grain size is important in determining the fall velocity (settling rate) of resuspended sediments. The fall velocity is determined from a form of the Stokes Law equation for common grains (rather than spheres) where the grain diameter is measured by the median sieve size (CERC, 1984.)

For a given activity and grain size distribution the amount of mass released in each class is calculated as a function of the volume of material resuspended, the fraction that is sediments, the density of the sediments and the fraction of the total mass in that class. A user input number of particles are released at each time step for each sediment class. The mass of each particle is determined as the mass in each sediment class divided by the number of particles.

Horizontal transport, settling, and turbulence-induced suspension of each particle is computed independently by the model for each time step. Particle advection is based on the relationship that a particle moves linearly (in 3-dimensions) with a local velocity obtained from the hydrodynamic field for a specified model time step. Diffusion is assumed to follow a simple random walk process defined as the square root of the product of an input diffusion coefficient and the time step.

TABLE 2-1. BREAKDOWN OF SEDIMENT CLASSIFICATIONS BY PARTICLE DIAMETER.

Sediment Classification	Particle Diameter (mm)
Clay	< 0.0039
Silt	0.0039 - 0.0625
Very Fine Sand	0.062 - 0.125
Fine Sand	0.125 - 0.25
Medium Sand	0.25 - 0.50
Coarse Sand	0.5 - 1.0

In a well-mixed, horizontally uniform flow, the vertical dispersion coefficient may be estimated from the mixing length and the turbulent kinetic energy. The empirical relationships for the turbulent kinetic energy at the bed and at the surface are taken from the k-L turbulence model used in Delft3D-FLOW, incorporating the shear stresses, resulting in a vertical dispersion model. The depth-dependency of the vertical dispersion coefficient is eliminated by depth-averaging to avoid particles gathering at the bottom or surface. D-WAQ PART allows linear scaling of the depth-averaged dispersion coefficient to allow for a reduction in vertical mixing due to stratification in the 3D models. Vertical diffusion is also scaled by an input coefficient and can be in the up or down direction.

Particle settling rates are calculated using Stokes equations based on the size and density of each particle class. Enhanced settling rates in the combined particle classes due to clumping are important for clay and fine-silt sized particles, bound by upper and lower concentration limits.

If the bed shear stress at any location is less than the critical shear stress for sedimentation, a particle that comes into contact with the bottom at that location will remain attached to the bottom (sedimentation). For sedimentation, D-WAQ PART creates an extra model layer for sediment at the bed. If the bed shear stress at any location is greater than the critical shear stress for sedimentation, a particle that comes in contact with the bottom at that location will be reflected back into the water column. If the bed shear stress at any location is greater than the critical shear stress for erosion, all deposited particles at that location (i.e. particles located in the extra bed-sediment layer) will be returned to the water column instantaneously.

For each model time step the suspended concentration of each sediment class as well as the total concentration is computed on a concentration grid. The concentration grid is a uniform rectangular grid with a user-specified cell size and overall area coverage that is independent of the resolution of the hydrodynamic data used to calculate transport. This allows for a finer resolution for determination of plume concentrations, avoiding concentration underestimation using the usually larger hydrodynamic model grid cells. The concentration grid is also used for sediment material deposited on the sea floor. Deposition is calculated as the sum of the mass of the sediment class particle that accumulates in a cell.

3 Hydrodynamic Modeling

A hydrodynamic model application was developed to generate spatial and time varying currents for use in the sediment transport and dispersion modeling. The model application was validated against observations of water surface elevation and currents for the period of November 10, 2020 – December 22, 2020; this period was also used as the timeframe for simulating the cable installation in the sediment transport modeling scenarios.

3.1 Hydrodynamic Model Application

The hydrodynamic model application to the Mayflower Wind Brayton Point ECC study area began with the development of a system of two grids, one overall large grid and a fine resolution nested grid. The large grid extended from New York Harbor through the New York Bight to an area approximately 40 km (25 mi) east of Cape Cod (and 60 km [37 mi] east of the Lease Area) covering the entire Brayton Point ECC with boundaries far removed from the Lease Area and Brayton Point ECC. Previous experience (Crowley and Mendelsohn, 2011) had shown that the extent of the large grid was necessary to capture the circulation and transport in the offshore areas associated with the BOEM MA/RI Lease Areas. The extent of the large grid and the gridded bathymetry is presented in Figure 3-1

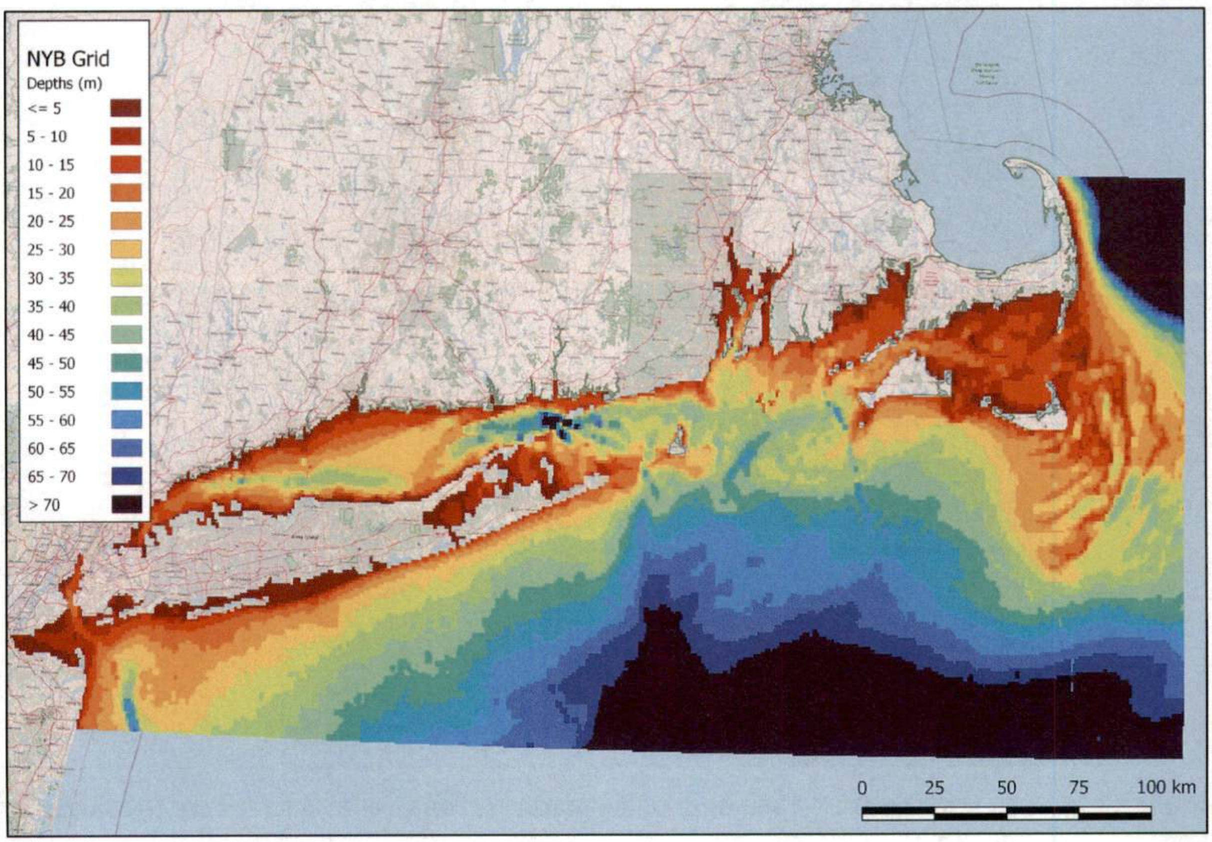

FIGURE 3-1. LARGE GRID AND BATHYMETRY DEVELOPED FOR THE HYDRODYNAMIC MODEL APPLICATION.

The nested grid was used to increase the resolution in Narragansett Bay with a focus on the Sakonnet River and Mount Hope Bay (Figure 3-2). The open boundaries extended offshore into Rhode Island Sound and were forced with time series output generated by the offshore large- scale grid.

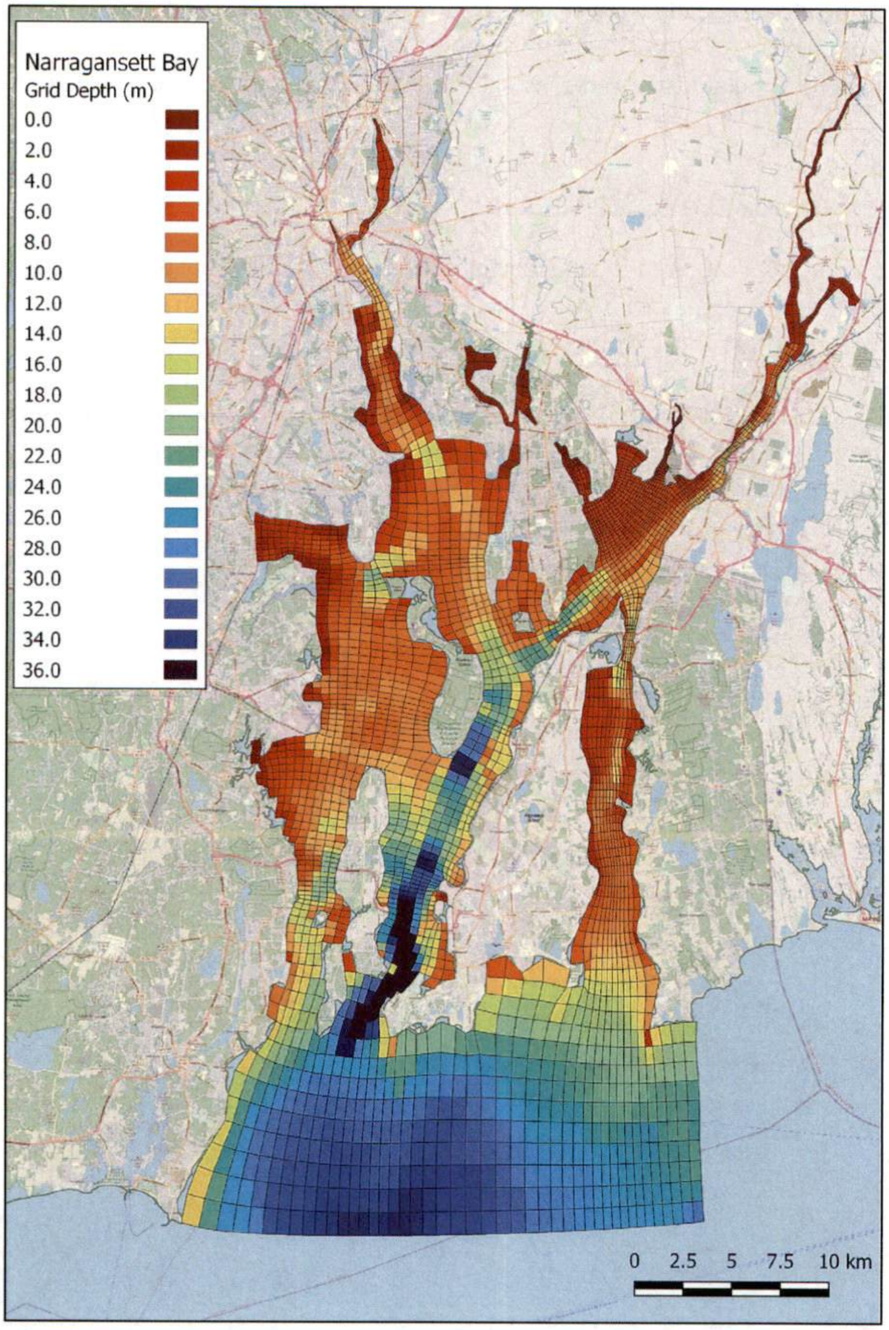

FIGURE 3-2. HIGHER RESOLUTION NESTED GRID OF NARRAGANSETT BAY WITH A FOCUS ON THE SAKONNET RIVER AND MOUNT HOPE BAY ALSO SHOWING THE GRIDDED BATHYMETRY.

The bathymetry for both grids was developed from a combination of sources including the General Bathymetric Chart of the Oceans GEBCO 08 Grid, NOAA Northeast Atlantic Coastal Relief Model (NOAA, 1999) and measurements along the ECC taken for the Project (Mayflower Wind G&G Survey, 2021a).

3.2 ENVIRONMENTAL FORCING

The model forcing included the open boundary specification of astronomic tides and surface winds. The tidal forcing was obtained from the TPXO 7.2 Global Inverse Tide Model (Egbert and Erofeeva, 2002) and was specified along the southern and eastern boundaries. Ocean currents and circulation in the study area are complex and influenced by several main factors. These include wind-driven processes, tides, and density gradients driven by offshore interaction with adjacent estuaries, and radiative and sensible heat flux through the air-sea interface (Codiga and Ullman, 2010). Throughout the domain however, tidal currents are the predominant force driving circulation (Spaulding and Gordon, 1982), with wind and density variations playing a smaller role. Further, the tides in this region are dominated by the M2 astronomical constituent (Spaulding and Swanson, 2008, Spaulding and White, 1990). Surface winds were applied based on the observations from the Mayflower Wind metocean buoy, available at 4 m (13 m) above mean sea level (MSL) at a 10-minute timestep and Quonset Point, RI - Station ID: 8454049, 2.1 m (6.97) ft. above MSL at a 6-minute timestep. A timeseries of the wind speeds for the validation timeframe is presented in Figure 3-3 and the wind rose is provided in Figure 3-4. The corresponding wind speed percentiles for this period are summarized in Table 3-1.

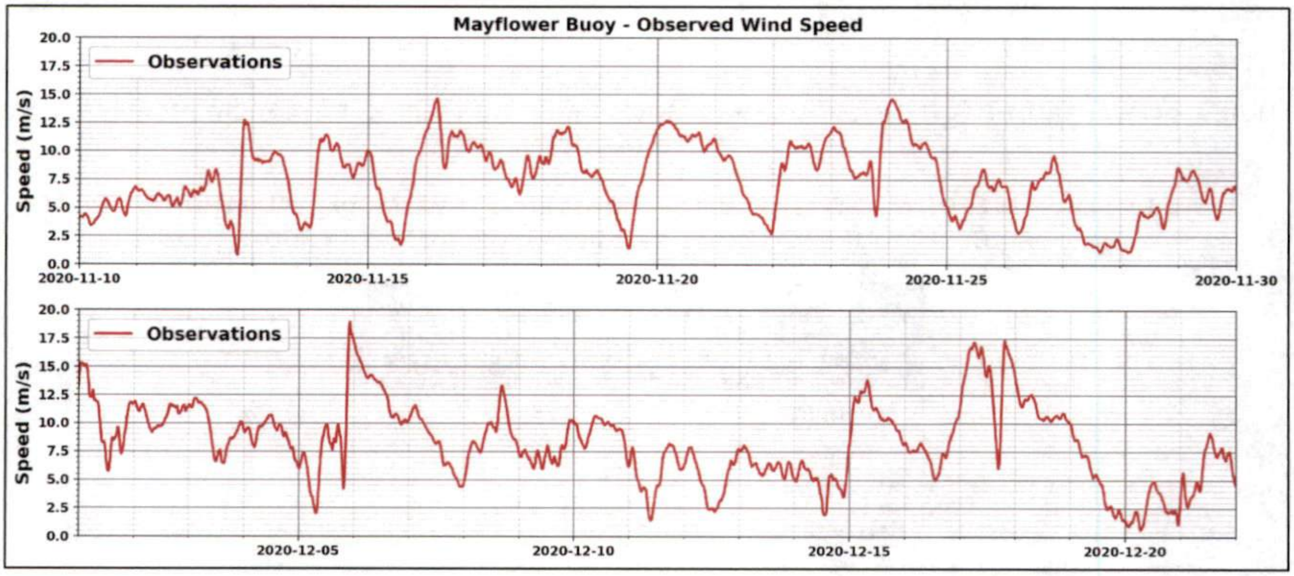

FIGURE 3-3. TIME SERIES OF WIND SPEEDS DURING THE HYDRODYNAMIC MODEL VALIDATION PERIOD.

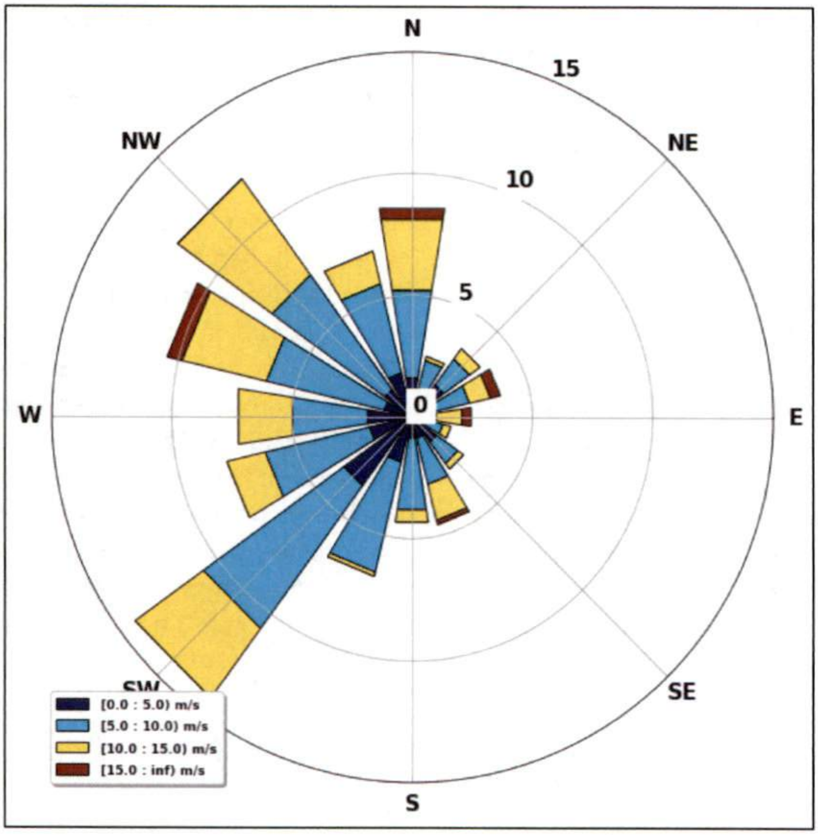

FIGURE 3-4. WIND ROSE FOR THE HYDRODYNAMIC MODEL VALIDATION PERIOD. DATA FROM THE MAYFLOWER WIND OFFSHORE METOCEAN BUOY.

TABLE 3-1. PERCENTILES OF WIND SPEEDS DURING THE HYDRODYNAMIC MODEL VALIDATION PERIOD AS RECORDED AT THE MAYFLOWER WIND OFFSHORE METOCEAN BUOY.

	Observed Wind Speed Statistics During Model Validation Period (m/s)
Minimum	0.19
Mean	7.78
Maximum	18.81
Percentiles	
5	2.12
10	3.16
25	5.34
50	7.74
75	10.27
90	12.00
95	13.31

3.3 Model Validation Results

The model application was validated against observations of water elevations and currents within the region. The locations of the various observation stations are shown in Figure 3-5.

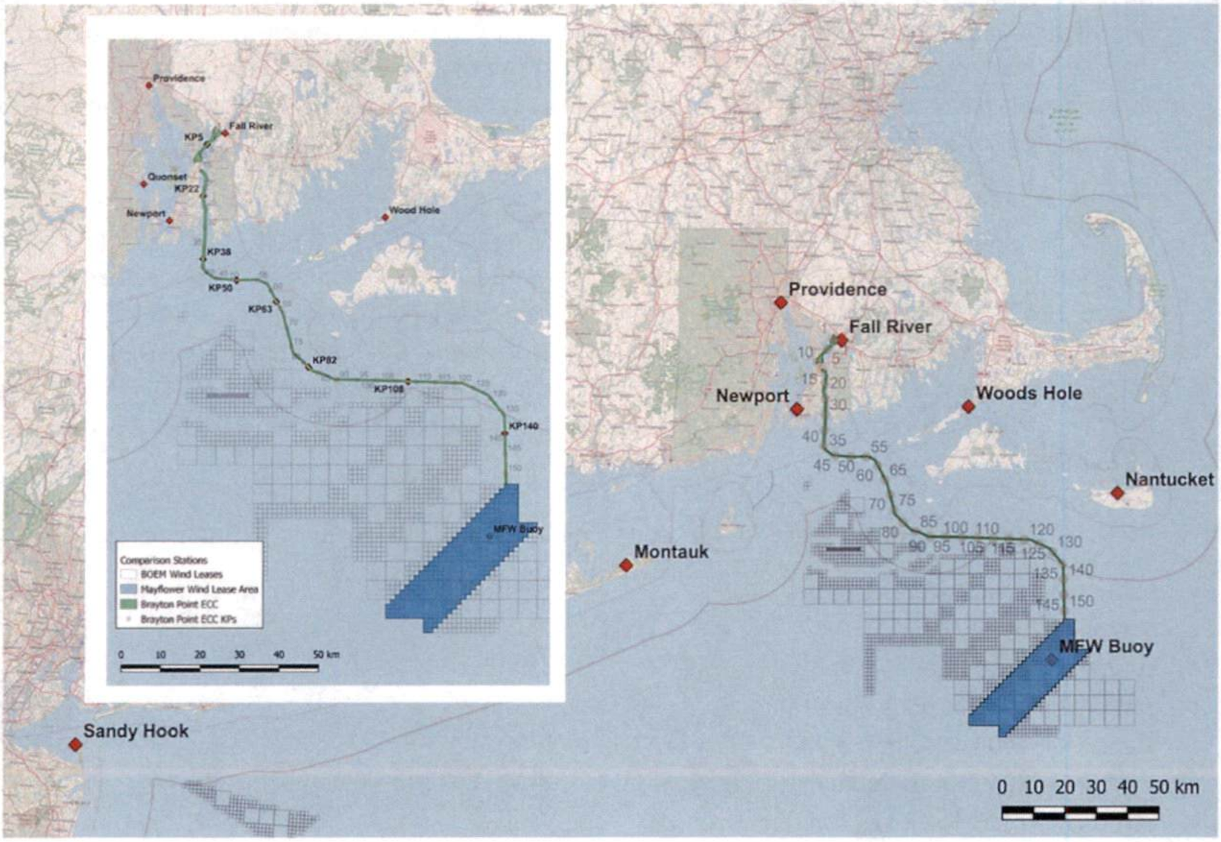

FIGURE 3-5. OBSERVATION STATIONS USED FOR DEVELOPING MODEL FORCING AND MODEL VALIDATION. INSET SHOWS A SUBSET OF KILOMETER (KP) MARKERS ALONG BRAYTON POINT ECC INDICATIVE CENTERLINE.

3.4 Validation of Model Predicted Water Surface Elevations

Water surface elevations (WSEs) predominately reflect the influence of tides, though can also be affected by winds, wind driven waves, and offshore pressure related sea level variations, particularly in coastal areas during storms. Model predictions of water surface elevations were compared to observations to evaluate how well the model was capturing water level variation in the region, particularly the water level variation from tides since the area is known to be tidally dominated (Spaulding and Swanson, 2008, Spaulding and White, 1990). The validation included multiple components including: (1) a qualitative comparison of time series, (2) a statistical comparison of model vs observation time series statistics, (3) statistical comparison of the tidal harmonics developed through harmonic decomposition of observed and predicted time series data. Harmonic decomposition refers to the output of a signal processing analysis that removes any non-periodic elements (such as set up or set down from winds) and then further breaks the tidal signal down in to its individual cyclical astronomical components (e.g. the semi-diurnal M2 component that dominates the tides in this region) that can be defined by their amplitude, period and phase. NOAA describes harmonic constituents as follows:

> *There are hundreds of periodic motions of the Earth, Sun, and Moon that are identified by astronomy. Each of these motions or "constituents" in a set of harmonic constants is a mathematical value describing the effect that cyclical motion of the Earth, Sun, Moon system has on the tides. There are 37 which normally have the greatest effect on tides and are used as the tidal harmonic constituents to predict tidal conditions for a location.*
>
> *A couple of examples:*
>
> - *M2 – The largest lunar constituent – is related to the direct gravitational effect of the Moon on the tides. The Earth rotates on its axis every 24-hours, but the Moon is orbiting in the same direction as the Earth's rotation. It takes a location on the Earth an additional 50 minutes to "catch up" to the Moon. This results in a tidal signal (M2) which has 2 peaks every 24-hours and 50 minutes.*
> - *S2 – The largest solar constituent – is related to the direct gravitational effect of the Sun on the tides. The Earth rotates on its axis every 24-hours. This results in a tidal signal (S2) which has 2 peaks every 24-hours.*

Water surface elevation data was obtained for the study time period from the following NOAA tide stations:

- Station 8531680: Sandy Hook, NJ
- Station 8510560: Montauk, NY
- Station 8452660: Newport, RI
- Station 8447930: Woods Hole, MA
- Station 8454000: Providence, RI
- Station 8454049: Quonset Point, RI
- Station 8447386: Fall River, MA

The five largest tidal harmonic components calculated from modeled and observed water surface elevation time series were compared at each of the NOAA tide stations (Figure 3-5). The five harmonic constituents compared were M2, S2, N2, K1, and O1 and their respective periods are presented in Table 3-2 below.

TABLE 3-2. TIDAL HARMONIC CONSTITUENT CHARACTERISTICS (NOAA, 2007).

Name	Constituent	Speed in degrees/hour	Period in hours
M2	Principal lunar semidiurnal constituent	28.98	12.42
S2	Principal solar semidiurnal constituent	30.00	12.00
N2	Larger lunar elliptic semidiurnal constituent	28.44	12.66
K1	Lunar diurnal constituent	15.04	23.93
O1	Lunar diurnal constituent	13.94	25.82

Plots of the model predicted and observed water surface elevation (WSE) time series are presented in Figure 3-6 through Figure 3-7 for stations located as shown in Figure 3-5. These plots illustrate that the model was able to capture the semi-diurnal nature of the tides, the shifts in water level due to storms and the variation of tidal range across the region. The tide range varies across the region, though the peak tidal amplitude is less than 1.25 m (4.10 ft) in most locations at most times.

The model predicted time series plotted in Figure 3-6 were generated by the large grid application and show that there is a large variation in tidal amplitudes and storm response across the domain which the model was able to predict. The Woods Hole station missed some of the variability likely due to complex coastal topography in the area. As will be shown below, the tidal harmonics are well represented at that station none the less.

The time series presented in Figure 3-7 were generated using the nested grid model application and again it can be seen that the model is able to adequately reproduce the tidal variability and the storm (wind) related offsets. This is a good indication that the model predictions are robust across the domain for many different types of areas as environmental conditions within the Brayton Point ECC study area.

The differences between model predictions and observations were evaluated quantitatively through the calculation of different statistical measures including the root mean square error (RMSE), and the correlation coefficient (R). Both of these measures are calculated on a point to point basis, i.e. the model predictions and the observations are compared one to one at every time step. As it essentially uses the absolute value of the differences, positive and negative differences do not average, making it an unforgiving measure of the difference between the model and the observations.

The root mean square error is a measure of the variance of the error (difference between the model prediction and the observation at a given time), defined by the equation is shown below.

$$RMSE = \sqrt{\overline{(model - obs)^2}}$$

The correlation coefficient is a measure of the variance of the error and is the standard of deviation of the difference between model predictions and observations, the equation is shown below.

$$R = \frac{covariance\ (model, obs)}{STD_{model} * STD_{obs}}$$

A summary of the statistics is shown in Table 3-3. With the exception of Woods Hole as was seen in the earlier comparison, the RMSE and correlation coefficient show an excellent fit between the model predictions and the observations, with a RMSE on the order of 0.1 m/s.

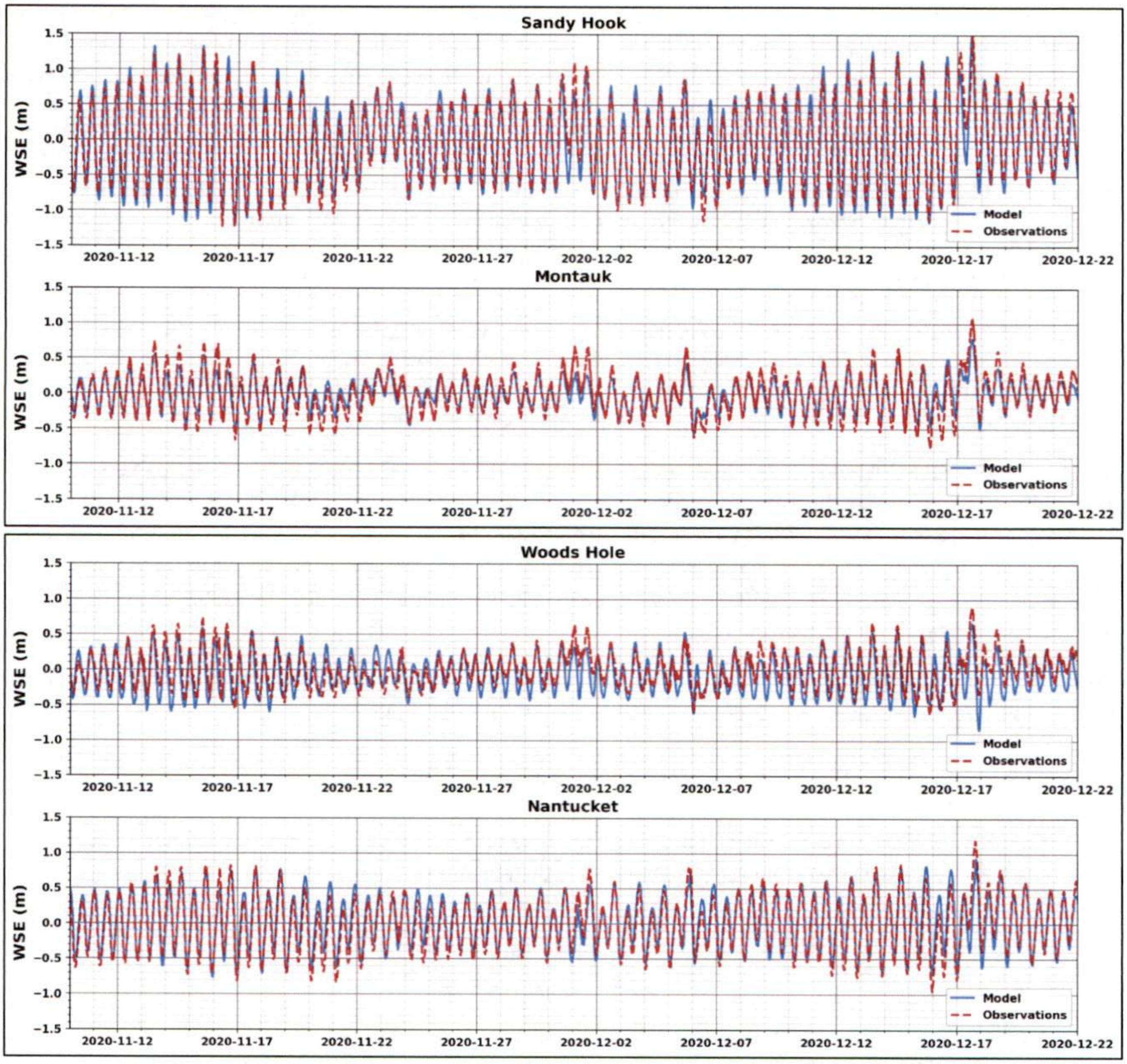

FIGURE 3-6. COMPARISON OF MODELED AND OBSERVED WATER SURFACE ELEVATIONS AT NOAA SANDY HOOK, MONTAUK, WOODS HOLE, AND NANTUCKET TIDE STATIONS. WATER SURFACE ELEVATIONS ARE PLOTTED RELATIVE TO MSL.

FIGURE 3-7. COMPARISON OF MODELED AND OBSERVED WATER SURFACE ELEVATIONS AT NOAA NEWPORT, PROVIDENCE, QUONSET POINT, AND FALL RIVER TIDE STATIONS. WATER SURFACE ELEVATIONS ARE PLOTTED RELATIVE TO MSL.

TABLE 3-3. SUMMARY OF STATISTICS AT WATER SURFACE ELEVATION OBSERVATION STATIONS BASED ON COMPARISON OF MODEL PREDICTED TO OBSERVED TIME SERIES OF DATA.

Station	RMSE (m/s)	R (-)
Sandy Hook	0.09	0.96
Montauk	0.13	0.92
Woods Hole	0.22	0.77
Nantucket	0.10	0.95
Newport	0.08	0.97
Fall River	0.09	0.96
Quonset Point	0.08	0.97
Providence	0.09	0.96

A harmonic decomposition was performed on both the observed and modeled time series at the observation locations. The harmonic constituents of the modeled and observed amplitude and phase at the eight comparison stations are summarized in Table 3-4 and Table 3-5, respectively. The results show that the M2 constituent dominates across all the sites and that the model is able to reproduce the variation in water surface elevation from the tides across the domain very well. The tables also provide the differences between model and observed characteristics. Differences in tidal amplitude vary up to a high of 0.09 m (2.95 ft) at Woods Hole, they are less than that in the majority.

TABLE 3-4. SUMMARY OF COMPARISON OF HARMONIC ANALYSIS OUTPUT OF CONSTITUENT AMPLITUDE FOR BOTH MODELED AND OBSERVED DATA FROM OBSERVATION STATIONS WITHIN THE MODEL DOMAIN.

		Amplitude (m)					
		Sandy Hook	Montauk	Woods Hole	Nantucket	Newport	Fall River
M2	Model	0.72	0.23	0.33	0.46	0.54	0.62
	Obs	0.69	0.30	0.24	0.46	0.52	0.61
	Difference	0.03	-0.07	0.09	0.00	0.02	0.01
N2	Model	0.20	0.07	0.08	0.11	0.13	0.14
	Obs	0.18	0.09	0.08	0.13	0.14	0.16
	Difference	0.03	-0.02	0.00	-0.01	-0.01	-0.02
K1	Model	0.17	0.08	0.07	0.11	0.07	0.06
	Obs	0.12	0.08	0.08	0.11	0.07	0.07
	Difference	0.05	-0.01	-0.01	0.00	-0.01	-0.01
S2	Model	0.13	0.06	0.06	0.04	0.09	0.10
	Obs	0.12	0.06	0.05	0.05	0.10	0.12
	Difference	0.01	0.01	0.01	0.00	-0.01	-0.01
O1	Model	0.04	0.04	0.05	0.08	0.04	0.03
	Obs	0.05	0.05	0.06	0.08	0.04	0.04
	Difference	-0.01	0.00	0.00	0.00	0.00	-0.01

TABLE 3-5. SUMMARY OF COMPARISON OF HARMONIC ANALYSIS OUTPUT OF CONSTITUENT PHASE FOR BOTH MODELED AND OBSERVED DATA FROM OBSERVATION STATIONS WITHIN THE MODEL DOMAIN.

		Constituent Phase (degrees)					
		Sandy Hook	Montauk	Woods Hole	Nantucket	Newport	Fall River
M2	Model	127	153	121	245	115	121
	Obs	122	163	151	249	117	124
	Difference	5	-10	-30	-4	-2	-2
N2	Model	327	348	321	69	314	322
	Obs	315	350	346	67	312	320
	Difference	12	-2	-26	2	1	1
K1	Model	14	183	192	216	177	186
	Obs	22	192	200	223	182	188
	Difference	-8	-9	-9	-7	-5	-2
S2	Model	174	32	359	161	6	12
	Obs	173	43	20	153	9	17
	Difference	1	-11	-21	8	-4	-5
O1	Model	291	304	295	314	297	301
	Obs	286	300	299	317	294	298
	Difference	5	4	-4	-3	3	3

3.5 VALIDATION OF MODEL PREDICTED CURRENTS

The model predictions of currents were validated to available observations. The objective of the comparison is to evaluate how well the model can recreate the magnitude and pattern of currents, particularly near the seabed where the sediments will be resuspended and transported by the currents during cable installation processes. Current data available to compare to the model predictions consisted of NOAA predictions of current velocities (along channel velocities) at the Fall River station, and current observations at the offshore Mayflower Wind metocean buoy in the Lease Area, both as located in Figure 3-5.

The Fall River bottom station is located adjacent to the dredged channel at a depth of approximately 9 m (30 ft) deep relative to MSL. The NOAA predicted current velocities, at that depth, were compared to model predictions at the corresponding depth. Figure 3-8 shows a comparison of current velocities. The NOAA predictions are provided as a singular directionless velocity, deemed to be aligned with the channel as there is little variability in current direction within channels in narrow waterways dominated by tides; as such the modeled speed plot shows the varying velocity in the along channel direction. The modeled current speeds match very well with the NOAA predicted speeds, with differences typically within a few centimeters per second in a total range of approximately 40 cm/s. The results of a statistical comparison between the model predictions and the observations at Fall River are presented in Table 3-6.

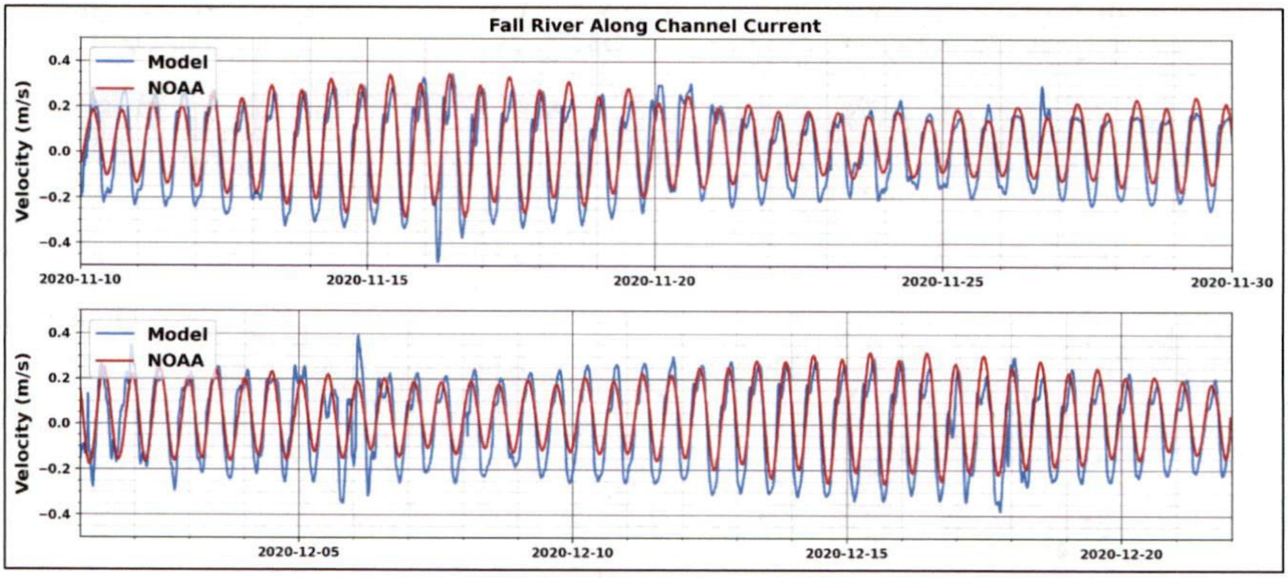

FIGURE 3-8. CCOMPARISON OF MODELED AND NOAA PREDICTED CURRENT SPEED AT FALL RIVER.

TABLE 3-6. SUMMARY OF CURRENT SPEED STATISTICS AT FALL RIVER.

	Model (m/s)	NOAA (m/s)	Difference (m/s)
Minimum	-0.48	-0.41	-0.07
Maximum	0.39	0.37	0.02
Percentiles			
5	-0.27	-0.27	0.00
10	-0.24	-0.22	-0.02
25	-0.16	-0.12	-0.05
50	0.05	0.09	-0.04
75	0.16	0.18	-0.02
90	0.22	0.24	-0.02
95	0.25	0.28	-0.03

The Mayflower Wind metocean buoy is located in approximately 47 m (154 ft) of water and has a vertical profile of current observations available, with observations extending to 41 m (135 ft). The near bottom observed currents were compared to model predictions near the bottom. Figure 3-9 shows a comparison of speeds at 39 m (128 ft) depth, and the associated observed and predicted current directions are shown in Figure 3-10. The comparison was made at the 39 m (128 ft) level as the signal in the observations was missing more data at the 41 m (135 ft) depth.

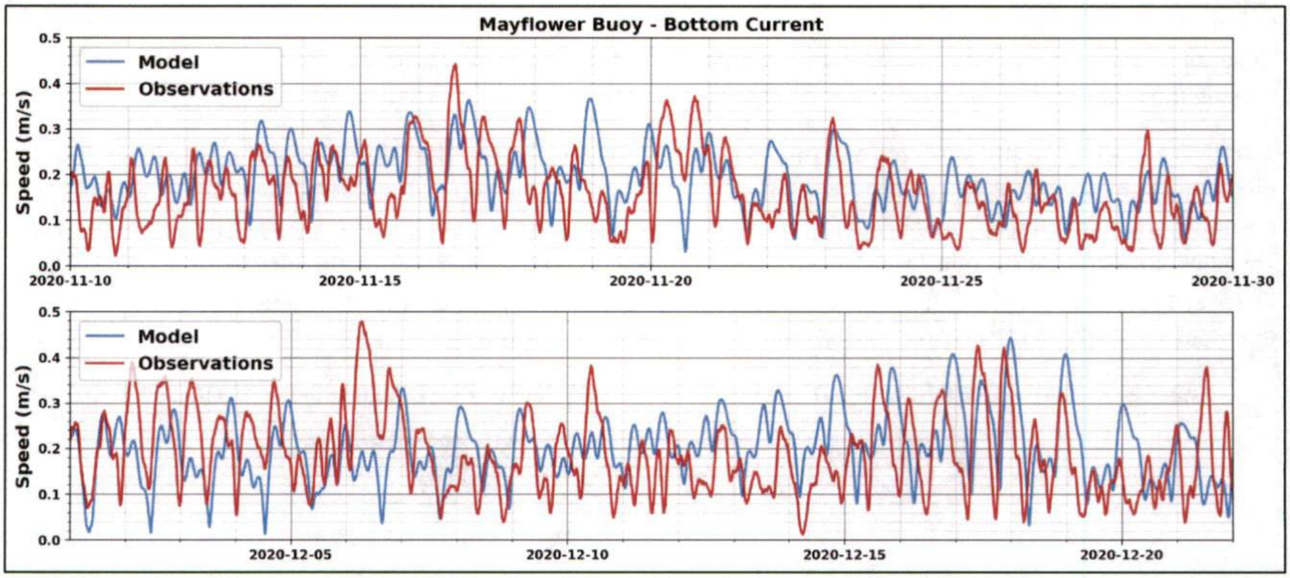

FIGURE 3-9. COMPARISON OF MODELED AND OBSERVED BOTTOM CURRENT SPEED AT THE OFFSHORE MAYFLOWER WIND METOCEAN BUOY.

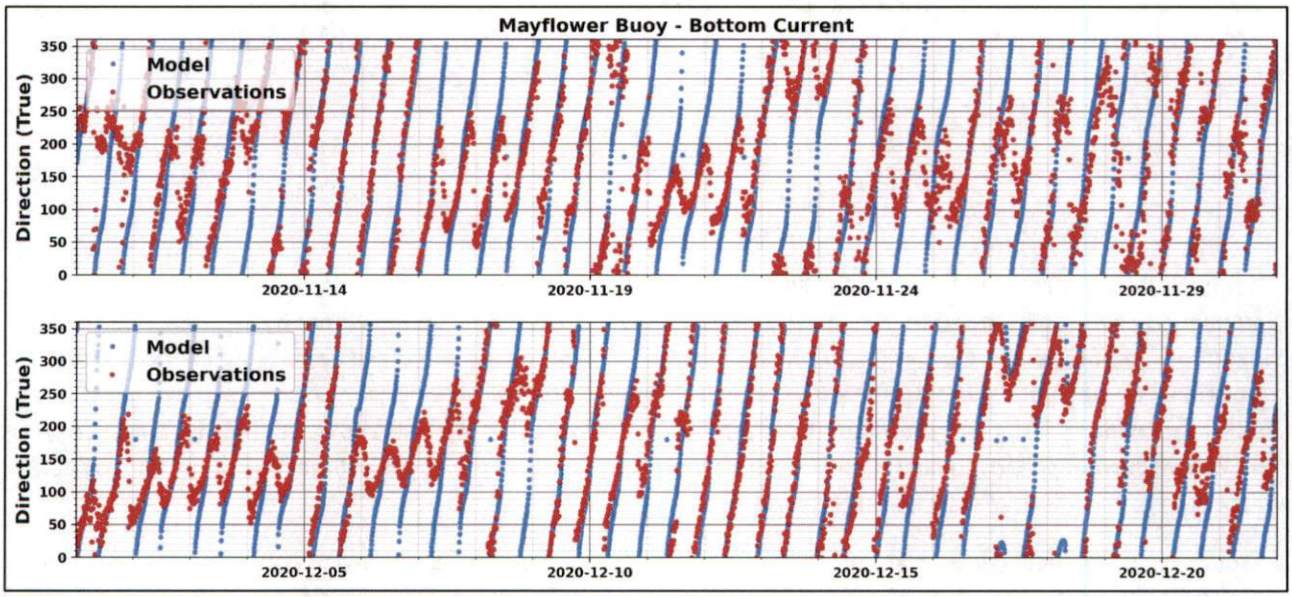

FIGURE 3-10. COMPARISON OF MODELED AND OBSERVED BOTTOM DIRECTION AT THE OFFSHORE MAYFLOWER WIND METOCEAN BUOY.

The figures show that the model recreates the overall magnitude and trends of the current speeds and the general rotary nature of the currents, however the model does not capture the directionality in all instances. The observed currents during this period show more tendency to flow towards the north and east, deviating from the more definite rotary characteristics than was captured by the model. This may be due to the currents during storm events and also influences of larger offshore currents that are not included in the model. At locations closer to shore from this offshore location it is expected that the current regime is more tidally dominated and outside the influences of the larger scale circulation offshore.

A statistical analysis of the observed and model predicted currents was also performed for the Mayflower Wind metocean buoy location. The minimum, mean and maximum current speeds comparing the model predicted and observed are presented in Table 3-7 along with a range of current speed percentiles. The comparison of these statistics shows that the model is within 0.07 m/s (0.14 kts) on average and has a difference less than 0.05 m/s (0.1 kts) at all percentile levels indicating that while the direction may not always be aligned with the observations the model is predicting the correct proportion and variability of bottom current speeds.

TABLE 3-7. SUMMARY OF CURRENT SPEED STATISTICS AT THE MAYFLOWER WIND METOCEAN BUOY.

	Model (m/s)	Observation (m/s)	Difference (m/s)
Minimum	0.01	0.00	0.01
Maximum	0.44	0.51	-0.07
Percentiles			
5	0.09	0.05	0.04
10	0.11	0.07	0.05
25	0.15	0.11	0.04
50	0.19	0.16	0.03
75	0.24	0.23	0.01
90	0.29	0.30	-0.01
95	0.32	0.34	-0.02

The currents vary throughout a given day and vary day to day as a function of the solar and lunar cycles; most variability is captured in the spring/neap cycle which refers to a two-week period where there are periods of larger tidal amplitudes (spring tides) and smaller amplitudes (neap tides) and these periods are connected by transitional or mean tides. The northeast is dominated by semi-diurnal M2 tides, which results in two high tides and two low tides per day. As a result of these tides, the currents ebb (flow out) and flood (flow in) twice a day. This causes current speeds to continuously ramp up and down in intensity and the directions to oscillate by 180 degrees (e.g. in and out of Narragansett Bay).

In some places the tidal currents are rectilinear, meaning primarily a singular flood and ebb direction with little time at directions between the two, whereas other regions have more rotary like currents which still have predominant ebb and flood however also have a more gradual transition between the two. Plots of the near bottom current speeds across the entire domain for peak ebb and peak flood currents are provided in Figure 3-9. While each plot represents an instant in time, they illustrate the relative spatial variability of peak current speeds across the region. Along the majority of the ECC, the peak current speeds are relatively low (<0.3 m/s), with a few regions with higher peaks such as near the Lease Area termination, a small portion southwest of Martha's Vineyard and then within the Sakonnet River and Mount Hope Bay where peaks increase to approximately >0.5 m/s; however, these peaks are not experienced the majority of the time.

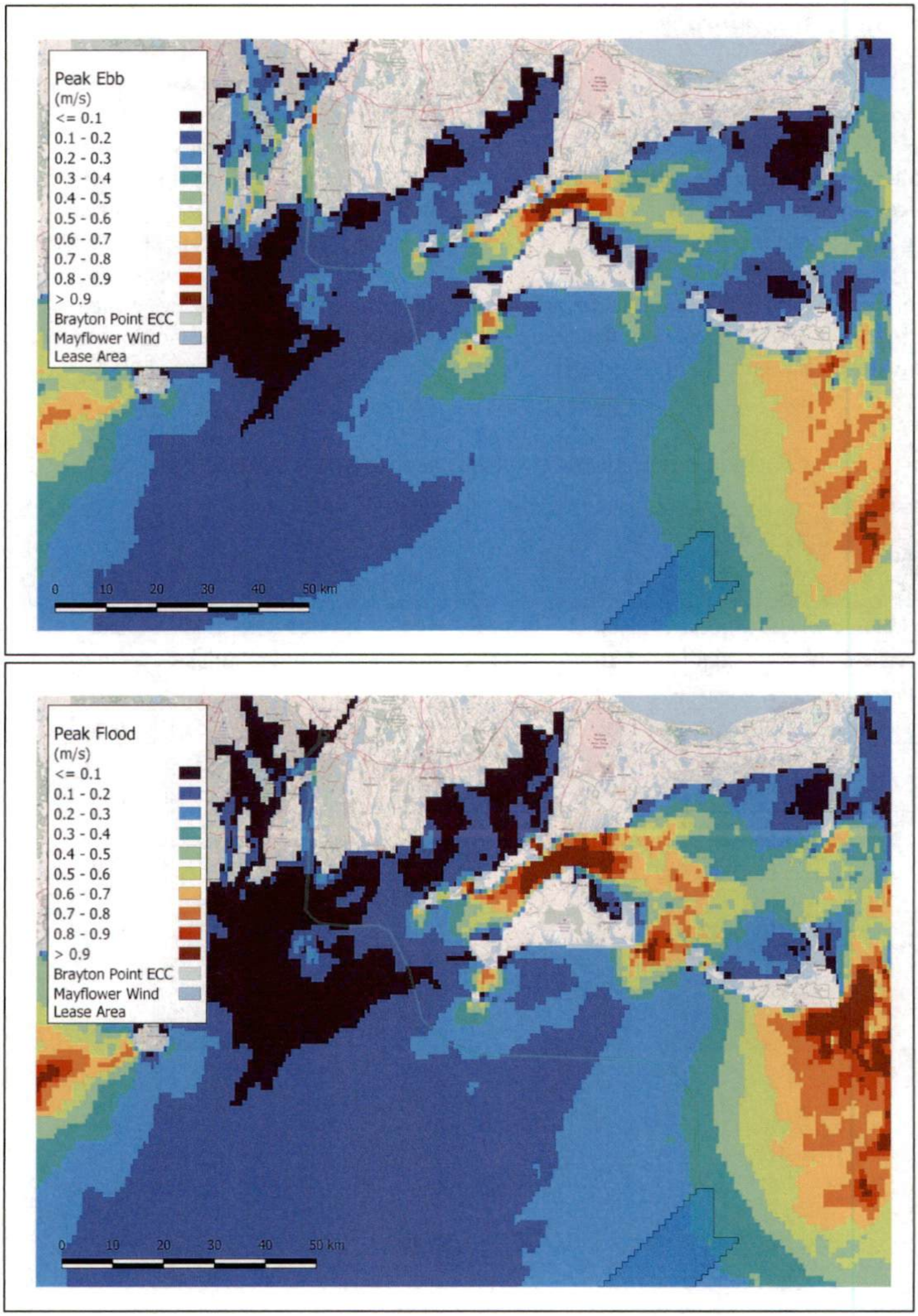

FIGURE 3-11. PEAK EBB (TOP) AND FLOOD (BOTTOM) CURRENT SPEEDS.

3.6 PROJECT SCENARIO

The three-dimensional time varying current fields of validated hydrodynamic model were stored and used in the sediment transport modeling. The near bottom currents at a set of stations aligned with different KPs were queried to assess the current regime along the ECC that will be relevant to the sediment transport. A map showing the current roses at the specific locations is presented in Figure 3-12 and a summary of statistics of the current speeds at these locations is provided in Table 3-8. The current roses show that the bottom speeds are relatively weak, and less than 0.15 m/s more than half the time at most stations except KP22 and KP140. The latter two stations are areas of relatively higher current speeds within the Sakonnet River and offshore near the Lease Area, respectively. The directions differ along the ECC in response to the changing circulation patterns which are shaped by the shoreline and offshore bathymetric features, however at all locations the tidal influence is dominant and the currents shift in direction continuously.

TABLE 3-8. SUMMARY OF CURRENT SPEED STATISTICS ALONG THE ECC.

	Current Speed Statistics (values in m/s)							
	KP5	KP22	KP38	KP50	KP63	KP82	KP108	KP140
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.56	1.16	0.30	0.30	0.30	0.55	0.37	0.45
Percentiles								
5	0.02	0.04	0.01	0.02	0.05	0.06	0.04	0.10
10	0.03	0.07	0.02	0.04	0.06	0.07	0.05	0.12
25	0.06	0.12	0.03	0.06	0.09	0.11	0.08	0.16
50	0.09	0.19	0.04	0.08	0.12	0.15	0.11	0.21
75	0.12	0.25	0.07	0.12	0.15	0.21	0.16	0.26
90	0.15	0.30	0.12	0.15	0.18	0.26	0.20	0.31
95	0.17	0.33	0.18	0.17	0.20	0.31	0.23	0.34

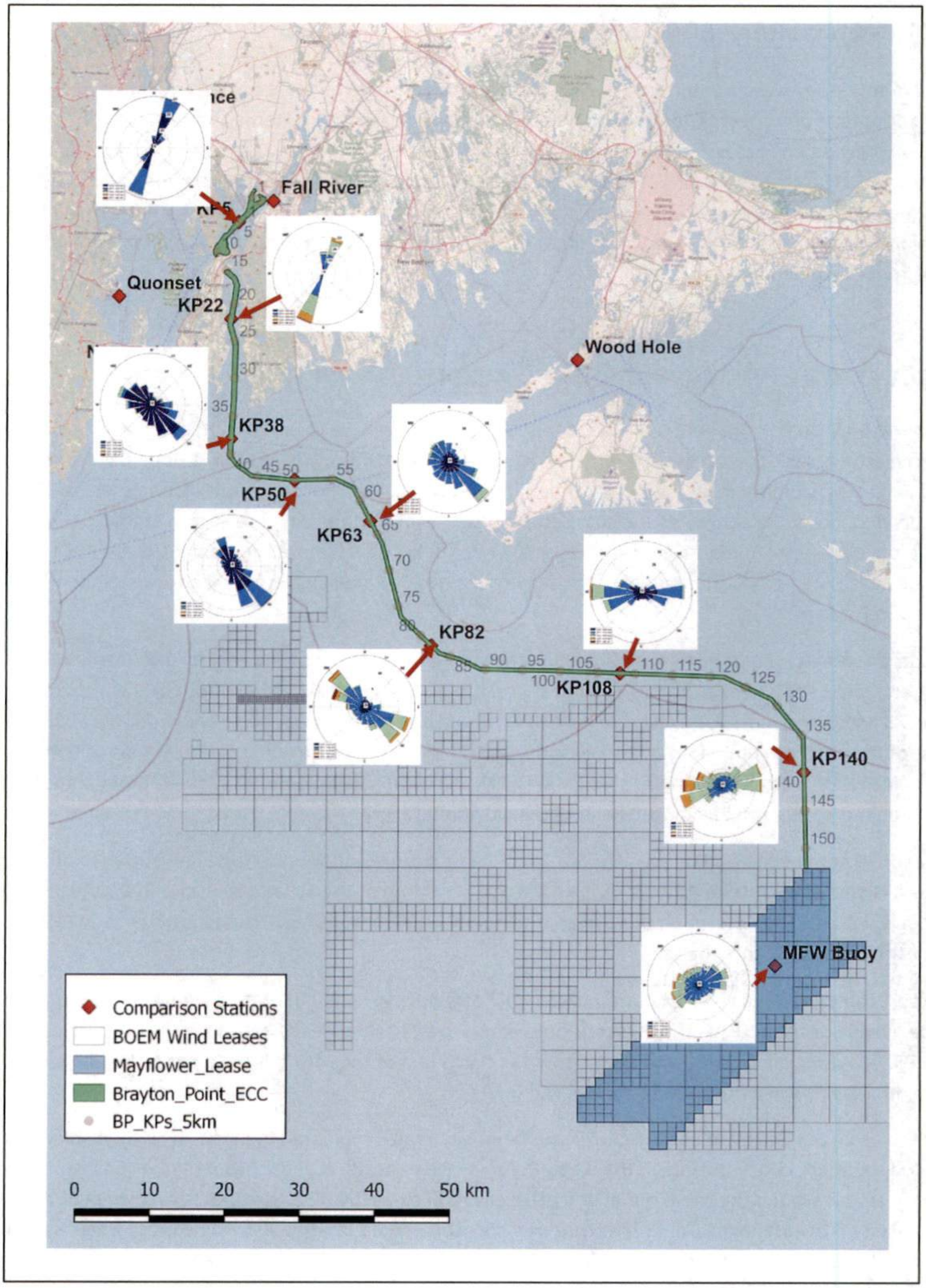

FIGURE 3-12. CURRENT ROSES FROM MODEL PREDICTED BOTTOM CURRENTS AT POINTS ALONG ECC.

4 Sediment Transport Modeling

The goal of this study was to determine the effects of proposed cable burial activities, evaluated in terms of water column concentrations of suspended sediment and sediment deposition patterns and thickness. The model application focused on "excess" sediment concentrations and did not incorporate natural background concentrations. The concentrations are therefore considered excess above any background levels. The effects were assessed through sediment dispersion, transport, and deposition modeling. This section provides a description of the sediment model application to the Brayton Point ECC development assessment and the resulting model predictions.

4.1 Brayton Point Export Cable Corridor Description

The planned Brayton Point export cable ECC connecting the Lease Area to land at Somerset, MA can be considered as two basic parts for modeling purposes: the portion of the ECC in Mount Hope Bay and the rest of the ECC extending from the head of the Sakonnet River to Lease Area. For the following analyses, the ECC will be further divided into four segments for discussion purposes: Mount Hope Bay, the Sakonnet River, Offshore Segment 1 (from the Sakonnet River entrance at KP34 to KP78) and Offshore Segment 2 (from KP78 to the north end of the Lease Area at KP152). A map of the Brayton Point ECC showing the four sections and the HDD sites is presented in Figure 4-1.

Starting at the Brayton Point terminus of the ECC, the submarine portion of the cables run from an HDD connection point used to bring the cables from shore, roughly 325 m (1,066 ft) offshore of the Brayton Point landfall, 9.5 km (5 nm) in a southwest direction to another HDD offshore exit point approximately 285 m (935 ft) offshore of the northern end of Aquidneck Island near the Mount Hope Bay entrance just west of Common Fence Point. The cables will cross Aquidneck Island and exit the island via HDD connection point, approximately 340 m (1,116 ft) offshore of Island Park at the head of the Sakonnet River.

The three HDD connection pits will be referred to as the Brayton Point, Mount Hope Bay entrance north of Aquidneck Island, and south of Aquidneck Island at the north end of the Sakonnet River excavation pits, respectively. Each of the excavation pits are assumed to be 3.05 m wide x 6.1 m long x 4.3 m deep (10 ft x 20 ft x 14 ft) for the purpose of this analysis.

Each export cable then runs approximately 18 km (9.7 nm) down the length of the Sakonnet River to the entrance at Rhode Island Sound at KP34. The ECC continues south to KP40 then heads east across the mouth of Buzzards Bay to KP55, south again to KP80 and east across the north end of the MA/RI lease areas to KP130 and finally south to the Mayflower Wind Lease Area at KP 152.

Each of the cable ECC segments and the HDD exit point sites were evaluated individually to determine the re-suspended sediment concentration in the water column, the deposition pattern and dimensions (spread and thickness), at and around the cable burial or HDD excavation site activities. The total surface area of the burial trench, based on the assumed 1 m (3.3 ft) wide trench, is presented in Table 4-1. The surface area associated with each HDD pit excavation is also presented in the table, as well as the amount of time in each the excavation activities take for each segment assuming continuous operation in that segment at the 200 m/hr advance rate.

TABLE 4-1. DISTANCE AND SURFACE AREA OF EACH TRENCH SECTION.

Section	Approximate Distance	Trench Surface Area (based on 1.0 m [3.3 ft] trench width)	Duration of Excavation Activities (hrs)
Mount Hope Bay	9.5 km (5.9 mi)	0.95 ha (2.4 ac)	47.5
Sakonnet River	18 km (11.2 mi)	1.8 ha (4.5 ac)	90
Offshore Segment 1	44 km (27.3 mi)	4.4 ha (10.9 ac)	220
Offshore Segment 2	74 km (46.0 mi)	7.4 ha (18.3 ac)	370
HDD Connection Pit	3.05 m x 6.1 m (10 ft x 20 ft)	0.00186 ha (0.0046 ac)	1

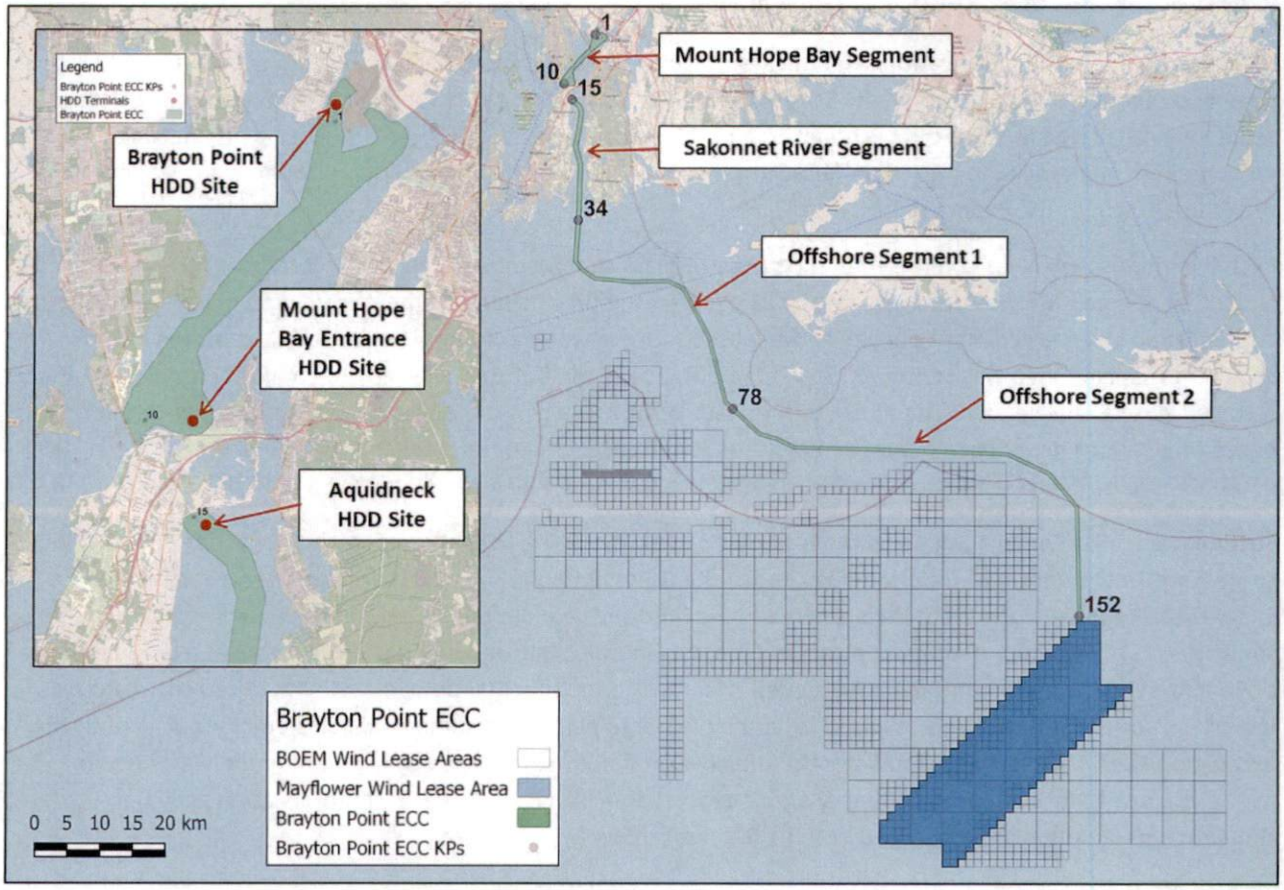

FIGURE 4-1. MAP OF THE BRAYTON POINT ECC SHOWING THE SEGMENTS USED FOR RESULTS DISCUSSION AND THE LOCATIONS OF THE HDD CONNECTION SITES ANALYZED.

4.2 SEDIMENT SOURCE TERMS

Two different subsea excavation techniques are likely to be employed for the cable burial trenching and the HDD pit excavation construction activities. For the cable burial activities, mechanical plow or jetting sediment excavation methods were assumed, while suction dredging was assumed for the HDD pit excavation. Losses (i.e. sediments resuspended to the water column) from each of these activities were represented in the D-WAQ PART model by characterizing the source strength, vertical distribution, and grain-size distribution of the sediment load. Details describing the parameterization of each method are provided below.

The cable burial activities were simulated with an advance rate of 200 m/hr (656 ft/hr). The trench dimensions were specified as 3 m (9.8 ft) deep by 1 m (3.3 ft) wide for the length of the export cables, resulting in a production rate of 600 m^3/hr (21,189 ft^3/hr) for the cable burial. An excavation production rate of 90 m^3/hr (3,178 ft^3/hr) was specified for the HDD pits suction dredging.

Using the source term specifications and the grain size distributions along the ECC, a loading time series was developed for each of the components listed in Table 4-1. The loading was subdivided into five-minute production segments, calculated as the cross-sectional area of the trench times the distance travelled by the jetting equipment in one time step (i.e. 50 m^3 [1766 ft^3] and 16.67 m [54.7 ft]) for injection into the water column over the entire length of the export cables.

Each five-minute load was comprised of six grain size mass components based on the local grain size distribution along that segment of the ECC, a loss rate of 25 percent, the production volume, the volume mass/moisture content ratio and the sediment density and released into the water column. The vertical distribution of the sediments resuspended was centered at 1.5 m (4.9 ft) above the bottom, whereby the majority of the sediment is released close to the seabed. The 25 percent release volume is a conservative value for these types of operations based on previous experience but is used in the absence of contractor data for the specific jetting or mechanical equipment to be used for the actual cable burial in the Sakonnet River, Mt. Hope Bay and Rhode Island Sound.

Suction dredge equipment was specified to be used to excavate the HDD connection pit at each of the sea-to-shore transition points in Mount Hope Bay and in the Sakonnet River. A suction dredger uses a vacuum to excavate a sediment slurry from the seabed and the fluidized sediment is released through a discharge pipe to a spoil area on the seafloor nearby. Contractor estimates indicate that the dredger can operate at a production rate of 90 m3/hr. For implementation in the modeling, it is assumed that 100 percent of the fluidized sediment will be lost to the water column as it is released from the discharge pipe (i.e. sediment will be side-cast adjacent to the excavation site). The discharged sediment is initialized within the model at a single point in the water column, 1.5 m (4.9 ft) above the seafloor. A summary of the export cable burial and the HDD pit excavation activities simulation parameters are presented in Table 4-2and Table 4-3, respectively.

TABLE 4-2. SUMMARY OF EXPORT CABLE BURIAL ACTIVITIES SIMULATED.

Export Cable Burial Activities	
Excavation method	Mechanical or jet trenching
Advance Rate	200 m/hr (656 ft/hr)
Production Rate (Based on 1 m wide x 3 m deep trench)	600 m^3/hr (21,189 ft^3/hr)
Release amount	25 percent
Release height	Centered 1.5 m (4.9 ft) above local seabed
Total Duration	727.5 hrs (30.3 days)

TABLE 4-3. SUMMARY OF HDD PIT EXCAVATION ACTIVITIES SIMULATED.

Export Cable Burial Activities	
Excavation method	Suction dredge
Production Rate (Based on 10 ft x 20 ft, 14 ft deep pit)	90 m^3/hr (3178 ft^3/hr)
Release amount	100 percent
Release height	Centered 1.5 m (4.9 ft) above local seabed
Total Duration (3 pits)	3 hrs (0.125 days)

4.3 Export Cable Corridor Sediment Characteristics

The sediment loading also takes into account the spatial variability of the sediments characteristics along the ECC with respect to the grain size distributions and the water content. For this assessment sediment surface grab samples were taken along the ECC. The samples were obtained as part of site investigation field studies performed for the Project (AECOM, 2022). A total of 36 samples were taken of which 23 were on the Brayton Point ECC and were used to characterize the sediments for the modeling. The remaining samples were taken as controls for use in the lab analysis. The samples were processed to determine the grain size distribution from both sieve and hydrometer and to provide the moisture content and specific gravity.

The grain size analysis was used to determine the percent of sediments in the six different sediment classification bins as defined in Table 2-1 using the Wentworth grade scale. The moisture content and specific gravity were estimated from the data and used to determine the percent of the trench that would be considered solids and to define the sediment density in the model. Since seabed sediments have moisture (water), this means that the trench volume is not entirely comprised of sediment.

The sediment characteristics along the Brayton Point ECC which were used in the modeling are presented in Figure 4-2. In Mount Hope Bay the figure shows that the sediments contain large fraction (over 50 percent) of silt and clay with the remainder divided roughly evenly among the 4 sand bins. At the mouth of the Sakonnet River (southern end) and moving into Rhode Island Sound the predominant sediment fraction is fine sand mixed with coarse and medium sand. Along the Brayton Point ECC to the west of Martha's Vineyard the sediments contain fine and very fine sand but become medium to coarse south of Martha's Vineyard and remain a mix of predominantly fine and medium sand for the remaining segments to the Lease Area. The tabulated details of the grain size distributions can be found in Appendix 1 - Brayton Point ECC Surface Sediment Grab Sample Grain Size Distribution.

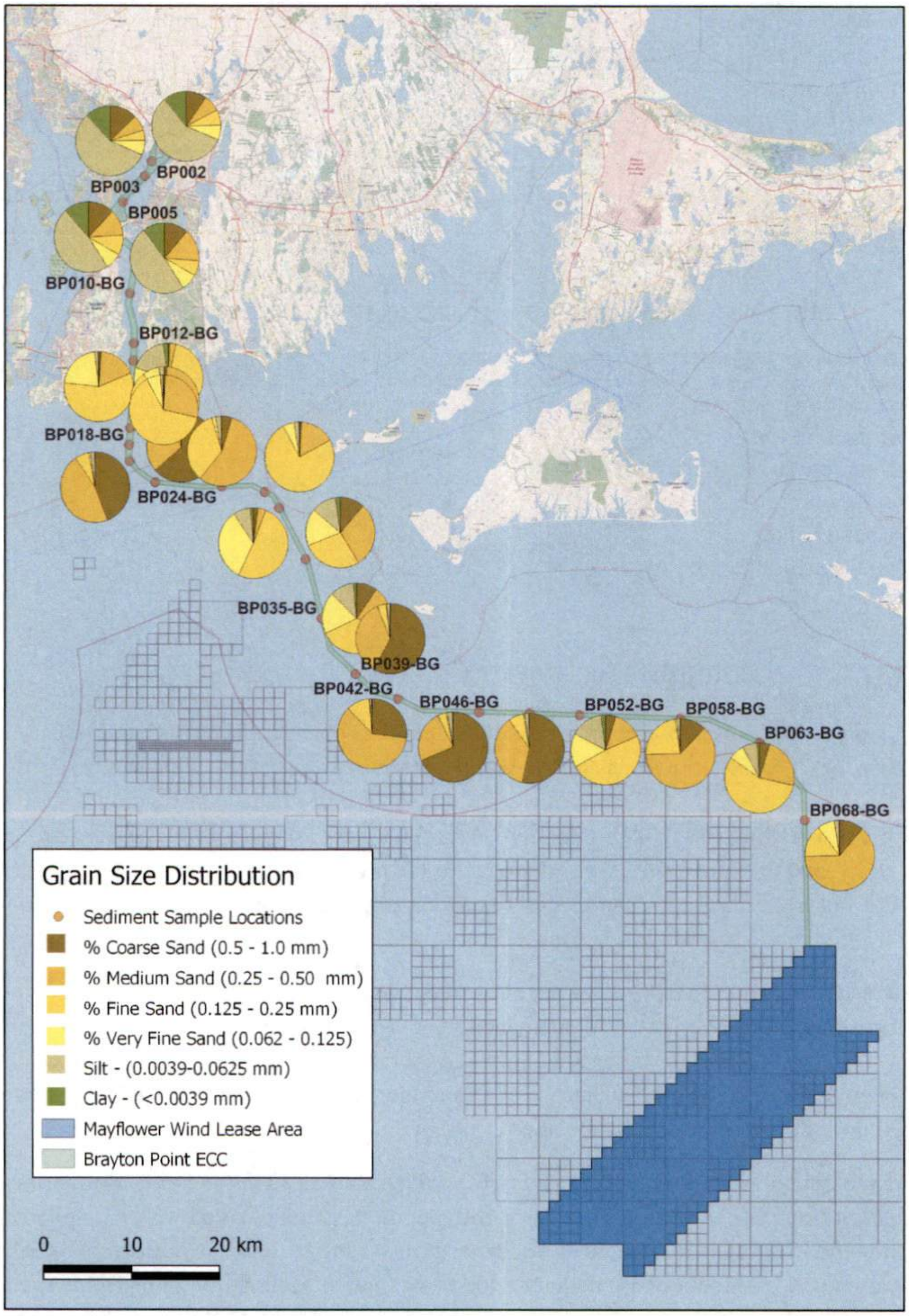

FIGURE 4-2. GRAIN SIZE DISTRIBUTION ALONG THE BRAYTON POINT EXPORT CABLE CORRIDOR. (MAYFLOWER WIND, 2021A)

The grain size distributions were parsed into segments with a dividing line at the mid-point between sediment samples for use in the model. The load development assumed a constant sediment grain size distribution based on the sample between midpoints. There was no additional information available on the transition of sediment characteristics (grain size fractions) between measurements so the modeling did not interpolate between samples. A hard transition was therefore made to the next segment's values at each of the mid-points between samples.

4.4 Brayton Point ECC Sediment Model Application

Based on the ECC, trench dimensions, and near surface sediment data, the model was run for each segment described in the preceding sections. The model was used to predict the trajectory and fate of the resuspended sediment resulting from the jetting and suction excavation activities.

At each time step sediment particles are released into the water column in proportion to the spatially varying sediment class distribution as determined from the surface grab samples analyzed. For each sediment class over 1,250,000 particles were released over the loading period of the simulations. Each particle is advected laterally by tidal currents as predicted by the Delft3D hydrodynamic model application (described in Section 1) at every time step in the model. The three-dimensional currents vary time and space and therefore the sediment model is predicting the sediment transport and deposition for a single discrete event. For this study a start date was chosen for a time period that would be likely to embark on the cable burial operations and was coordinated with a time when there was in-situ data for model validation as presented in Section 1. The final selected dates placed the simulation between November and December 2020.

At each time step of the model simulation sediment concentrations in the water column were calculated both on the hydrodynamic model grid as well as on a rectangular grid measuring approximately 20 m by 20 m (65 ft x 65 ft) in the horizontal and 1 m (3.28 ft) in the vertical dimension. For each model time step, water column concentrations of total suspended sediments were calculated based on the mass of sediment per unit volume of water for each class of sediments and stored in terms of mass per cubic meter.

Concentrations are calculated on a grid of finite dimension and therefore provide a concentration average, based on the cell volume and mass within that cell, at each time step and thus in reality there may be some highly localized peaks above the model predicted concentrations, directly above the cable burial tool representative of a jet / mechanical trenching.

Individual sediment particles also have a downward (fall) velocity which is variable depending on both the particle size of the sediment class (settling velocity) and the environmental conditions. There is some upward movement potential associated with the parameterized vertical mixing but the general trend is for the particles to settle to the seabed where larger particles settle faster than smaller ones. Once a sediment particle has settled onto the bottom it remains as placed (no-resuspension is assumed).

Deposited mass was calculated based on particle deposition locations overlain on the same rectilinear 20 m by 20 m (65 ft x 65 ft) grid. The deposition for each cell calculated by the model are also averages across finite grid cell area. There may be some highly localized points (i.e., in line with the jetting) where deposition accumulations exceed that of the predicted deposition as output by the model. The mass in each cell across the seabed is stored at each time step (therefore always accumulating) in units of mass per square meter.

The model was also used to simulate the sediment dispersion from the HDD pit suction dredging. Three HDD-associated sediment release scenarios were modeled, corresponding to the Brayton Point, Mount Hope Bay and Aquidneck HDD connection offshore sites. Based on specifications provided by Mayflower Wind, 80 m^3 (2,825 ft^3) of sediment were to be entrained in the suction device and discharged at a nearby site over a period of approximately 1 hour.

A similar methodology was applied for these cofferdam infilling scenarios as was done for the jet/mechanical trenching scenarios concerning the sediment type, with the same sediment classification being used and the sediment distribution being determined based on the closest grab sample. The same 20 m by 20 m (65 ft by 65 ft) horizontal grid was used to calculate concentration and deposition output. A five-minute time step was used for all of the HDD simulations.

The results of the model simulations are presented in the following sections. The sections address the potential impacts for the Mount Hope Bay jetting, the Sakonnet River jetting, the two offshore jetting activities and the HDD activities, respectively.

4.5 Sediment Transport Model Results

The D-WAQ PART model was used to perform simulations for each construction activity. All modeling assumed continuous operation for each phase of the construction. Note that reported concentrations are those predicted above the background concentration in the study area.

The results from the model runs are presented below in maps showing the predicted TSS concentrations and subsequent deposition for each activity. Specifically, two sets of graphics were developed for each scenario:

(i) A map of time-integrated maximum instantaneous TSS concentrations (mg/L), which shows peak TSS for any cell at any time step in the model domain throughout full water column.
(ii) Seabed deposition (thickness in mm) following the modeled activity.

The results are depicted in multiple figures for the scenario. The subsections below discuss the figures for the scenario result and summarize the results in tabular form. Two main sections address the water column TSS concentrations and the deposition thickness resulting from the sediments settling to the seabed. The results in each of those sections are divided into 3 sub-sections representing the impacts on two Narragansett Bay segments, (Mount Hope Bay and the Sakonnet River), two offshore segments, (the portion of the ECC between KP34 and KP78, and the portion on the ECC between KP78 and KP152), and the HDD pit excavation activities impacts, respectively.

4.6 WATER COLUMN CONCENTRATION

The water column concentrations presented are the maximum TSS concentration above background anywhere in the water column at each 20 m x 20 m (65 ft x 65 ft) concentration grid cell over the total duration of the cable installation. Ambient TSS load and concentrations have been monitored in Mount Hope Bay for many years, related to concerns for impacts of the three waste water treatment plants that discharge into the bay and rivers feeding the bay (EPA, 2016, Abdelrhman 2016, Desbonnet et.al., 1992). Ambient TSS concentrations were observed ranging regularly from 2 mg/L to 19 mg/L, with a mean of in the range of 11 mg/L (FERC, 2005).

4.6.1 Mount Hope Bay and Sakonnet River Sediment Concentrations, KPO - KP34

A map of the maximum water column TSS associated with the cable installation activities in the Mount Hope Bay (KP0 – KP10) and Sakonnet River (KP15 – KP34) portions of Narragansett Bay are presented in Figure 4-3 and Figure 4-4. The transport and dispersion of resuspended sediments in the two water bodies are similar.

Mount Hope Bay is an enclosed partially mixed estuary with a dynamic tidal regime, effectively transporting and dispersing the resuspended sediments over a wide area as can be seen in the figure. The level of maximum concentrations predicted in the estuary was primarily a result of the relatively high concentrations of silt and clay in the sediments as seen in the grain size distribution data (Figure 4-2 and Appendix 1 - Brayton Point ECC Surface Sediment Grab Sample Grain Size Distribution). The small grain size of the silt and clay particles mean that they settle more slowly than sand classes allowing additional time for transport and spreading through tidal circulation.

Mount Hope Bay has two openings, (to the south and southwest), and is open to the tidally influenced Taunton River at the head of the bay in the northeast corner. The tidal dynamics drive the currents along a predominantly southwest-northeast axis which aligns with the majority of the Brayton Point ECC, transporting the resuspended sediments along the ECC axis. The higher TSS concentrations are consequently seen to follow the ECC as well. The exception is the area near the southwest entrance to the bay where the ECC turns south towards the HDD connection north of Aquidneck Island. Along that section of the ECC the suspended sediments (and the maximum TSS concentrations) were transported perpendicular to the ECC.

The Sakonnet River is similarly an enclosed partially mixed estuary with a dynamic tidal regime, transporting and dispersing the resuspended sediments over a wide area. The river also has relatively high concentrations of silt and clay in the sediments as seen in the grain size distribution. For the most part the tidal currents along the length of the estuary are aligned with the ECC except near the head of the Sakonnet River where the ECC is in a southeast-northwest direction. In that area the tidal currents are oblique to the ECC and some higher TSS concentrations are seen to extend farther from the cable installation centerline. There is also a section of higher speed currents over the portion of the ECC that run past Fogland Point, midway along the river, where maximum TSS concentrations follow the currents off the ECC centerline.

Figures 4-3 and 4-4 show a time-integrated picture of the modeled maximum concentration over the entire trenching simulation; concentrations are not at the level shown all at once, but occur over time as the cable installation progresses. As an example, the concentration in the Sakonnet River at an instant in time is presented in Figure 4-5. In the figure, the sediment plume is seen being transported to the north, away from the trenching operation but is dispersed and diminishes to near background levels within a few kilometers. At any given location, the high concentrations dimmish rapidly and the low concentrations diminish to background in only a few hours.

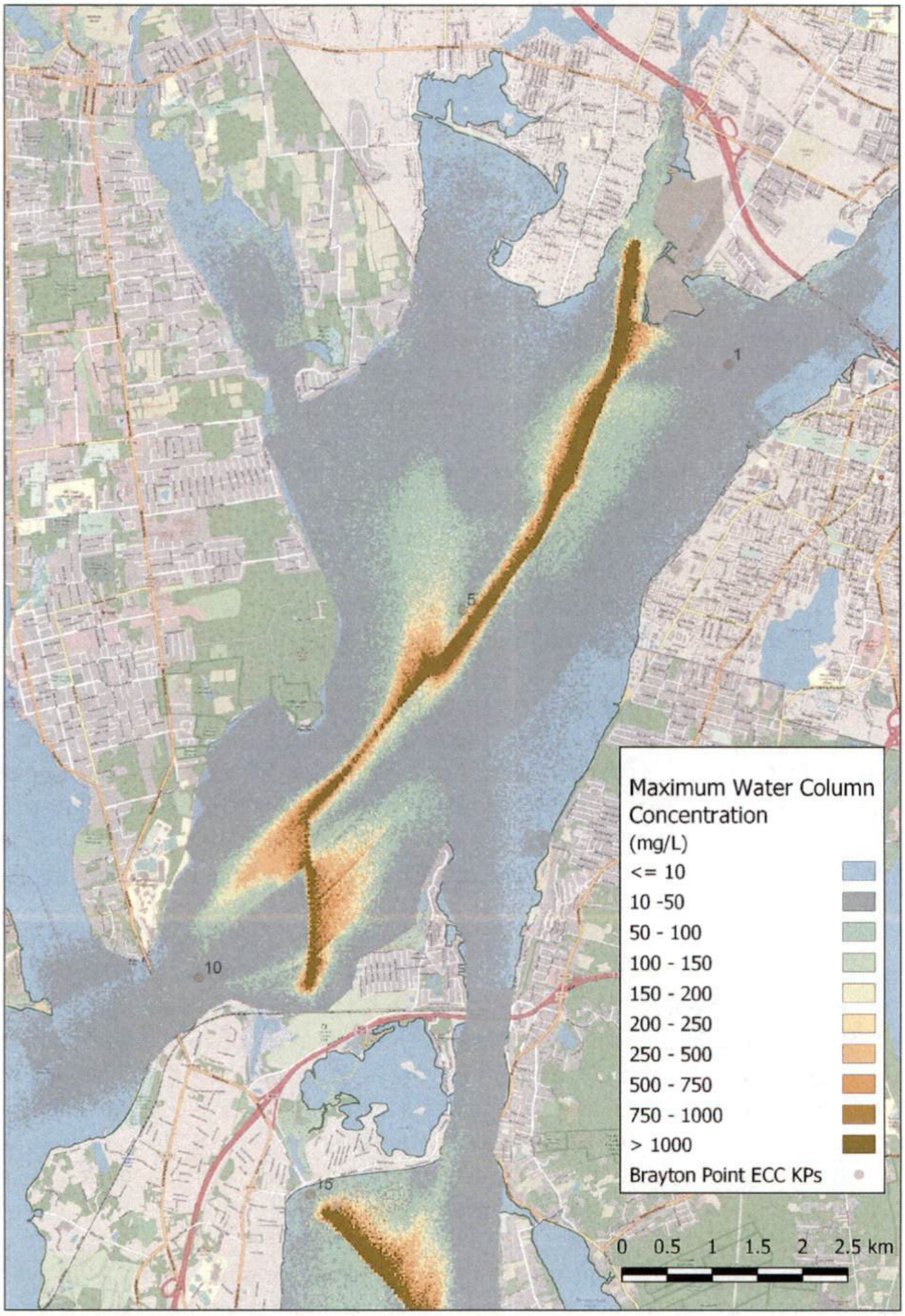

FIGURE 4-3. MAP OF MAXIMUM SEDIMENT CONCENTRATION IN THE MOUNT HOPE BAY PORTION OF THE EXPORT CABLE INSTALLATION, KP0 TO KP10.

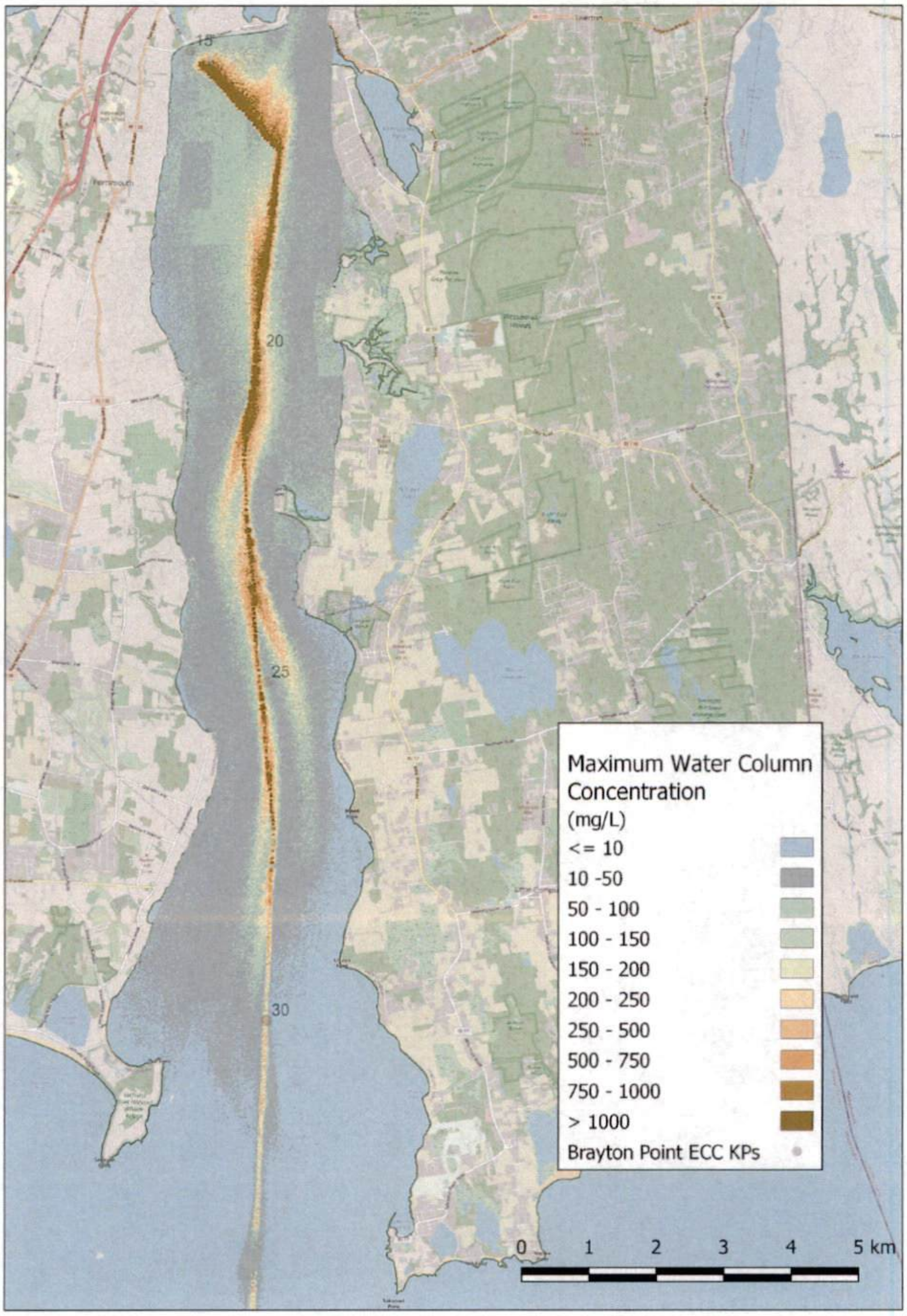

FIGURE 4-4. MAP OF MAXIMUM SEDIMENT CONCENTRATION IN THE SAKONNET RIVER PORTION OF THE EXPORT CABLE INSTALLATION, KP15 TO KP34.

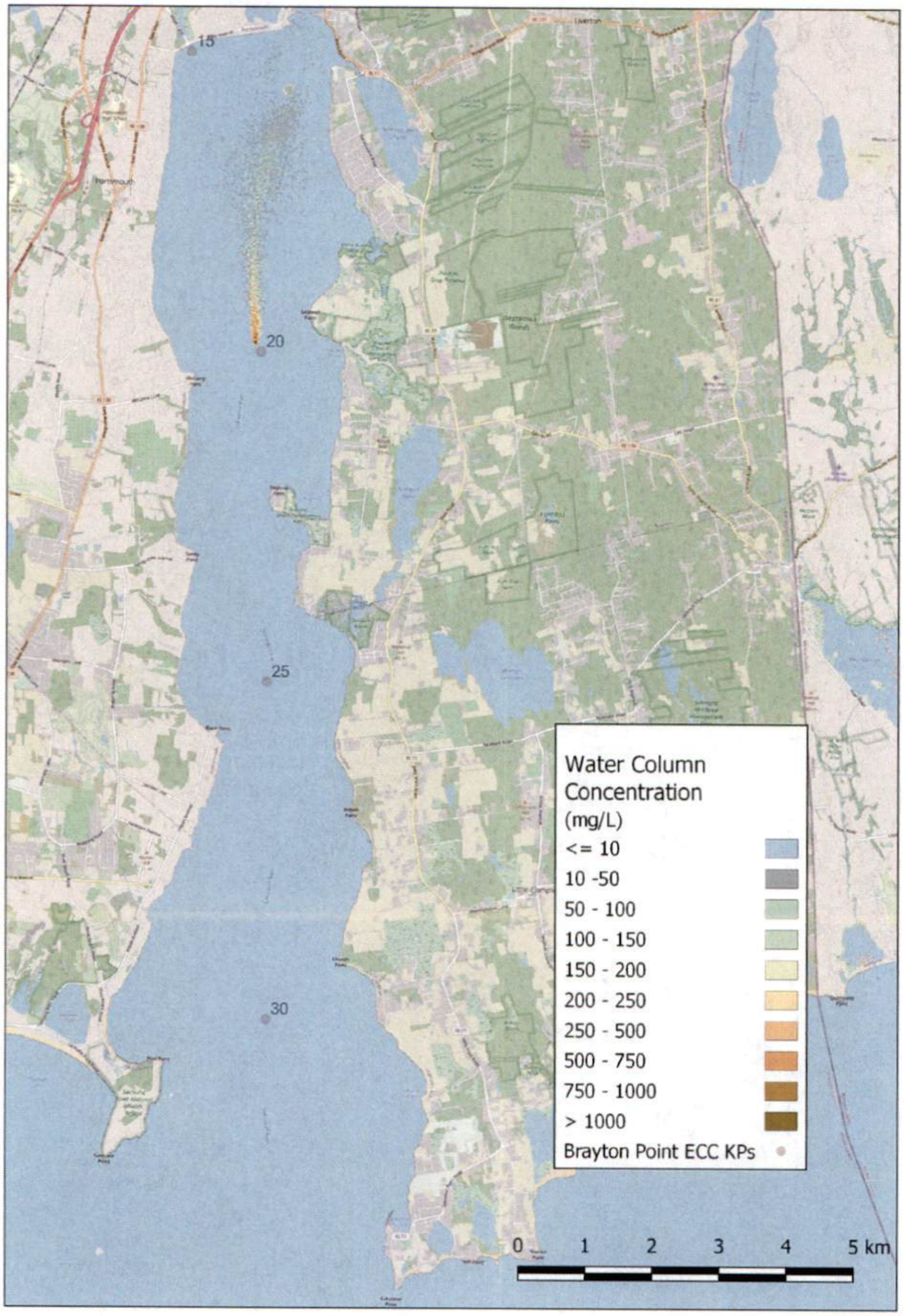

FIGURE 4-5. MAP OF AN EXAMPLE INSTANTANEOUS SEDIMENT CONCENTRATION AT IN THE SAKONNET RIVER PORTION OF THE EXPORT CABLE INSTALLATION, KP15 TO KP34.

The maximum water column TSS concentration results are summarized in Table 4-4, describing the area coverage at selected TSS concentration threshold and the distance that the TSS concentration extends from the cable installation centerline. While the lower concentration numbers in the table indicate that 10 mg/L could be observed at a maximum distance of 4.4 km (2.7 mi) from the ECC in Mount Hope Bay and up to 3.3 km (2.1 mi) from the ECC in the Sakonnet River, the more biologically keyed threshold of 100 mg/L was contained within approximately 1.2 km (0.74 mi) and 0.62 km (0.38 mi) for Mount Hope Bay and the Sakonnet River, respectively. The area coverage of the threshold TSS concentration levels of 100 mg/L maximum TSS concentration in Mount Hope Bay and the Sakonnet River were 542 ha (1340 ac) and 668 ha (1650 ac), respectively.

TABLE 4-4. AREA COVERAGE FOR SELECTED TSS CONCENTRATION THRESHOLDS IN MOUNT HOPE BAY AND THE SAKONNET RIVER (KP0 – KP34).

TSS Threshold (mg/L)	Mount Hope Bay Area Coverage (ha) KP0 - KP10	Maximum Distance from Indicative ECC Centerline (km)	Sakonnet River Area Coverage (ha) KP15 - KP34	Maximum Distance from Indicative ECC Centerline (km)
10	3625	4.40	3477	3.37
50	1015	1.83	1330	1.46
100	542	1.16	668	0.61
150	402	0.99	488	0.44
200	334	0.74	391	0.39
250	293	0.57	321	0.22
500	184	0.32	175	0.0
>1000	101	0.15	84	0.0

4.6.2 Offshore Sediment Concentrations, KP34 - KP152

The maximum water column TSS concentrations from the cable installation process offshore, between the mouth of the Sakonnet River and the Mayflower Wind Lease Area are presented in Figure 4-6 and Figure 4-8 and a summary table of TSS concentration areal coverage and distance from the installation centerline is presented in Table 4-5. The results are noticeably different than those of the Mount Hope Bay and Sakonnet River areas. The segment of the ECC extending directly south from the mouth of the Sakonnet showed a fairly small signature of even the 10 mg/L TSS concentration level between KP34 and KP45. A signature tidal oscillation was seen but again small through KP45 but increasing towards KP78. In addition, the higher TSS concentrations remained close to the centerline from the Sakonnet River entrance through KP55. It can be seen from the grain size distribution (Figure 4-2) that the amount of slit and clay is only a small fraction of the total sediment distribution and larger sized particle dominate indicating that the settling would be faster and therefore less transport occurred through that area.

The small grain size fractions increase in their proportion of the distribution between KP55 and KP78 which led to more transport and dispersion and greater area coverage away from the ECC. The areal coverage at the selected TSS concentration thresholds for the Offshore Segment 1 portion of the cable installation route were similar if not lower in each case than those of the Mount Hope Bay and Sakonnet River areas although the length of the ECC through this segment is more than 2 times as long as the Sakonnet River and 4.5 times as long as the Mount Hope

Bay segment. The 10 mg/L TSS concentration extended up to 2.2 km (1.3 mi) away from the cable installation centerline but the 100 mg/L threshold concentration is contained within 0.37 km (0.23 mi).

The Offshore Segment 2 segment (KP78 – KP152) of the export cable installation impacts are presented in Figure 4-8. There was a length of relatively low impact between KP78 and KP100 in this segment which was due to the predominance of large sediment grain sizes. The TSS concentrations and their extent were low in the area. This is true for most of the offshore segments of the ECC, where concentrations of 100mg/L were predicted to be within 50 m (160 ft) of the centerline, and to decreased quickly.

In the stretch of the ECC to the east of KP100 the grain size distribution changes to favor smaller particle sizes again and the 10 mg/L TSS concentration limit extent increased to a maximum distance of 1.65 km (1 mi) commensurately. The 100 mg/L concentration limit reaches 0.37 km (0.23 mi) as in the previous segment, but the higher concentration thresholds are all contained in smaller areas closer to the ECC centerline.

The effects of the rotary tidal current oscillations observed in the Mayflower Wind metocean buoy currents and the hydrodynamic model predicted currents can be seen in the 10 mg/L concentration footprint in Figure 4-8. Rather than a rectilinear (back and forth motion) tidal pattern in the sediment concentrations, the concentrations can be seen to make an almost helical pattern between KP100 and KP152. The currents are fairly strong in that region but the grain size distribution shows a predominance of larger sizes which resulted in lower water column concentrations.

TABLE 4-5. AREA COVERAGE FOR SELECTED TSS CONCENTRATION THRESHOLDS FOR THE OFFSHORE EXPORT CABLE SEGMENTS (KP34 – KP152).

TSS Threshold (mg/L)	Offshore Segment 1 Area Coverage KP34 - KP78 (ha)	Maximum Distance from Indicative ECC Centerline (km)	Offshore Segment 2 Area Coverage KP78 - KP152 (ha)	Maximum Distance from Indicative ECC Centerline (km)
10	3408	2.18	6629	1.65
50	1163	0.75	1354	0.71
100	662	0.37	585	0.37
150	437	0.23	340	0.17
200	312	0.13	216	0.10
250	232	0.09	148	0.09
500	80	0.0	32	0.0
>1000	11	0.0	3	0.0

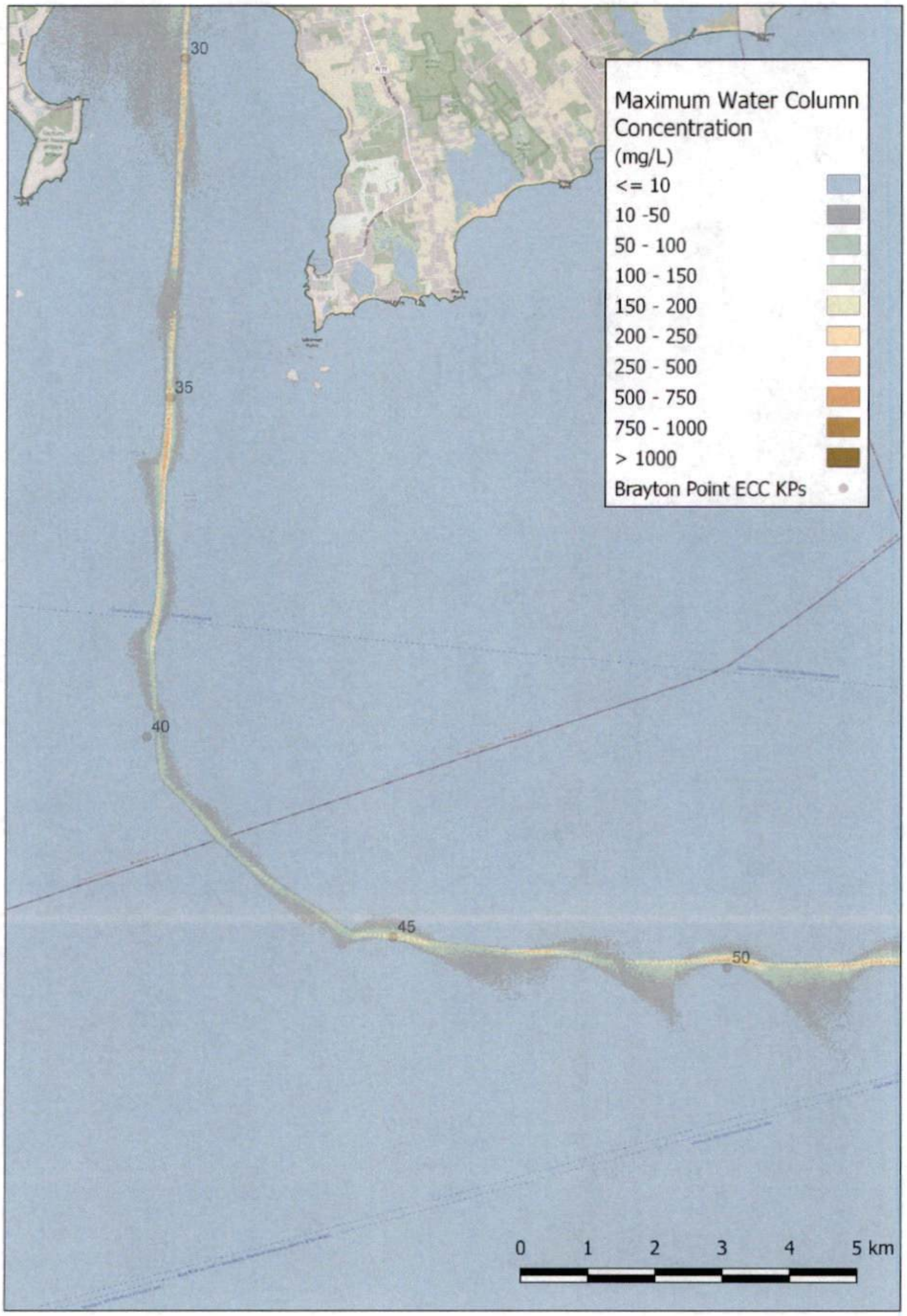

FIGURE 4-6. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE OFFSHORE EXPORT CABLE INSTALLATION, KP34 TO KP55.

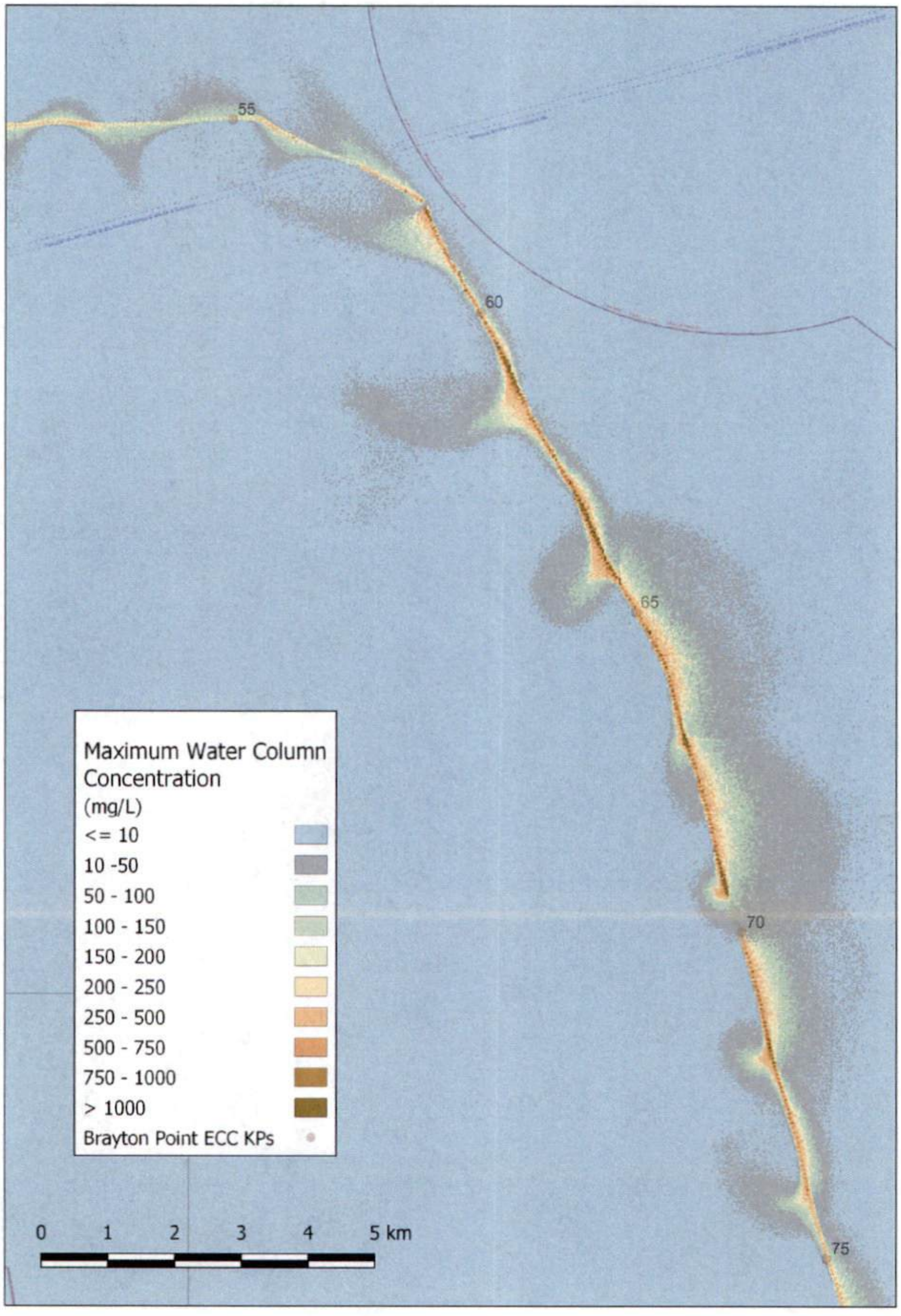

FIGURE 4-7. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE OFFSHORE EXPORT CABLE INSTALLATION, KP55 TO KP78.

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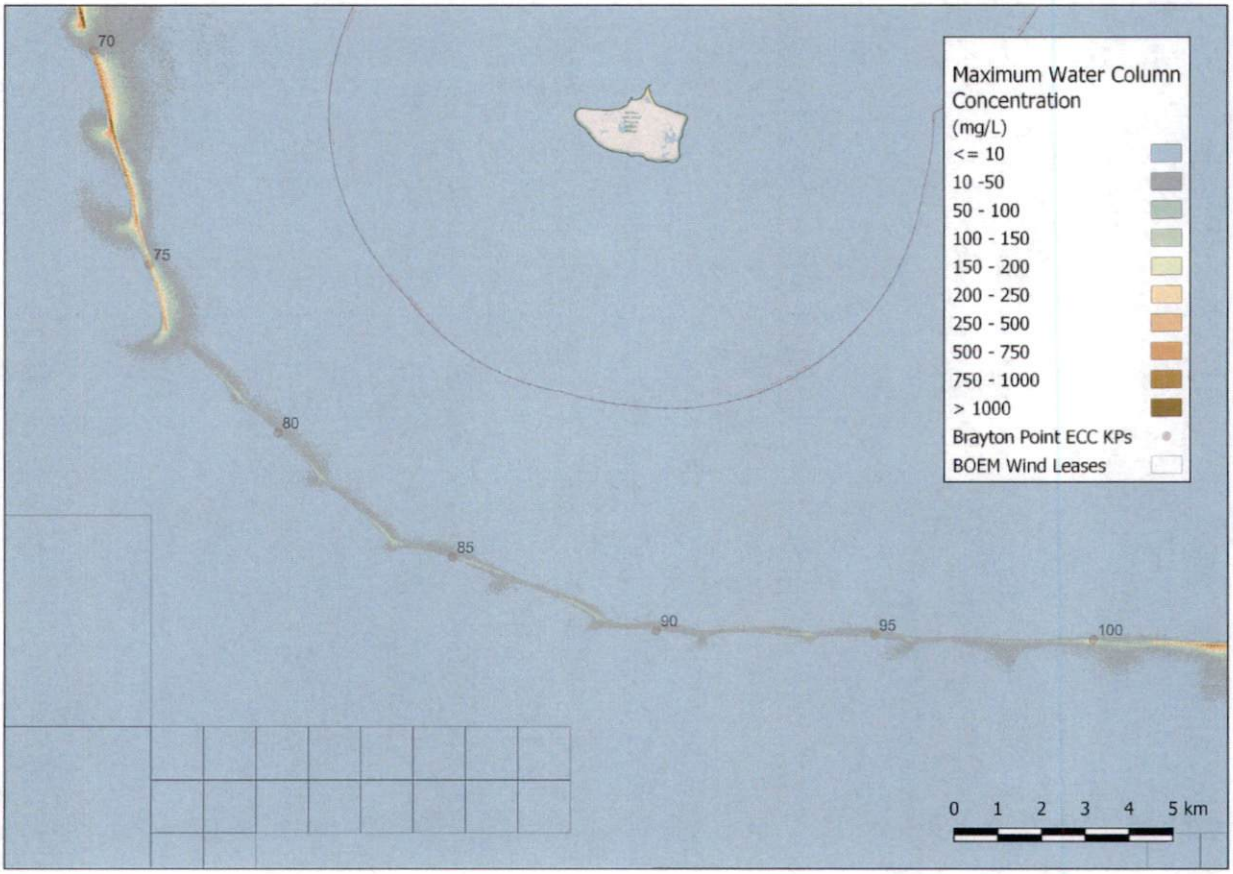

FIGURE 4-8. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE OFFSHORE EXPORT CABLE INSTALLATION, KP78 TO KP105.

Reviewing Table 4-6 in light of Table 4-4 and Table 4-5, it can be seen that half or more of the impacts were experienced in the Mount Hope Bay and Sakonnet River segments, at less than 30 km (19 mi), (20 percent of the total length), as opposed to 118 km (73 mi) for the offshore segments. This was particularly true of the higher TSS concentration levels examined.

It is of interest to understand how the resuspended TSS and associated concentrations disperse over time. This provides an additional metric to better understand the physical impacts and their environmental consequences. A summary of the duration of the TSS plume after the cessation of the installation activities at selected concentration levels for each of the ECC segments examined above is presented in Table 4-7.

The duration of the water column concentrations in Mount Hope Bay were fairly slow to decrease as the relatively higher currents in the bay appear to have kept the sediment suspended longer than in slower current areas. The same was true of the Sakonnet River although to a lesser extent where the higher concentrations settled out quickly.

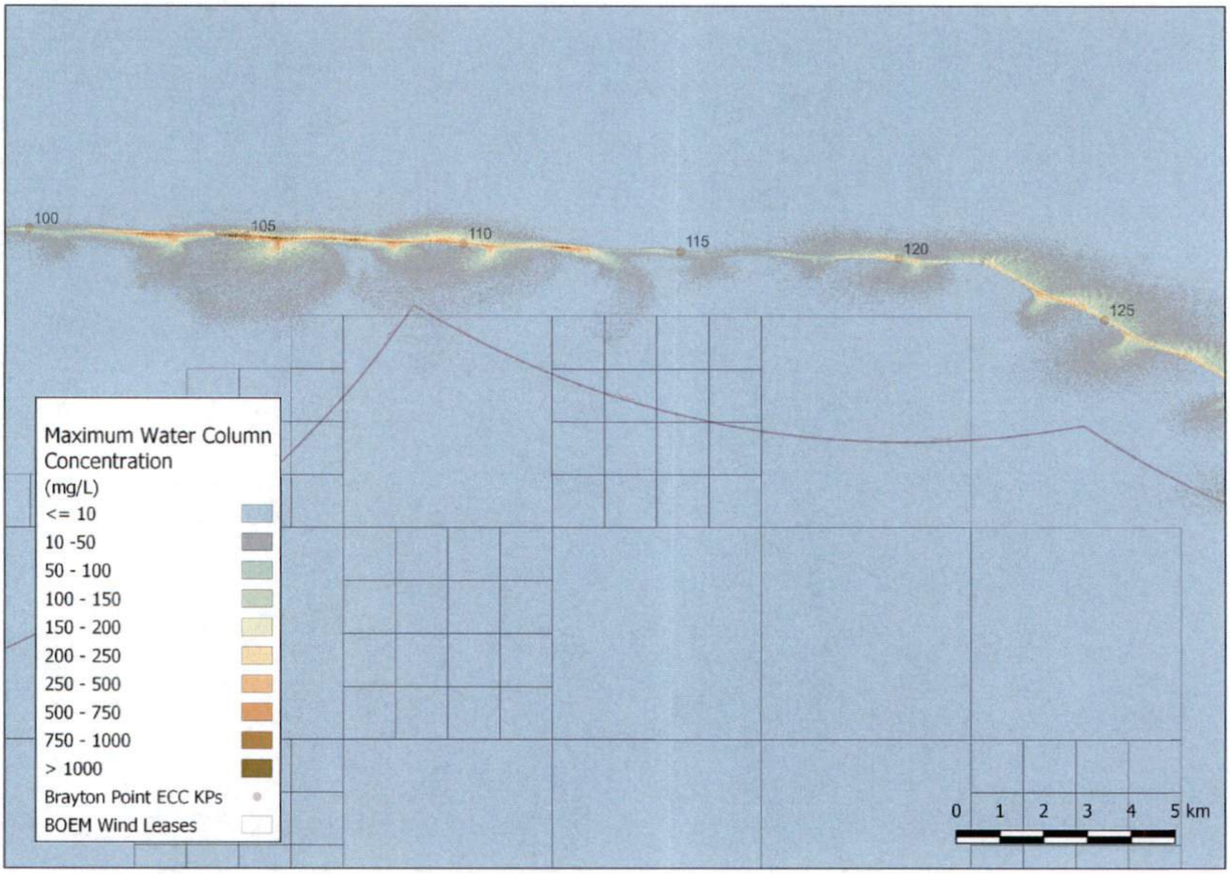

FIGURE 4-9. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE OFFSHORE EXPORT CABLE INSTALLATION, KP105 TO KP125.

TABLE 4-6. SUMMARY OF TOTAL AREA COVERAGE FOR SELECTED TSS CONCENTRATION THRESHOLDS OVER THE LENGTH OF THE ECC.

TSS Threshold (mg/L)	Total Area Coverage KP0 - KP152 (ha)
10	17140
50	4863
100	2457
150	1668
200	1253
250	993
500	470
>1000	199

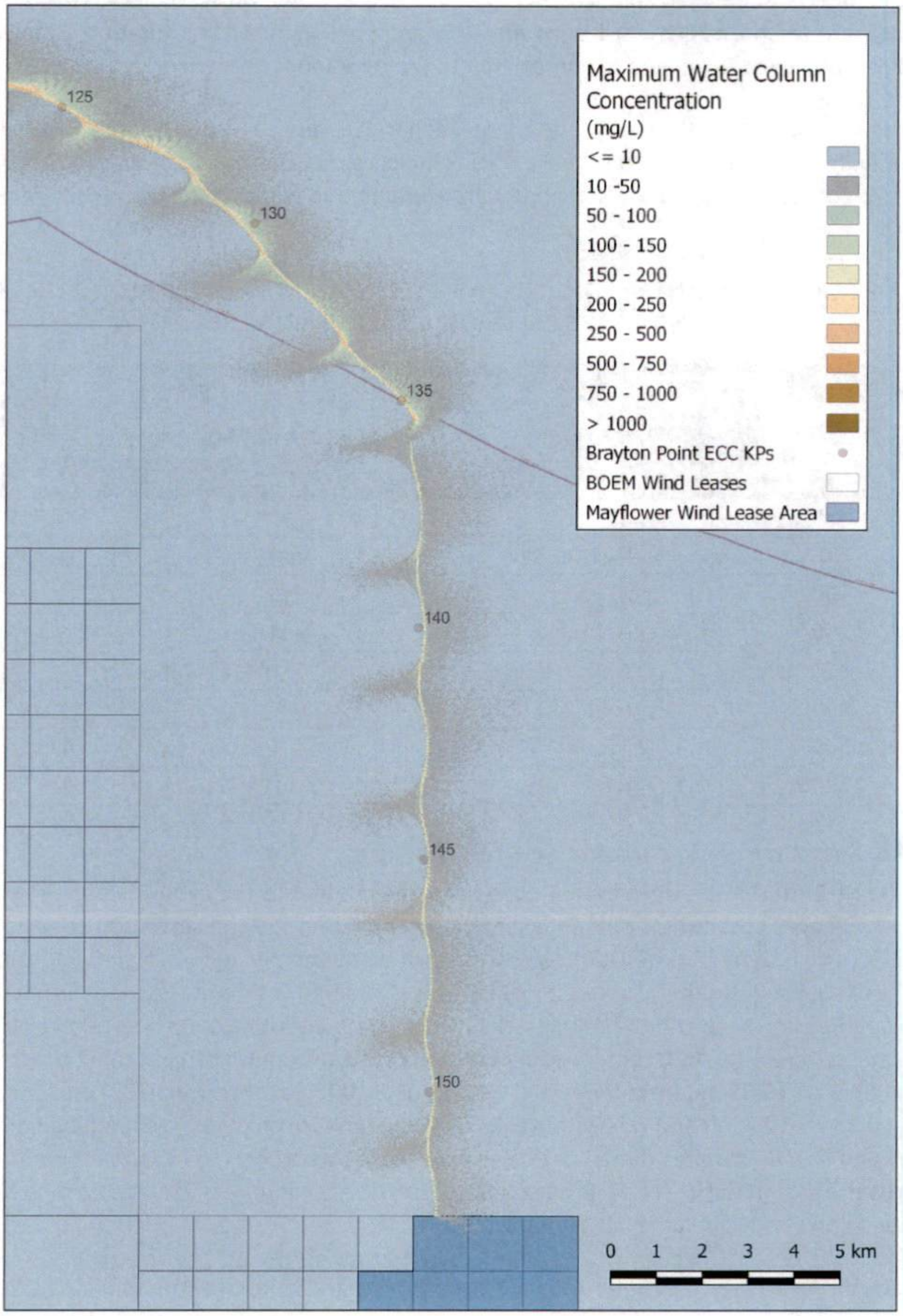

FIGURE 4-10. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE OFFSHORE EXPORT CABLE INSTALLATION, KP125 TO KP152.

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The offshore segments cleared more rapidly than in Mount Hope Bay and the Sakonnet River but the very fine sand and silt content in Offshore Segment 1 between KP55 and KP78 increase the duration at the selected concentration threshold levels evaluated in comparison to the remainder of the offshore route.

In all areas excluding Mount Hope Bay and a portion of Offshore Segment 1, the TSS concentration fell below the 100 mg/L threshold in less than 20 minutes. These results indicate that the water column TSS concentration impacts from the export cable installation activities were contained to within or near the Brayton Point ECC and were short lived.

TABLE 4-7. TIME FOR TSS CONCENTRATIONS TO DROP BELOW SELECTED LEVELS ALONG THE ECC AFTER THE END OF THE CABLE INSTALLATION ACTIVITIES

TSS Concentration (mg/L)	Mount Hope Bay KP0 - KP10 (min)	Sakonnet River KP10 – KP34 (min)	Offshore Segment 1 KP34 – KP78 (min)	Offshore Segment 2 KP78 – KP152 (min)
10	2980	1465	725	255
50	860	465	215	95
100	280	20	175	35
150	160	20	115	15
200	140	20	95	15
250	120	20	95	15
500	100	0	35	0
>1000	60	0	15	0

4.6.3 HDD Pit Excavation Sediment Concentrations

The impacts of the HDD excavation were examined in the same manner as the cable installation impacts. Figure 4-11 shows the model predicted extent of the maximum water column TSS concentration at each of the HDD sites overlain on the ECC. The Brayton Point HDD pit results shown on the map in the left figure indicate that the impacts of the dredging activities there were almost entirely contained within the ECC. The same is almost true for the Mount Hope Bay entrance and the Aquidneck pit excavation activities though a short tail of 10 mg/L TSS concentration extends across the ECC centerline in each reaching a maximum of 1 km (0.62 mi) from the Mount Hope Bay pit and 0.88 km (0.55 mi) from the Aquidneck pit. The 100 mg/L threshold TSS concentration was contained within 0.33 km (0.2 mi) and was within the ECC boundaries in all cases. It should be noted that for the Mount Hope Bay and Aquidneck sites there is a tidal influence that transports the sediment plume in one direction (towards the east in this case). At other stages of the tide the plume is likely to be directed in the opposite direction, albeit with similar levels of impact.

The areal coverage of the 10 mg/L or higher TSS concentration ranged from a low of 18 ha (45 ac) at the relatively low energy Brayton Point site up to 28 ha (70 ac) at the high energy Mount Hope Bay site near the entrance to Mount Hope Bay. The 100 mg/L TSS concentration threshold covered no more than 5.4 ha (13 ac) at any of the sites.

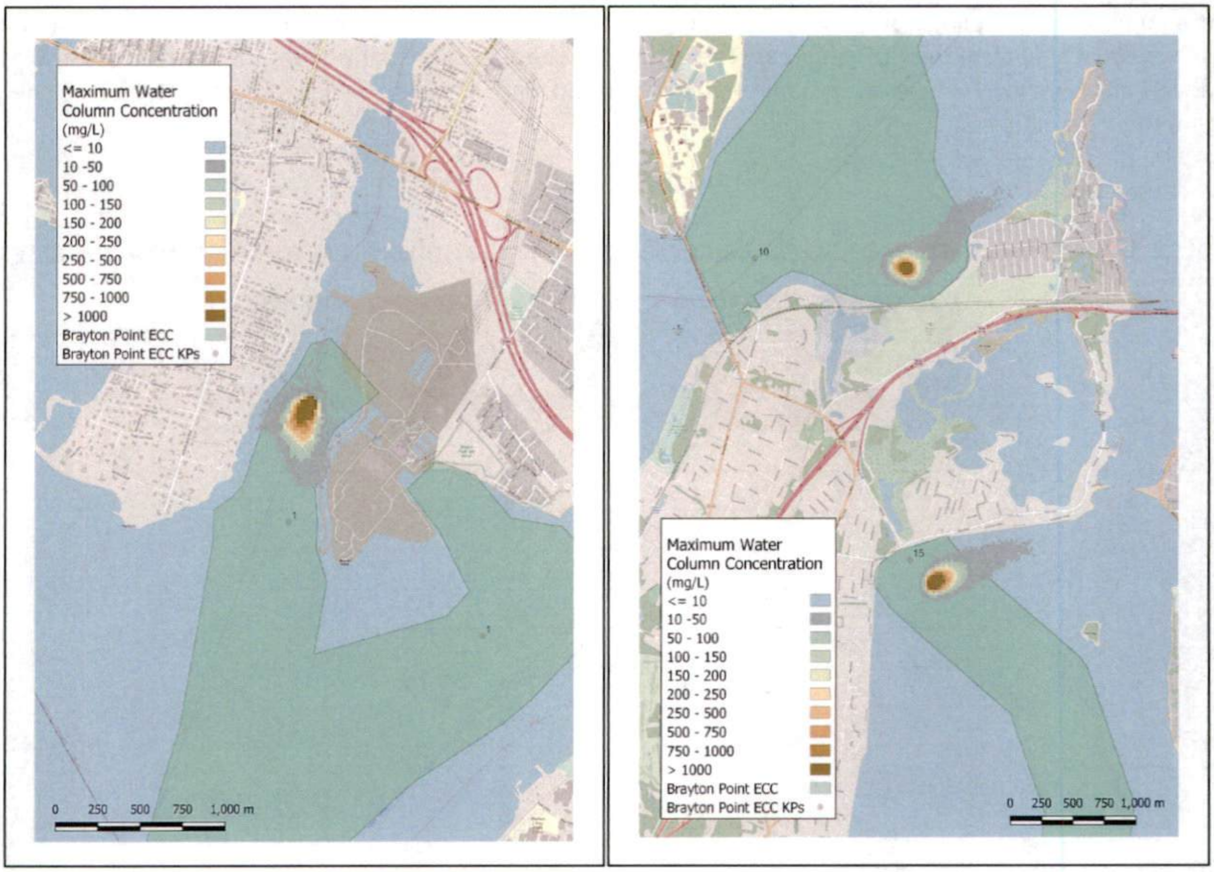

FIGURE 4-11. MAP OF MAXIMUM SEDIMENT CONCENTRATION ASSOCIATED WITH THE EXCAVATION ACTIVITIES AT THE THREE HDD CONNECTION PITS AT BRAYTON POINT (LEFT MAP), AND MOUNT HOPE BRIDGE AND AQUIDNECK ISLAND (RIGHT MAP).

TABLE 4-8. AREA COVERAGE FOR SELECTED TSS CONCENTRATION THRESHOLDS FOR THE THREE HDD PIT EXCAVATION ACTIVITIES.

TSS Threshold (mg/L)	Brayton Pt HDD Pit Area Coverage (ha)	Maximum Distance from Release (km)	Mount Hope Bay HDD Pit Area Coverage (ha)	Maximum Distance from Release (km)	Aquidneck HDD Pit Area Coverage (ha)	Maximum Distance from Release (km)
10	18.5	0.53	28.5	1.08	22.5	0.88
50	7.1	0.38	7.0	0.21	7.5	0.31
100	5.2	0.32	4.6	0.14	5.4	0.25
150	4.4	0.29	3.6	0.11	4.4	0.21
200	3.8	0.27	2.9	0.11	3.7	0.20
250	3.3	0.25	2.6	0.10	3.2	0.18
500	2.4	0.21	1.6	0.08	2.1	0.15
>1000	1.4	0.17	0.8	0.05	1.2	0.10

The amount of time required for the water column TSS concentration to drop below the 100 mg/L threshold was less than 100 min at all of the HDD pit areas (Table 4-9). The concentrations sank below the selected thresholds relatively quickly, the lower concentrations or 10 mg/L and 50 mg/L persisted for several hours at the high energy Mount Hope Bay site.

TABLE 4-9. TIME FOR TSS TO DROP BELOW SELECTED LEVELS AT THE HDD SITES AFTER THE END OF THE RELEASE

TSS Concentration (mg/L)	Brayton Pt-HDD Duration (min)	Mount Hope Bay-HDD Duration (min)	Aquidneck-HDD Duration (min)
10	280	400	300
50	140	160	120
100	100	100	100
150	80	100	80
200	80	80	80
250	60	80	60
500	40	40	40
>1000	20	40	40

4.7 Sediment Deposition on the Seabed

The ultimate fate of the resuspended sediments is to resettle onto the seabed. Depending on the amount and type of sediments resuspended and the local current regime they can settle close to or far from the resuspension point at the cable installation operations. These factors also affect the sedimentation depth, i.e. how thick a layer the deposited sediments can create. As with the water column concentrations the farther the sediments are transported the more area they cover when settling, but at a lower thickness than if the entire mass settles near the resuspension point.

This is an important factor in determining the potential for impacts due to smothering of organisms that live near or on the seabed. Each of the segments described above were examined to determine the seabed deposition depth and areal coverage, the results of which are presented in the following sections.

4.7.1 Mount Hope Bay and Sakonnet River Sediment Deposition, KP0 to KP34

The model- predicted deposition thickness and area coverage settled sediments associated with the export cable installation operations in Mount Hope Bay and the Sakonnet River are presented in Figure 4-12 and Figure 4-13, respectively. Referring to the figures there is a very clear line of deposition that follows the ECC because the majority of sediment resuspended fell back to the seabed fairly quickly, and therefore in line with the cable route. There is a minor exception to the quick deposition in the area of the Mount Hope Bay entrance where the strong currents run in and out of the bay perpendicular to the ECC at that point. As seen in the water column concentrations, a portion of the sediments were transported away from the ECC with the currents and therefore settled elsewhere as well. In that they were transported, they were also dispersed and the sediment deposition thickness in that area was consequentially smaller.

A summary of the deposition thickness and footprint area coverage statistics is presented in Table 4-10. The highest deposition thicknesses were contained primarily within a 20 m (65 ft) corridor around the ECC centerline. The 1 mm (0.04 in) deposition depth extended to a maximum of 124 m (406 ft) and 161 m (528) and the 0.5 mm (0.02 in) depth extended to 267 m (876) and 202 m (663) in Mount Hope Bay and the Sakonnet, respectively. Thinner deposits are found at larger distances related to the silt and clay particles that have low fall velocities and therefore experience greater travel distances. Depositions exceeding 1 mm (0.4 in) cover a maximum area of 58 ha (143 ac) in the Sakonnet and 42 ha (104 ac) in Mount Hope Bay for a combined total of 100 ha (247 ac) in the two.

TABLE 4-10. AREA COVERAGE FOR SEABED SEDIMENTATION THICKNESS THRESHOLDS IN MOUNT HHOPE BAY AND THE SAKONNET RIVER (KP0 – KP34).

Thickness Threshold (mm)	Mount Hope Bay Area Coverage KP0 - KP10 (ha)	Maximum Distance from Indicative ECC Centerline (m)	Sakonnet River Area Coverage KP15 - KP34 (ha)	Maximum Distance from Indicative ECC Centerline (m)
0.5	91	267	127	202
1	42	124	58	161
1.5	28	85	43	122
2	22	64	39	87
5	12	15	35	24
>10	1	<10	20	<10

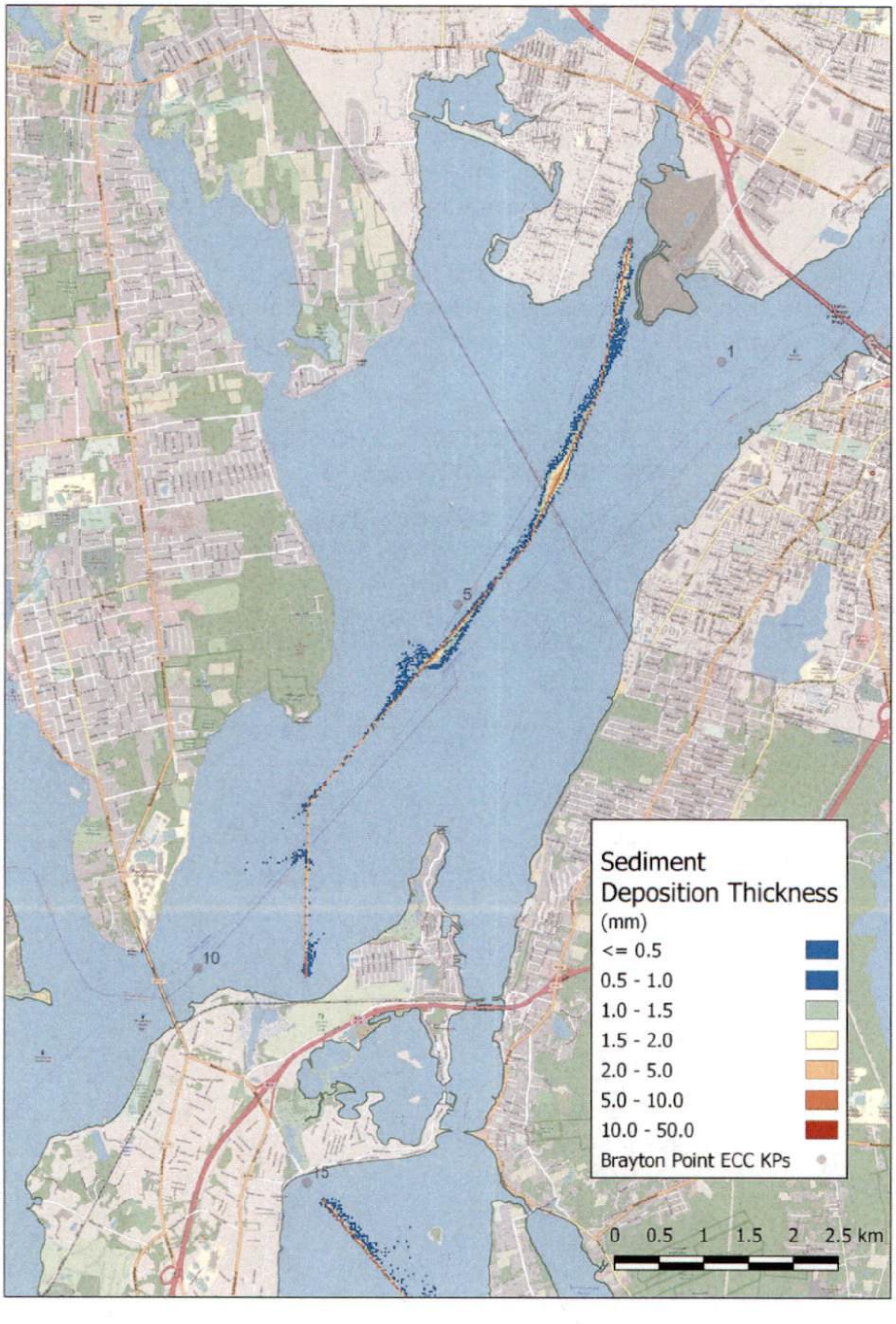

FIGURE 4-12. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION THICKNESS IN THE MOUNT HOPE BAY PORTION OF THE EXPORT CABLE INSTALLATION, KP0 TO KP10.

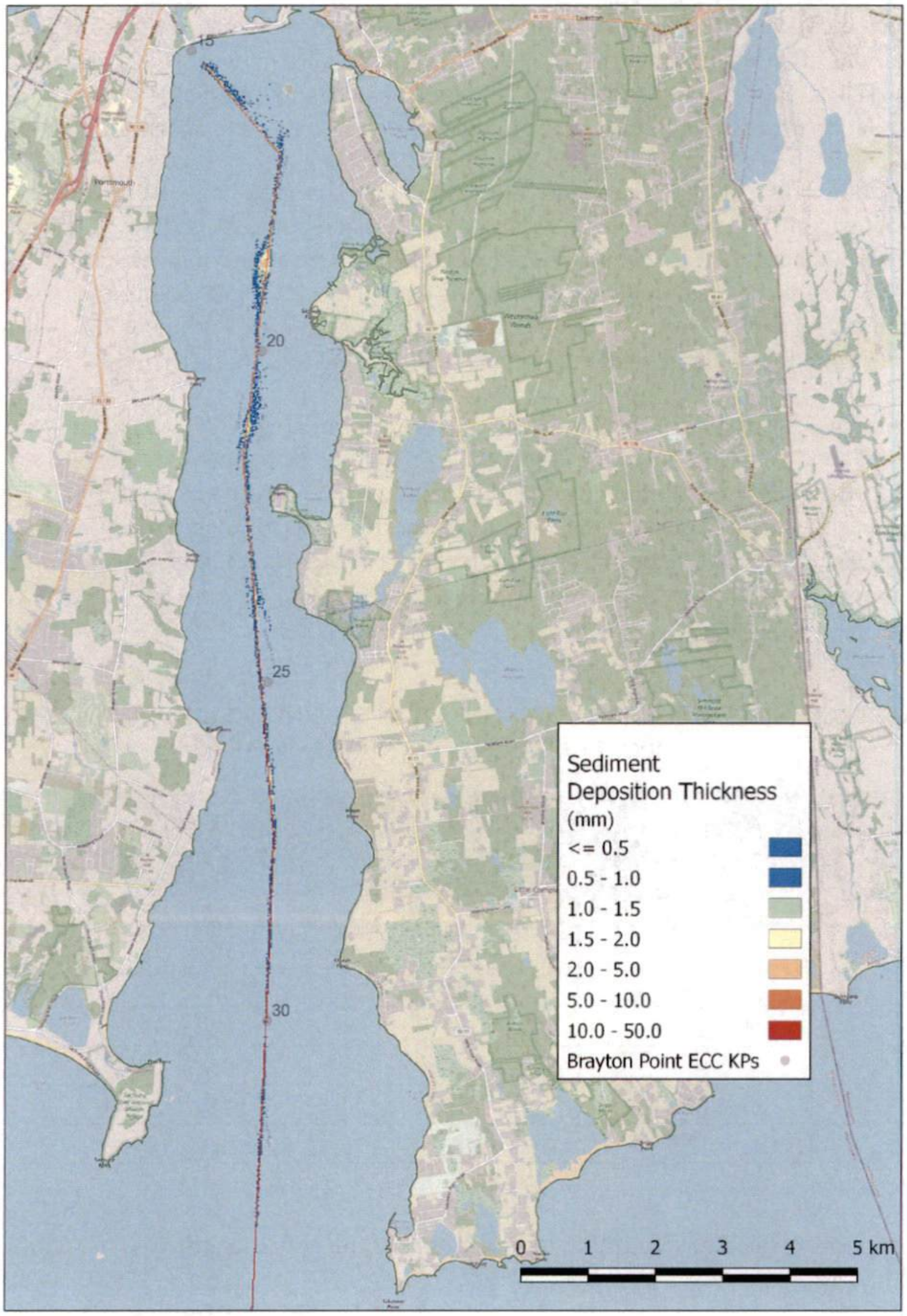

FIGURE 4-13. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION THICKNESS IN THE SAKONNET RIVER PORTION OF THE EXPORT CABLE INSTALLATION, KP15 TO KP34 .

IES

4.7.2 *Offshore Sediment Deposition, KP34 to KP152*

The model- predicted deposition thickness and area coverage settled sediments associated with the export cable installation operations offshore are presented in Figure 4-14 and Figure 4-15 for Offshore Segment 1 and Figure 4-16 through Figure 4-18 for Ofshore Segment 2. The deposition coverage along the offshore segments of the export cable installation process was smaller than in the Mount Hope Bay and Sakonnet River segments.

Suspended sediment falling quickly to the seabed and resulting in the line of deposition following the ECC was even more pronounced offshore. There was little deposition outside of the 20 m (65 ft) installation corridor and none outside of the ECC boundaries. The maximum extent of the deposition footprint in the offshore areas was in the region of KP105 where the 0.5 mm (0.02 in) thickness extended 179 m (587 ft) but the maximum 1 mm (0.04 in) thickness extended 59 m (194) from the installation centerline in the area around KP58. A summary of the deposition thickness and footprint area coverage statistics is presented in Table 4-11.

Depositions exceeding a 1 mm (0.4 in) thickness covered a maximum area of 165 ha (407 ac), seen in the Offshore Segment 2 segment and 96 ha (237 ac) in the Offshore Segment 1 River segment for a total area coverage of 261 ha (645 ac) for the entire 118 km (64 nm) length of the offshore ECC. The area covered by 0.5 mm (0.02 in) or greater thickness was 179 ha (442 ac) and 134 ha (331 ac) for the Offshore Segment 2 and Offshore Segment 1 segments, respectively. The total for the entire offshore length of the export cable covered with a deposition thickness of 0.5 mm (0.02 in) or more was 313 ha (773 ac).

TABLE 4-11. AREA COVERAGE FOR SEABED SEDIMENTATION THICKNESS THRESHOLDS ALONG THE OFFSHORE EXPORT CABLE SEGMENTS (KP34 – KP152).

Thickness Threshold (mm)	Offshore Segment 1 Area Coverage KP34 - KP78 (ha)	Maximum Distance from Indicative ECC Centerline (m)	Offshore Segment 2 Area Coverage KP78 - KP152 (ha)	Maximum Distance from Indicative ECC Centerline (m)
0.5	134	88	179	179
1	96	59	165	50
1.5	93	46	163	31
2	92	31	161	28
5	81	<10	121	<10
>10	7	<10	16	<10

The total area coverage at selected deposition thicknesses over the entire length (KP0 to KP152) of the ECC is presented in Table 4-12.

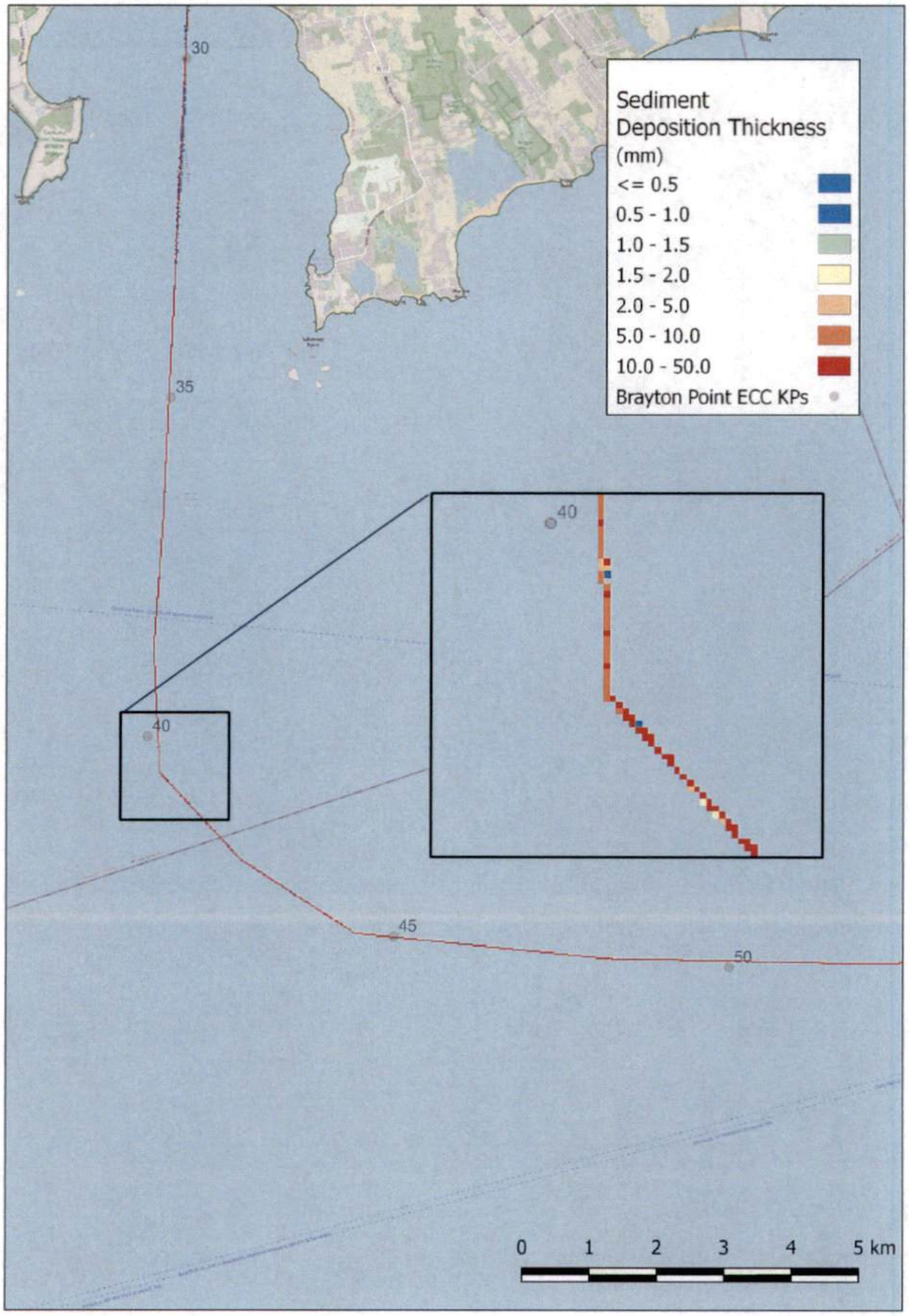

FIGURE 4-14. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ALONG THE FIRST PART OF OFFSHORE SEGMENT 1 OF THE EXPORT CABLE INSTALLATION, KP34 TO KP55.

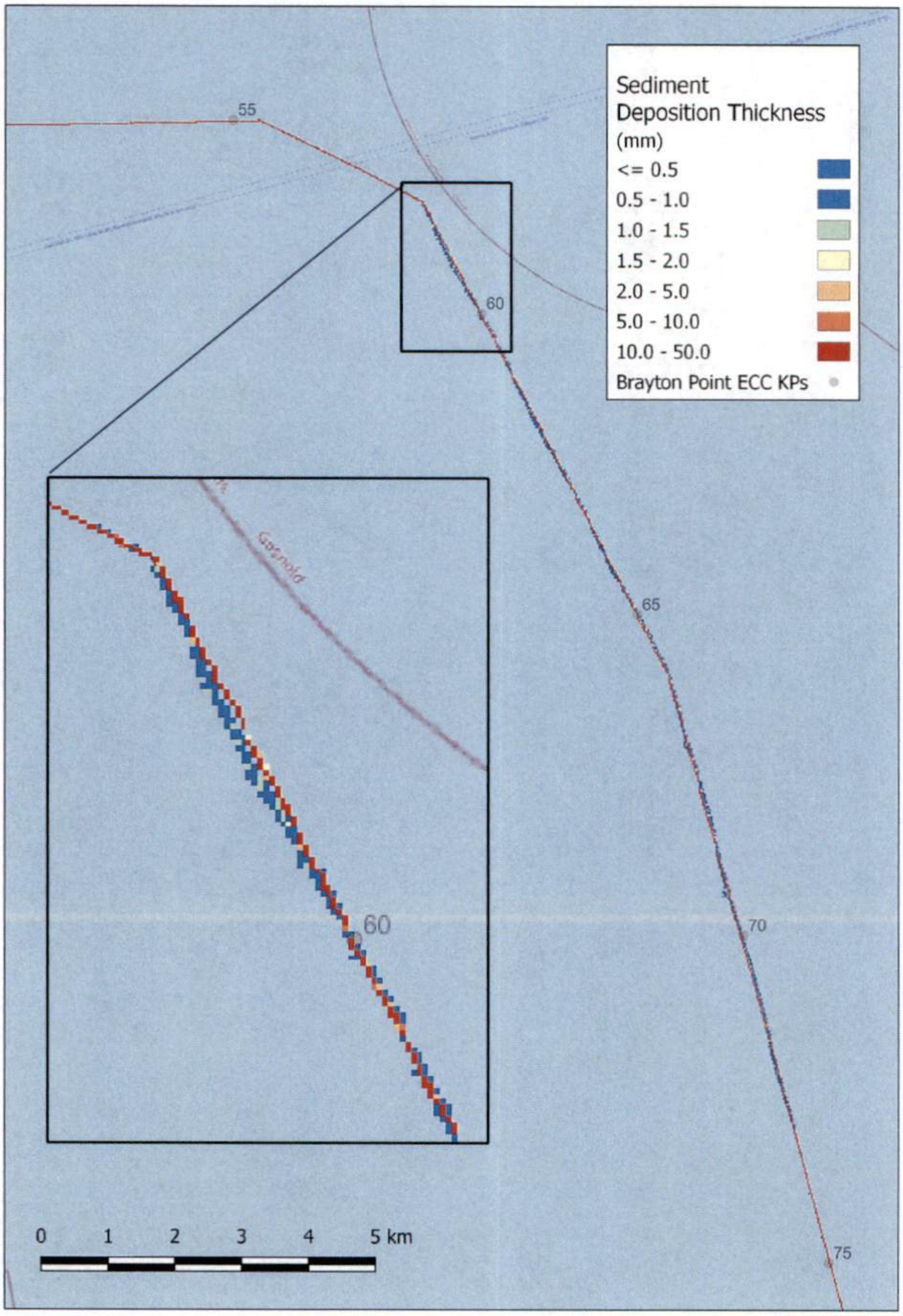

FIGURE 4-15. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ALONG THE SECOND PART OF OFFSHORE SEGMENT 1 OF THE EXPORT CABLE INSTALLATION, KP55 TO KP78.

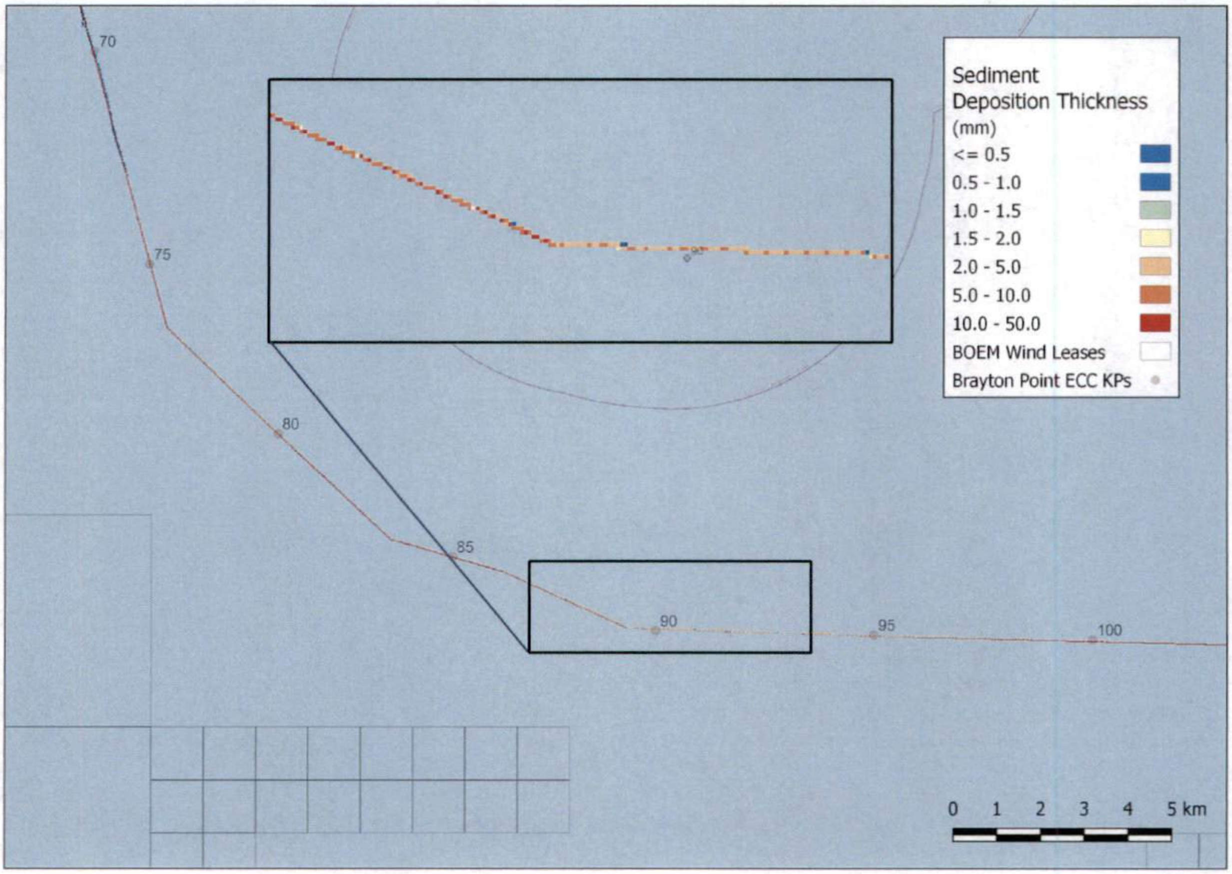

FIGURE 4-16. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ALONG THE FIRST THIRD OF OFFSHORE SEGMENT 2 OF THE EXPORT CABLE INSTALLATION, KP78 TO KP105.

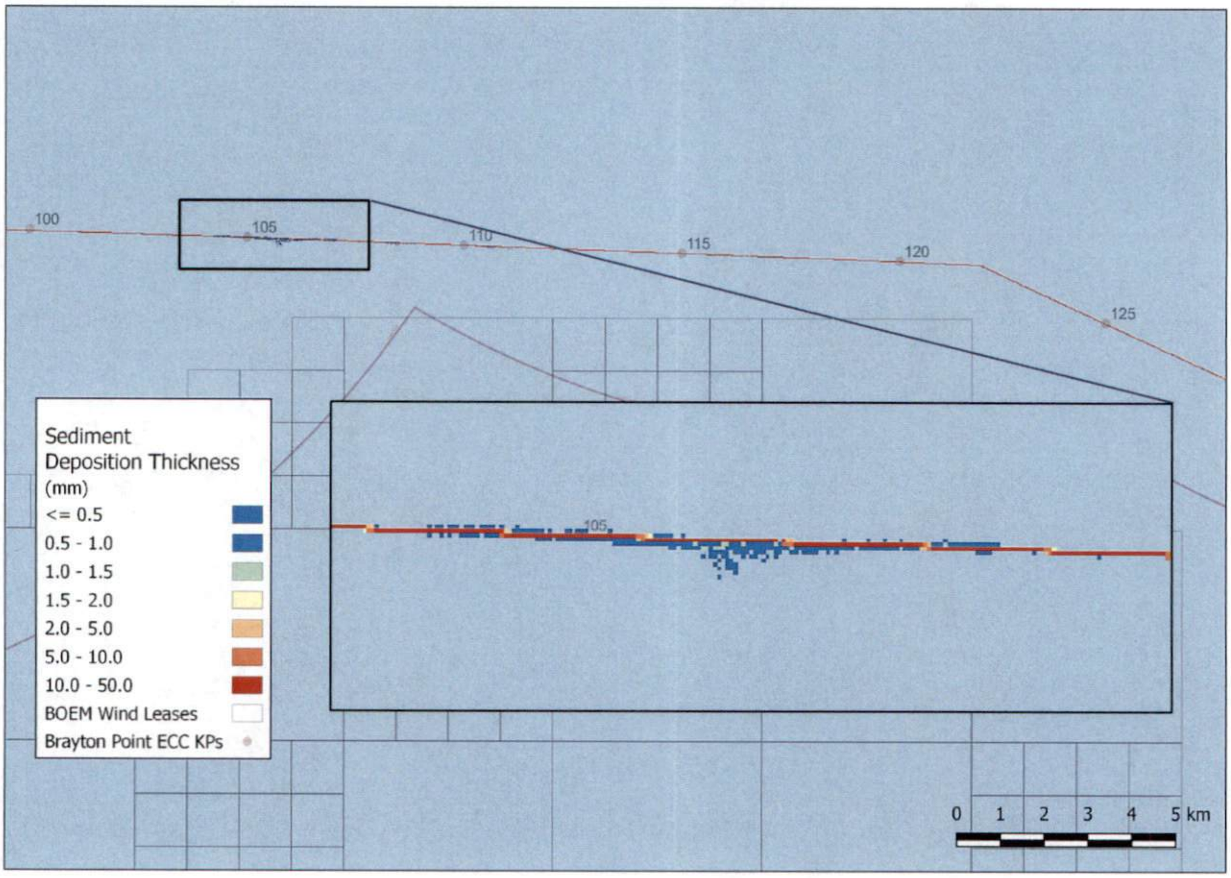

FIGURE 4-17. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ALONG THE MIDDLE THIRD OF OFFSHORE SEGMENT 2 OF THE EXPORT CABLE INSTALLATION, KP105 TO KP125.

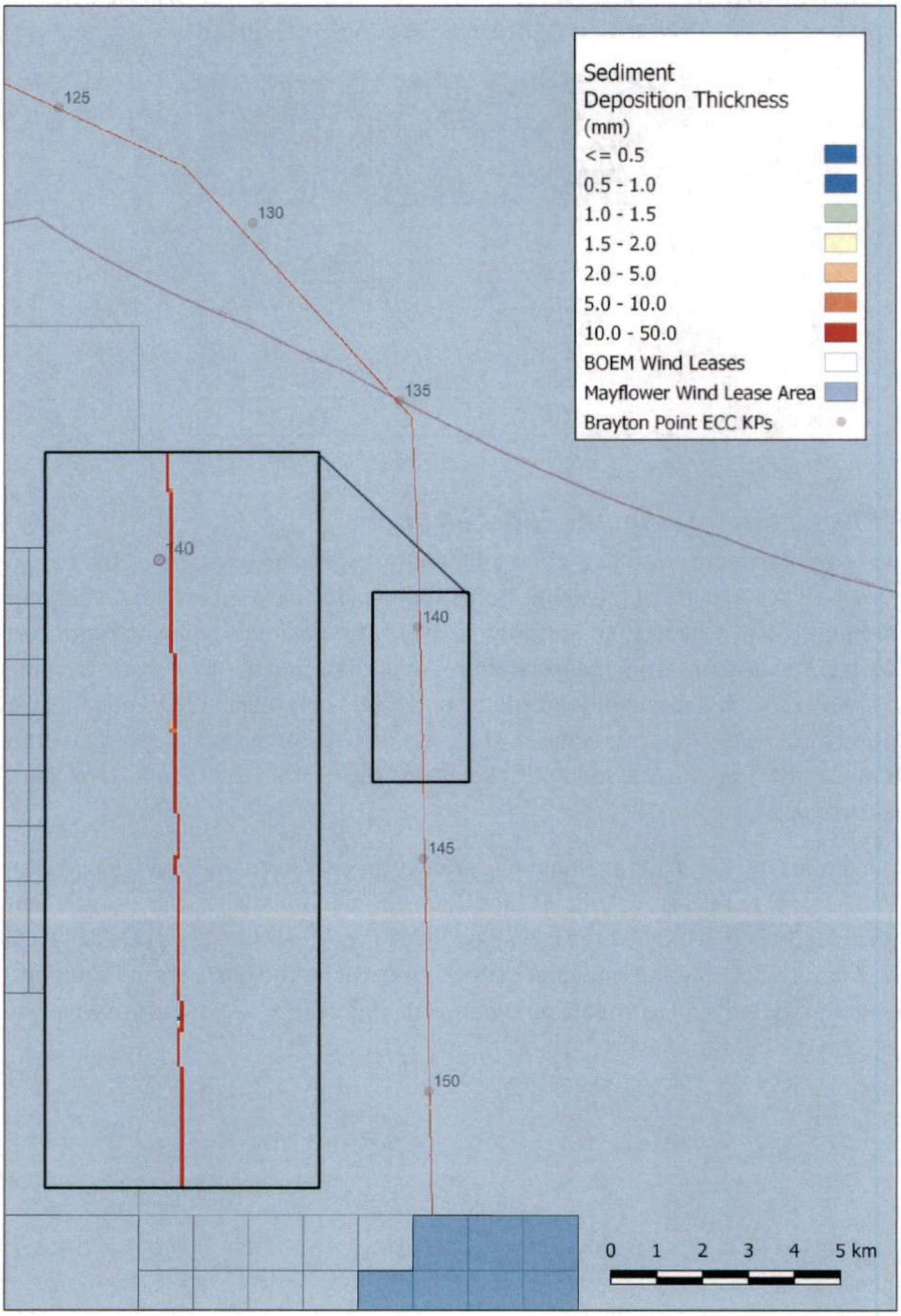

FIGURE 4-18. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ALONG THE LAST THIRD OF OFFSHORE SEGMENT 2 OF THE EXPORT CABLE INSTALLATION, KP125 TO KP152.

IES

TABLE 4-12. SUMMARY OF TOTAL AREA COVERAGE FOR SELECTED SEDIMENT DEPOSITION THRESHOLDS OVER THE LENGTH OF THE EXPORT CABLE CORRIDOR.

Deposition Thickness (mm)	Total Deposition Coverage KPO - KP152 (ha)
0.5	531
1	361
1.5	326
2	315
5	223
>10	23

4.7.3 HDD Pit Excavation Sediment Concentrations

The deposition patterns and depths resulting from sediment resuspension from the HDD pit excavation activities are shown in Figure 4-19. A summary of the deposition thickness and footprint area statistics is presented in Table 4-13. As shown in Figure 4-9, the deposition footprint is small and completely contained within the ECC for all three of the HDD sites. The distance from the excavation site of the 1 mm (0.04 in) thickness threshold was less than a maximum of 95 m (312 ft), at the Brayton Point site but was only 42 m (138 ft) and 57 m (187 ft) at the Mount Hope Bay and Aquidneck sites, respectively. The 0.5 mm (0.02 in) thickness coverage extended to a maximum of 158 m (518 ft) from the Brayton Point site, 56 m (183 ft) from the Mount Hope Bay site and 102 m (335 ft) from the Aquidneck site.

The areal coverage of the 1 mm (0.4 in) threshold thickness or greater were small, at 0.5 ha (1.2 ac), 0.28 ha (0.69 ac) and 0.36 ha (0.89 ac) for the Brayton Point, Mount Hope Bay and Aquidneck sites, respectively. The lower threshold thickness of 0.5 mmm (0.02 in) area coverages were 1 ha (2.5 ac), 0.46 ha (1.1 ac) and 0.92 ha (2.3 ac) at the Brayton Point, Mount Hope Bay and Aquidneck sites, respectively. The numbers indicate that the sediment deposition at the HDD sites had limited impact on the surrounding seabed areas and are well within the ECC in all cases as can be seen in the figures as well.

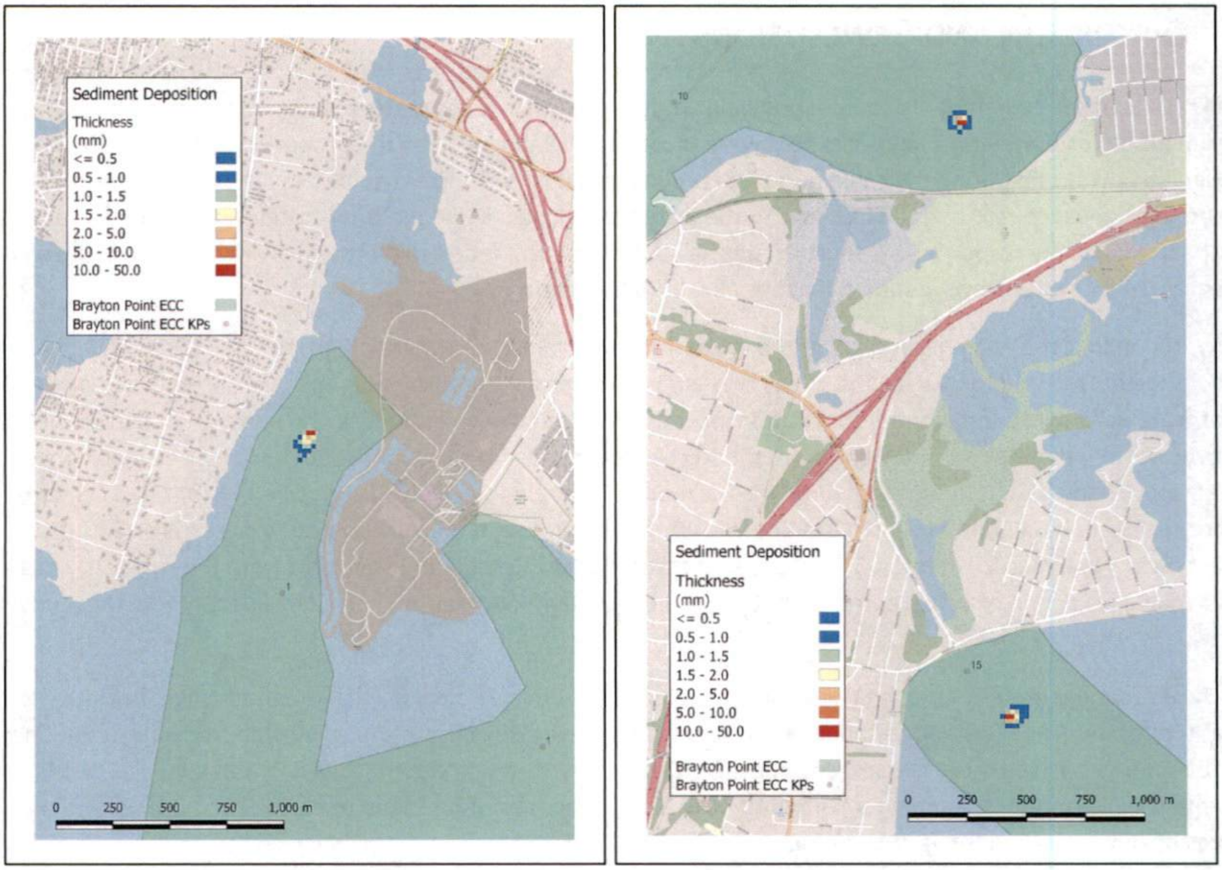

FIGURE 4-19. MAP OF MAXIMUM SEABED SEDIMENT DEPOSITION ASSOCIATED WITH THE EXCAVATION ACTIVITIES AT THE THREE HDD CONNECTION PITS AT BRAYTON POINT (LEFT MAP), AND MOUNT HOPE BRIDGE AND AQUIDNECK ISLAND (RIGHT MAP).

TABLE 4-13. AREA COVERAGE FOR SEABED SEDIMENTATION THICKNESS THRESHOLDS FOR THE THREE HDD PIT EXCAVATION ACTIVITIES.

Thickness Threshold (mm)	Brayton Pt HDD Pit Area Coverage (ha)	Maximum Distance from Release (m)	Mount Hope Bay HDD Pit Area Coverage (ha)	Maximum Distance from Release (m)	Aquidneck HDD Pit Area Coverage (ha)	Maximum Distance from Release (m)
0.5	1.0	158	0.76	56	0.92	102
1	0.5	95	0.28	42	0.36	57
1.5	0.3	76	0.16	41	0.24	50
2	0.1	52	0.12	31	0.16	43
2.5	0.1	42	0.08	29	0.12	31
5	0.1	42	0.08	29	0.08	31
>10	0.1	42	0.08	29	0.08	31

5 Discussion and Conclusions

The results of the sediment dispersion modeling study indicated that the water column concentration and the sediment deposition pattern and thickness were most heavily influenced by the properties of the trench sediments disturbed during the cable burial operations and localized current velocities. The dimensions of the trench, the advance rate and the loss rate to the water column, specified the total amount of sediments re-suspended, but the response was short lived for all but the finest grade sediments (silts and clays). A conservative loss rate of 25 percent was assumed for the cable burial operations.

A hydrodynamic model application over the area stretching from the New York Bight to Cape Cod with a fine resolution nested grid for Narragansett Bay was applied to predict the three- dimensional currents and circulation that were used in the sediment model to transport the resuspended sediments. Wind observations from the Mayflower Wind metocean buoy and from the NOAA weather station at Quonset Point were used along with TPXO model tide data to drive the hydrodynamic model. The model- predicted surface elevations and currents were successfully validated using NOAA tide and current stations and the vertical profile of currents at the Mayflower Wind metocean buoy. This procedure assured that the sediment transport from the currents were a reasonable reflection of actual currents that the cable installation operations will likely encounter in the study area.

Surface sediment grab sample data was collected along the ECC at 23 sites used in the modeling. The data showed that the Mount Hope Bay and Sakonnet River segments were mostly characterized by high fractions of the fine grade silt and clay sediment classes (greater than 50 percent), through Mount Hope Bay and the Sakonnet River segments. Offshore, the sediments tended to have higher fractions of fine sand to coarse sand classes with an occasional pocket of silt or very fine sand.

In regions with large clast sizes, sediments re-suspended from the cable burial operations quickly dropped back to the sea floor keeping TSS concentrations low and localized; concentrations above ambient background were limited to within a few meters of the burial tool. The deposition area coverage was small as a result. This was true for most of the offshore segments of the ECC where concentrations of 100mg/L were predicted to be within 50 m (160 ft) of the route and decreased rapidly (less than 15 minutes). The segments of the ECC between KP32 and KP45 and between KP78 and KP100 are particular examples of this, where the currents were low and the sediment grain size distribution favored the larger materials. The sections of the offshore route that were seen to have higher fractions of the fine grade sediments exceeded that response in the model predictions showing the 100 mg/L concentration extending to greater than 300 m (984 ft). These areas are seen between KP55 and KP78 and again in the area of KP100 to KP110.

The sediment deposition footprint resulting from the cable installation activities occurred relatively locally. Along the majority of the route a large fraction of the mass settles out quickly and does not get transported far by the currents. Deposition thicknesses of 1 mm (0.04 in) are generally limited to a corridor with a maximum width of 30 - 35 m (100 – 115 ft) around the cable centerline. In the areas where there are finer grain sediments, the 1mm (0.04 in) thickness contour distance can increase locally to 165 m (540 ft) from the ECC as seen in the area of KP105.

The fine grade materials tend to settle slowly compared to the larger grain size sediments, meaning that the resuspended silt, clay and even very fine sands tend to be transported farther with the tidal currents than the coarser components and correspondingly higher water column concentrations and longer durations of plumes were predicted from the model. This was the case along the Mount Hope Bay and Sakonnet River segments of the ECC where much of Mount Hope Bay and the Sakonnet River were impacted at low concentration levels.

The higher-level suspended sediment concentrations (100 mg/L TSS and up) were somewhat contained in the Sakonnet River but covered a larger area in Mount Hope Bay. Near the Mt. Hope Bay Aquidneck landing, currents running perpendicular to the EC coupled with fine grade resuspended sediments, increased the overall material transport extending the maximum 100 mg/L concentration a little over 1 km (0.62 mi). Concentrations reached levels of 500 mg/L but were short lived and persisted for approximately 30 minutes to an hour. Concentrations in the range of 200 mg/L or more are not expected to endure for longer than about 2 hours, while the lowest concentrations, in the 10 mg/L range may last several hours after re-suspension.

The conditions creating suspended sediments at the HDD excavation sites were different than those investigated for the cable burial routes. The source was assumed to be at a single point and continuous over a 1- hour period, releasing 100 percent of the dredged material into the water column. The sediments at the three HDD sites were similar (each taken from the nearest surface grab sample site), where, excluding the rock/cobble component, they were comprised of approximately 50 percent silt and 11 percent clay and therefore the material settled relatively slowly to the seabed. Concentrations of 100 mg/L were transported to a maximum of 0.32 km (0.2 mi) from the HDD site but dissipated in a little over an hour. The area coverage of the 100 mg/L or greater level was contained within an average of 5 ha (12 ac).

The sedimentation footprint however was very small with a maximum coverage of the 1 mm (0.04 in) thickness contour of only 0.5 ha (1.2 ac), extending a maximum distance of 95 m (312 ft) and 1 ha (2.5 ac) for the 0.5 mm (0.02 in) thickness contour, extending a maximum distance of 158 m (518 ft) from the HDD site.

Since the time of completion of the sediment transport and dispersion study for the Brayton Point ECC cable burial, additional in-situ data has been collected and analyzed. This is of interest in the lower Mount Hope Bay and upper Sakonnet River areas in that the new data shows a marked divergence from the surface grabs at several points. For the reach of the ECC in Mount Hope Bay near the entrance to the East Passage of Narragansett Bay where the cable centerline is aligned in a north-south direction, perpendicular to the tidally driven currents, two new data points with vertical profiles of the sediments show considerably coarser material. The new data would replace the surface grabs in the southwestern end of the ECC to the HDD connection site on the north side of Aquidneck Island at the Mount Hope Bay entrance. The coarser material would have the effect of reducing the transport and deposition concentration and thickness maxima, respectively, as reported in Section 4 and therefore have less of an impact on the environment.

The same is true of the upper half of the Sakonnet River where three new vertical profiles of the sediment are available. The vertical profile sediment data at the northern end of the Sakonnet River was previously taken from a station more than a third of the distance towards the ocean. The new data shows lower fine grained (silt and clay) percentages particularly in the lower half of the trench. Again, the coarser material would have the effect of reducing the transport and deposition concentration and thickness maxima, respectively, predicted in the study based on the surface grab data also reducing the impacts.

In summary, despite conservative model assumptions, water column concentrations and seabed deposition thickness and extent from the cable burial operations and HDD exit pit dredging remain generally localized and of short duration.

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Appendix 1 - Brayton Point ECC Surface Sediment Grab Sample Grain Size Distribution

SampleID	Easting	Northing	Longitude	Latitude	%Coarse Sand (0.5-1.0 mm)	%Medium Sand (0.25-0.50 mm)	%Fine Sand (0.125-0.25 mm)	%VeryFine Sand (0.062-0.125 mm)	%Silt-(0.0039-0.0625 mm)	%Clay (<0.0039 mm)
21SU-MW0521-BP002	316865.8	4618773.5	-71.20092	41.69969	7.3	6	5.5	5.3	44.5	8.4
21SU-MW0521-BP003	316084.7	4617116.5	-71.20979	41.68460	10.4	6	3.9	5.6	46.4	9.8
21SU-MW0521-BP005	313608.3	4614216.1	-71.23862	41.65792	8.2	8.2	6.3	5.2	32.5	7.8
21SU-MW0521-BP010-BG	314381.2	4604007.4	-71.22618	41.56621	8.8	11.8	5.4	6.2	38.5	8
21SU-MW0521-BP012-BG	314848.1	4598463.4	-71.21887	41.51642	0.4	3.1	48.1	28.2	17.6	2.4
21SU-MW0521-BP013-BG	314775.6	4596531.2	-71.21915	41.49902	1.1	17.4	57.9	21.1	1.7	0.2
21SU-MW0521-BP017-BG	314420.4	4588971.3	-71.22108	41.43089	1	23.4	63.6	7.8	2.4	0.3
21SU-MW0521-BP018-BG	314287.3	4587062.6	-71.22208	41.41368	0.8	27.7	63.5	6.5	1.3	0.2
21SU-MW0521-BP019-BG	314377.4	4585235.9	-71.22045	41.39726	21.6	22.7	3.2	0.4	1	0.1
21SU-MW0521-BPT07-BG	317290.1	4582870.9	-71.18491	41.37664	59.6	28.1	4.7	0.4	0.9	0.2
21SU-MW0521-BP024-BG	324846.7	4582428.0	-71.09448	41.37433	4.6	56.2	34.5	1.7	2.6	0.4
21SU-MW0521-BPT08-BG	329719.7	4581796.7	-71.03607	41.36969	0.9	16.1	75.1	5.3	2.3	0.3
21SU-MW0521-BP028-BG	331367.1	4580016.0	-71.01589	41.35401	2.1	3.8	50.9	33.5	8	1.3
21SU-MW0521-BPT09-BG	334364.8	4574333.1	-70.97852	41.30347	10.9	28.8	26.8	16.5	11.2	2.2
21SU-MW0521-BP035-BG	336209.3	4567713.5	-70.95472	41.24425	8.7	19.5	33.7	17.6	10.1	1.4
21SU-MW0521-BP039-BG	340050.6	4561525.3	-70.90729	41.18931	37.1	22.8	2.7	0.2	1	0.1
21SU-MW0521-BP042-BG	344859.7	4558726.7	-70.84926	41.16505	25.6	58.1	10.1	0.2	1	0.2
21SU-MW0521-BP046-BG	354060.6	4557245.5	-70.73928	41.15342	20.8	7.3	1.2	0.2	0.7	0.1
21SU-MW0521-BP049-BG	359766.8	4557113.7	-70.67128	41.15324	43.9	30.1	5.9	0.5	1.6	0.2
21SU-MW0521-BP052-BG	365453.9	4556948.1	-70.60349	41.15271	4.5	13.2	46.5	15.1	14.6	2
21SU-MW0521-BP058-BG	376862.7	4556558.9	-70.46749	41.15102	12	62.4	22.9	0.9	1.4	0.2
21SU-MW0521-BP063-BG	385790.7	4553858.8	-70.36062	41.12801	4.5	22.8	53.6	7.1	6.7	1
21SU-MW0521-BP068-BG	390918.1	4545193.7	-70.29801	41.05068	11.3	63.1	15	8	2.2	0.2
21SU-MW0521-A080-BG	390041.4	4563662.8	-70.31175	41.21689	0.2	0.4	48.4	48.8	2.3	0.2
21SU-MW0521-BPALT02	317652.6	4618421.7	-71.19136	41.69671	0.15	20.9	14.25	7.5	46.8	10.6
21SU-MW0521-C01-BG	383725.7	4562652.0	-70.38688	41.20691	0.2	3.3	91.3	2.8	2.3	0.3
21SU-MW0521-C02-BG	386552.5	4562690.3	-70.35318	41.20765	0.2	24.6	67.6	3.9	3.4	0.6
21SU-MW0521-C03-BG	385169.1	4561339.7	-70.36942	41.19529	0.2	0.6	82.1	15	2.2	0.3
21SU-MW0521-C04-BG	383714.5	4560170.0	-70.38654	41.18455	0.2	3.6	86.5	6.7	2.9	0.4
21SU-MW0521-C05-BG	386499.5	4560086.7	-70.35333	41.18420	0.2	5.7	87.2	3.2	3.6	0.4

SampleID	Easting	Northing	Longitude	Latitude	%Coarse Sand (0.5-1.0 mm)	%Medium Sand (0.25-0.50 mm)	%Fine Sand (0.125-0.25 mm)	%VeryFine Sand (0.062-0.125 mm)	%Silt-(0.0039-0.0625 mm)	%Clay (<0.0039 mm)
21SU-MW0521-C05-BG-DUP	386499.5	4560086.7	-70.35333	41.18420	0.2	4.1	90.4	3.1	2.3	0.3
21SU-MW0521-C16-BG	325252.4	4589128.9	-71.09157	41.43474	0.2	0.3	32	66	1.8	0.2
21SU-MW0521-C17-BG	322854.2	4587722.4	-71.11984	41.42155	0.2	0.4	18.4	78.5	2.5	0.4
21SU-MW0521-C17-BG-DUP	322854.2	4587722.4	-71.11984	41.42155	0.2	0.4	22.5	74.1	2.8	0.4
21SU-MW0521-C19-BG	386562.5	4562674.3	-70.35306	41.20751	0.2	0.4	25.5	71.6	2.4	0.3
21SU-MW0521-C20-BG	386562.5	4562674.3	-70.35306	41.20751	0.2	0.4	31.3	65.8	2.3	0.3

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment H: Benthic Habitat Mapping Report

Revised: February 2023

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MAYFLOWER WIND

Benthic Habitat Mapping to Support State Permitting Applications - Brayton Point ECC for RI State Waters and GLD

Document Number	MW01-COR-PRT-RPT-0112
Document Revision	A
Document Status	Final
Owner/Author	INSPIRE Environmental
Issue Date	October 28, 2022
Security Classification	Confidential
Disclosure	For use by Mayflower Wind and Authorized Third Parties

Revision History

Version	Prepared By	Reviewer(s)	Approver(s)	Date	Purpose of Issue
A	Marisa Guarinello	Joel Southall Kathleen Freeman Tim Reiher	Erin Healy Jen Flood	October 28, 2022	Submittal to RI CRMC and DEM

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Glossary

Acronym	Definition
APC	Areas of particular concern
BOEM	Bureau of Ocean Energy Management
CMECS	Coastal and Marine Ecological Classification Standard
COP	Construction and Operations Plan
ECC	Export Cable Corridor
EFH	Essential Fish Habitat
EMF	Electric and magnet field
FGDC	Federal Geographic Data Committee
ft	feet
GLD	Geographic Location Description
HAPC	Habitat Area of Particular Concern
HDD	horizontal directional drilling
IAC	Inter-Array Cable
in	inch
INSPIRE	INSPIRE Environmental
km	kilometer
m	meter
MA	Massachusetts
MA/RI WEA	Massachusetts/Rhode Island Wind Energy Area
MBES	multibeam echosounder
mm	millimeter
MSIR	Marine Site Investigation Report
nm	nautical mile
NMFS	NOAA National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
OSP	Offshore Substation Platform
PV	Plan View
RI	Rhode Island
SAV	submerged aquatic vegetation
SPI	Sediment Profile Imaging
SSS	side-scan sonar
WTG	Wind Turbine Generator
YOY	young-of-the-year

Executive Summary

Mayflower Wind proposes to develop the entire Mayflower Wind Lease Area OCS-A 0521 as an offshore wind renewable energy project. There will be up to 149 positions in the Lease Area occupied by up to 147 wind turbine generators (WTGs) and up to five offshore substation platforms (OSPs). The 149 positions will conform to a 1.0 nm x 1.0 nm (1.9 km x 1.9 km) grid layout with an east-west and north-south orientation, which is aligned with layouts across the entire Massachusetts/Rhode Island Wind Energy Area (MA/RI WEA). Submarine inter-array cables (IACs) will connect WTGs and OSPs within the Lease Area. Offshore export cables will run through export cable corridors (ECCs) from the OSPs in the Lease Area to two points of interconnection at the regional electric transmission grid located at Falmouth, MA and at Brayton Point in Somerset, MA. Horizontal directional drilling will be used at all cable landfalls to avoid impacts to sensitive coastal resources. Project activities, design parameters, and associated potential impacts through seafloor disturbance are presented in further detail in Volume I, Section 3 of the Mayflower Wind Construction and Operations Plan (COP) available at https://www.boem.gov/renewable-energy/state-activities/mayflower-wind.

The purpose of this benthic habitat mapping report and associated data is to provide detailed information about the physical and biological characteristics and spatial distribution of benthic habitats found within the Study Area, which includes the subtidal seafloor of the Brayton Point ECC where it crosses the portion of Federal Waters designated as Geographic Location Description (GLD) areas identified in the Rhode Island Ocean Special Management Plan (OSAMP), and then Rhode Island State Waters. The Project requires approvals from various state agencies, including the Rhode Island Energy Facility Siting Board, the Coastal Resources Management Council (CRMC), and the Rhode Island Department of Environmental Management (RIDEM). Most relevant to this report, CRMC regulations in both the Coastal Resources Management Program, or "Red Book", (650-RICR-20-00-1 et seq.) and the OSAMP (RI CRMC, 2010) include requirements pertaining to identification and evaluation of benthic habitats. This report provides the baseline data and information necessary to support CRMC's review of any Project impacts on benthic habitats under its regulations.

Mayflower Wind has collected extensive geophysical data and ground-truth data to support the mapping and characterization of habitats within the Study Area. The geophysical data used to support benthic habitat mapping not only meet the recommended resolution specified in the Bureau of Ocean Energy Management's (BOEM) Geophysical, Geotechnical, and Geohazard Guidelines (BOEM, 2020a) and the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division's (NMFS) recommendations (NMFS, 2021), but were also collected with state-of-the-art equipment and are provided at the highest resolution possible. The benthic habitat data provided here should be viewed as the most accurate representation of the seafloor possible using the high-resolution geophysical and ground-truth data collected.

Six primary benthic habitat types were mapped within the Study Area: Glacial Moraine A, Mixed-Size Gravel in Muddy Sand to Sand, Coarse Sediment, Sand, Mud to Muddy Sand, and Bedrock. When habitats were updated with modifiers, a total of 19 habitat types were mapped within the Study Area including mobile habitats characterized by ripples, discrete areas with boulder fields, and discrete areas with *Crepidula* (slipper shell) cover. Sand, Sand – Mobile, and Mud to Muddy Sand habitat types were the most prevalent habitats mapped at the Brayton Point ECC with smaller areas of Glacial Moraine A at the Southwest Shoal and in Rhode Island Sound. Areas of Mixed-Size Gravel in Muddy Sand to Sand were mapped in Rhode Island Sound and areas of Mud to Muddy Sand with *Crepidula* Substrate were interspersed with Mud to Muddy Sand in the Sakonnet River and Mount Hope Bay near Aquidneck Island. The benthic habitats and their characterizing sediments and benthic biological communities as mapped for this Mayflower Wind assessment generally agree with several recently published studies (LaFrance et al., 2019; Hale et al., 2018; Shumchenia and King, 2019; Shumchenia et al., 2016) related to benthic habitats and fauna within Narragansett Bay, which include the Sakonnet River and/or Mount Hope Bay.

Identified habitats of particular relevance to RI state agency review include submerged aquatic vegetation (SAV), glacial moraine, and those habitats that may be utilized by juvenile cod and spawning winter flounder and their eggs. SAV beds were mapped by the state near the mouth of the Sakonnet River, located over 1 km from the edges of the Brayton Point ECC. Based on distinct side-scan sonar signatures in the geophysical data, SAV and/or macroalgae may be present in the vicinity of the Brayton Point ECC in the Sakonnet River at Aquidneck Island, but this has not yet been field-verified. The area will be surveyed for SAV prior to construction, as necessary, to guide horizontal directional drilling (HDD) placement. A distinction was made between Glacial Moraine A and Glacial Moraine B habitats to distinguish between areas of unconsolidated geological debris (A) and consolidated geological debris (B). All glacial moraine mapped within the Study Area was mapped as type A and no type B was mapped. Using data collected by Mayflower Wind, Glacial Moraine A habitats were mapped as comprising 4.1% (411 acres) of the habitats mapped at the Brayton Point ECC in Federal Waters (GLD) and comprising 3.1% (185 acres) of the habitats mapped at the Brayton Point ECC in RI State Waters, predominantly located in Rhode Island Sound. Glacial moraines, as identified in the OSAMP (RI CRMC, 2010), intersect the Brayton Point ECC in two areas within the GLD portion of Federal Waters; at Southwest Shoal and where the ECC turns due west outside of RI State Waters.

Essential fish habitat (EFH) and habitat areas of particular concern (HAPC) are designated by the New England Fishery Management Council for certain species and life stages of fish and invertebrates in the nearshore and offshore waters of New England, including the area covered by the Study Area. These designations are comprised of two components: (1) broad geographic areas (e.g., nearshore waters and seafloor shallower than 20 m; mapped 10-min squares) and (2) text documentation that describes the habitat characteristics that shall constitute EFH and/or HAPC within the designated geographic areas. Therefore, spatial data on the distribution of those habitat characteristics are needed to refine the specific location of EFH and/or HAPC. Habitat types mapped by Mayflower Wind using geophysical data and sediment and benthic community data from grabs and imagery collected in 2021 and 2022 within the HAPC designated geographic area and with characteristics that match the HAPC description for juvenile cod encompass 361 acres of the Study Area within RI State Waters (6.0% of the Brayton Point ECC within RI State Waters). Habitat types mapped by Mayflower Wind within the EFH designated geographic area and with characteristics that match the EFH description for winter flounder encompass 731 acres of the Study Area, all within RI State Waters (12.1% of the Brayton Point ECC within RI State Waters).

1. Introduction

1.1 Mayflower Wind Project Overview and Layout

The Mayflower Wind Lease Area OCS-A 0521 (Lease Area) encompasses 127,388 acres (51,552 hectares) located in Federal Waters 26 nautical miles (nm), (48 kilometers [km]) south of Martha's Vineyard, 20 nm (37 km) south of Nantucket, and 51 nm (94 km) southeast of the Rhode Island coast (Figure 1-1). There will be up to 149 positions in the Lease Area occupied by up to 147 wind turbine generators (WTGs) and up to five offshore substation platforms (OSPs). The 149 positions will conform to a 1.0 nm x 1.0 nm (1.9 km x 1.9 km) grid layout with an east-west and north-south orientation, which is aligned with layouts across the entire Massachusetts/Rhode Island Wind Energy Area (MA/RI WEA). Submarine inter-array cables (IACs) will connect WTGs and OSPs within the Lease Area.

Within the offshore export cable corridor (ECC) from the Lease Area to Brayton Point (Brayton Point ECC), up to two HVDC offshore export power cables and associated communications cabling. The cables within the Brayton Point ECC will be installed in a bundled configuration where practicable, will connect the OSPs to the landfall site at Brayton Point. The Brayton Point ECC is nominally 1,640 feet (ft, 500 meter [m]) to 2,300 ft (700 m) wide, to allow for maneuverability during installation and maintenance. The ECC may be locally narrower or wider to accommodate sensitive locations and to provide sufficient area at landfall locations, at crossing locations, or for anchoring. The ECC has been surveyed to assess seabed conditions and to allow for micro-siting (micro-routing) of cables to avoid where practicable sensitive resources and areas where cable burial may be difficult.

The Brayton Point ECC extends from the Lease Area north and then west through Federal Waters, into RI State Waters through Rhode Island Sound to the Sakonnet River where heads north, crosses Aquidneck Island in Portsmouth, RI, continues northeast into Mount Hope Bay, and then into Massachusetts State Waters to Brayton Point in Somerset, MA (Figure 1-1). Intermediate landfall on Aquidneck Island will require sea-to-shore transitions via horizontal directional drilling (HDD) at two locations, one entering and one exiting Aquidneck Island in Portsmouth, RI. HDD will be used at all cable landfalls to avoid impacts to sensitive coastal resources.

For the purposes of this report, the benthic habitat study area (Study Area) includes the subtidal seafloor of the portion of the Brayton Point ECC within RI State Waters and within the area described in the RI Ocean Special Area Management Plan (OSAMP; RI CRMC, 2010) as the Geographic Location Description (GLD) in Federal Waters [referred to as Brayton Point ECC – Federal Waters (GLD)] where the RI Coastal Resources Management Council (RI CRMC) has Federal consistency review authority (Figure 1-2). This report provides a detailed assessment of benthic habitats that have been mapped from geophysical and benthic ground-truth data within the Study Area. Ground-truth data refer to physical samples and imagery collected during benthic surveys conducted by Mayflower Wind to provide direct measurement and observations of the physical and biological characteristics for the seafloor surface. These data were used to develop and calibrate an understanding of the seafloor characteristics associated with different acoustic signatures observed in the geophysical data. This calibration process is particularly useful in assessing backscatter data, which have a relative rather than absolute scale and can vary in relation to a number of factors (see Section 2.1.1 for details).

Additional details on the Study Area relevant to the benthic habitat mapping assessment are provided in Table 1-1.

Table 1-1. Mayflower Wind Project Components for the Brayton Point ECC

Cable Characteristics	Design Parameters
Number of Cables	Two offshore export power cables plus associated communications cabling [a]
Cable Diameter (per cable)	6.9 in (175.0 mm)
Nominal Cable Voltage	±320 kV
Length of Cable Corridor (RI State Waters)	20.4 mi (32.8 km)
Length of Cable Corridor (RI GLDs)	50.0 mi (80.4 km)
Cable Corridor Width	1,640 ft to 2,300 ft (500 m to 700 m)
Number of Cable / Pipeline Crossings Anticipated	3 in the Sakonnet River Up to 13 in the GLDs
Anticipated Cable Burial Depth (below level seabed) (Target Burial Depth = 6 ft (1.8 m))	3.2 to 13.1 ft (1.0 to 4.0 m)
Approximate Cable Load Current	2,000 A

Notes:

[a] The cables will be installed in a bundled configuration, consisting of two power cables plus associated communications cabling installed together, where practicable, in order to minimize seabed impacts from installation. Maximum cable bundle width is twice the maximum cable diameter.

1.2 Benthic Assessment Survey and Reporting History

Two surveys were conducted in Summer 2021 and Spring 2022 to characterize benthic resources for the Project in the Study Area. A total of 339 stations were sampled across the Study Area (Table 1-2; Figures 1-3 and 1-4). Many stations were re-sampled across the multiple surveys, for a total of 348 station sampling events over the course of the six field surveys (Table 1-3). All benthic field surveys and analyses were conducted by Fugro USA Marine, Inc. (Fugro) and Integral Consulting, with the exception that the summarization of benthic community analysis results from grab samples in 2021 was conducted by AECOM. Laboratory analysis of grab samples was conducted by Alpha Analytical, Inc. for sediment grain size and by AECOM or EcoAnalysts, Inc. for benthic community parameters.

A variety of sampling techniques were utilized to collect data on the physical and biological characteristics of the seafloor (Table 1-4). These techniques were used in combination across the surveys and included sediment profile and plan view imaging (SPI/PV), sediment grab sampling, and GrabCam imaging (a video camera attached to the grab sampler). Up to three replicate SPI/PV image pairs were collected and analyzed at each individual SPI/PV station. At select areas, transects across the ECC were sampled by either collecting a series of single SPI/PV image pairs along the transects (referred to as "Transect SPI/PV"), or by using the GrabCam to collect video across the transect (Transect GrabCam). At grab sample locations, one sample was collected with a dual bucket van Veen grab sampler with 0.04-square meter bucket size and GrabCam imagery was collected. Sampling effort at stations ranged from one to all three sampling techniques (SPI/PV, grab, GrabCam); at some stations, sampling techniques also varied across surveys. A complete inventory of all data collected by sampling type for all surveys at each station is provided in Attachment A.

For full details and survey-specific benthic data results, see COP Appendix M, Benthic and Shellfish Resources Characterization Report, and COP Appendix M.2, Benthic and Shellfish Resources Characterization Report Addendum #2. RI state data (RIGIS, 2021) were used to assist in mapping submerged aquatic vegetation (SAV) presence at and near the Brayton Point ECC.

Table 1-2. Unique Benthic Stations Sampled Across the Study Area

Portion of Study Area	Number of Stations
Brayton Point ECC - Federal Waters (GLD)	162
Brayton Point ECC - RI State Waters	177
Total	**339**

Table 1-3. Benthic Stations Sampled Across the Study Area During Each Survey

Portion of Study Area	Number of Stations		
	Summer 2021	Spring 2022	Total
Brayton Point ECC - Federal Waters (GLD)	63	105	**168**
Brayton Point ECC - RI State Waters	68	112	**180**
Total	**131**	**217**	**348**

*Note, some stations were sampled multiple times, therefore the total here is greater than the total of unique stations sampled in each area as presented in Table 1-2.

Table 1-4. Benthic Sampling Techniques Across Surveys

Sampling Technique	Number of Stations Sampled with Given Technique		
	Summer 2021	Spring 2022	Total*
SPI/PV	54	24	**78**
Grab	20	47	**67**
GrabCam	20	50	**70**
Transect SPI/PV	64	148	**212**
Transect GrabCam	6	10	**16**
Total	**164**	**279**	**443**

*Multiple sampling techniques were used across all stations; this table records the total number of benthic replicate "samples" (grabs or imagery) that were collected across all surveys.

1.3 Benthic Habitat Mapping Assessment Purpose and Objectives

The purpose of this report and associated data is to provide detailed information about the physical and biological characteristics and spatial distribution of benthic habitats found within the Study Area. The Project requires approvals from various state agencies, including the Rhode Island Energy Facility Siting Board, the Coastal Resources Management Council (CRMC), and the Rhode Island Department of Environmental Management (RIDEM). Most relevant to this report, CRMC regulations in both the Coastal Resources Management Program, or "Red Book", (650-RICR-20-00-1 et seq.) and the OSAMP (RI CRMC, 2010) include requirements pertaining to identification and evaluation of benthic habitats. This report provides the baseline data and information necessary to support CRMC's review of any Project impacts on benthic and demersal fish habitats under its regulations.

Specific Red Book requirements related to benthic habitats pertain to those habitats that support SAV. Section 1.3.1(R) of the Red Book defines CRMC's goals to preserve, protect, and where possible, restore SAV habitat. These habitats are found throughout shallow coastal areas in Narragansett Bay and their presence is periodically mapped across the Bay using aerial imagery and field verification by the URI Environmental Data Center (URI Environmental

Data Center and RIGIS). The Red Book outlines information pertaining to site-specific monitoring, assessment of impacts, and mitigation for SAV.

Specific OSAMP requirements related to benthic habitats pertain to those habitats that meet the criteria for areas of particular concern (APCs), as defined by CRMC in Section 11.10.2 of the OSAMP. Glacial moraines are considered to be APCs because they provide structural complexity and permanence that serve to provide valuable habitat for benthic species and demersal fish. Glacial moraines are complex geoforms that may have many different expressions at the seafloor surface based on geological origin, position within a larger moraine complex, and modern geological processes, including sediment supply. Rhode Island's marine landscapes were by glaciers and remnants of this glaciation are evident on the seafloor. Deposits on the surface of landforms can be a mix of till, and reworked sediments derived from the glacial deposits and subsequent marine transgression. The OSAMP presumptively excludes development in APCs unless an applicant demonstrates, for example, "by clear and convincing evidence that there are no practicable alternatives that are less damaging in areas outside of the APC, or that the proposed project will not result in a significant alteration to the values and resources of the APC."

Benthic habitats mapped using data collected by Mayflower Wind will be compared to distributions of SAV mapped by the state (RIGIS, 2021) and areas mapped as glacial moraine in the OSAMP (RI CRMC 2010). As juvenile cod and winter flounder have been noted as demersal fish species of potential concern, maps of benthic habitats crosswalked to essential fish habitat (EFH) and/or habitat areas of particular concern (HAPC) designated by the New England Fishery Management Council for relevant life stage of these species are provided as well.

Mayflower Wind has collected extensive geophysical data (COP Appendix E, Marine Site Investigation Report [MSIR]) and ground-truth data (COP Appendices M and M.2, Benthic Resources) to support the mapping and characterization of habitats within the Study Area. INSPIRE Environmental (INSPIRE) conducted benthic habitat mapping by using these geophysical and ground-truth data to further delineate and refine geological seabed interpretations prepared for the Mayflower Wind MSIR (COP Appendix E) into detailed benthic habitat classifications mapped across the Study Area (Figure 1-5).

The geophysical data used to support benthic habitat mapping not only meet the recommended resolution specified in BOEM's Geophysical, Geotechnical, and Geohazard Guidelines (BOEM, 2020a) and NMFS' recommendations (NMFS, 2021), but were also collected with state-of-the-art equipment and are provided at the highest resolution possible. The benthic habitat data provided here should be viewed as the most accurate representation of the seafloor possible using the high-resolution geophysical and ground-truth data collected.

2. Input Data and Methods

Multiple sources of geophysical and ground-truth data were used as input for mapping benthic habitats within the Study Area. Brief summaries of these data sources and details pertinent to their use in the habitat mapping process are described here. Full details of geophysical and ground-truth data collection, processing, and analysis are provided in the Marine Site Investigation Report (COP Appendix E, MSIR) and benthic assessment reports (COP Appendices M and M.2, Benthic Resources) appended to the COP.

2.1 Input Data

2.1.1 Geophysical Data and Derived Data Products

Geophysical data surveys of the Study Area were conducted in 2020 and 2021 by Fugro. High-resolution geophysical surveys included collection of high-resolution multibeam echosounder (MBES) and side-scan sonar (SSS) data (COP Appendix E, MSIR). MBES and SSS are collected using different instruments deployed from the same survey vessel (Figure 2-1). The MBES was installed on Fugro's Hydrodynamic Acoustic System pole, which provides a high degree of positional accuracy. The MBES can be optimized for either bathymetric or backscatter data, but not for both. The geophysical surveys conducted for offshore wind development are designed to support engineering and construction design and, therefore, the MBES was optimized for bathymetric data, and backscatter data were collected as an ancillary data product.

Bathymetric data were derived from the MBES and processed to a resolution of 50 cm (COP Appendix E, MSIR). Bathymetric data provide information on depth and seafloor topography (Figures 2-2 and 2-3).

Backscatter data were derived from the MBES and processed to a resolution of 25 cm (COP Appendix E, MSIR). Backscatter data are based on the strength of the acoustic return to the instrument and provide information on seafloor sediment composition and texture. Backscatter data are best interpreted in concert with hill-shaded bathymetry (Figures 2-4 and 2-5). Backscatter returns are relative (see below) and referred to in terms of low, medium, and high reflectance rather than absolute decibel values. In general, softer, fine-grained sediments absorb more of the acoustic signal and a weaker signal is returned to the MBES. However, backscatter strength is disproportionately affected by the coarse sediment fraction (e.g., Goff et al., 2000), so fine sediment with small amounts of shell hash can generate higher backscatter reflectance than coarser sediment. Although backscatter data provide valuable information about sediment grain size, decibel values reflect not only sediment grain size, but also compaction, water content, and texture (Lurton and Lamarche, 2015). For example, sand that is hard-packed and sand that has prominent ripples may have higher acoustic returns than sediments of similar grain size that do not exhibit compaction or ripples.

Backscatter decibel values are also influenced by water temperature, salinity, sensor settings, seafloor rugosity, and MBES operating frequency, among other factors (Lurton and Lamarche, 2015; Brown et al., 2019). Differences in backscatter decibel values can also occur when data have been collected over a very large survey area under dynamic conditions, with different instruments, and in different years. This scenario is common and does not nullify the data; methods to optimize processing (as appropriate to the sensors) and to display the data optimal for interpretation are well developed (Lurton and Lamarche, 2015; Schimel et al., 2018). Backscatter data products vary based on processing (Lucieer et al., 2017) and data display procedures. Mapping of seafloor composition and habitats, while greatly aided by backscatter data, should not rely solely on these data (see Table 1 in Brown et al., 2011). The manner in which the suite of geophysical data was used for habitat delineations is described further in Section 2.2.

SSS data were generated from a towed instrument (Figure 2-1) and, thus, have a lower positional accuracy than MBES data. However, because the SSS towfish is closer to the seafloor with a lower angle of incidence, the resolution, signal to noise ratio, and intensity contrast of SSS images are higher than those of MBES backscatter images (Lurton and Jackson, 2008). The processed SSS images provide the highest resolution data on sediment textures and objects on the seafloor (boulders, debris) (Figures 2-6 and 2-7). Thermoclines and haline variations affect the acoustic signal and result in data artifacts, presenting as sinuous rippling of alternating low and high returns that cannot be removed from the data; these artifacts are visible when viewed at very close range. SSS data were processed to a resolution of 10 cm; this resolution permits detection of medium to large boulders but does not permit the reliable detection of individual cobbles (6.4 cm to 25.6 cm). Although individual small boulders and cobbles cannot be detected in 10-cm resolution SSS, textures and patterns in the data can indicate the presence or absence of higher densities of these features, which can be confirmed by ground-truth data (Figure 2-8).

Boulders greater than or equal to 30 cm (0.3 m) in diameter were identified from the MBES and SSS data; boulder fields and individual boulder "picks" outside boulder fields were mapped by Fugro and used as input data for benthic habitat mapping (Figure 2-9). At the Brayton Point ECC, boulder detection was conducted via Fugro's proprietary machine learning algorithm was followed with manual review and classification of boulders and anthropogenic features (e.g., lobster traps). Boulder fields are defined as a geoform by the Federal Coastal and Ecological Marine Classification Standard (CMECS; FGDC, 2012).

Seabed sediment types were classified by Fugro using a simplified version of the CMECS Substrate classification hierarchy, which is based on the Folk classification scheme (Folk, 1954) (Figure 2-10; COP Appendix E, MSIR). Seabed sediment types within this simplified scheme are Mud to Muddy Sand, Sand, Gravelly Mud, Gravelly Sand, and Gravel. All but Gravelly Sand were delineated within the Study Area (COP Appendix E, MSIR). This CMECS scheme applies only to geological sediments; Shell, Construction Materials, and Anthropogenic Rock Rubble were also used in mapping seabed sediment types. In areas of Gravel with unconsolidated stratified glacial deposits, a geoform morphological unit of Glacial Moraine/Till was delineated. Bathymetry and SSS were used as the primary data sets to delineate these seabed sediment types, and backscatter was utilized as a secondary data set, due to its relative nature, as discussed above in this section and in COP Appendix E, the MSIR. Grain size distribution results from laboratory analysis of grab samples were used to ground-truth the sediment types indicated by the geophysical data (COP Appendix E, MSIR). A combination of backscatter over hillshaded bathymetry and SSS data was used to detect large- and small-scale bedforms, such as mega-ripples and ripples (*sensu* BOEM, 2020a) and ripple scour depressions (RSDs) (COP Appendix E, MSIR) (Figure 2-11).

2.1.2 Ground-Truth Data

As detailed in Section 1.2 of this report, ground-truth data were collected at a total of 339 stations in the Study Area using a variety of benthic sampling techniques, with some stations sampled during multiple surveys and using multiple techniques (Tables 1-2, 1-3, and 1-4; Figures 1-3 and 1-4). These benthic data (SPI/PV, grab samples, GrabCam) were analyzed for a suite of parameters on sediment types, bedform dynamics, and biogeochemical processes, as well as to characterize infaunal and epifaunal biological communities (Table 2-1). Detailed descriptions of each variable analyzed and full data analysis results for each benthic survey can be found in the Benthic and Shellfish Resources Characterization Report and Addendum #2 (COP Appendices M and M.2, Benthic Resources). All benthic data results prepared for Mayflower Wind by Fugro, Integral, and AECOM, were provided to INSPIRE for the purpose of mapping benthic habitats. These data were inventoried and summarized as detailed below to provide a single summarized set of key variables at each station for ground-truthing geophysical data and mapping benthic habitats.

CMECS Substrate and Biotic classifications were consistently evaluated across all surveys from SPI/PV (including Transect SPI/PV), grab samples, and GrabCam (Table 2-1). These variables serve as ground-truth for assessing and calibrating geophysical data signatures and characterizing the physical and biological characteristics of benthic habitats. Primary CMECS Substrate and Biotic classifiers were selected for the summary data set: Substrate Group and Subgroup, Biotic Subclass and Co-occurring Biotic Subclass. Substrate Group and Subgroup parameters provide categorical values describing sediment composition (e.g., Sandy Gravel, 30-80% gravel cover on sand). CMECS Biotic Subclasses describe dominant biota (by percent cover) at a coarse level. Within the Benthic/Attached Biota Biotic Setting, there are eight classes, of which the Faunal Bed class is of most relevance to the U.S. Atlantic outer continental shelf. Three subclasses fall under the Faunal Bed hierarchy: Attached Fauna, Soft Sediment Fauna, and Inferred Fauna (e.g., tracks and trails, egg masses). Although Biotic Subclass is not directly based on sediment grain size distributions, it reflects them at the scale of relevance to the dominant fauna present, thus serving as an integrator of physical and biological characteristics of the seafloor. The CMECS definition expressly states that "substrate type is such a defining aspect of the Faunal Bed class that CMECS Faunal Bed subclasses are assigned as physical-biological associations involving both biota and substrate" (FGDC, 2012).

Because the presence of Attached Fauna can be an important component of benthic habitat utilization by benthic taxa and demersal fish (NMFS, 2021) and may be present at sparse to patchy levels and therefore not classified as the Biotic Subclass, INSPIRE summarized Attached Fauna presence into a single variable. Attached Fauna were noted as present if Attached Fauna types were noted at the level of the Biotic Subclass or Co-occurring Biotic Subclass, or, where available, the Biotic Group or Co-occurring Biotic Group across all available replicate-level sampling data (i.e., a replicate is a single SPI/PV image pair, single grab, or a single GrabCam video).

The presence of sensitive and non-native taxa were evaluated from PV images by INSPIRE (Table 2-1). Sensitive seafloor habitats include corals, SAV beds, and valuable cobble and boulder habitat (BOEM, 2019). Cobble and boulder habitat can serve as structure for hard and soft corals, nursery grounds for juvenile lobster, and as preferable benthic habitat for squid to deposit their eggs. The benthic data collected serve as baseline presence/absence data for marine non-native species within the Study Area. The colonial tunicate *Didemnum vexillum* is known to have widespread presence on Georges Bank and other areas of New England (Stefaniak et al., 2009), and dense colonies of this tunicate can smother native species (Bullard et al., 2007). Because species-level identification cannot be confirmed without a physical sample, presence observed in the PV images was noted as *Didemnum* spp.

The summarized data set includes predominant values across all available replicate data for Substrate Group, Substrate Subgroup, Biotic Subclass, and Co-occurring Biotic Subclass, presence/absence values for Attached Fauna, and types of sensitive taxa and non-native taxa. Predominance was determined across all analyzed samples and surveys with the predominant category having the maximum number of analyzed replicates. If multiple categories occurred with equal frequency, then the predominant category was classified as "Varies." Sample type and replicate count are also provided.

In addition, variability across replicate level data was examined for Substrate Subgroup and Biotic Subclass. This examination evaluated variation of the result in a scalar, quantitative format. Calculations to compare the variable categories, as well as the predominant results while accounting for overall sampling effort, are described below.

Two measures to assess variable heterogeneity within a station were computed:

- Categorical Variability: variability of relevant categorical variables across all surveys and sample types was calculated by dividing unique number of categories by the number of analyzed replicates. Numerical results ranged from 0 to 1, with 1 indicating high variability and heterogeneity.
- Percentage of Predominance: quantitative measure (%) of a category's dominance at a station across time and over sample types was calculated by dividing the number of replicates in the predominant category at a station by the total number of analyzed replicates. Numerical results ranged from 0% to 100%, with 100% indicating the category at that station was fully dominant (all replicates were categorized the same way).

Stations without a quantitative value designated as N/A indicates a "Varies" result for predominant category, as percentage of predominance could not be calculated; stations designated as Not Analyzed indicates the station was not analyzed for the variable being examined. Because variability cannot be measured with a sample size of one, results that are designated as N/A for categorical variability indicate there was only one analyzed replicate for the station.

Table 2-1. Benthic Ground-truth Parameters with Corresponding BOEM COP Requirements and Guidelines

BOEM COP Guidelines and *NOAA*[†] *Recommendations*	Parameters Derived from PV Images	Parameters Derived from SPI Images	Parameters Derived from Grab Samples	Parameters Derived from GrabCam
Classification of CMECS sediment type Grain size analysis	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup	CMECS Substrate Group CMECS Substrate Subgroup Grain size major mode & descriptor	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup Sediment type (based on grain size analysis)	Surface Sediment Type & Features Observed
Identification of distinct horizons in subsurface sediment	None	Grain size major mode & descriptor Apparent Redox Potential Discontinuity (aRPD)*	None	Surface Sediment Type & Features Observed
Delineate hard bottom substrates	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup	CMECS Substrate Group CMECS Substrate Subgroup Grain size major mode & descriptor	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup Sediment type (based on grain size analysis)	Surface Sediment Type & Features Observed
Identification of bedforms Characterization of physical hydrodynamic properties	Bedform size Mud clasts	Boundary roughness	None	Surface Sediment Type & Features Observed
Identification of rock outcrops and boulders Characterization and delineation of any hard bottom gradients of low to high relief such as coral (heads/reefs), rock or clay outcroppings, or other shelter-forming features	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup	None	CMECS Substrate Class CMECS Substrate Subclass CMECS Substrate Group CMECS Substrate Subgroup	Surface Sediment Type & Features Observed
Characterization of benthic habitat attributes	Sediment Descriptor* Habitat Type & Complexity	aRPD* Prism penetration depth Sediment oxygen demand and proxies (methane, voids, *Beggiatoa*)	Sediment type (based on grain size analysis)	Surface Sediment Type & Features Observed

BOEM COP Guidelines and *NOAA[†] Recommendations*	Parameters Derived from PV Images	Parameters Derived from SPI Images	Parameters Derived from Grab Samples	Parameters Derived from GrabCam
Classification to CMECS Biotic Component to lowest taxonomic unit practicable	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass	None	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass CMECS Biotic Group CMECS Co-occurring Biotic Group CMECS Biotic Community CMECS Co-occurring Biotic Community	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass CMECS Biotic Group CMECS Co-occurring Biotic Group
Characterization of benthic community composition (identify and confirm benthic species (flora and fauna) that inhabit the area) Identification of communities of sessile and slow-moving marine invertebrates (clams, quahogs, mussels, polychaetes, anemones, sponges, echinoderms) *Identification of potentially sensitive seafloor habitat* *Identification of important biogenic habitats:* *Hard bottom substrates with epifauna* *Hard bottom substrates with macroalgae* *Submerged aquatic vegetation (seagrass)* *Long-lived and habitat forming taxa (e.g., emergent fauna)*	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass CMECS Biotic Group CMECS Co-occurring Biotic Group Epifauna* Infauna* Sensitive taxa[1] Non-native taxa[1] Macroalgae Percent Cover* Burrows/Tubes/Tracks Eel grass	Epifauna* Successional Stage* Feeding voids Subsurface worms Brittle stars Eelgrass	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass CMECS Biotic Group CMECS Co-occurring Biotic Group CMECS Biotic Community CMECS Co-occurring Biotic Community Taxa Abundance (based on Benthic Community Analysis) Biomass (based on Benthic Community Analysis)	CMECS Biotic Subclass CMECS Co-occurring Biotic Subclass CMECS Biotic Group CMECS Co-occurring Biotic Group Fauna Observed

Source: BOEM, 2019, 2020b; NMFS, 2021

† NMFS Recommendations are indicated by use of italicized characters and support BOEM Guidelines with further detail.

* Indicates variable that is a CMECS modifier. CMECS Modifiers provide additional detail to further characterize habitat components using a consistent set of definitions.

1 Indicates parameter analyzed by INSPIRE only

Notes:

All 2020 and 2021 analyses and data results can be found in Mayflower Wind COP Appendices M and M.2 Benthic and Shellfish Resources Characterization Reports, as well as in Integral Sediment Profile and Plan View Data Reports for Imaging Surveys conducted of the Mayflower Wind Project Areas.

2.2 Benthic Habitat Mapping Approach

The input data and outputs of INSPIRE's habitat mapping process are detailed in a simplified diagram presented in Figure 2-12. To map habitats for the purposes of assessing the potential impacts of the Project on these biotic communities, derived data products related to seabed characterization developed for the MSIR (COP Appendix E) and discussed in Section 2.1.1 of this report were used as a starting point for mapping benthic habitats relevant to demersal species utilization. These datasets on sediment type, boulders, geoforms, and bedforms (COP Appendix E, MSIR) were used in conjunction with geophysical data (bathymetry, backscatter, SSS) and benthic ground-truth data. All data were reviewed in an iterative process to delineate benthic habitats. Delineations must be of a size appropriate both to the resolution of the data and to the subject of interpretation. The resolution of the geophysical data, delineation size, and the use of CMECS Substrate Component, as well as additional CMECS modifiers, meet Federal agency recommendations (NMFS, 2021).

As discussed in Section 2.1.1 of this report, grain size distributions from analytical laboratory analysis were assessed in ground-truthing geophysical data for seabed sediment classifications (COP Appendix E, MSIR). Additional data collected during benthic surveys for purposes of benthic resource characterization (COP Appendices M and M.2, Benthic Resources) provide a wealth of information for use in describing the seafloor in terms of physical and biological characteristics of relevance to benthic biota and demersal fish. These data include the suite of parameters assessed from SPI/PV and GrabCam imagery (Table 2-1). As detailed in Section 2.1.2 of this report, these data were reviewed, evaluated, and summarized for purposes of supporting benthic habitat mapping. Summarized data values, along with associated imagery, were reviewed for each delineated seabed sediment polygon alongside 50-cm resolution bathymetry, 25-cm resolution backscatter, 10-cm SSS data, boulder fields, individual boulder picks, and seafloor morphological units (geoform, bedform, and biogenic) (Figure 2-13). Applying this additional review of benthic ground-truth data, INSPIRE delineated new habitat polygons and refined seabed sediment classifications as appropriate, as well as incorporated information on seafloor morphology into a single data set of classified and delineated benthic habitats for the Study Area; an example is included in Figure 2-14.

Using all benthic ground-truth data to refine seabed sediment classifications resulted in some categorical changes. For example, the entirety of Mount Hope Bay was classified as Gravelly Mud based on the laboratory results of two grab samples and the MSIR specifically notes that the gravel components could be shell rather than gravel and that information related to this compositional difference was not provided by the laboratory (see Table 2.2 in Appendix E2 to COP Appendix E, MSIR). Review of imagery-based ground-truth data in Mount Hope Bay revealed patchy to complete cover of shell fragments and/or living and/or non-living *Crepidula* (slipper shells). Ground-truth imagery also indicated *Crepidula* cover in polygons identified as Gravelly Mud in the Sakonnet River, RI. Where potential discrepancies between reported data and geophysical signatures were indicated and only reported GrabCam values were available, raw video was consulted. For example, at Station A021, the GrabCam CMECS Substrate Subgroup was reported as Gravelly Muddy Sand and *Crepidula* cover was evident in the video, and the presence of *Crepidula* was incorporated into the final habitat mapping. These types of discrepancies in summarized ground-truth results were infrequent.

Refinements to delineated seabed classifications included using more descriptive terminology to distinguish between different representations of Gravel as mapped in the MSIR (COP Appendix E, MSIR). Additionally, the geoform of Glacial Moraine/Till provided in the separate seabed morphology data layer that overlapped with Gravel sediment classifications in the MSIR data was mapped as a benthic habitat type (COP Appendix E, MSIR).

Furthermore, modifiers were used to provide additional descriptive information about the benthic habitats found within the Study Area; CMECS modifiers and Geoform, Substrate, or Biotic terms were used to the extent practicable. These modifiers include features of the seafloor that are relevant to the biota that utilize these habitats and describe the value of the habitats for these biota beyond what is provided in the geological seabed mapping. Modifiers are related to features that describe the mobility, stability, and complexity of the benthic habitats mapped. Where bedforms, such as mega-ripples and ripples, indicating frequent physical disturbance of the seafloor were observed across the majority of a habitat polygon, the "Mobile" modifier was used. Boulder fields were used to refine habitat boundaries and were applied as modifiers, except where they overlapped with habitat types that by their definition are characterized by the typical or frequent presence of boulder fields. Shell substrate (living or non-living shells), frequently comprised primarily of *Crepidula* (slipper shells) in the Study Area, provides unique habitats for certain species of benthic invertebrates and demersal fish; modifiers were applied where these features were present in ground-truth data and where they were indicated given nearby similar geophysical signatures and ground-truth data a "(Likely)" prefix was added to these modifiers. SAV provides unique habitats for certain species of benthic invertebrates and demersal fish; modifiers were applied for both recent and historical (modifier of "potential") areas of SAV in the Study Area.

All habitats and their distributions within the Study Area are described in more detail in Section 3.0. In addition to the primary habitat data on types and modifiers, separate attributes were included in the geospatial data to record several other features of each habitat polygon: area, type of bedforms observed, presence of scattered boulders and debris, and refinements of Coarse Sediment habitats. In addition to the natural bedforms defined in the BOEM Geophysical Survey Guidelines (2020a): mega-ripples = 5 – 60 m wavelength and 0.5 – 1.5 m height; ripples = <5 m wavelength and <0.5 m height; other bedforms such as ripple scour depressions and trawl marks were noted where present. The presence of isolated boulders and debris (boulder picks and debris contacts) were also noted as "Scattered boulders; Scattered debris" in the habitat data. Additionally, further characterizations of Coarse Sediment habitat polygons were recorded as "coarse sediment refinements" to provide additional detail on the nature of coarse sediment (e.g., gravelly sand, sandy gravel, no gravel in ground-truth) where such a distinction could be reliably made from ground-truth and geophysical data. These refinements were only applied to polygons in which ground-truth stations were located.

3. Results

3.1 Summary of Benthic Assessment Results Across Surveys

As discussed in Section 1.2, ground-truth data were collected at a total of 339 stations in the Study Area using a variety of benthic sampling techniques, and benthic data results were summarized for a suite of CMECS variables and other parameters that meet BOEM Guidelines (2019, 2020b) and NMFS Recommendations (2021) (Table 2-1). Results are presented for each individual station in Attachment B. Note that a small number of stations were assigned different IDs for different surveys. For the summarized data set, these spatially co-located stations were reassigned to an ID that was traceable to the individual survey IDs for that shared station.

Summarized station-level results in Attachment B include predominant values across all available replicate data at each station for Substrate Group, Substrate Subgroup, Biotic Subclass, and Co-occurring Biotic Subclass, presence/absence values for Attached Fauna, and types of sensitive taxa and non-native taxa, as well as the mapped benthic habitat type within which each station was located is included in Attachment B. These summarized data are presented and discussed in conjunction with benthic habitat distributions in Section 3.3.

Measures of categorical variability and percentage predominance for Substrate Subgroup and Biotic Subclass for each station are also provided in Attachment B. Results across portions of the Study Area reveal that there was generally low to moderate variability and heterogeneity in Substrate Subgroup and Biotic Subclass (Figures 3-1 and 3-2). High predominance percentages across all portions of the Study Area indicates that Substrate Subgroup and Biotic Subclass were homogenous at the station level (Figure 3-2).

3.2 Benthic Habitat Types

Six primary benthic habitat types were mapped within the Study Area: Glacial Moraine A, Mixed-Size Gravel in Muddy Sand to Sand, Coarse Sediment, Sand, Mud to Muddy Sand, and Bedrock. When habitats were updated with modifiers, a total of 19 habitat types were mapped within the Study Area: 10 at the Brayton Point ECC in Federal Waters (GLD) and 18 at the Brayton Point ECC in RI State Waters. In addition, a few anthropogenic features (rock rubble, dredged material deposits) were mapped at the Brayton Point ECC in RI State Waters; these are not included in the counts of habitat types mapped (Table 3-1). For the purposes of aiding interpretation and presentation of data in ground-truth tables, individual benthic habitat types with modifiers have been grouped and color-coded to consolidate types of related habitats that are present in very small areas (Table 3-1).

Overall descriptions of each habitat type as observed across the Study Area are provided below and descriptions of spatial distribution within the Brayton Point ECC in Section 3.3. Two tables are provided for each portion of the Study Area; the first gives spatial distributions and characteristics of the benthic habitat types, and the second provides key abiotic and biotic information derived from ground-truth variables located within the various benthic habitats sampled. Specifically, this information is provided in Tables 3-2 and 3-3 for the Brayton Point ECC in Federal Waters (GLD), and in Tables 3-4 and 3-5 for the Brayton Point ECC in RI State Waters. The color key presented in Table 3-1 is utilized in all these tables.

3.2.1 Glacial Moraine and Bedrock

Glacial moraines are complex and heterogeneous environments with characteristic surface and subsurface features that relate to their glacial origin. They are complex landforms associated with deposition of sediment carried by glaciers during advance and retreat. Typically, they consist of unstratified drift (till or diamicton) but may have a complex structure with stratified drift interbedded with till and abundant erratic boulders (Bennet and Glasser 2009). Till is characteristically composed of a poorly sorted mix of pebbles, cobbles and/or boulders within a fine-grained matrix of silt and clay. Till has a wide range of origins including supraglacial and subglacial that affect the nature of the deposits (Bennet and Glasser, 2009). It displays distinctive patterns in geophysical data with a wide range of geotechnical properties depending upon the processes that formed it (O´Cofaigh et al., 2007). In southern New England, the glacial moraine landform has a topographic pattern where higher topographic areas can be formed by coarser-grained sediment (e.g., cobbles and boulders) derived from patches of basal till deposited when the ice advanced across the moraine prior to retreat, and lower areas are typically composed by modern sands that have filled meltwater channels (Oldale and O'Hara, 1984). Deposits on the surface of glacial moraine landforms can be a mix of till, stratified drift, and reworked sediments derived from the glacial deposits and subsequent marine transgression. Subsurface expressions of glaciation are present in the Study Area and are reviewed in detail in the Marine Site Investigation Report (COP Appendix E, MSIR); only the surface expressions of these geologic features represent benthic habitats and are of relevance to the assessment presented here.

End moraine deposits on the islands and Martha's Vineyard and Nantucket represent the southern limit of the Wisconsinan and Illinoian glacial maximums (Uchupi et al., 2001). The Brayton Point ECC crosses the offshore extension of the Martha's Vineyard moraine (see Figure 2.1 in COP Appendix E, MSIR). The Martha's Vineyard moraine is rugged and boulder-strewn where it intersects the Brayton Point ECC (COP Appendix E, MSIR). Closer to RI, the Brayton Point ECC also crosses the offshore extension of the Buzzards Bay moraine and near the mouth of the Sakonnet River crosses a terminal moraine that is perhaps an extension of the Point Judith moraine (as mapped by Baldwin et al., 2016).

Narragansett Bay and Rhode Island Sound were once both glacial lakes and Narragansett Bay is a drowned river valley that was shaped by actions of the Laurentide ice sheet during the last glacial period (~18,000 years ago). Channels cut by the ice are evident in the channels of the West and East Passages of the Bay on either side of Conanicut Island. Deglaciation and modern geological action have continued to influence the seafloor and benthic habitats found within Narragansett Bay and Rhode Island Sound. Moraine and bedrock features were present as discrete surface outcroppings and reefs near the southern end of Mount Hope Bay near Aquidneck Island.

The surface benthic habitats associated with glacial moraines often provide habitat for sessile and mobile benthic invertebrates and for demersal fish. Glacial moraine habitats have previously been mapped in the MA/RI WEA as two types (A and B), in order to distinguish unconsolidated glacial moraine deposits (A) from consolidated moraine habitats that have high structural complexity and structural permanence (B) (INSPIRE, 2020; INSPIRE, 2021). Glacial Moraine B habitat was not mapped in the Brayton Point ECC. Glacial Moraine A habitat was mapped at the Brayton Point ECC in both in Federal Waters (GLD) and RI State Waters (specifically in RI Sound and as discrete outcroppings near Aquidneck Island in Mount Hope Bay) (Table 3-1). Small discrete bedrock outcrops are often found near moraine deposits and were mapped at the Brayton Point ECC in RI State Waters (Table 3-1); these habitats are not discussed further and were not sampled by ground-truth data collections.

Glacial Moraine A habitat are complex habitats composed of consolidated and unconsolidated geologic debris directly deposited by glacial movement (rather than reworking from meltwaters or transgressive seas) and are limited in distribution along the outer continental shelf near New England. Due to the presence of very coarse and poorly sorted sediment, the seabed of this habitat type generally exhibits high reflectance in backscatter data, and SSS data reveal a patchwork mosaic of irregularly distributed features, including boulders, textures indicating high prevalence of smaller gravels, and discrete areas of loose mobile sediments near/at the boulders, which can display morphological features (ripples) (Figure 3-3). By definition, these habitats are frequently characterized by boulder fields with boulders, and smaller gravels, present in varying densities; therefore, boulder field modifiers were not applied to the Glacial Moraine A habitat type.

CMECS Substrate Subgroups identified at the 15 stations sampled within Glacial Moraine A habitats included Gravel Pavement, Muddy Gravel, Sandy Gravel, Muddy Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand, and Very Coarse/Coarse Sand (Tables 3-3 and 3-5). Ripples were also present within these habitats where mapped in Federal Waters (GLD) at the Brayton Point ECC (Table 3-2). Although there are generally high densities of pebbles, cobbles, and boulders in areas designated as Glacial Moraine A, these broad areas of high density are rarely continuous. Rather, their distribution is patchy and a high degree of heterogeneity was observed among ground-truth sampling within Glacial Moraine A habitat (Tables 3-3 and 3-5). The 15 ground-truth stations sampled within Glacial Moraine A habitat represent the range and heterogeneity of sediment types and biota found within these habitats (Tables 3-3 and 3-5). Notably, the Attached Fauna were present at most stations sampled (80% at the Brayton Point ECC in Federal Waters (GLD), 90% at the Brayton Point ECC in RI State Waters) and the sensitive taxa of the northern star coral *Astrangia poculata* were observed at the Brayton Point ECC in Federal Waters (GLD) (20% of stations) and in RI State Waters (80% of stations) (Tables 3-3 and 3-5).

3.2.2 Mixed-Size Gravel in Muddy Sand to Sand

Mixed-Size Gravel in Muddy Sand to Sand habitats composed of varying sizes of gravels dispersed and patchy on the surface of soft sediments were mapped at the Brayton Point ECC in both Federal Waters (GLD) and RI State Waters (Table 3-1). Although the small boulders (<0.3 m) and cobbles present in this habitat were smaller than the threshold for detecting individual objects from the geophysical data, their presence was evident by the irregular textures and patterns in side-scan sonar data and then confirmed by ground-truth data (Figures 2-8 and 3-4). These habitats generally exhibited moderate to high relative backscatter returns (Figure 3-4). Boulder fields often intersected this habitat type, and the Boulder Field(s) modifiers was not applied to the habitat classification.

Ground-truth data were essential to identifying this habitat type and CMECS Substrate Subgroups identified at the 29 stations sampled included Gravel Pavement, Sandy Gravel, Muddy Gravel, Gravelly Sand, Gravelly Muddy Sand, Medium Sand, and Fine/Very Fine Sand (Tables 3-3 and 3-5). Ripples were observed in a small percentage of this habitat type where mapped (Tables 3-2 and 3-4). Attached Fauna were present at 75% of the 4 stations sampled within Mixed-Size Gravel in Muddy Sand to Sand habitats in Federal Waters (GLD) and at 28% of 25 stations sampled within RI State Waters (Tables 3-3 and 3-5). This habitat type supports a diverse range of attached and soft sediment taxa, as well as the sensitive taxa of the northern star coral (Tables 3-3 and 3-5).

3.2.3 Coarse Sediment Habitats

Coarse Sediment habitat types encompass sands with varying degrees of gravel (~5-80% of the surface composition). Coarse Sediment habitats within the Study Area included a broad range of habitats. Coarse Sediment habitats, with various and multiple modifiers (Mobile, Boulder Field(s)), were mapped at the Brayton Point ECC in Federal Waters (GLD) and in RI State Waters (Table 3-1). The seafloor of these habitat types exhibited generally medium to high reflectance values in backscatter and SSS data (Figure 3-5). The Coarse Sediment – Mobile habitat type is characterized by distinct, regular, and prevalent ripples evident in the SSS data (Figure 3-5) where the seafloor is subjected to small, but frequent currents and storm events and is common on the outer continental shelf (Figure 3-5). Ground-truth data provided sufficient information to determine the composition of gravels within Coarse Sediment habitat types and allowed for Coarse Sediment refinement variables to be applied; for example, Sandy Gravel and Gravelly Sand. The Mobile modifier was applied where ripples were present throughout most of the given habitat polygon. In the Coarse Sediment and/or Coarse Sediment – Mobile with Boulder Field(s) habitat types the seafloor exhibited variability and rugosity and ripples were interspersed with boulders (Figure 3-5).

CMECS Substrate Subgroups identified at the 26 stations sampled within Coarse Sediment – Mobile habitat at the Brayton Point ECC in Federal Waters (GLD) included Gravelly Sand, Gravelly Muddy Sand, Very Coarse/Coarse Sand, Medium Sand, and Fine/Very Fine Sand (Table 3-3). Soft sediment taxa were predominantly observed at stations sampled within Coarse Sediment – Mobile habitats at the Brayton Point ECC in Federal Waters (GLD) with Attached Fauna present at less than 10% of these stations (Table 3-2). No sensitive taxa or non-native taxa were observed in Coarse Sediment habitats. No stations were sampled with Coarse Sediment habitats within RI State Waters.

3.2.4 Sand Habitats

The Sand habitat types consist of sand that has been subjected to a wide range of oceanic processes. These habitat types are very common on the outer continental shelf and were mapped in all portions of the Study Area (Table

3-1). The seafloor of these habitats exhibited a range of values in backscatter and SSS data reflectance but were predominantly low to medium (Figure 3-6). The Sand and Muddy Sand – Mobile habitat type describes these sandy habitats where the seafloor is subjected to small but frequent currents and storm events and ripples were prevalent (Tables 3-2 and 3-4; Figure 3-6). Sand – with Boulder Field(s) habitats were mapped at the Brayton Point ECC in Federal Waters (GLD) and RI State Waters (Tables 3-2 and 3-4).

CMECS Substrate Subgroups identified at the 130 stations sampled within Sand habitat types ranged from Sandy Gravel to Fine/Very Fine Sand (Tables 3-3 and 3-5). Sand habitats predominantly supported soft sediment taxa, except where the Boulder Field(s) modifier was applied at the Brayton Point ECC in Federal Waters (GLD) and Attached Fauna were observed at 40% of the stations sampled within these Sand with Boulder Field(s) habitats (Table 3-3). Attached Fauna were also observed at a small percentage of stations within other Sand habitat types (Tables 3-3 and 3-5). The sensitive taxa of northern star coral and a possible non-native tunicate *Didemnum* spp. were also recorded in Sand with Boulder Field(s) at the Brayton Point ECC in Federal Waters (GLD) at very low prevalence.

3.2.5 Mud to Muddy Sand Habitats

The Mud to Muddy Sand habitat types consist of relatively featureless mud, sandy mud, and muddy sand, except where described by modifiers for boulder fields, shell or *Crepidula*, SAV, and/or mobility. These habitats were mapped in all portions of the Study Area (Table 3-1). The seafloor of these habitats exhibited predominantly low backscatter and SSS reflectance indicating that the surface is less dense and the sediments more fine-grained compared to other habitat types, with variability in acoustic signatures related to the various modifiers applied.

CMECS Substrate Subgroups identified at the 114 stations sampled within Mud to Muddy Sand habitat types included Muddy Gravel, Gravelly Muddy Sand, Gravelly Mud, Medium Sand, Fine/Very Fine Sand, and Muddy Sand (Tables 3-3 and 3-5). At the 40 stations sampled within Mud to Muddy Sand – *Crepidula* Substrate, Substrate Subgroups were Pebble/Granule, Sandy Gravel, Muddy Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand, and Gravelly Mud; all of these stations were with the RI State Waters portion of the Brayton Point ECC (Table 3-5). It is important to note that many of these Subgroup determinations were derived from laboratory analysis of sediment samples which may report shell as gravel (COP Appendix E, MSIR). The Mud to Muddy Sand habitat types generally supported soft sediment taxa with a very low prevalence of Attached Fauna, except where the *Crepidula* Substrate modifier was applied (Tables 3-3 and 3-5).

3.2.6 *Crepidula* Substrate

Crepidula Substrate was mapped as a modifier in Mud to Muddy Sand – with Boulder Field(s), and Mud to Muddy Sand habitats (Table 3-1). The seafloor of these habitat types exhibited generally medium to high reflectance values in backscatter and SSS data (Figure 3-7). Ripples were present with low prevalence, 15% in Mud to Muddy Sand – *Crepidula* Substrate at the Brayton Point ECC in RI State Waters (Table 3-4).

Ground-truth data were essential to identifying this habitat type and CMECS Substrate Subgroups identified at the 40 stations sampled were Pebble/Granule, Sandy Gravel, Muddy Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand, and Gravelly Mud (Table 3-5). The CMECS Biotic Subclass of Mollusk Reef Biota was used at some stations to capture dominant *Crepidula* cover (COP Appendices M and M.2, Benthic Resources), and, where patchy in cover, *Crepidula* were captured as part of Attached Fauna presence (Table 3-5).

3.2.7 Submerged Aquatic Vegetation

Mud to Muddy Sand habitats with the potential for SAV were mapped at Brayton Point ECC in RI State Waters, nearshore at the northern end of the Sakonnet River (Table 3-1). Distinct side-scan sonar data signatures indicated the potential presence of SAV in shallow, nearshore waters south of Aquidneck Island at Portsmouth, RI at the Brayton Point ECC in RI State Waters. Due to the shallow depths in these locations that create accessibility issues for survey vessels, no benthic ground-truth stations were collected.

Table 3-1. Color-coded Key to Benthic Habitat Types with Modifiers and Related Groupings for Ground-truth Tables and Plots

Benthic Habitat Types with Modifiers	Brayton Pt – Fed (GLD)	Brayton Pt – RI	Habitat Color	Grouped Habitat Color	Grouped Habitat Category
Glacial Moraine A	X	X			not grouped
Mixed-Size Gravel in Muddy Sand to Sand	X	X			not grouped
Coarse Sediment – with Boulder Field(s)		X			Coarse Sediment – with Boulder Field(s)
Coarse Sediment – Mobile with Boulder Field(s)	X				
Coarse Sediment – Mobile	X				not grouped
Coarse Sediment	X	X			not grouped
Sand – with Boulder Field(s)	X	X			Sand – with Boulder Field(s)
Sand – Mobile with Boulder Field(s)	X	X			
Sand – Mobile	X	X			not grouped
Sand	X	X			not grouped
Mud to Muddy Sand – with SAV		X			Mud to Muddy Sand or Sand - SAV
Mud to Muddy Sand – *Crepidula* Substrate with Boulder Field(s)		X			Mud to Muddy Sand - with Boulder Field(s)
Mud to Muddy Sand – (Likely) *Crepidula* Substrate with Boulder Field(s)		X			
Mud to Muddy Sand – Shell / *Crepidula* Substrate		X			Mud to Muddy Sand – *Crepidula* Substrate
Mud to Muddy Sand – *Crepidula* Substrate		X			
Mud to Muddy Sand – (Likely) *Crepidula* Substrate		X			
Mud to Muddy Sand – Mobile		X			Mud to Muddy Sand
Mud to Muddy Sand	X	X			
Bedrock		X			not grouped
Anthropogenic		X			not grouped

3.3 Benthic Habitat Distributions

The geophysical and benthic survey data collected by Mayflower Wind have refined the understanding of the distribution of habitats within the Study Area. While six primary benthic habitat types were mapped (nineteen with modifiers) not all types were present in each portion of the Study Area (Table 3-1) or in equal or consistent distributions within or between portions. Habitat composition and characteristics and corresponding ground-truth data within each portion of the Study Area are provided in Tables 3-2 through 3-5. The color key presented in Table 3-1 is utilized in all tables.

A total of ~9,908 acres were mapped at the Brayton Point ECC in Federal Waters (GLD) (Table 3-2). Over 85% of this area was mapped as Sand, Sand – Mobile, or Mud to Muddy Sand habitat types (Table 3-2). Where the Brayton Point ECC enters RI's GLD areas, predominant habitats are Sand and Sand – Mobile before transitioning to a mix of Sand and Coarse Sediment – Mobile habitats with discrete boulder fields (Figure 3-8). Where the Brayton Point ECC crosses Southwest Shoal, benthic habitats are a combination of Glacial Moraine A and Sand – with Boulder Field(s) (Figure 3-8), corresponding to the offshore extension of the Martha's Vineyard moraine (COP Appendix E, MSIR). From Southwest Shoal northwest to the RI State Waters line, the Brayton Point ECC is primarily composed of Sand habitats with small areas of Mud to Muddy Sand and of Sand – with Boulder Field(s) (Figure 3-8).

A total of ~6,036 acres were mapped at the Brayton Point ECC in RI State Waters (Table 3-4), with distinct differences in habitat composition related to spatial location, namely RI Sound, the Sakonnet River, and Mount Hope Bay (Figure 3-9). Forty-one percent of the Brayton Point ECC in RI State Waters was comprised of Mud to Muddy Sand habitat, and 21% of Sand habitat (Table 3-4). The Sand habitat type was mapped in RI Sound and at the mouth of the Sakonnet River. Mud to Muddy Sand habitats were the primary habitat types mapped throughout the Sakonnet River and Mount Hope Bay (Figure 3-9), which are both depositional estuarine environments. *Crepidula* Substrate was found overlying these muds in some areas of the upper Sakonnet River and in the lower Mount Hope Bay (Figure 3-9). Very small areas of Mud to Muddy Sand – with Boulder Field(s), Glacial Moraine A, and Bedrock habitat types were mapped in the lower portion of Mount Hope Bay near Aquidneck Island (Figure 3-9), and larger areas of Glacial Moraine A were mapped in RI Sound near the RI State Waters line. Intermixed with these habitats and extending further north were Mixed-Size Gravel in Muddy Sand to Sand habitats interspersed with Sand habitats (Figure 3-9). The distribution of these habitats is related to the offshore extension of the Buzzards Bay moraine, a terminal moraine that is perhaps an extension of the Point Judith moraine near the mouth of the Sakonnet River (as mapped by Baldwin et al., 2016; COP Appendix E, MSIR).

Clusters of individual surficial boulders generally corresponded with the distribution of habitat types with gravel components (Glacial Moraine A, Mixed-Size Gravel in Muddy Sand to Sand – with Boulder Field(s)) and proximal areas; specifically, at and to either side of Southwest Shoal, near the RI State Waters line offshore, in RI Sound from the RI State Waters Line to the mouth of the Sakonnet River, and in the lower portion of Mount Hope Bay near Aquidneck Island (Figures 3-10 and 3-11).

A total of 314 benthic ground-truth stations were sampled in the Study Area; 146 in Federal Waters (GLD) and 168 in RI State Waters (Tables 3-3 and 3-5). Generally, CMECS Substrate classification defined by >30% gravel composition (Gravel Pavement, Sandy Gravel, Muddy Sandy Gravel), corresponded with Glacial Moraine A and Mixed-Size Gravel in Muddy Sand to Sand habitats. CMECS classifications at ground-truth stations defined by <30% gravel (Gravelly Sand, Gravelly Muddy Sand, Gravelly Mud) were also found in these habitats, as well as in Coarse Sediment – Mobile habitats in the Federal Waters (GLD) portion of the Brayton Point ECC (Figures 3-12 and 3-13). CMECS Substrate classifications composed of various sand grain size composition corresponded to Sand and also Mud to Muddy Sand habitats, and those ground-truth stations classified as Mud, Sandy Mud, or Muddy Sand were found in the Mud to Muddy Sand habitats (Figures 3-12 and 3-13). Most of the Brayton Point ECC was dominated by the Biotic Subclass of Soft Sediment Fauna, as these were supported by soft bottom sediments in soft bottom sand and mud habitat types and in patches within gravel habitat types (Figures 3-14 and 3-15). Distribution of Attached Fauna corresponded well with habitats defined by high prevalence of large gravels: Glacial Moraine A, Mixed-Size Gravel in Muddy Sand to Sand, and those with Boulder Field(s) (Figures 3-14 to 3-17). Northern star coral were observed at the Brayton Point ECC in Federal Waters (GLD), corresponding with Glacial Moraine A and Sand – with Boulder Field(s) habitats at Southwest Shoal (Table 3-3; Figure 3-18), and in RI State Waters in RI Sound corresponding with Glacial Moraine A and Mixed-Size Gravel in Muddy Sand to Sand habitats (Table 3-5; Figure 3-19). One possible occurrence of the non-native tunicate *Didemnum* spp. was recorded in Sand – with Boulder Field(s) habitat in the Federal Waters (GLD) portion of the Brayton Point ECC at Southwest Shoal (Figure 3-20).

Table 3-2. Composition & Characteristics of Mapped Benthic Habitat Types within the Brayton Point Export Cable Corridor in GLD Portion of Federal Waters

Brayton Point ECC – Federal Waters (GLD) ***(~9,908 acres mapped)***	**Presence in Brayton Point ECC – Federal Waters(GLD)**		**Bedforms** *Type Present in Given Percentage of Habitats*		
	Area (acres)	Percentage	Mega-ripples	Ripples	RSD
Glacial Moraine A	411	4.1%	0%	57.8%	0%
Mixed-Size Gravel in Muddy Sand to Sand	18	0.18%	0%	16.8%	42.5%
Coarse Sediment – Mobile with Boulder Field(s)	140	1.41%	0%	100%	0%
Coarse Sediment – Mobile	886	8.9%	0%	99.9%	0.06%
Coarse Sediment	0.08	0.001%	0%	0%	0%
Sand – with Boulder Field(s)	183	1.8%	0%	2.6%	56.4%
Sand – Mobile with Boulder Field(s)	622	6.3%	0%	92.5%	7.5%
Sand – Mobile	2,869	29.0%	7.3%	59.4%	40.6%
Sand	3,982	39.7%	0%	4.2%	55.4%
Mud to Muddy Sand	850	8.6%	0%	0%	23.0%

RSD = Ripple Scour Depression

Table 3-3. Characteristics of Mapped Benthic Habitat Types as Informed by Benthic Ground-truth Data within the Brayton Point Export Cable Corridor in Federal Waters (GLD)

Brayton Point ECC – Federal Waters (GLD) ***(~9,908 acres mapped)***		**Glacial Moraine A**	**Mixed-Size Gravel in Muddy Sand to Sand**	**Coarse Sediment – Mobile**	**Sand – with Boulder Field(s)**	**Sand – Mobile**	**Sand**	**Mud to Muddy Sand**
SPI/PV Ground-truth Values	Number of Benthic stations[1]	5	4	26	25	46	31	9
	Predominant CMECS Substrate Subgroups Observed in Ground-truth Data[2]	Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand	Gravelly Sand, Medium Sand, Fine/Very Fine Sand	Gravelly Sand, Gravelly Muddy Sand, Very Coarse/Coarse Sand, Medium Sand, Fine/Very Fine Sand	Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand, Very Coarse/Coarse Sand, Medium Sand, Fine Sand, Fine/Very Fine Sand	Sandy Gravel, Gravelly Sand, Very Coarse/Coarse Sand, Medium Sand, Fine/Very Fine Sand	Gravelly Muddy Sand, Medium Sand, Fine/Very Fine Sand, Muddy Sand	Medium Sand, Fine/Very Fine Sand, Muddy Sand
	Predominant CMECS Biotic Subclasses Observed in Ground-truth Data	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna	Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna
	Presence of Attached Fauna Observed in Ground-truth Data (% of stations)	Yes (80.0%)	Yes (75.0%)	Yes (7.7%)	Yes (40.0%)	Yes (4.3%)	No	No
	Sensitive Taxa Observed in Ground-truth Data (% of stations)[3]	Northern Star Coral (20.0%)	None	None	Northern Star Coral (4.0%)	None	None	None
	Non-Native Taxa Observed in Ground-truth Data (% of stations)[3]	None	None	None	Possible *Didemnum* spp. (4.0%)	None	None	None

Notes:

Of the 10 total habitat types mapped (Table 3-2), 7 intersect with ground-truth stations.

1 Benthic sampling includes SPI/PV, grab, and GrabCam stations

2 Substrate Subgroup determined from combined SPI/PV analysis

3 Sensitive and Non-Native Taxa determined from PV analysis

Table 3-4. Composition & Characteristics of Mapped Benthic Habitat Types within the Brayton Point Export Cable Corridor in RI State Waters

Brayton Point ECC – RI State Waters ***(~6,036 acres mapped)***		**Presence in Brayton Point ECC – RI State Waters**		**Bedforms** *Type Present in Given Percentage of Habitats*	
		Area (acres)	Percentage	Ripples	RSD
Glacial Moraine A	***Predominantly in RI Sound***	185	3.1%	0%	0%
Mixed-Size Gravel in Muddy Sand to Sand	***Only in RI Sound***	510	8.5%	16.0%	0%
Coarse Sediment – with Boulder Field(s)	***Only in RI Sound***	0.004	0.0001%	0%	0%
Coarse Sediment	***Only in RI Sound***	0.1	0.001%	0%	0%
Sand – with Boulder Field(s)	***Only in RI Sound***	61	1.0%	0%	74.7%
Sand – Mobile with Boulder Field(s)	***Only in RI Sound***	33	0.6%	11.2%	88.8%
Sand – Mobile	***Only in RI Sound***	121	2.0%	8.7%	91.3%
Sand	***In RI Sound & the Sakonnet River***	1,263	20.9%	31.6%	62.8%
Mud to Muddy Sand – with SAV	***Only in the Sakonnet River***	3.6	0.06%	0%	0%
Mud to Muddy Sand – *Crepidula* Substrate with Boulder Field(s)	***Only in Mount Hope Bay***	4.4	0.07%	0%	0%
Mud to Muddy Sand – (Likely) *Crepidula* Substrate with Boulder Field(s)	***Only in Mount Hope Bay***	86	1.4%	0%	0%
Mud to Muddy Sand – Shell / *Crepidula* Substrate	***Only in Mount Hope Bay***	511	8.5%	0%	0%
Mud to Muddy Sand – *Crepidula* Substrate	***In the Sakonnet River & Mount Hope Bay***	704	11.7%	15.0%	0%
Mud to Muddy Sand – (Likely) *Crepidula* Substrate	***Only in the Sakonnet River***	37	0.62%	0%	0%
Mud to Muddy Sand – Mobile	***Only in the Sakonnet River***	29	0.48%	100%	0%
Mud to Muddy Sand	***In the Sakonnet River & Mount Hope Bay***	2,476	41.0%	0%	0%
Bedrock	***In the Sakonnet River & Mount Hope Bay***	3.3	0.06%	0%	0%
Anthropogenic	***In the Sakonnet River & Mount Hope Bay***	6.7	0.11%	0%	0%

RSD = Ripple Scour Depression

Table 3-5. Characteristics of Mapped Benthic Habitat Types as Informed by Benthic Ground-truth Data within the Brayton Point Export Cable Corridor in RI State Waters, *continued on next page*

Brayton Point ECC – RI State Waters *(~6,036 acres mapped)*		**Glacial Moraine A** *Predominantly in RI Sound*	**Mixed-Size Gravel in Muddy Sand to Sand** *Only in RI Sound*	**Sand – with Boulder Field(s)** *Only in RI Sound*	**Sand – Mobile** *Only in RI Sound*
SPI/PV Ground-truth Values	Number of Benthic stations[1]	10	25	4	4
	CMECS Substrate Subgroups Observed in Ground-truth Data[2]	Gravel Pavement, Sandy Gravel, Muddy Sandy Gravel, Muddy Gravel, Very Coarse/Coarse Sand	Gravel Pavement, Sandy Gravel, Muddy Gravel, Gravelly Sand, Gravelly Muddy Sand, Medium Sand, Fine/Very Fine Sand	Sandy Gravel, Medium Sand, Fine/Very Fine Sand	Gravelly Sand, Medium Sand
	CMECS Biotic Subclasses Observed in Ground-truth Data	Attached Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Soft Sediment Fauna
	Presence of Attached Fauna Observed in Ground-truth Data (% of stations)	Yes (90.0%)	Yes (28.0%)	No	Yes (25.0%)
	Sensitive Taxa Observed in Ground-truth Data (% of stations)[3]	Northern Star Coral (80.0%)	Northern Star Coral (12.0%)	None	None
	Non-Native Taxa Observed in Ground-truth Data (% of stations)[3]	None	None	None	None

Notes:
N/A = Not Applicable
Of the 18 total habitat types mapped (Table 3-4), 8 intersect with ground-truth stations.
1 Benthic sampling includes SPI/PV, grab, and GrabCam stations
2 Substrate Subgroup determined from combined SPI/PV analysis
3 Sensitive and Non-Native Taxa determined from PV analysis

Table 3-5. Continued

Brayton Point ECC – RI State Waters *(~6,036 acres mapped)*		**Sand** *In RI Sound & the Sakonnet River*	**Mud to Muddy Sand – with Boulder Field(s)** *Only in Mount Hope Bay*	**Mud to Muddy Sand – *Crepidula* Substrate** *In the Sakonnet River & Mount Hope Bay*	**Mud to Muddy Sand** *In the Sakonnet River & Mount Hope Bay*
SPI/PV Ground-truth Values	Number of Benthic stations[1]	20	1	40	64
	CMECS Substrate Subgroups Observed in Ground-truth Data[2]	Medium Sand, Fine/Very Fine Sand	N/A	Pebble/Granule, Sandy Gravel, Muddy Sandy Gravel, Gravelly Sand, Gravelly Muddy Sand, Gravelly Mud	Muddy Gravel, Gravelly Muddy Sand, Muddy Sand, Fine/Very Fine Sand, Gravelly Mud
	CMECS Biotic Subclasses Observed in Ground-truth Data	Inferred Fauna, Soft Sediment Fauna	None	Attached Fauna, Inferred Fauna, Mollusk Reef Biota, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna
	Presence of Attached Fauna Observed in Ground-truth Data (% of stations)	No	No	Yes (40.0%)	Yes (1.6%)
	Sensitive Taxa Observed in Ground-truth Data (% of stations)[3]	None	None	None	None
	Non-Native Taxa Observed in Ground-truth Data (% of stations)[3]	None	None	None	None

Notes:
N/A = Not Applicable
Of the 18 total habitat types mapped (Table 3-4), 8 intersect with ground-truth stations.
1 Benthic sampling includes SPI/PV, grab, and GrabCam stations
2 Substrate Subgroup determined from combined SPI/PV analysis
3 Sensitive and Non-Native Taxa determined from PV analysis

4. Discussion

The Study Area for this Project includes the Brayton Point ECC in Federal Waters that overlap with RI's GLD and in RI State Waters. Relevant Project components and/or activities within the Study Area include the export cable, any necessary secondary cable protection, and all related seafloor preparation, construction, operation and maintenance, and decommissioning activities. The only anticipated permanent impact to the seafloor would be secondary cable protection.

The primary objective is to achieve a suitable target burial depth of the offshore export cables in the seabed along the entire cable route by micro-routing the cables within the ECC and by assessing and selecting suitable installation/burial tools for the seabed conditions. Secondary cable protection will be used where sufficient burial depth cannot be achieved due to seabed conditions or to avoid risk of interaction with external hazards, including at locations where cables are required to cross existing pipelines. The specific secondary protection materials to be used will be considered and selected as the final cable design and installation engineering is developed; these could include concrete mattresses, frond mattresses, rock bags, and/or rock berms.

For the purposes of this assessment, secondary cable protection on up to 15% of the length of the Brayton Point ECC , including at cable and pipeline crossings, is assumed. The need for secondary cable protection will be minimized to the extent practicable through refinement of cable design and installation engineering decisions (including micro-routing, cable bundling, and burial tool selection as described above). The secondary cable protection will measure approximately 6 m wide, where used.

Temporary impacts may result from seafloor preparation and cable installation activities. Boulder removal/relocation and anchoring are currently only anticipated along discrete segments of the Brayton Point ECC (Figure 4-1). Temporary impacts expected at each landfall are related to the offshore HDD exit pits where the export cables will be un-bundled and brought ashore via HDD. Each offshore export power cable will be installed in a separate HDD conduit in its own bore (communications cabling will be installed in the same HDD bore as a power cable, possibly in its own smaller sub-conduit). A total of four HDDs are considered at each landfall location; this consists of one HDD for each offshore export power cable (two HDDs) plus an additional two HDDs and conduits considered for potential future transmission infrastructure (including potential future export cables from the Mayflower Wind lease area).

At the offshore exit point of each HDD, an offshore exit pit may be excavated to support HDD installation and cable pull-in operations. Figure 4-2 illustrates potential locations of these offshore exit points on either side of Aquidneck Island. Offshore exit point locations for the HDDs may still be further adjusted as the final HDD trajectory design is developed and will be sited considering seabed characteristics in the area at and surrounding the exit point.

All of the potential HDD exit pit locations under consideration in RI State Waters are located within Mud to Muddy Sand – *Crepidula* Substrate or Shell / *Crepidula* Substrate (Figure 4-2). It is expected that *Crepidula* gastropods would recolonize areas disturbed by the HDD exit construction relatively quickly for several reasons. First, in this region, *Crepidula* are present and extend over a much broader area than the specific areas that would be disturbed at the HDD exit point. This regional population will be a source of larvae to aid in recolonization of the disturbed seafloor. Timing for recolonization will depend on larval recruitment; the gregarious settlement of their larvae on conspecifics (Zhao and Qian 2002) generally leads to very dense accumulations with a flat, reef-like texture as live shells build over dead shells. *Crepidula* have relatively high fecundity, typically reproducing in the spring and/or summer, and often females will reproduce twice per year (Pechenik et al., 2017; Proestou et al., 2008; Richard et al., 2006). These life cycle characteristics aid in the proliferation of *Crepidula* populations and allow for the recovery of populations following disturbance given a source of larvae is maintained. *Crepidula* are native to the U.S. Atlantic coast but have been successful at quickly spreading in the U.S. Pacific Northwest and in Europe where they are not native (SERC, 2022). This indicates that Crepidula are capable of recolonizing an area relatively easily following a disturbance such as HDD exit pit excavation.

The habitats mapped within the Study Area in Federal Waters (GLD) were primarily soft bottom with dynamic sands and muds typical of offshore environments in Southern New England (Table 3-2). These habitats provide a mix of mobile sands and depositional muddy environments that support a combination of small and large tube-building and burrowing infauna, as well as mobile epifauna (mollusks and crustaceans). Where Glacial Moraine A, Mixed-Size Gravel in Muddy Sand to Sand, and Coarse Sediment or Sand habitats with Boulder Fields were mapped in the Study Area, these habitats provide structure to support attached fauna and demersal fish, such as black sea bass and tautog, that utilize hard bottom substrates and structure. Within the RI State Waters portion of the Study Area, these structure-providing habitats were predominantly mapped in Rhode Island Sound and in small discrete areas of Mount Hope Bay near Aquidneck Island. Much of the Sakonnet River was characterized as depositional mud habitats, which support a combination of small and large tube-building and burrowing infauna, as well as mobile epifauna (mollusks and crustaceans). Discrete patches of *Crepidula* cover were also mapped; these filter-feeding gastropods provide filtration ecosystem services. This mapping effort adds to the collective understanding of benthic habitats in the offshore waters of Rhode Island Sound and within the Sakonnet River and Mount Hope Bay given that few published benthic studies cover this specific area.

Several recently published studies are available in the peer-reviewed and gray literature related to benthic habitats and fauna within Narragansett Bay, which include the Sakonnet River and/or Mount Hope Bay (e.g., LaFrance et al., 2019; Hale et al., 2018; Shumchenia and King, 2019; Shumchenia et al., 2016). The benthic habitats and their characterizing sediments and benthic biological communities as mapped for this Mayflower Wind assessment generally agree with these recent publications. Surficial sediment and benthic habitat maps compiled from a suite of geophysical data and sediment grab samples show Mount Hope Bay as composed primarily of Sandy Mud and Mud (LaFrance et al., 2019). The Sakonnet River was not mapped in this study.

Recent biotopes mapped from a SPI survey conducted throughout Narragansett Bay in 2018 (Shumchenia and King, 2019) provide further support for the habitat types mapped in the Sakonnet River and Mount Hope Bay by Mayflower Wind. For example, "Mud with Crepidula Beds" was the biotope identified at the sampling station in that study coincident with the Mud and Sandy Mud with *Crepidula* Substrate habitat type mapped by Mayflower Wind at the northern end of the Sakonnet River. Similarly, "Mud with Shell Hash and burrowers" was documented at two stations sampled in that study at the southwestern end of Mount Hope Bay coinciding with and in the vicinity of Mud and Sandy Mud with Shell/*Crepidula* Substrate habitats where Soft Sediment Fauna and Mollusk Reef Biota CMECS Biotic Subclasses were documented by Mayflower Wind. There was similar concordance to the northeast in Mount Hope Bay near the RI-MA State Waters boundary where biotopes of "Mud with burrowers" and "Mud or Organic-rich Mus with small tube-builders" mapped by that study corresponded to Mud to Muddy Sand habitats with Soft Sediment Fauna CMECS Biotic Subclasses mapped by Mayflower Wind.

SAV beds, dominated by *Zostera marina*, represent unique habitats throughout the shallow coastal waters of Narragansett Bay. SAV extent varies over time and these aquatic plants experience peak growth during late summer months. SAV are found in mud and muddy sand sediments. SAV distribution is periodically mapped across Narragansett Bay using aerial imagery and field verification by the URI Environmental Data Center on behalf of the State of RI (URI Environmental Data Center and RIGIS; Figure 4-3). SAV beds were not mapped by URI within the Brayton Point ECC. The closest SAV mapped by URI is near the mouth of the Sakonnet River, located over 1 km from the edges of the Brayton Point ECC (Figure 4-3). Based on distinct side-scan sonar signatures in the geophysical data collected by Mayflower Wind, SAV and/or macroalgae may be present in the vicinity of the Brayton Point ECC in the Sakonnet River south of the Aquidneck Island crossing, but this area has not yet been field-verified (Figure 4-4).

Glacial Moraine A habitats comprised 4.1% (411 acres) of the habitats mapped at the Brayton Point ECC in Federal Waters (GLD) and comprised 3.1% (185 acres) of the habitats mapped at the Brayton Point ECC in RI State Waters, predominantly located in Rhode Island Sound (Tables 3-2 and 3-4). A distinction was made between Glacial Moraine A and Glacial Moraine B habitats to distinguish between areas of unconsolidated geological debris (A) and consolidated geological debris (B); Glacial Moraine B was not mapped within the Study Area. Glacial Moraine B deposits are characteristically poorly sorted and dense with very high boulder densities resulting in greater structural complexity and permanence. By comparison, the surface of Glacial Moraine A units was reworked with sand and gravel deposits resulting in less structural complexity and permanence.

Glacial moraines identified in the OSAMP (RI CRMC, 2010) intersect the Brayton Point ECC in two areas within Federal Waters that overlap with RI's GLD; at Southwest Shoal and where the ECC turns due west outside of RI State Waters (Figure 4-5). Glacial moraines defined in the OSAMP were based on several sources interpreted by Boothroyd (2009). Most of the data near the Southwest Shoal interpreted in the OSAMP were collected by the United States Geological Survey (USGS) in 1980 over very widely spaced seismic lines and near the RI State Waters boundary in 1975 (McMullen et al. 2009). Because of the paucity of seismic data in the region of the Brayton Point ECC, the areas identified in the OSAMP are general and do not reflect high-resolution distribution of moraine deposits and subsequent erosion and deposition of surficial sediments that affect benthic habitats. Using data collected by Mayflower Wind, most of the area of moraine identified in the OSAMP at Southwest Shoal was mapped as Glacial Moraine A (Figure 4-5). In contrast, only a small, discrete area of the OSAMP-identified moraine near the RI State Waters boundary was mapped as Glacial Moraine A using data collected by Mayflower Wind (Figure 4-5). The OSAMP does not identify any moraines in RI State Waters that overlap with the Brayton Point ECC (Figure 4-5); however, Glacial Moraine A habitats were mapped at the Brayton Point ECC in RI Sound using data collected by Mayflower Wind (Figure 4-5).

EFH and HAPC are designated by the New England Fishery Management Council for certain species and life stages of fish and invertebrates in the nearshore and offshore waters of New England, including the area covered by the Study Area. These designations are comprised of two components: (1) broad geographic areas (e.g., nearshore waters and seafloor shallower than 20 m; mapped 10-min squares) and (2) text documentation that describes the habitat characteristics that shall constitute EFH and/or HAPC within the designated geographic areas. Therefore, spatial data on the distribution of those habitat characteristics are needed to refine the specific location of EFH and/or HAPC.

HAPC designated by the New England Fishery Management Council for juvenile cod include structurally complex rocky-bottom or vegetated habitat in inshore areas at depths less than 65 ft (20 m) that provide juvenile cod with protection from predation and support a wide variety of prey items (NEFMC, 2017). Cobble habitats are essential for the survival of juvenile cod in that they may assist with avoiding predation by older year classes (Gotceitas & Brown, 1993) and recent studies suggest that rocky, hard bottom habitats may be important for reproduction (DeCelles et al., 2017). Additional studies suggest that structures such as boulders and SAV, which provide vertical relief for predator avoidance and feeding, may be the primary drivers of cod settlement and nursery habitat use in Narragansett Bay and coastal Rhode Island rather than complex cobble substrates given that these waters are largely characterized by fine-grained sediments (Langan et al., 2020). The entire seafloor of both the Sakonnet River and Mount Hope Bay is shallower than 20 m, but only very limited areas contain complex rocky-bottom habitat consistent with characteristics that match the HAPC description for juvenile cod. The majority of the Brayton Point ECC shallower than 20 m was mapped as Sand and Mud to Muddy Sand which are habitats less likely to be used by juvenile cod (Figure 4-6). The majority of the 361 acres (6% of the Brayton Point ECC in RI State Waters;), mapped with HPAC characteristics, is located in Rhode Island Sound.

The actual footprint of Project activities will be smaller than the Study Area (i.e., the entire corridor for which habitats were mapped). Where juvenile cod benthic habitats are found, these habitats would experience some impacts from Project activities that permanently or temporarily disturb the seafloor, such as the burying of export cables and long-term presence of secondary cable protection measures in hard bottom areas where target cable burial depth is not possible. Given their preference for hard bottom/complex habitat, cable mattresses, rock berms, or frond mattresses used as secondary cable protection may provide increased habitat availability for both adult and juvenile cod (Reubens et al., 2013). Depending on the material used, secondary protection may be colonized by barnacles, tube-forming species, hydroids, and other fouling species found on existing hard bottom habitat in the region. Other Project activities are not expected to result in long term adverse impacts to either adult or juvenile cod EFH.

Winter flounder are a demersal species likely to occur year-round within the Study Area. Adult winter flounder prefer soft bottom muddy and sandy substrates, but also utilize hard bottoms on offshore banks (Pereira et al., 1999). Adult winter flounder migrate to nearshore/estuarine waters in the late fall and early winter to spawn and then may migrate to cooler, offshore waters in the summer. Winter flounder lay benthic eggs in shallow (<16 ft [5m]) nearshore waters, bays, and estuaries in mud, muddy sand, gravel, macroalgae, and submerged aquatic vegetation (NEFMC, 2017). EFH designated by the New England Fishery Management Council for winter flounder eggs, young-of-the-year (YOY) juveniles, and spawning adults in the Study Area are likely to be found from January through June (Massie, 1998) in Mixed-Size Gravel in Muddy Sand to Sand, Coarse Sediment, Sand, and Mud to Muddy Sand habitats, as well as any benthic substrate with SAV. The characteristic of these mapped habitats match the EFH description and have been mapped to encompass 731 acres of the Brayton Point ECC (12.1% of the portion in RI State Waters; Figure 4-7). Non-spawning winter flounder adults and older juveniles are more frequently found in continental shelf benthic habitats and deeper coastal waters than in the shallower habitats utilized by eggs and YOY (NEFMC, 2017; Phelan, 1992). Therefore, juveniles and non-spawning adults are likely to utilize Mixed-Size Gravel in Muddy Sand to Sand, Coarse Sediment, Sand, and Mud to Muddy Sand habitats in the Study Area.

Impacts from Project activities related to installation of the export cable in shallow nearshore (<16 ft [5m]) waters may temporarily directly affect winter flounder eggs, YOY, and spawning adults. Eggs could be entrained within the jet plow or experience increased mortality due to sediment suspension (Berry et al., 2011). These impacts are expected to be minor because they will disturb a small portion of available EFH in the area and temporary because the substrates within nearshore portions of the Brayton Point ECC are expected to return to essentially the same as pre-existing conditions, allowing for continued use by spawning winter flounder, YOY, and eggs. Juveniles and adult flounder may also be temporarily displaced by seafloor disturbing activities. Winter flounder are expected to recolonize most areas once construction is complete, however similar to other species that utilize sandy habitats, they may experience small amounts of permanent habitat loss in areas that are converted from sandy sediments to hard bottom habitats should secondary cable protection be needed. Loss of habitat due to conversion to hard bottom is not expected to have a significant impact on these species due to the large area of alternate suitable habitat available.

Mayflower Wind will implement the following environmental protection measures to reduce potential impacts on benthic habitat, invertebrates, and finfish along the Brayton Point ECC. These measures are based on accepted protocols and procedures successfully implemented for similar offshore projects.

- Design the sea-to-shore transition to reduce the dredging footprint and effects to benthic organisms (e.g., consider use of gravity cells, siting of offshore exit points).
- Use HDD at landings to avoid disturbance to nearshore finfish, invertebrates, EFH, and sensitive habitats (e.g., SAV beds) to the extent practicable and to minimize spatial and temporal effects to benthic organisms.
- Micro-route cables within the Brayton Point ECC to avoid complex habitats, where possible.
- Bury cables wherever possible to allow for benthic recolonization after construction is complete.
- Use industry standard cable burial and cable shielding methods to reduce potential effects/change in ambient electric and magnet fields (EMFs) during operations and maintenance.
- Install offshore export cables to target burial depths where possible and use cable shielding materials to minimize effects of EMFs.

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MAYFLOWER WIND

Benthic Habitat Mapping to Support State Permitting Applications - Brayton Point ECC for RI State Waters and GLD - FIGURES

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List of Figures

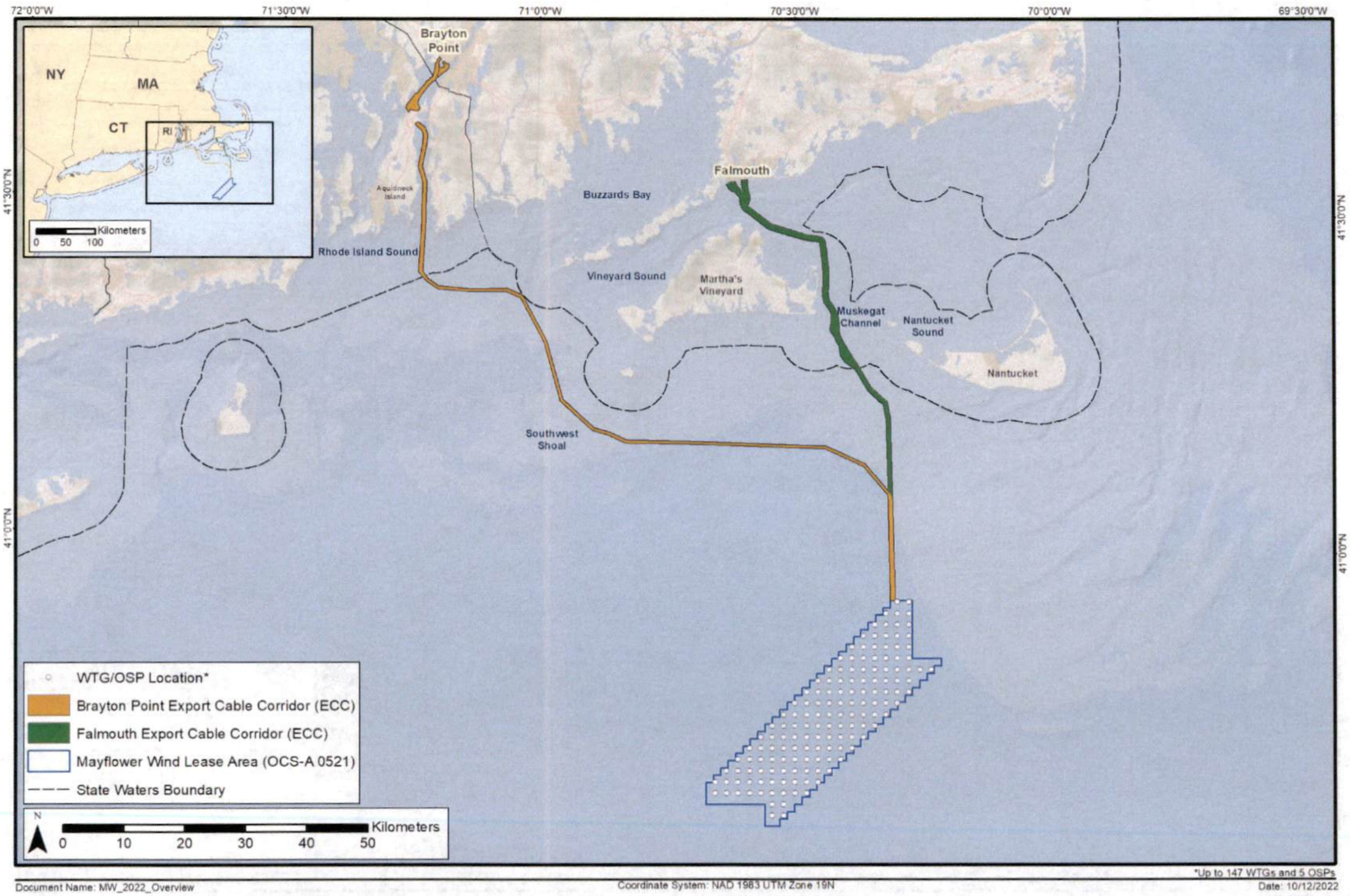
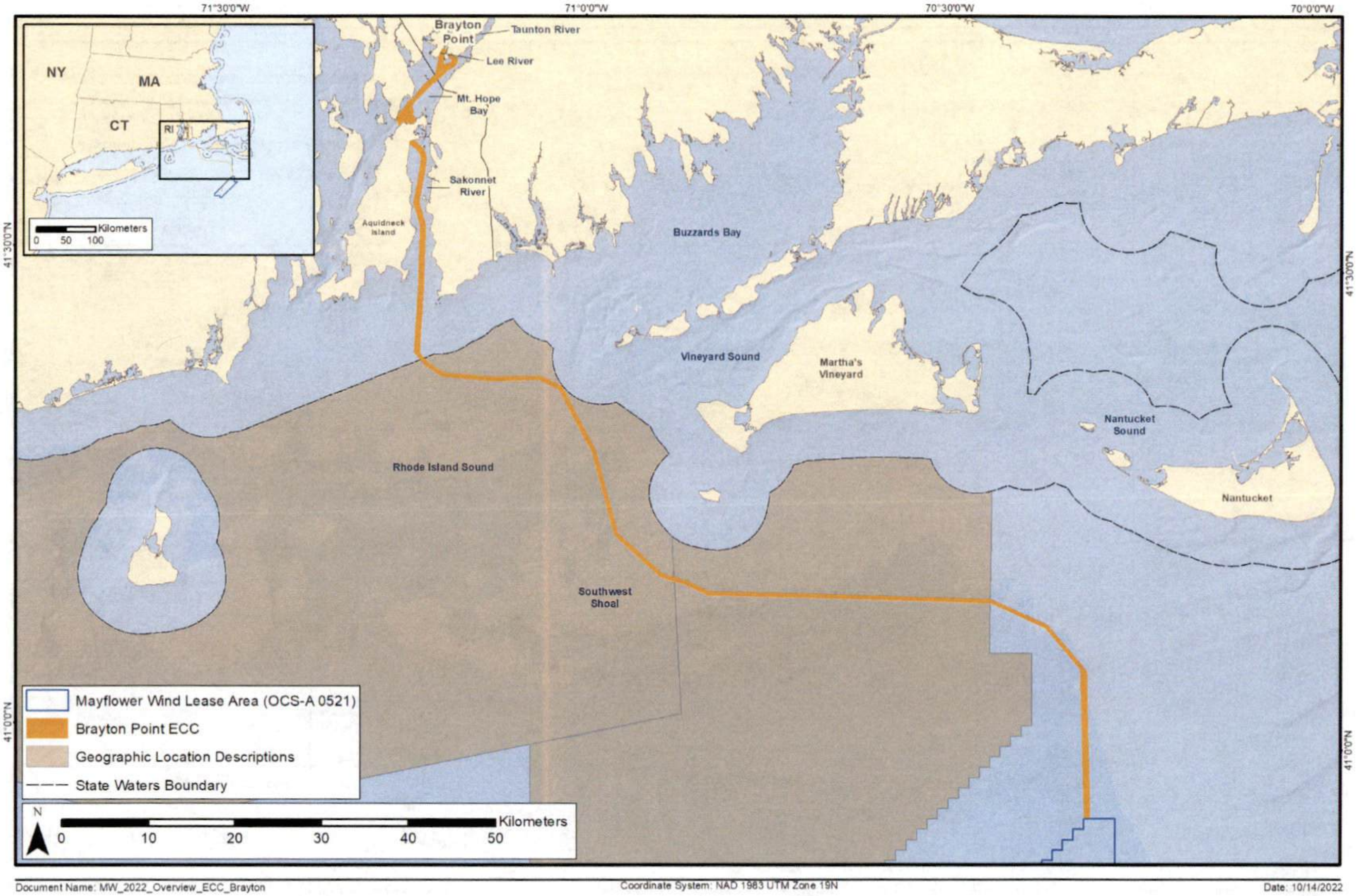


Figure 1-1. **Location of the Mayflower Wind Lease Area with potential wind turbine generator (WTG)/offshore substation platform (OSP) foundation positions and offshore export cable corridors (ECCs)**



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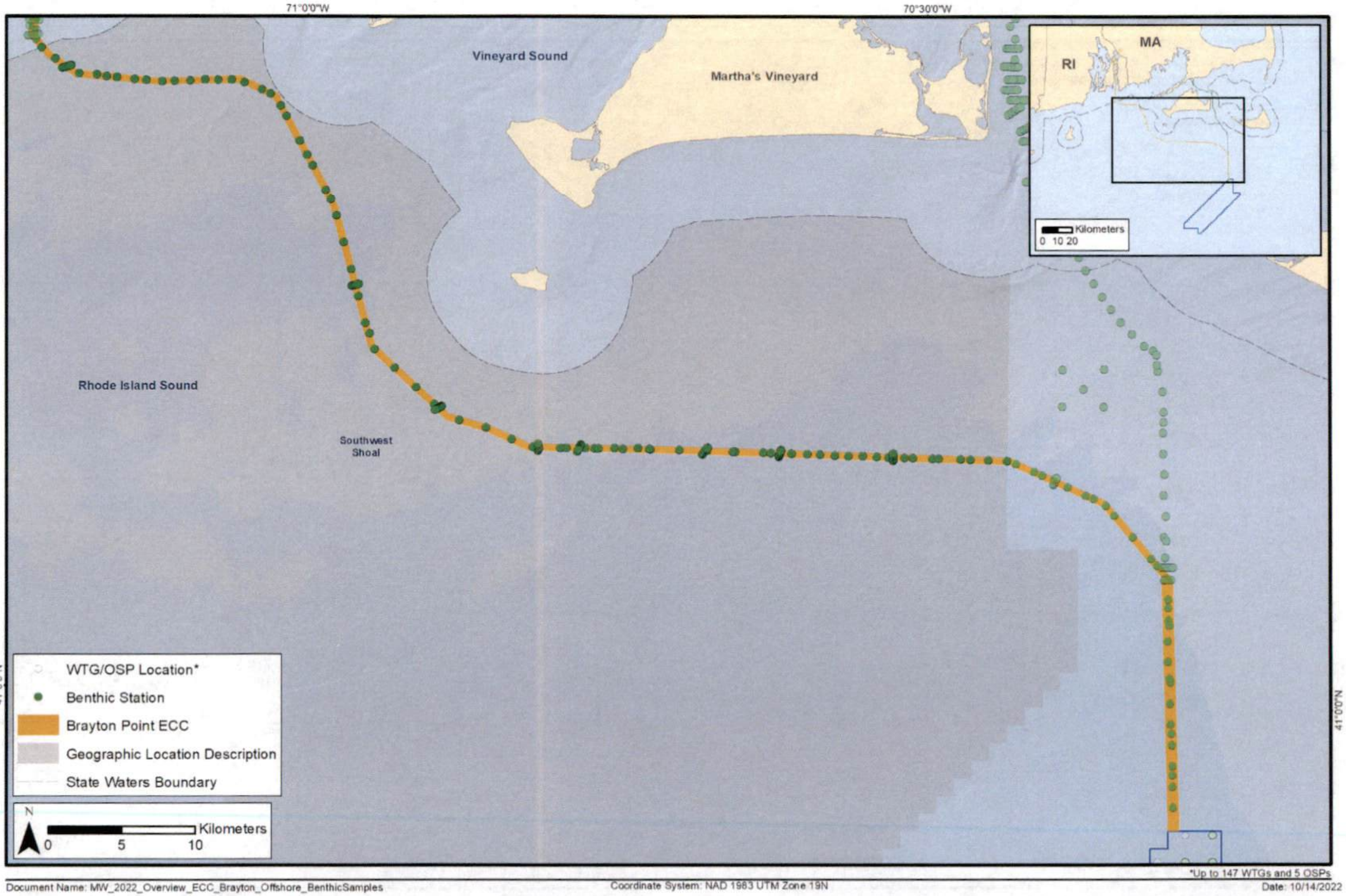
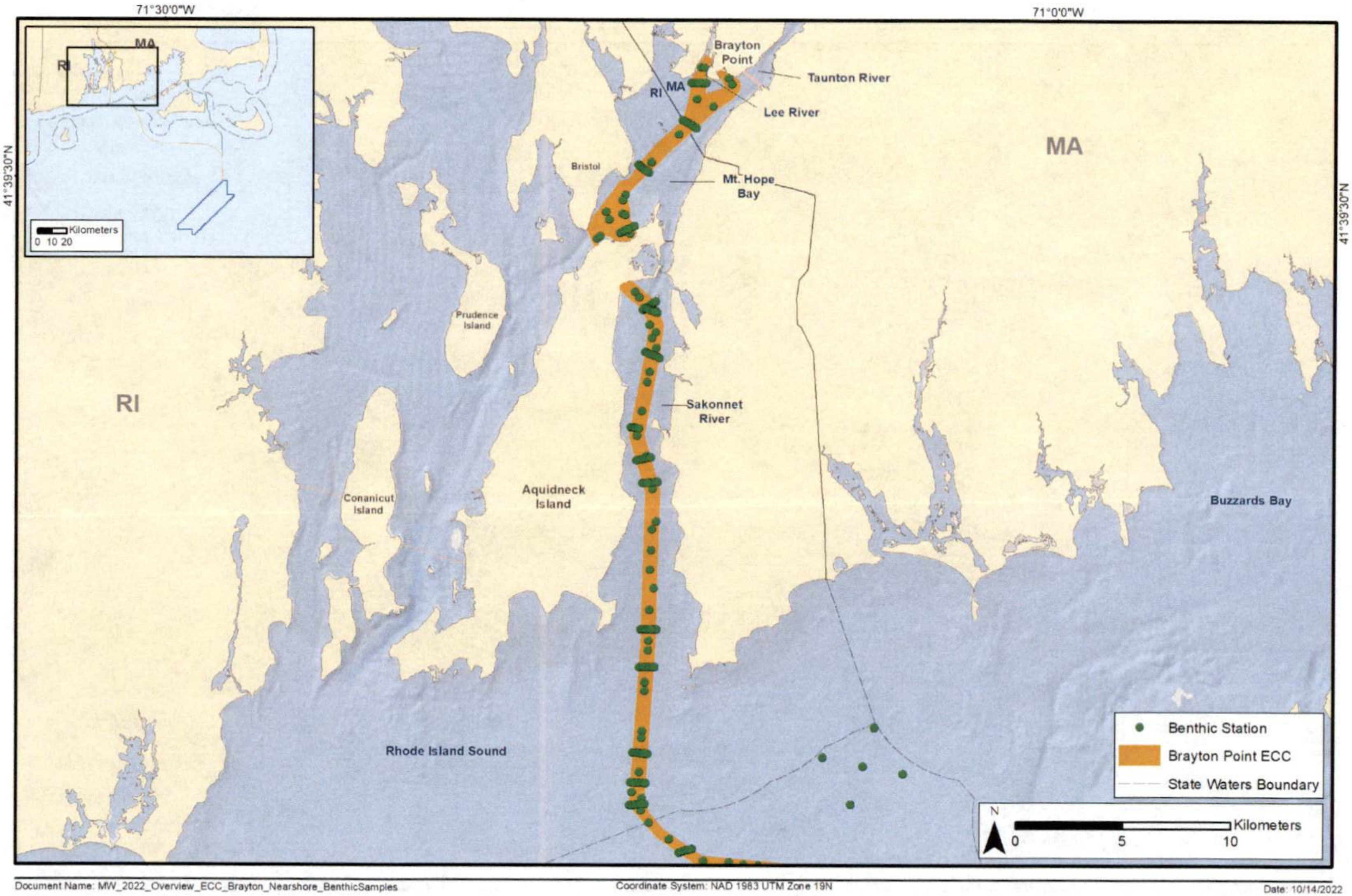


Figure 1-3. **Locations sampled for benthic ground-truth data across all field surveys at the Brayton Point offshore export cable corridor (1 of 2)**



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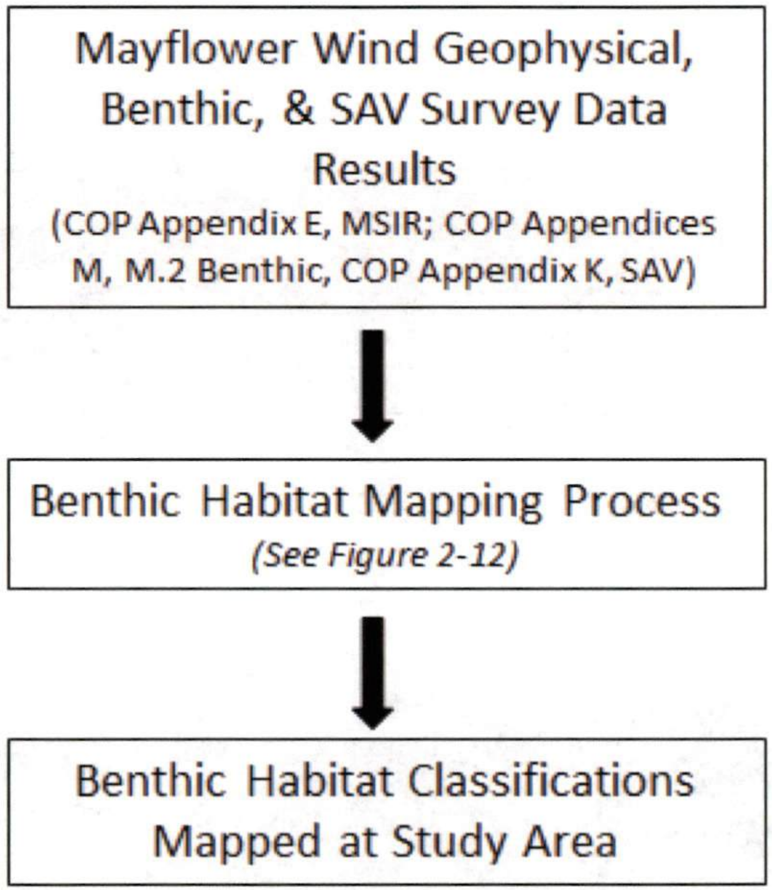
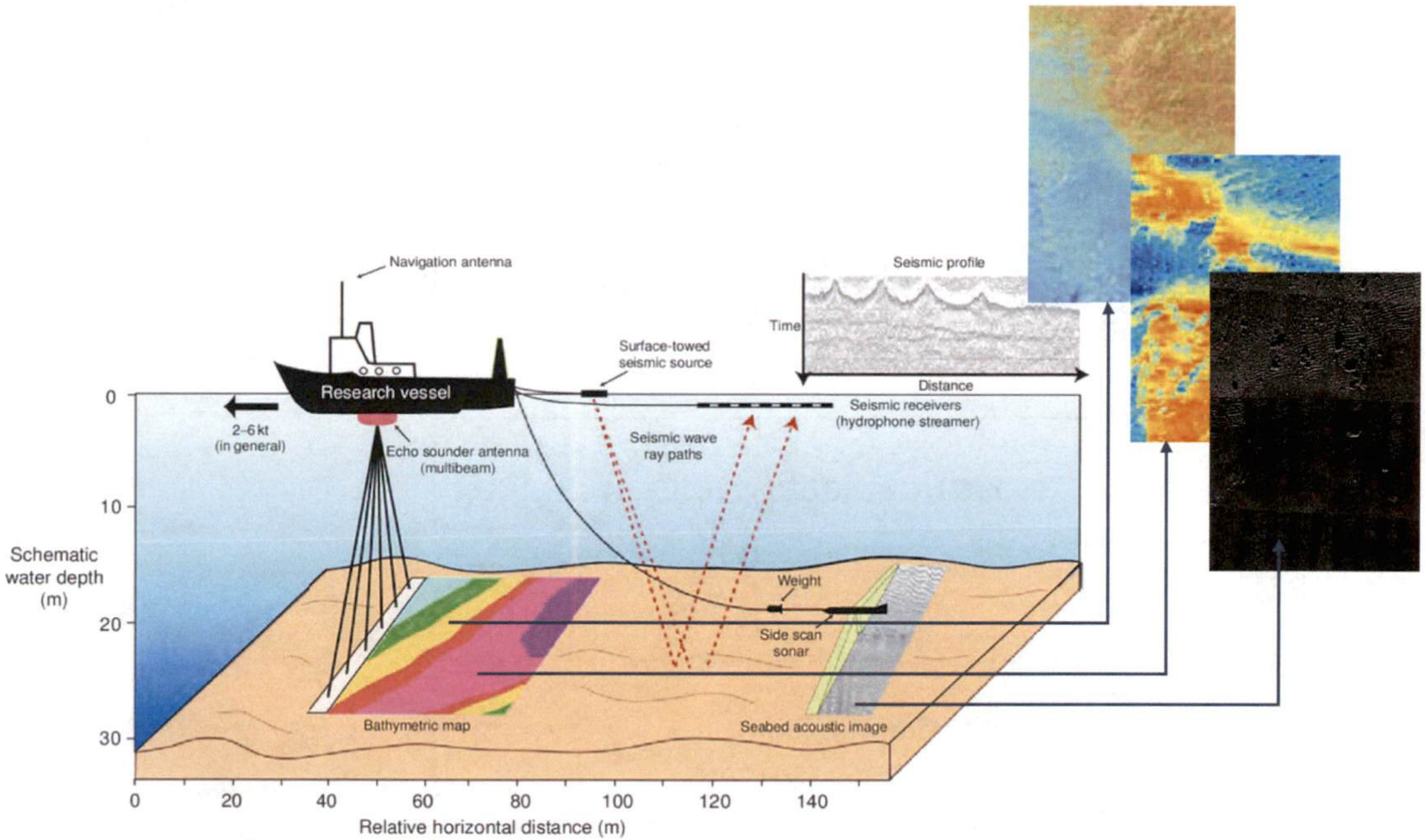


Figure 1-5. **Generalized benthic habitat mapping workflow diagram**



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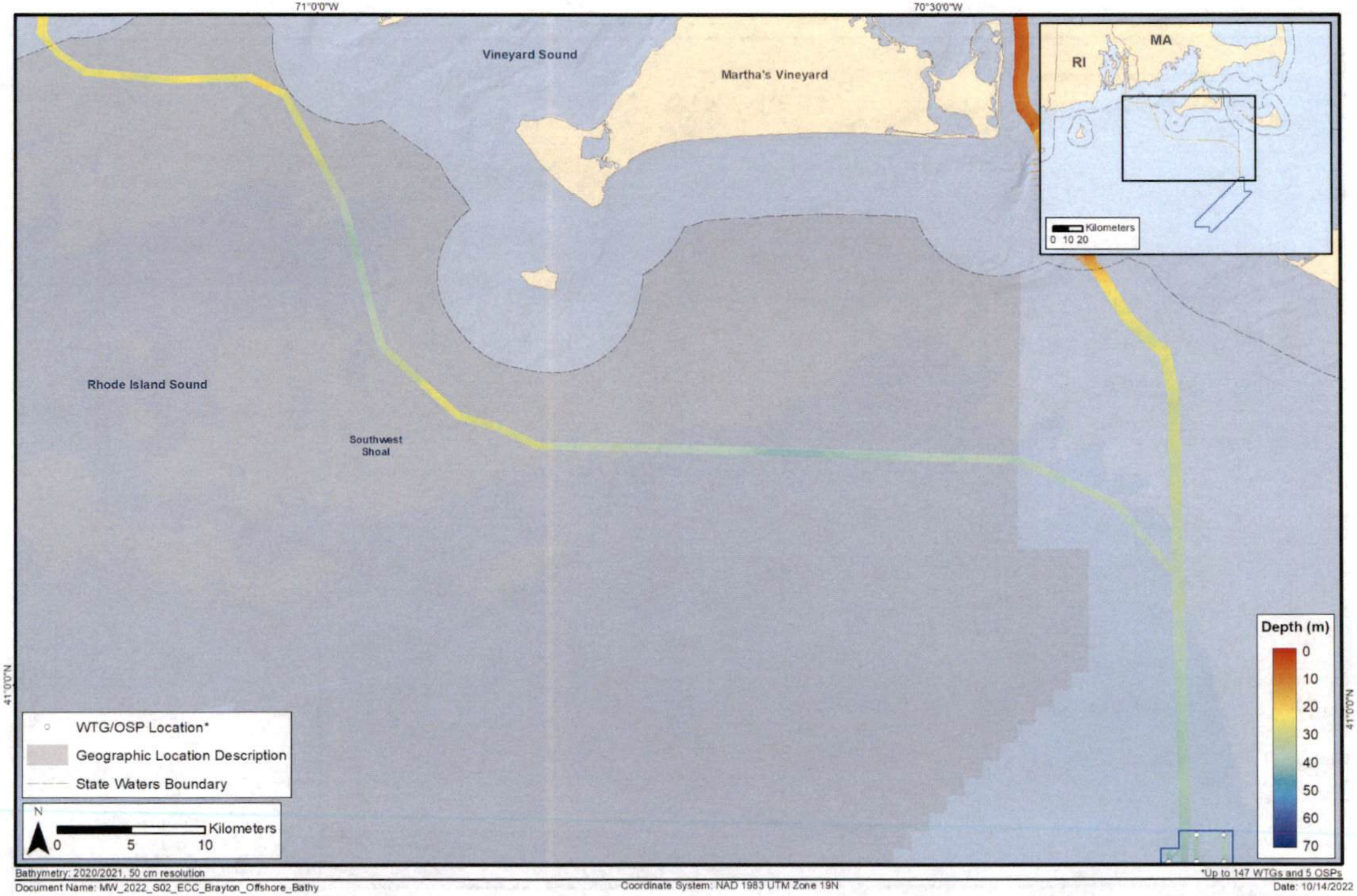
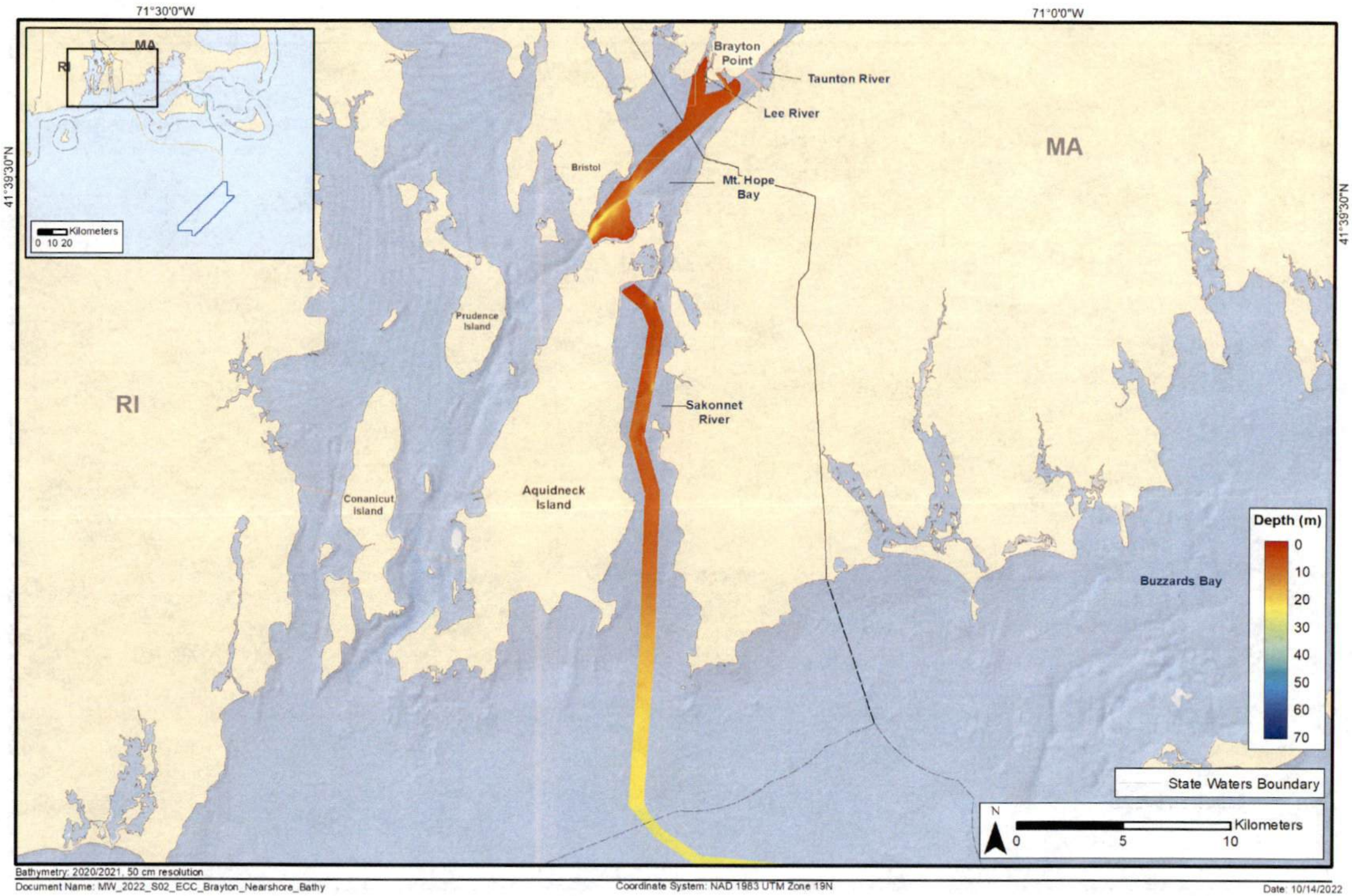


Figure 2-2. Bathymetric data at the Brayton Point ECC (1 of 2)



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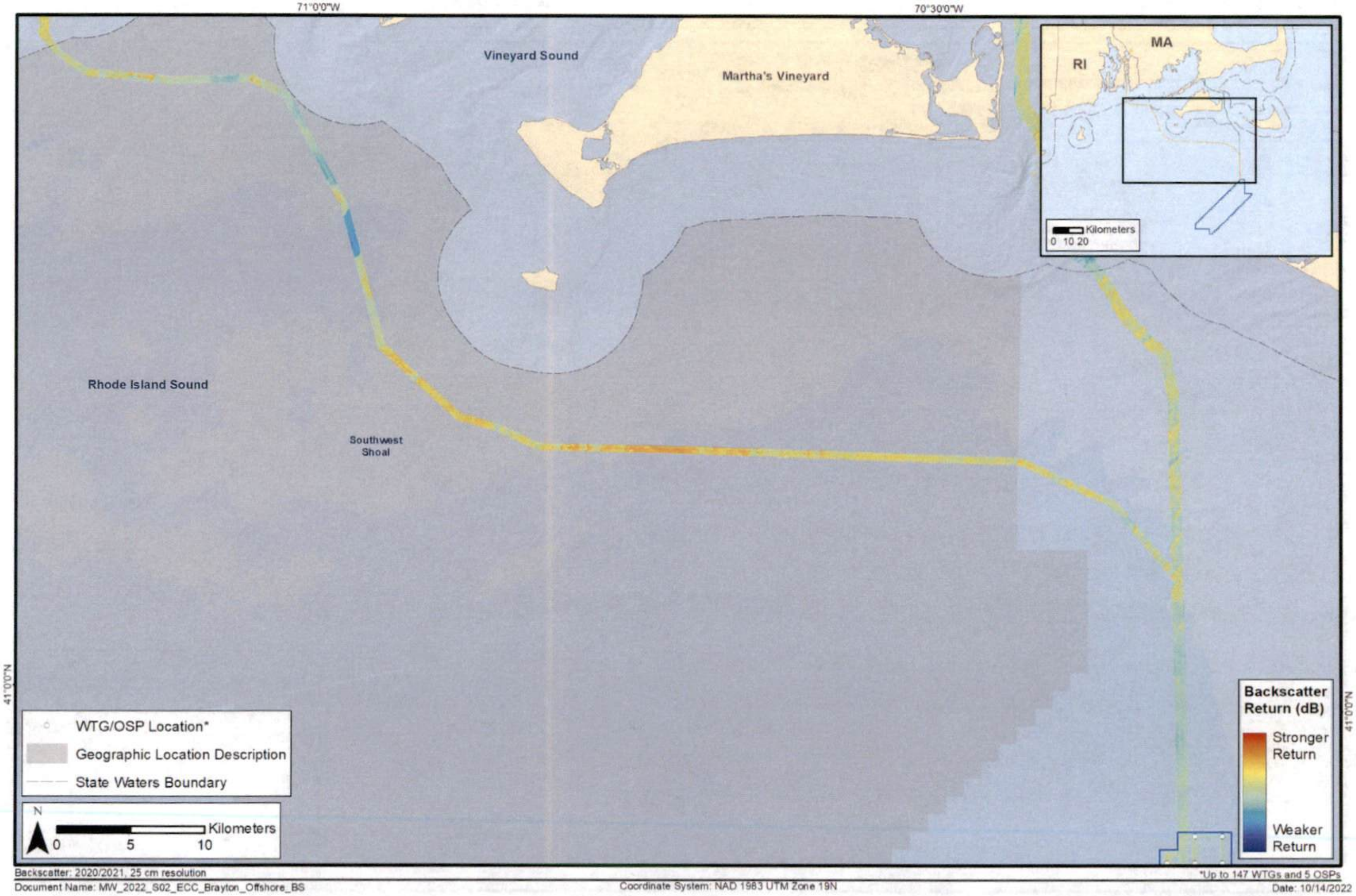

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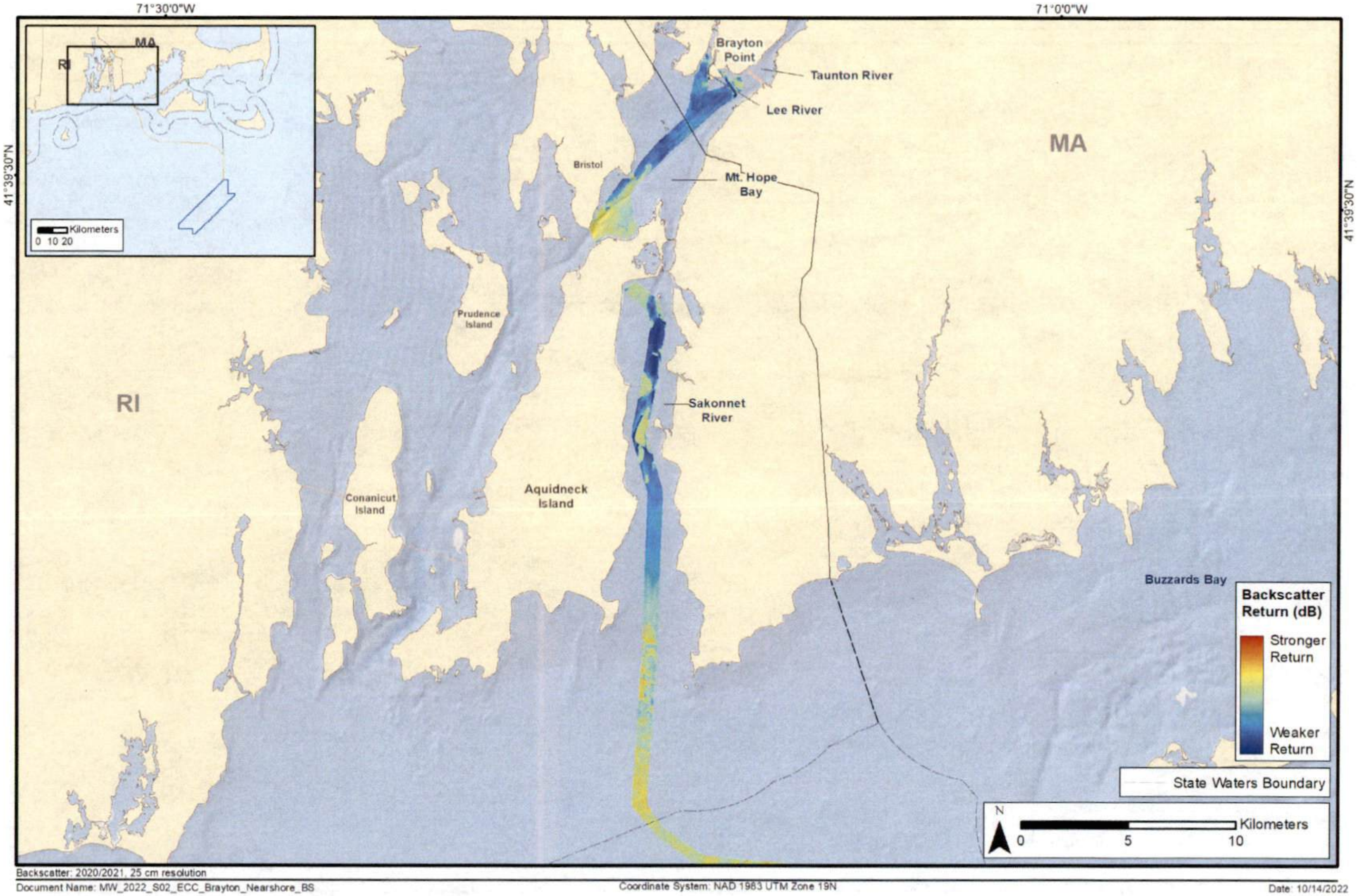


Figure 2-5. Backscatter data over hillshaded bathymetry at the Brayton Point ECC (2 of 2)

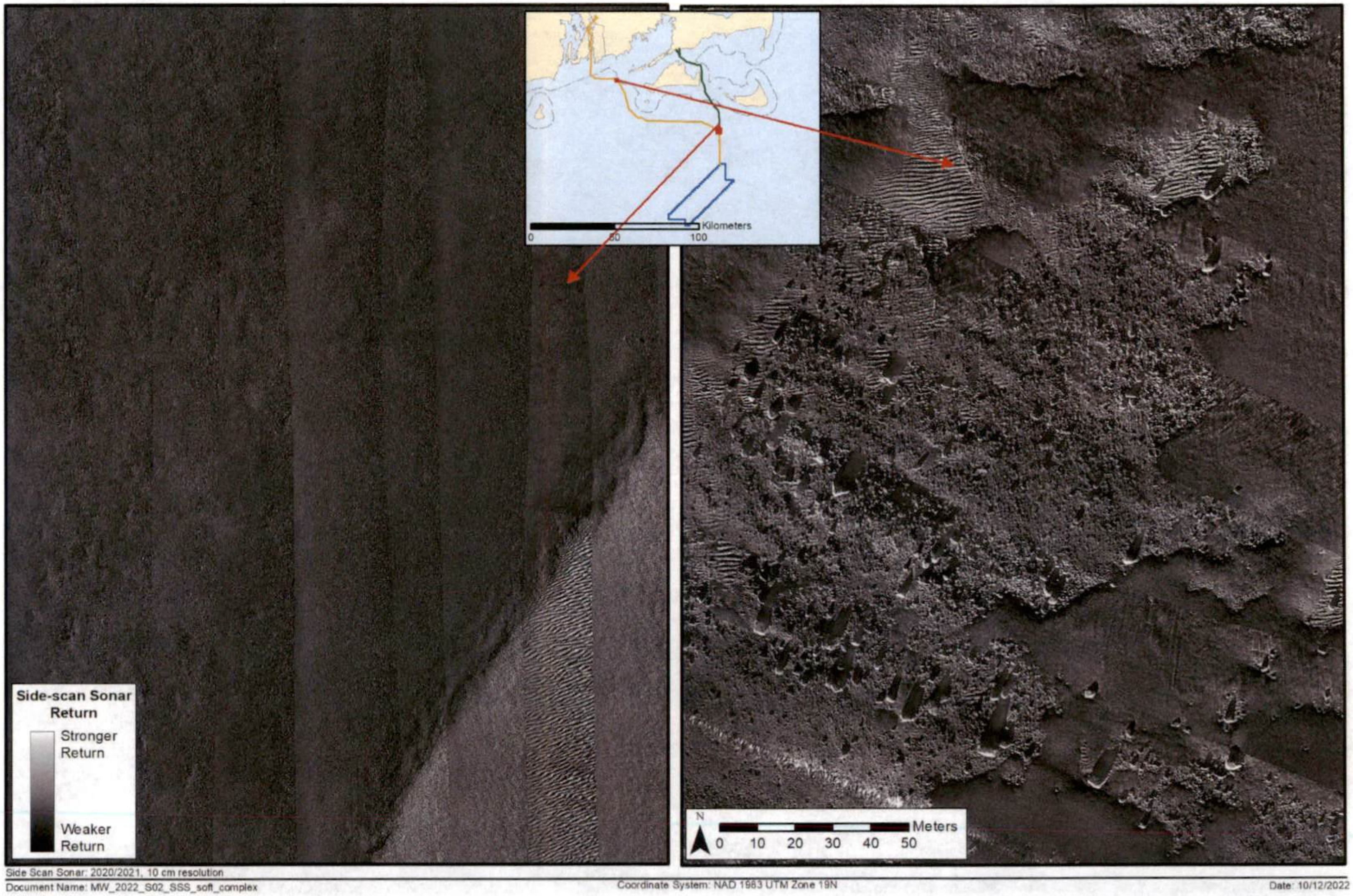


Figure 2-6. **Examples of side-scan sonar (SSS) data showing soft benthic habitats of sand and mud (left) and heterogeneous and complex habitats of glacial moraine (right)**

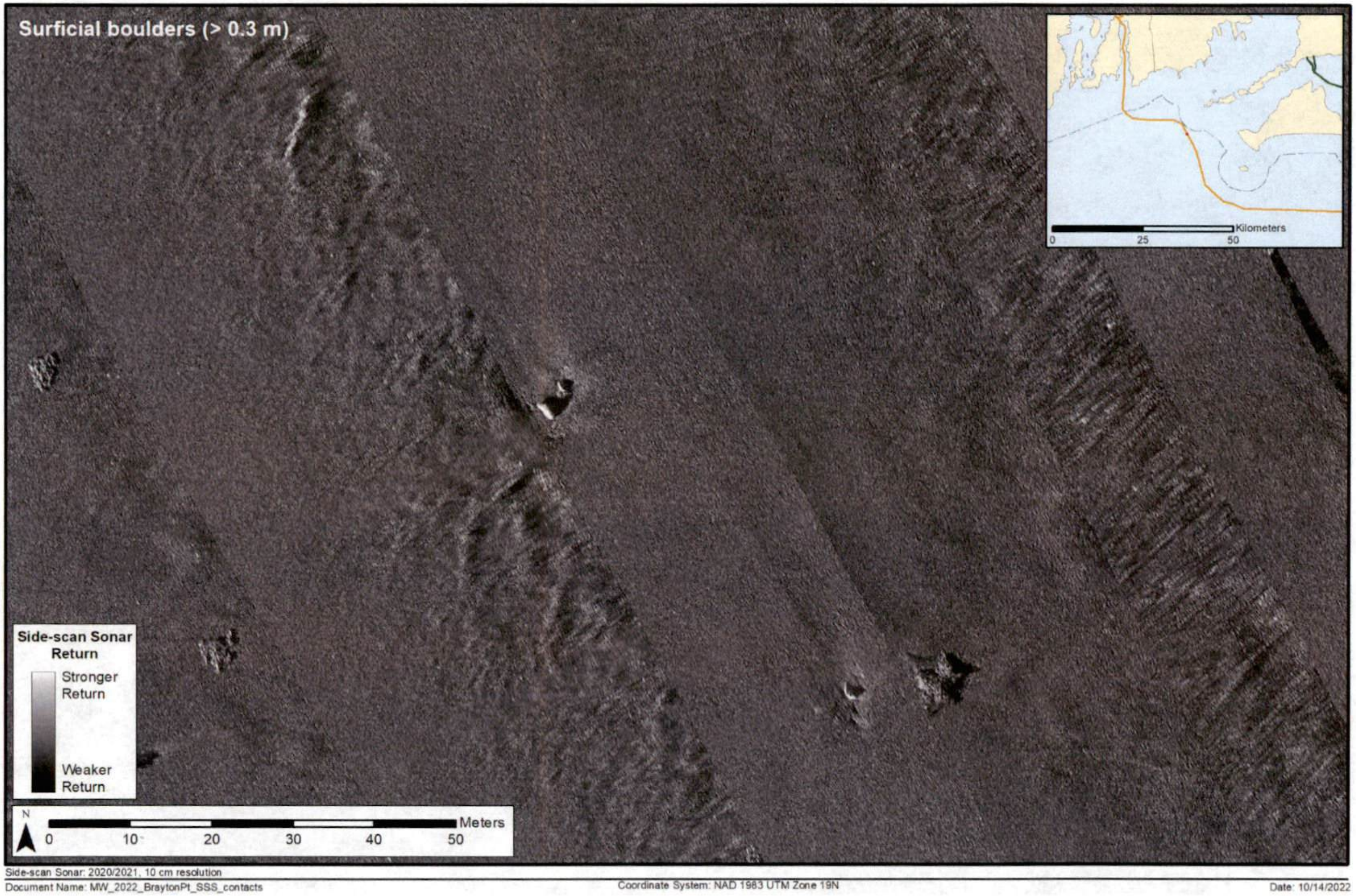
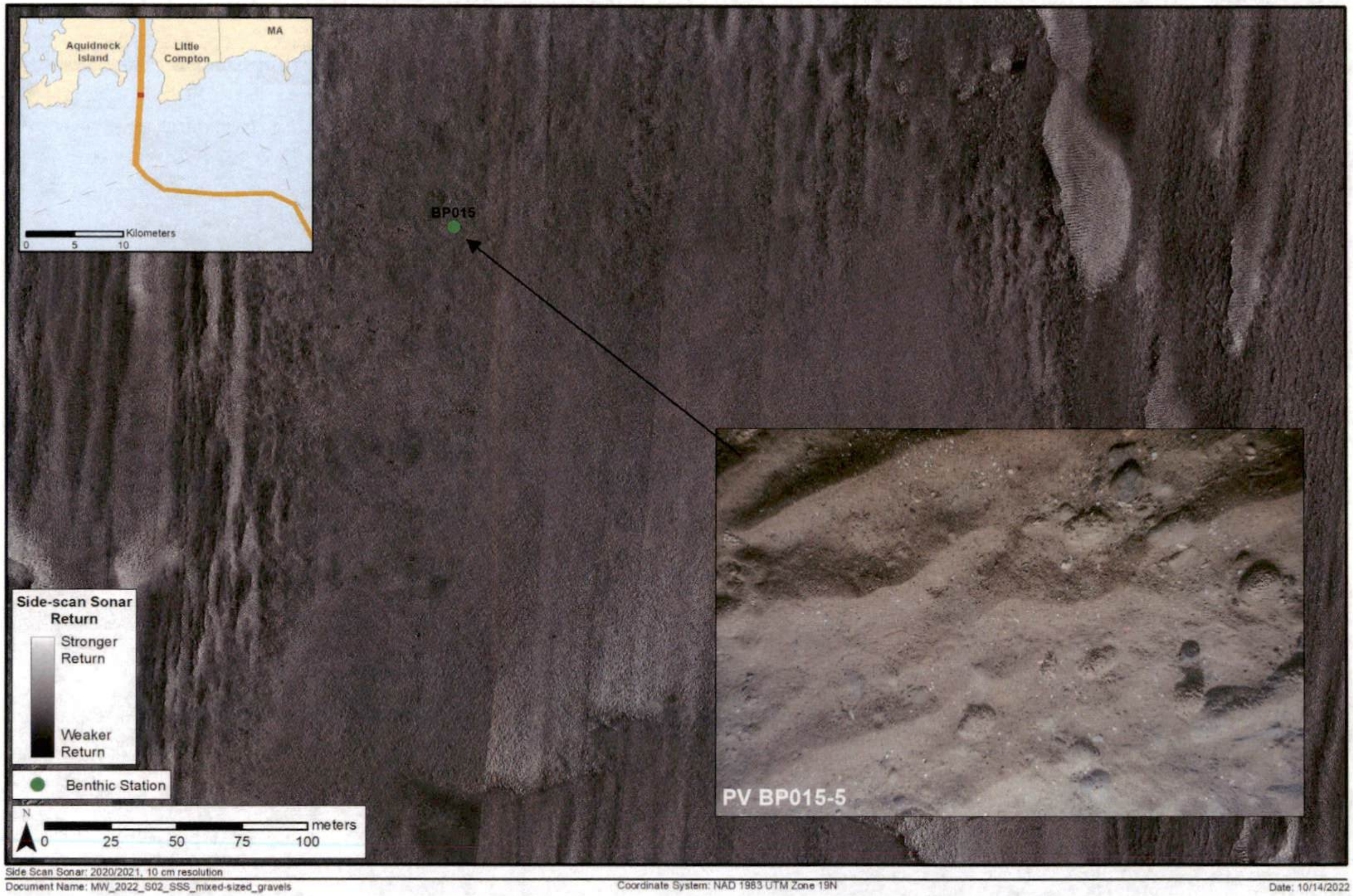


Figure 2-7. Example of SSS data showing individual objects on the seafloor identified as boulders



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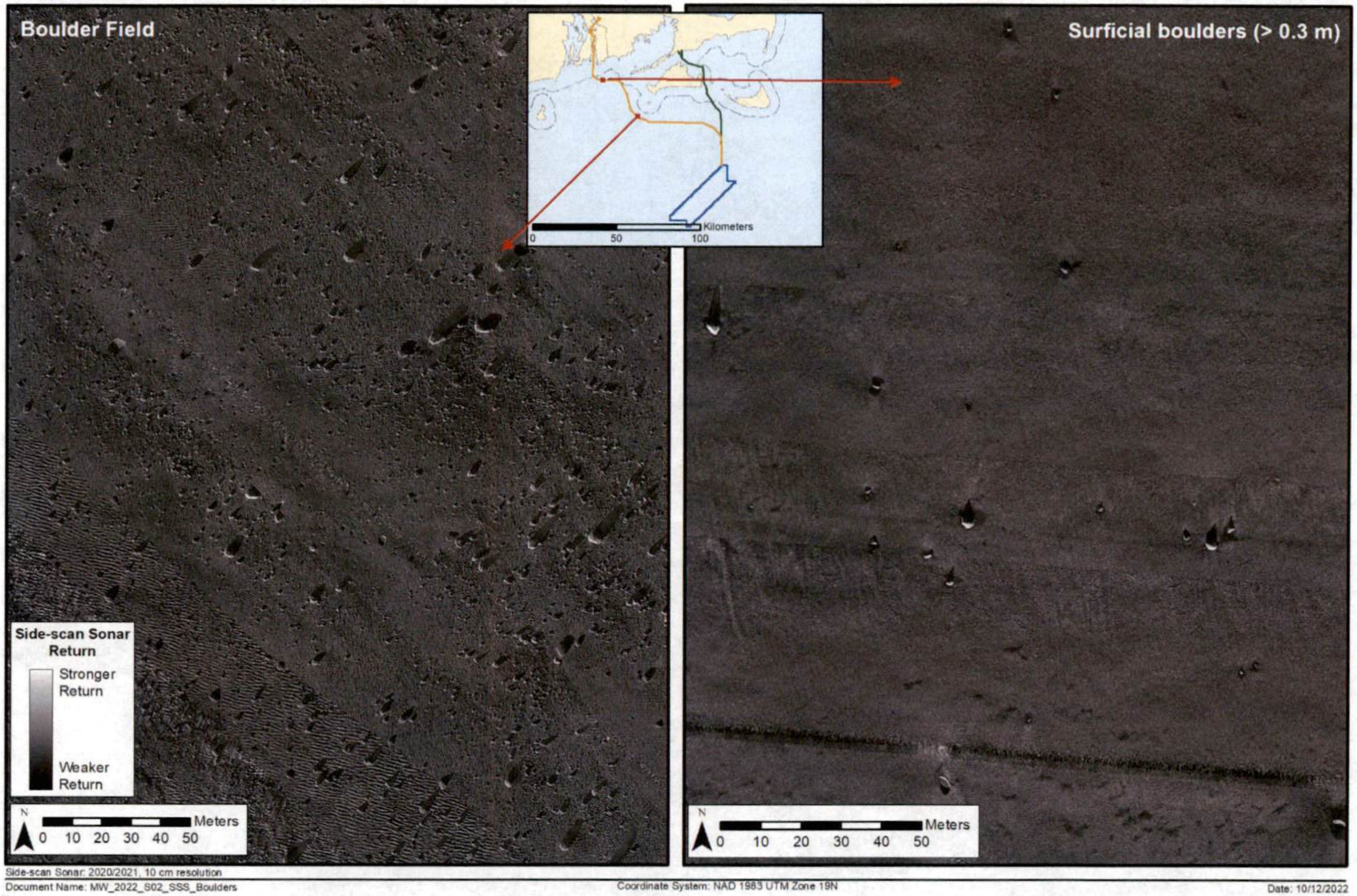

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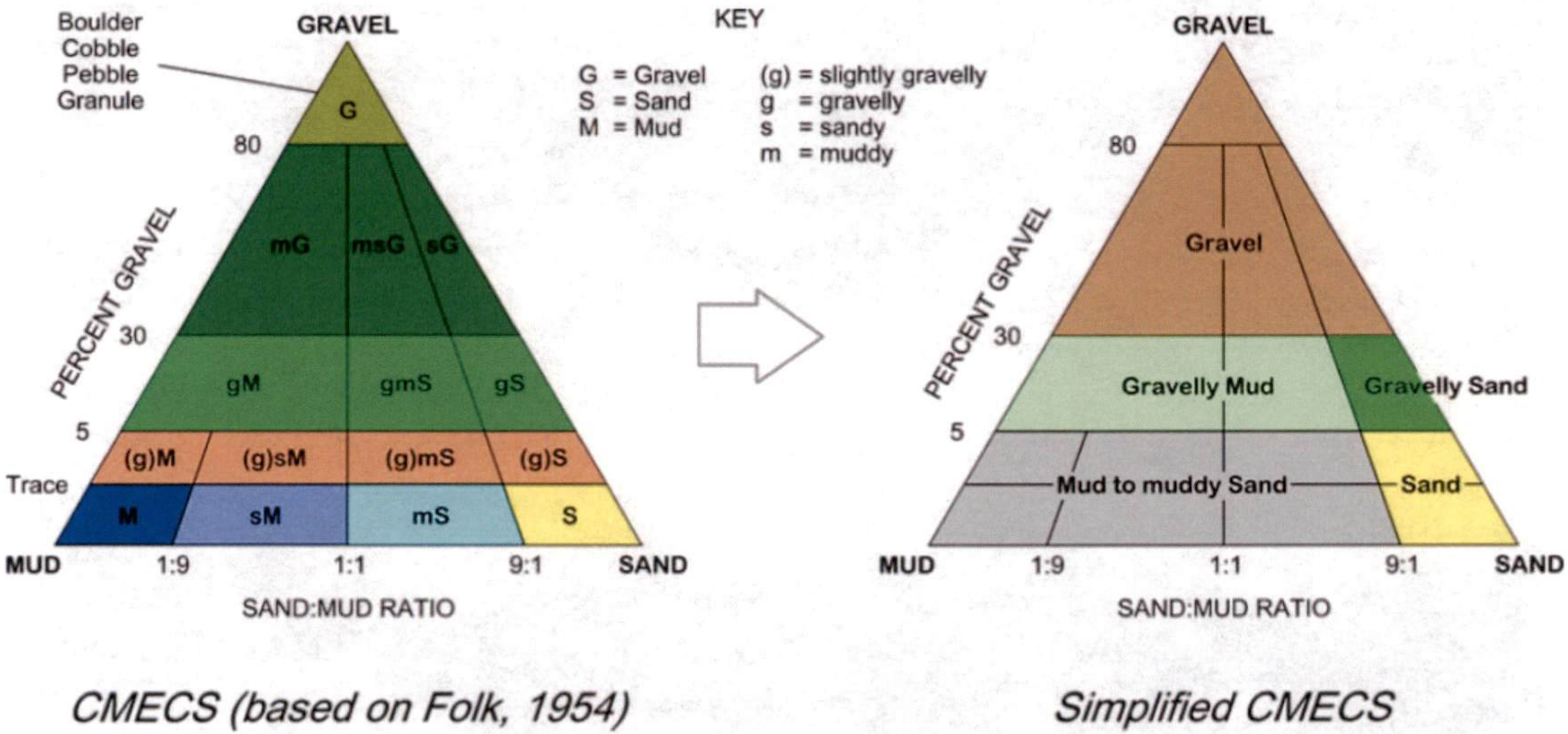

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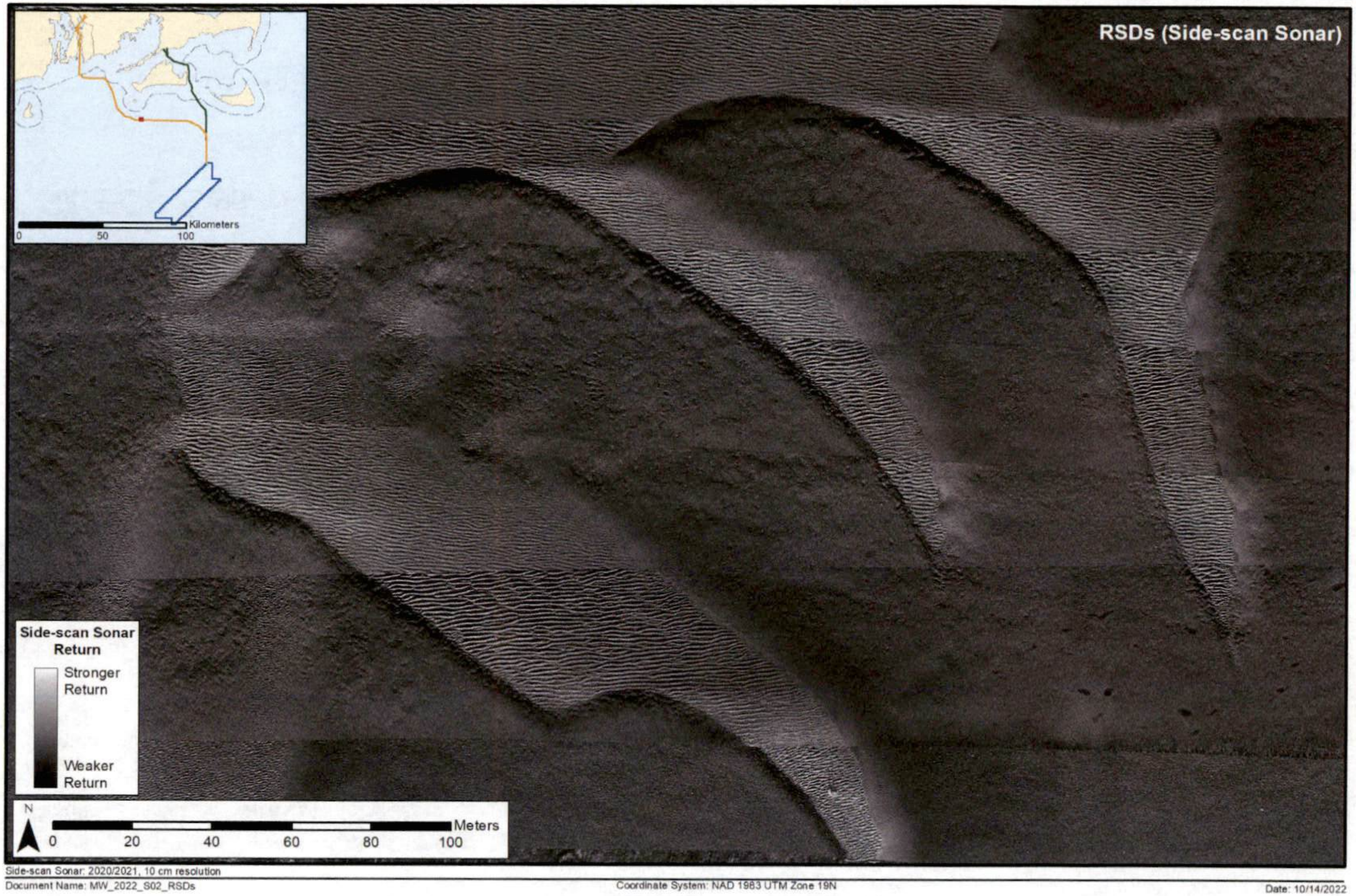

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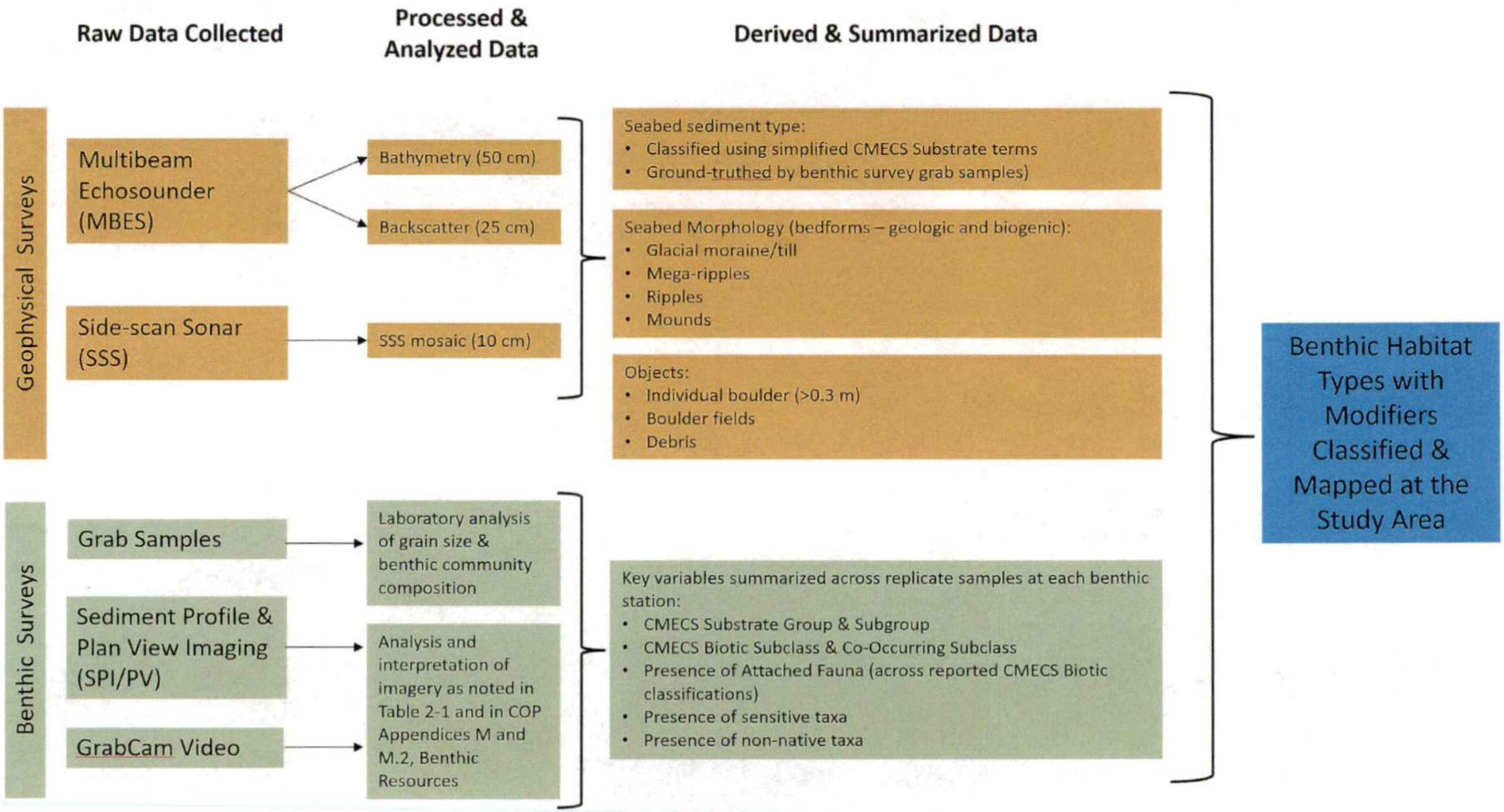

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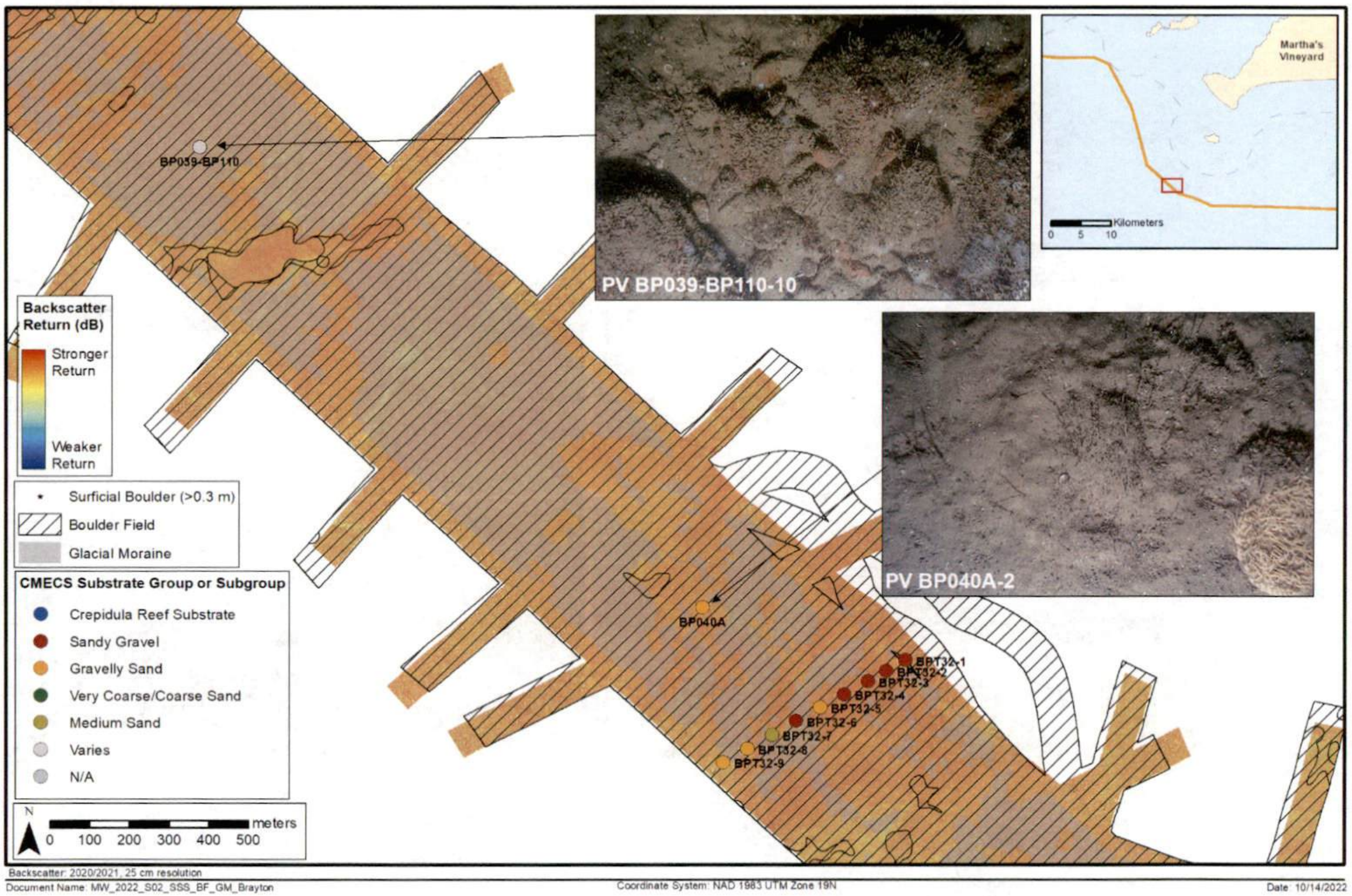

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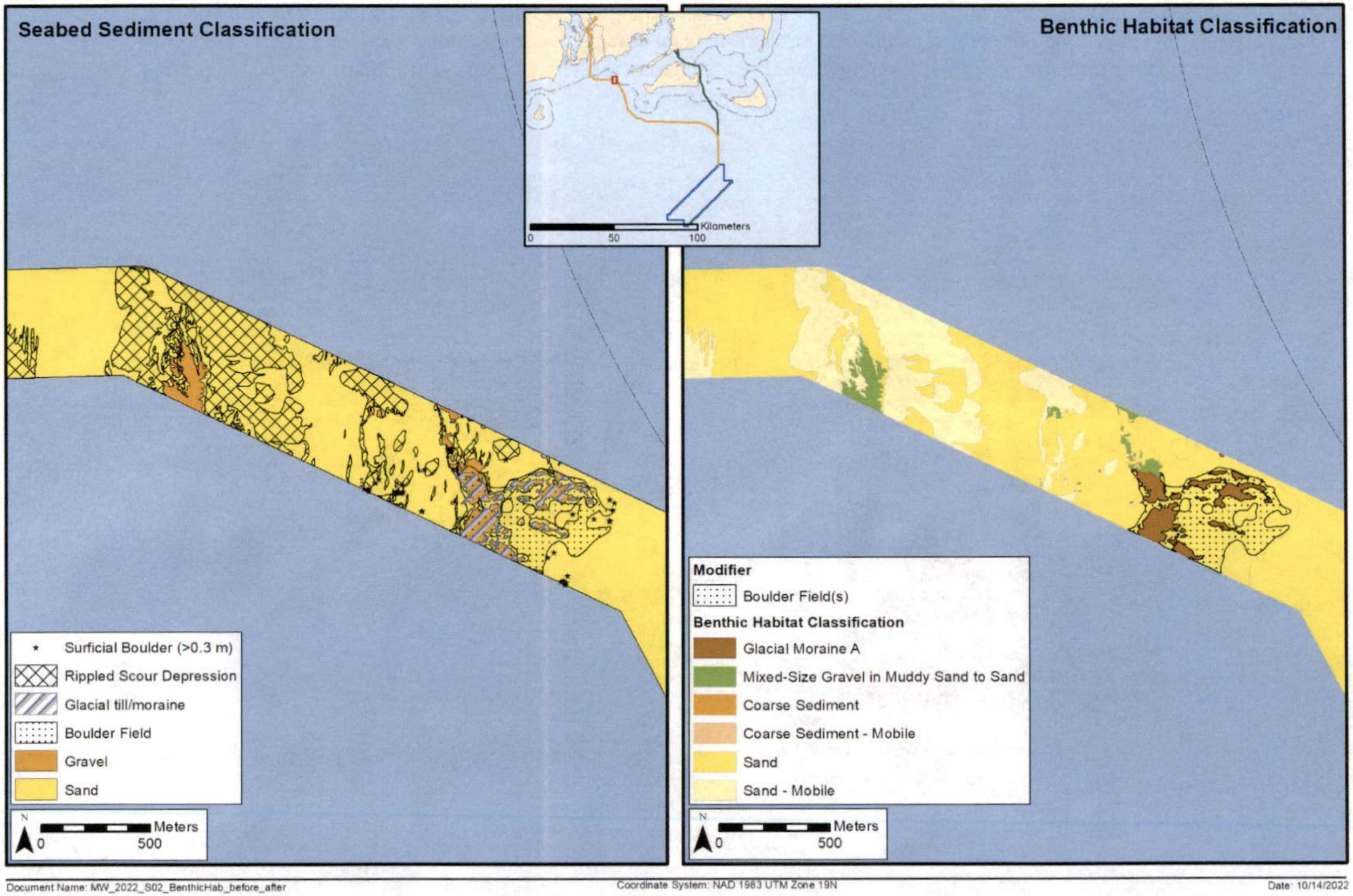

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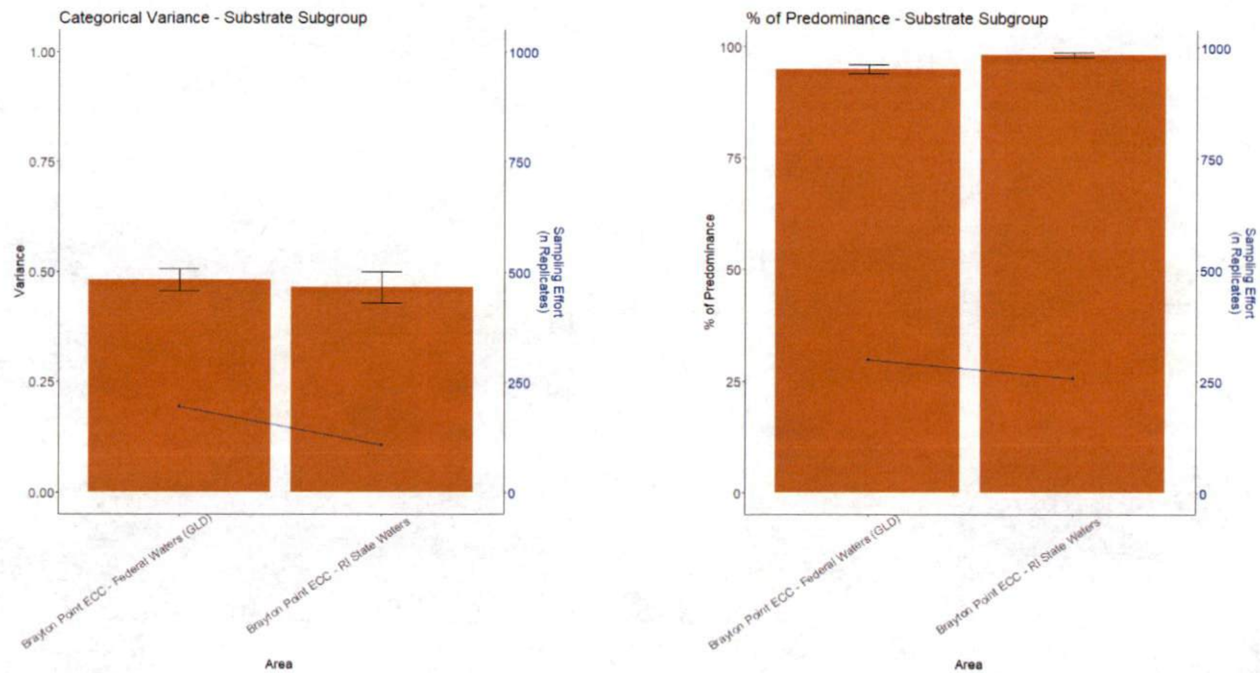


Figure 3-1. **Plots showing the categorical variability (left) and percentage of predominance (right) of Substrate Subgroup across all portions of the Study Area give a high-level depiction of which areas have more heterogeneous stations; sampling effort (# replicate samples collected) is overlaid to evaluate its effects. Categorical variability values range from 0 to 1, with 1 indicating high variability and heterogeneity. Percentage of predominance values range from 0 to 100%, with 100% indicating the category at that station was fully dominant (all replicates were categorized the same way).**

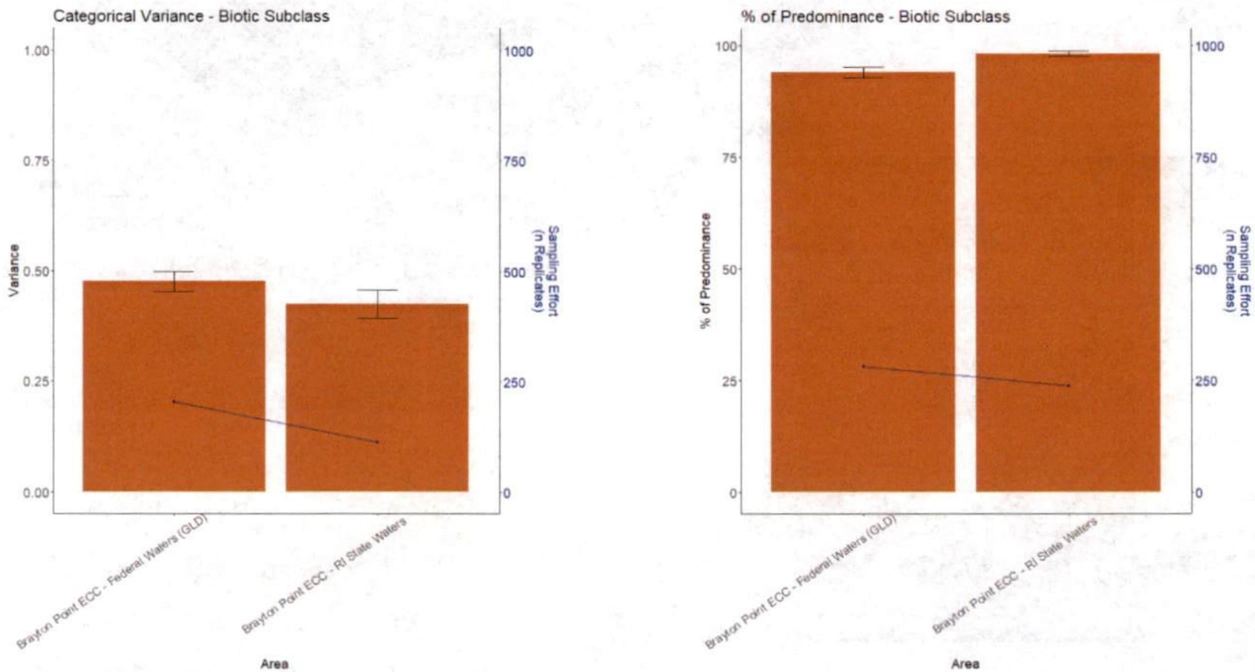
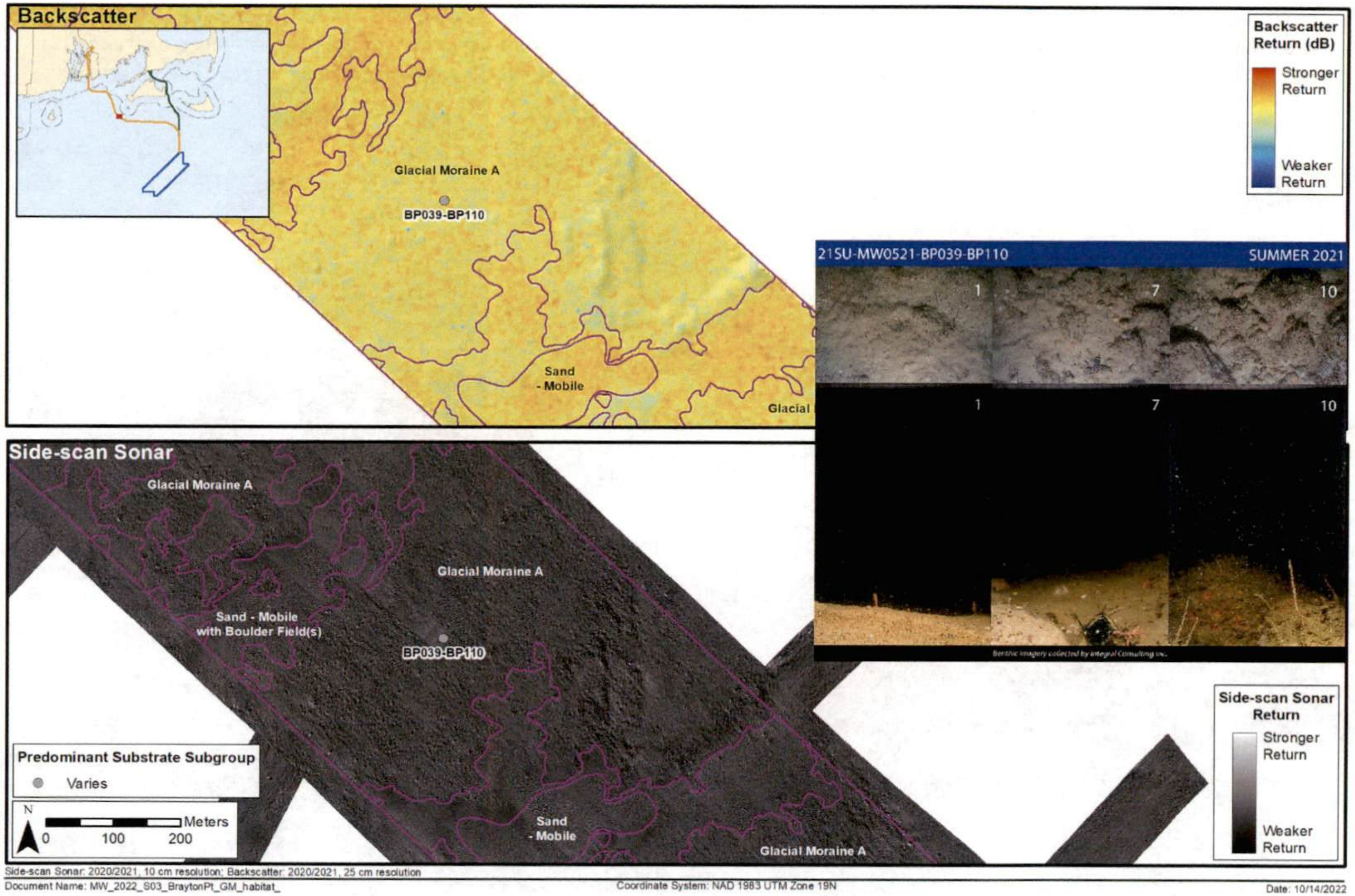


Figure 3-2. **Plots showing the categorical variability (left) and percentage of predominance (right) of Biotic Subclass across all portions of the Study Area give a high-level depiction of which areas have more heterogeneous stations; sampling effort (# replicate samples collected) is overlaid to evaluate its effects. Categorical variability values range from 0 to 1, with 1 indicating high variability and heterogeneity. Percentage of predominance values range from 0 to 100%, with 100% indicating the category at that station was fully dominant (all replicates were categorized the same way).**



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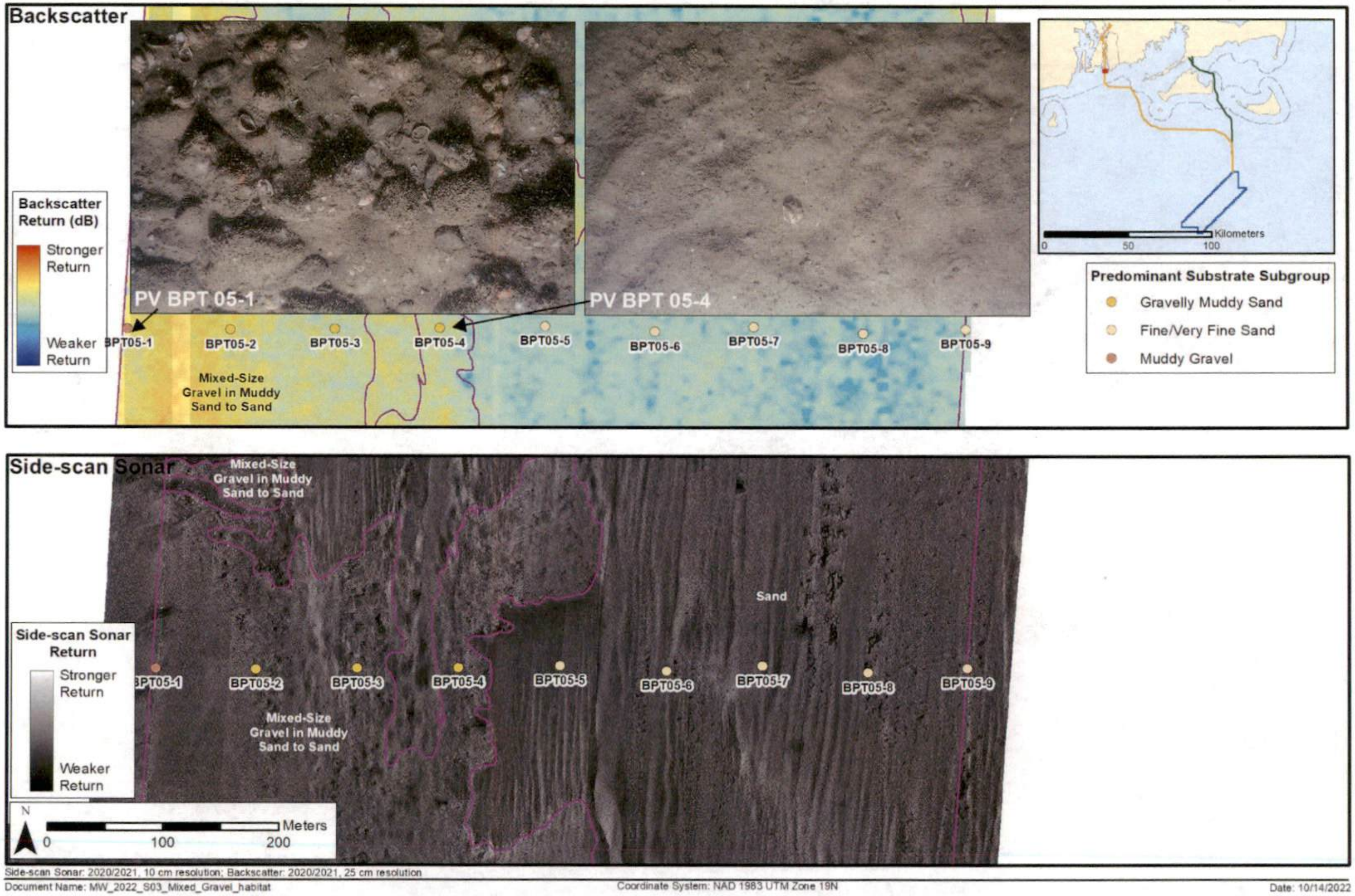

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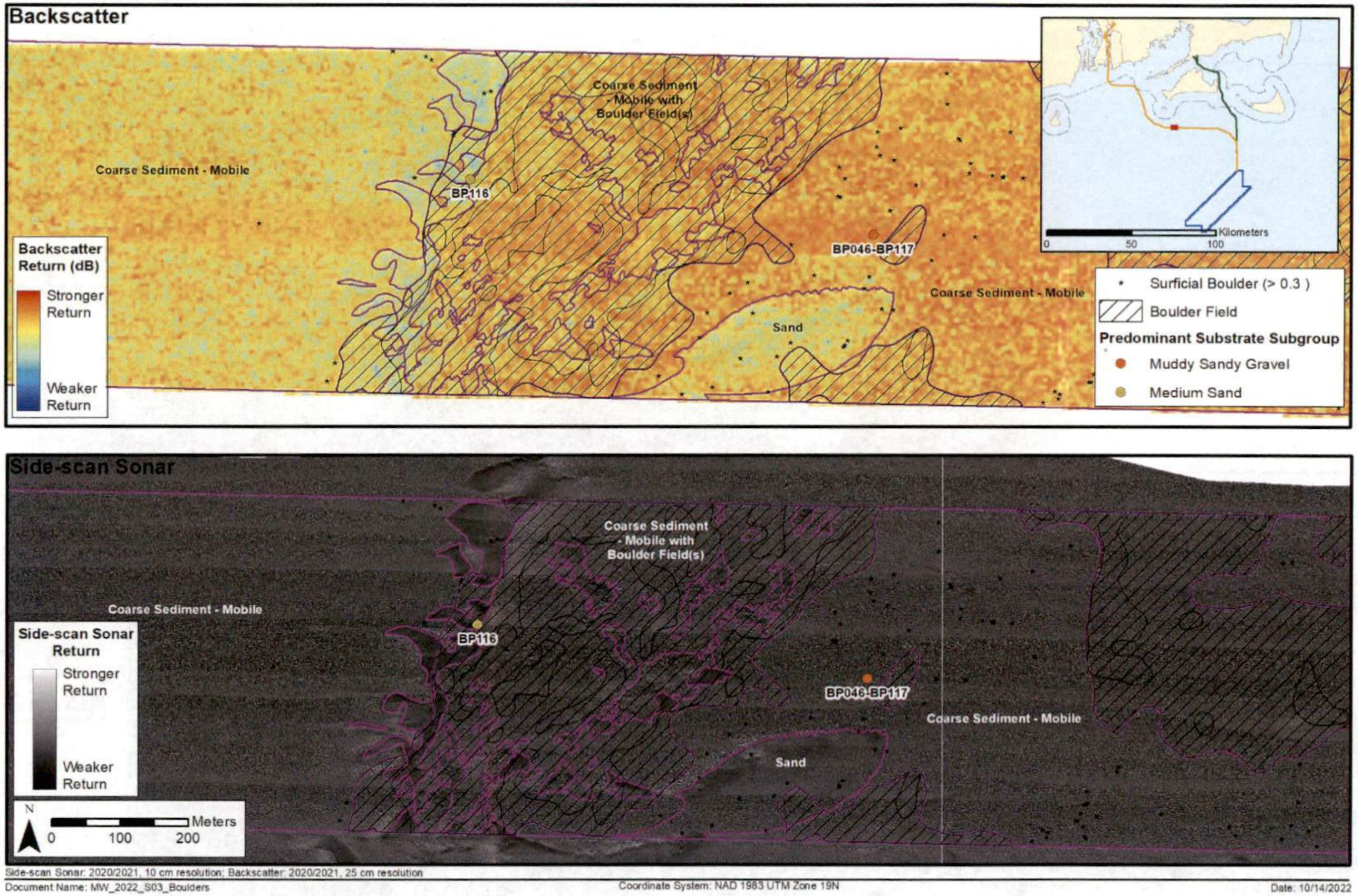

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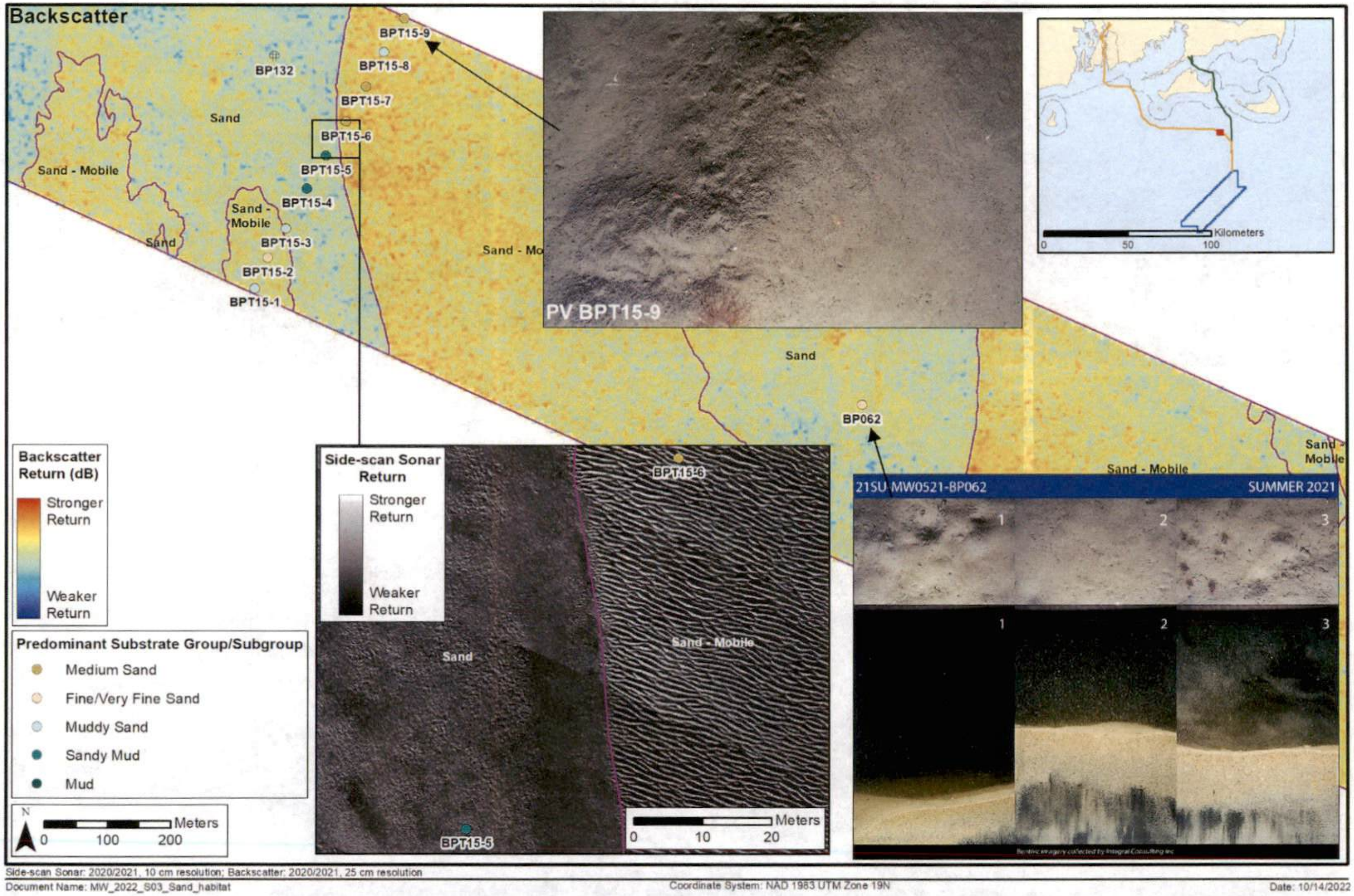

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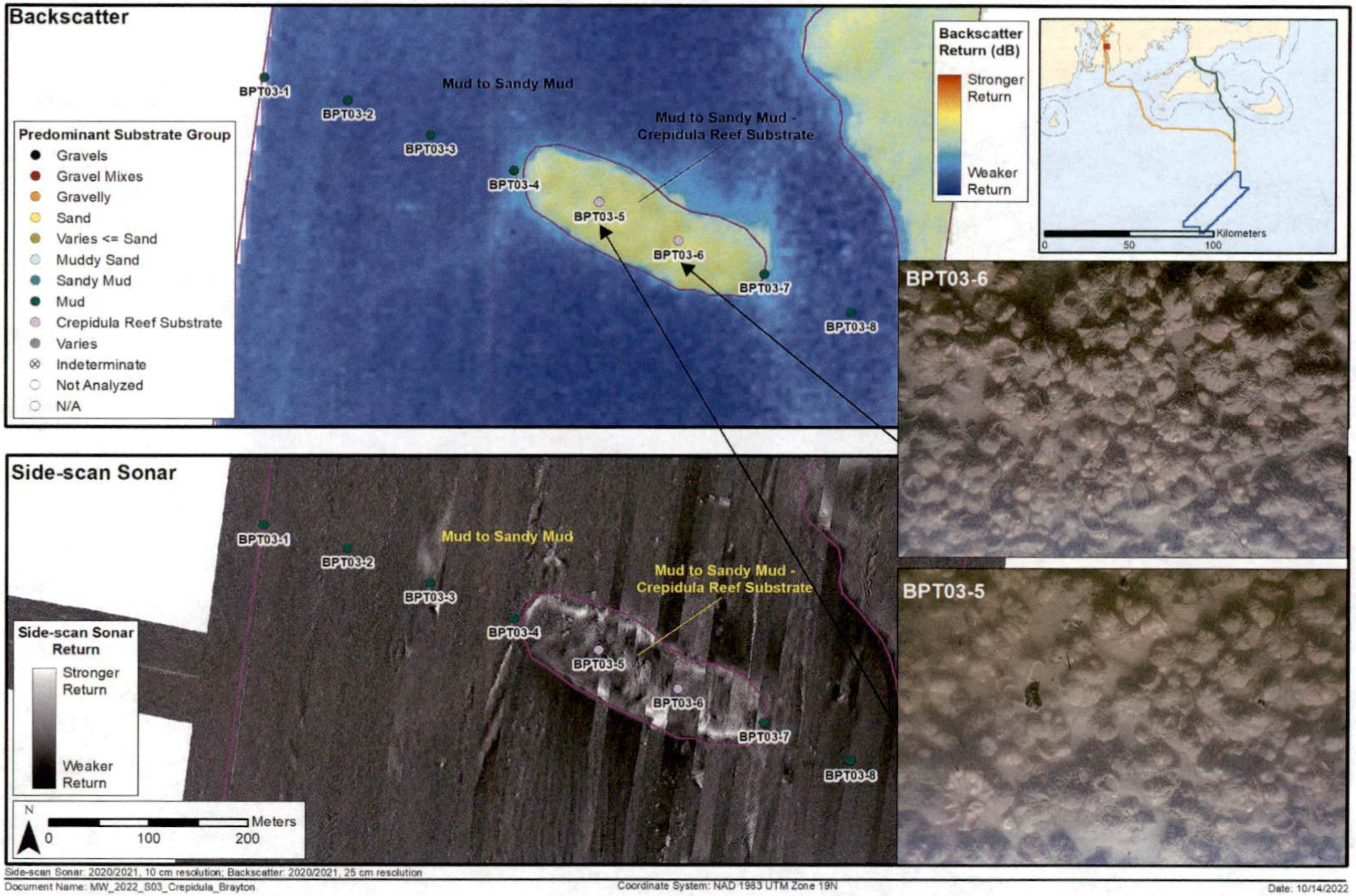

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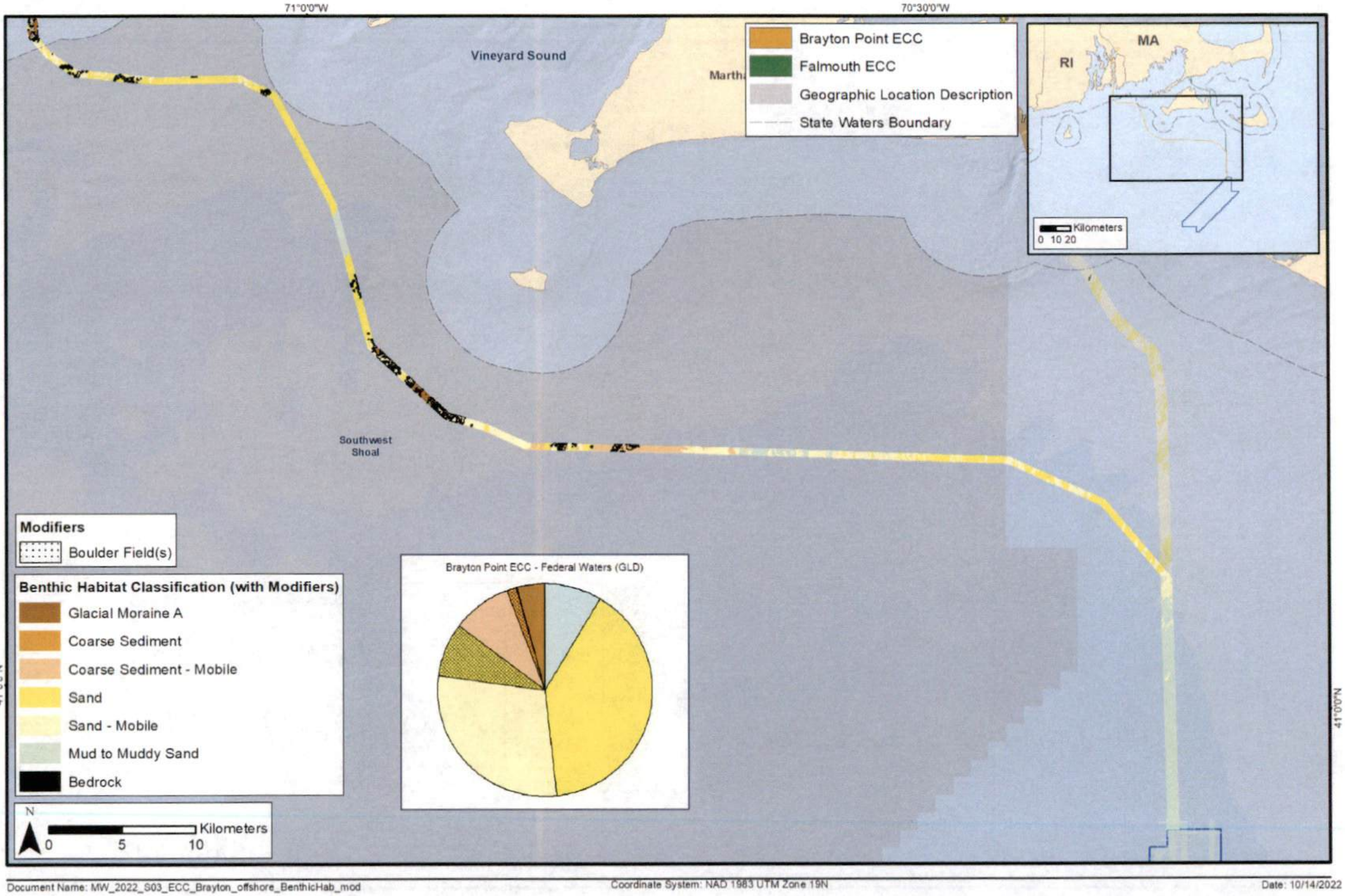

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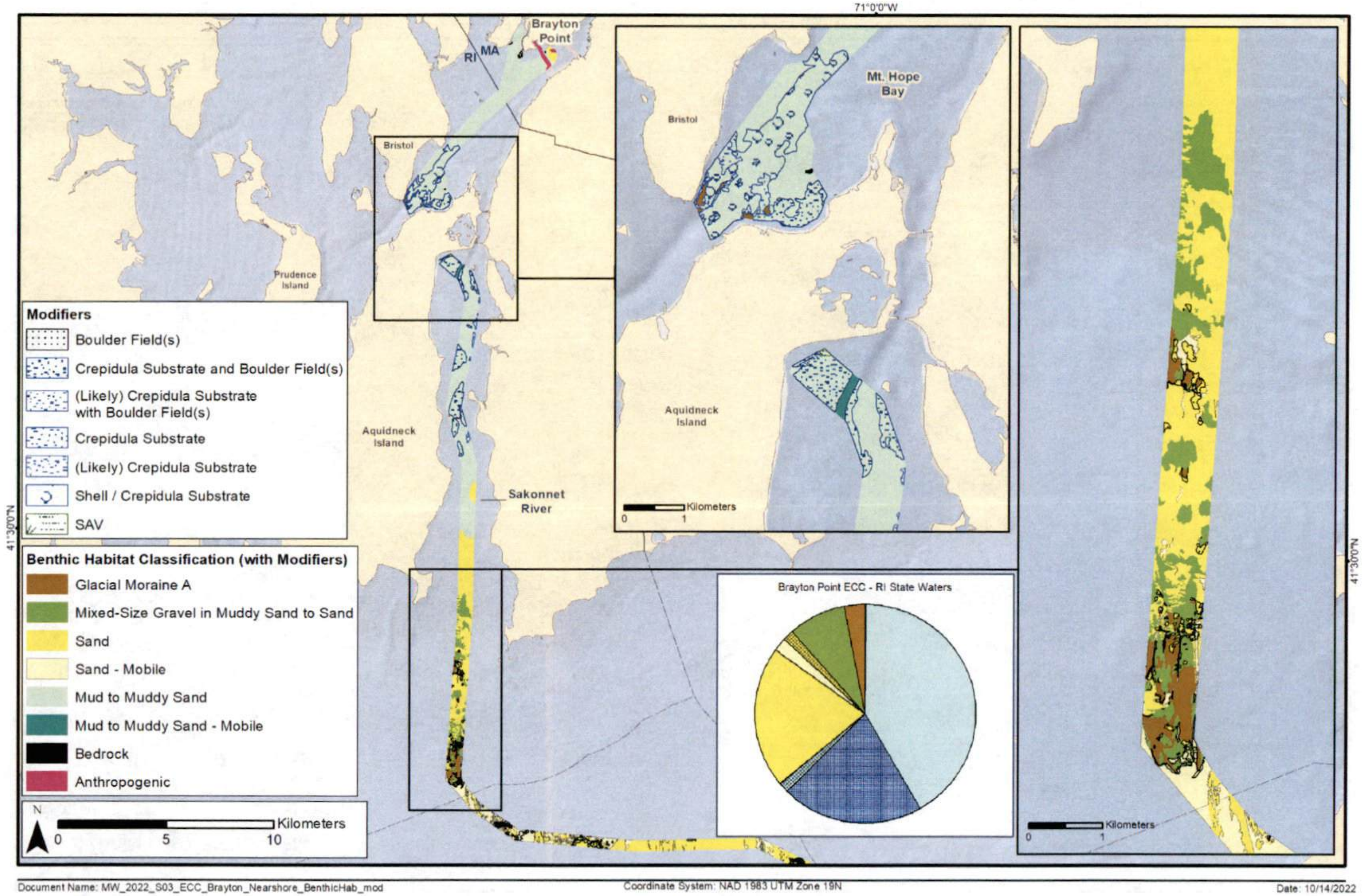

Figure 3-9. Benthic habitat types with modifiers mapped at the Brayton Point ECC (2 of 2) and pie charts of habitat composition

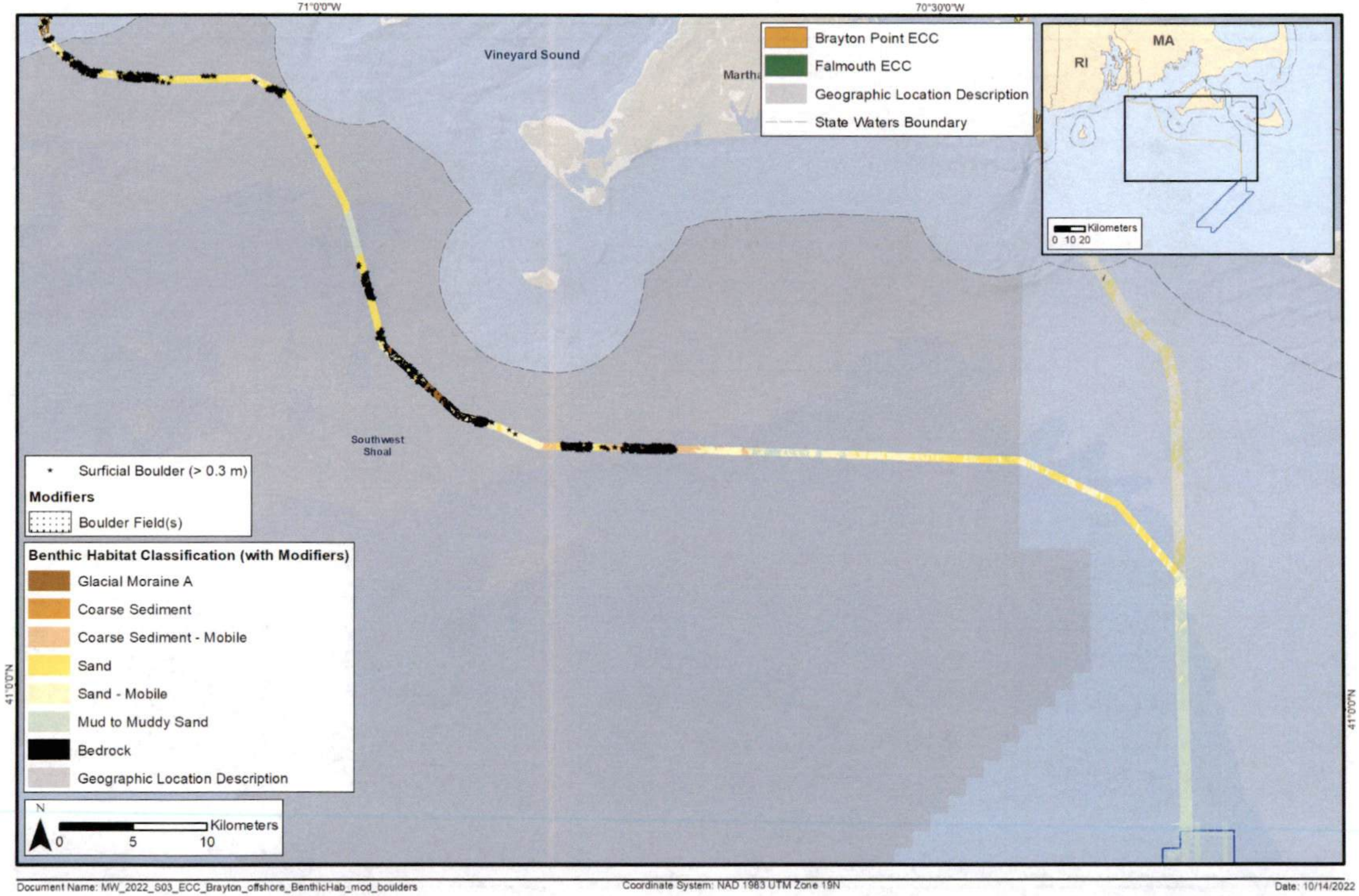

Figure 3-10. Benthic habitat types with modifiers and individual large boulders (>0.3 m) mapped at the Brayton Point ECC (1 of 2)

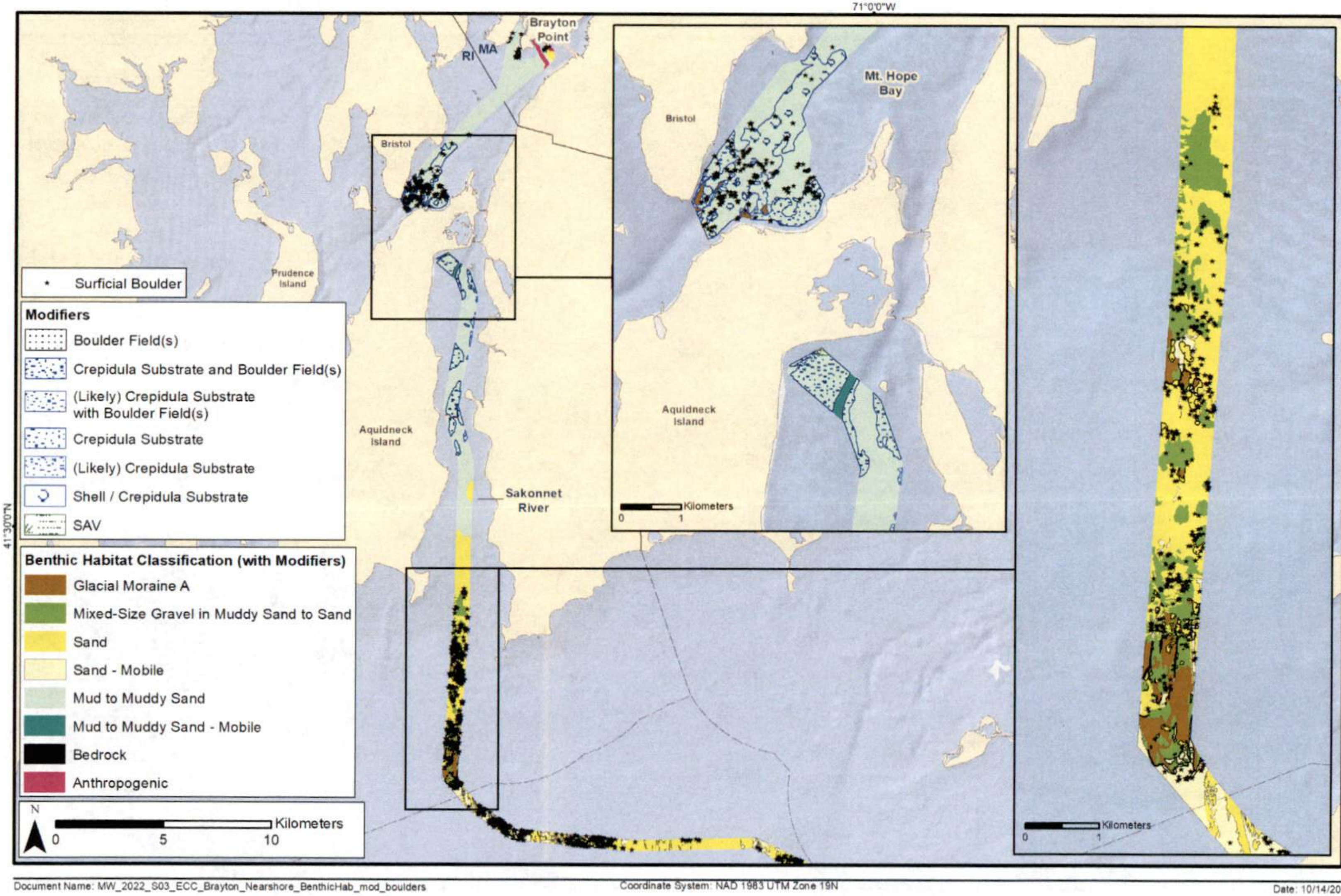

Figure 3-11. Benthic habitat types with modifiers and individual large boulders (>0.3 m) mapped at the Brayton Point ECC (2 of 2)

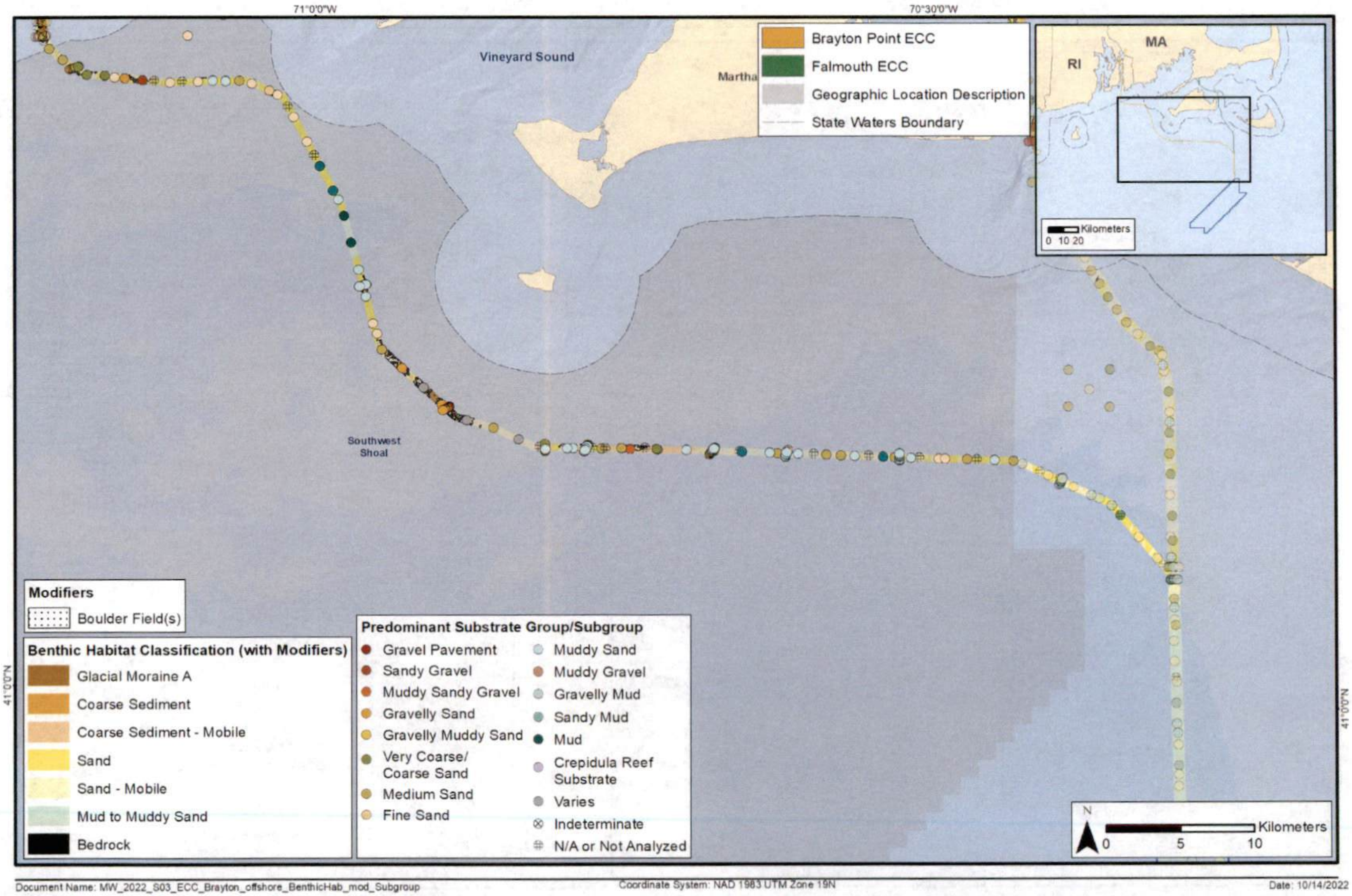

Figure 3-12. **Benthic habitat types with modifiers mapped and ground-truth CMECS Substrate Subgroup or Substrate Group at the Brayton Point ECC (1 of 2)**

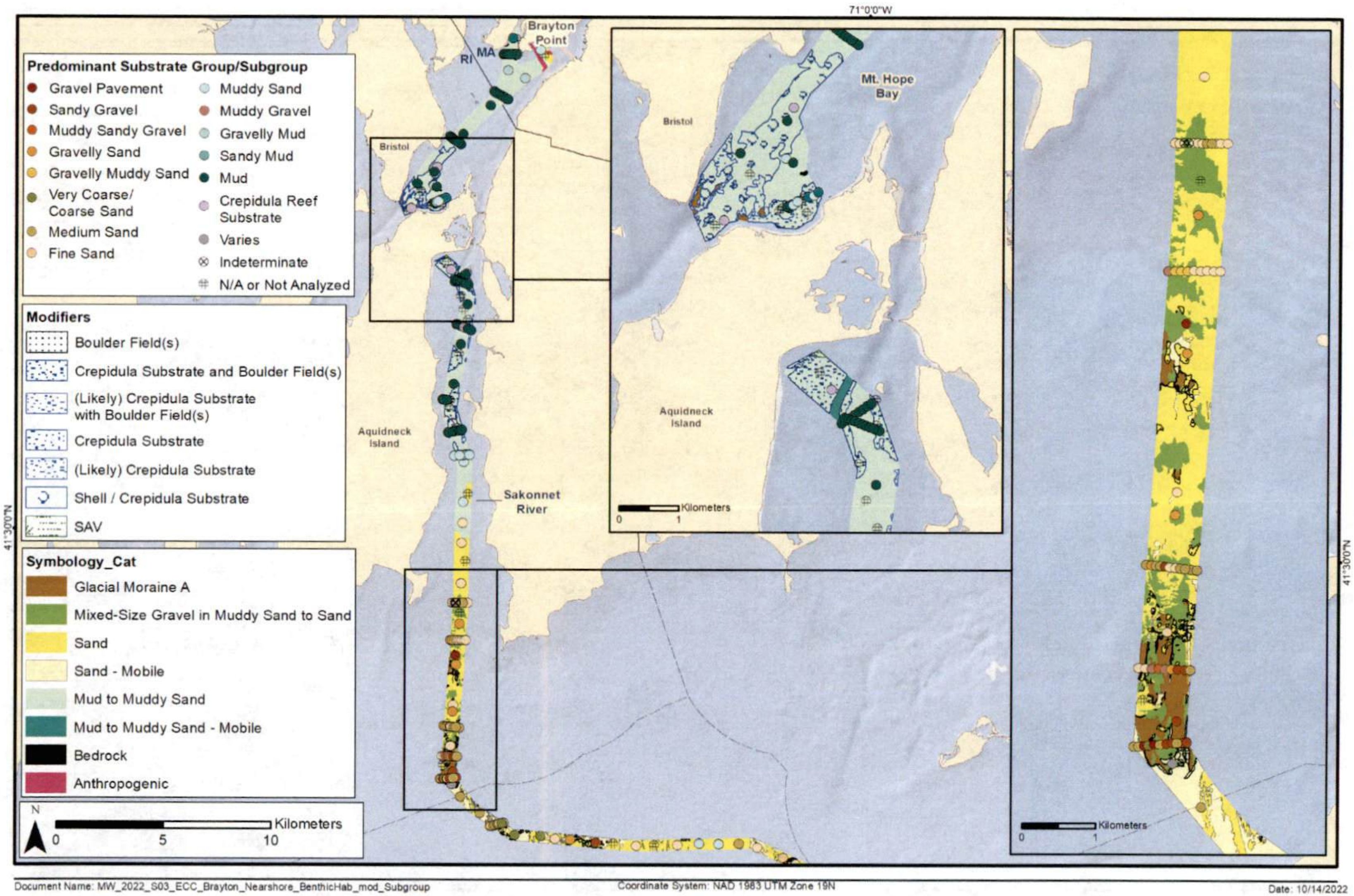

Figure 3-13. Benthic habitat types with modifiers mapped and ground-truth CMECS Substrate Subgroup or Substrate Group at the Brayton Point ECC (2 of 2)

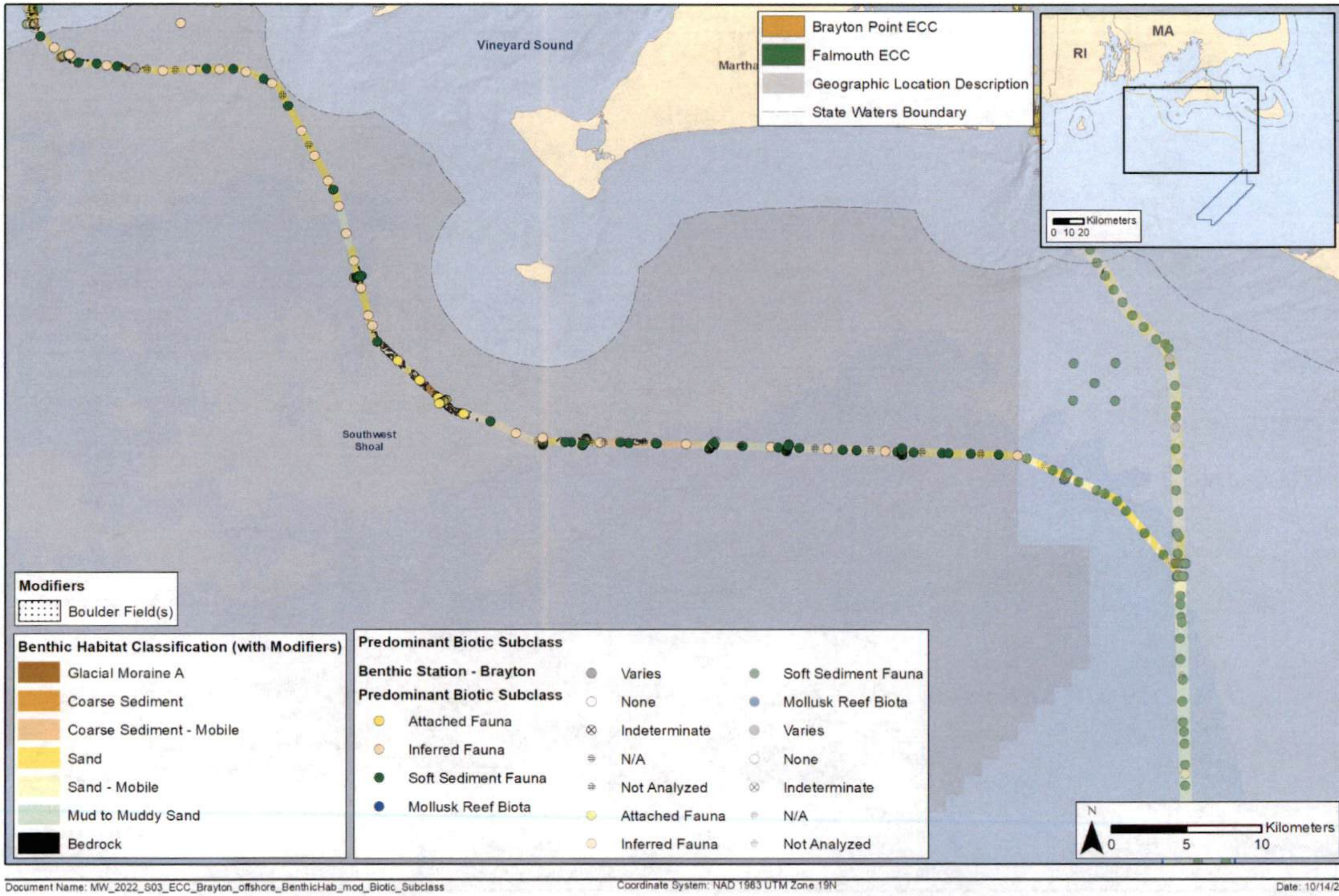

Figure 3-14. Benthic habitat types with modifiers mapped and ground-truth CMECS Biotic Subclass at the Brayton Point ECC (1 of 2)

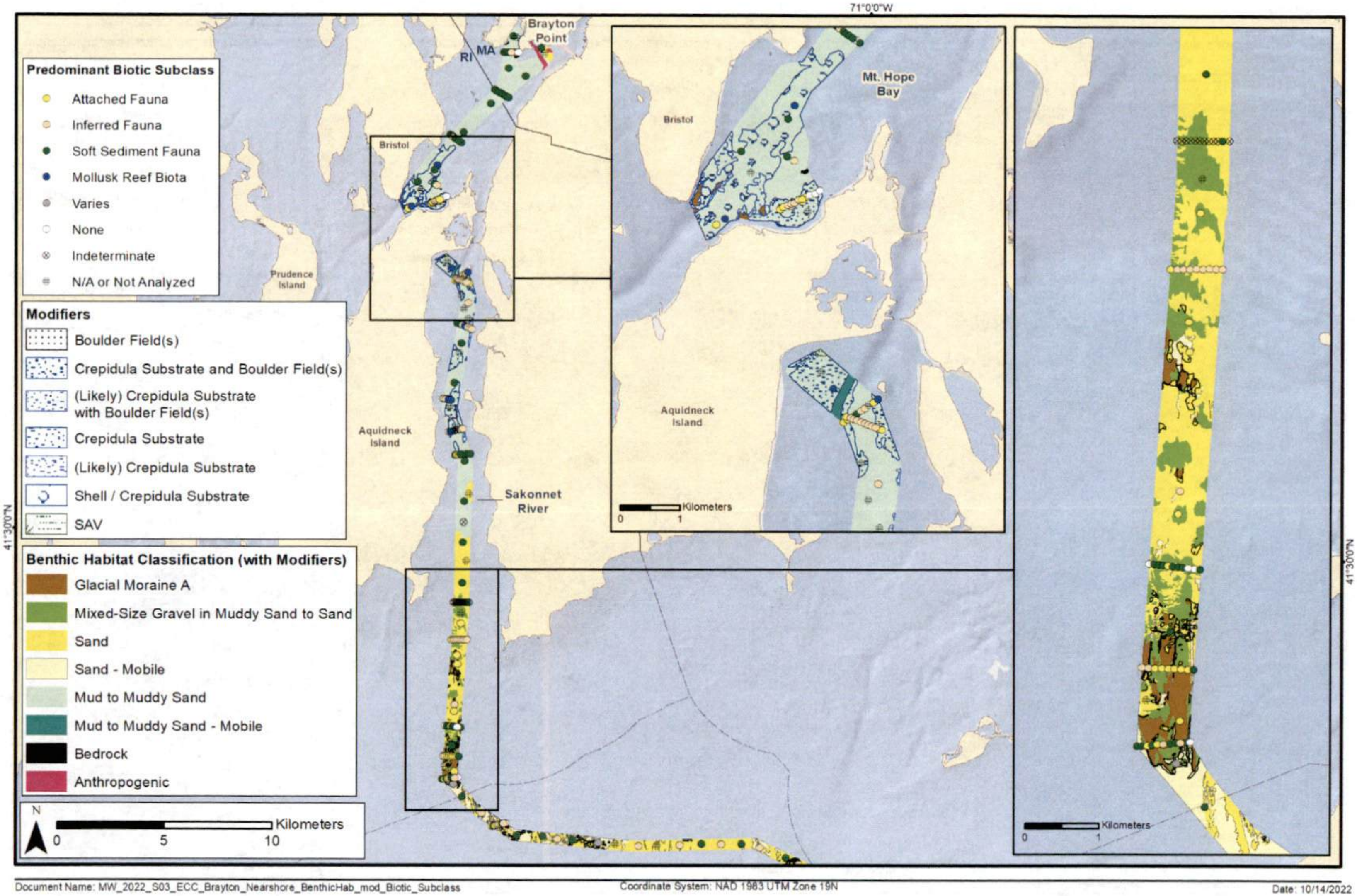

Figure 3-15. Benthic habitat types with modifiers mapped and ground-truth CMECS Biotic Subclass at the Brayton Point ECC (2 of 2)

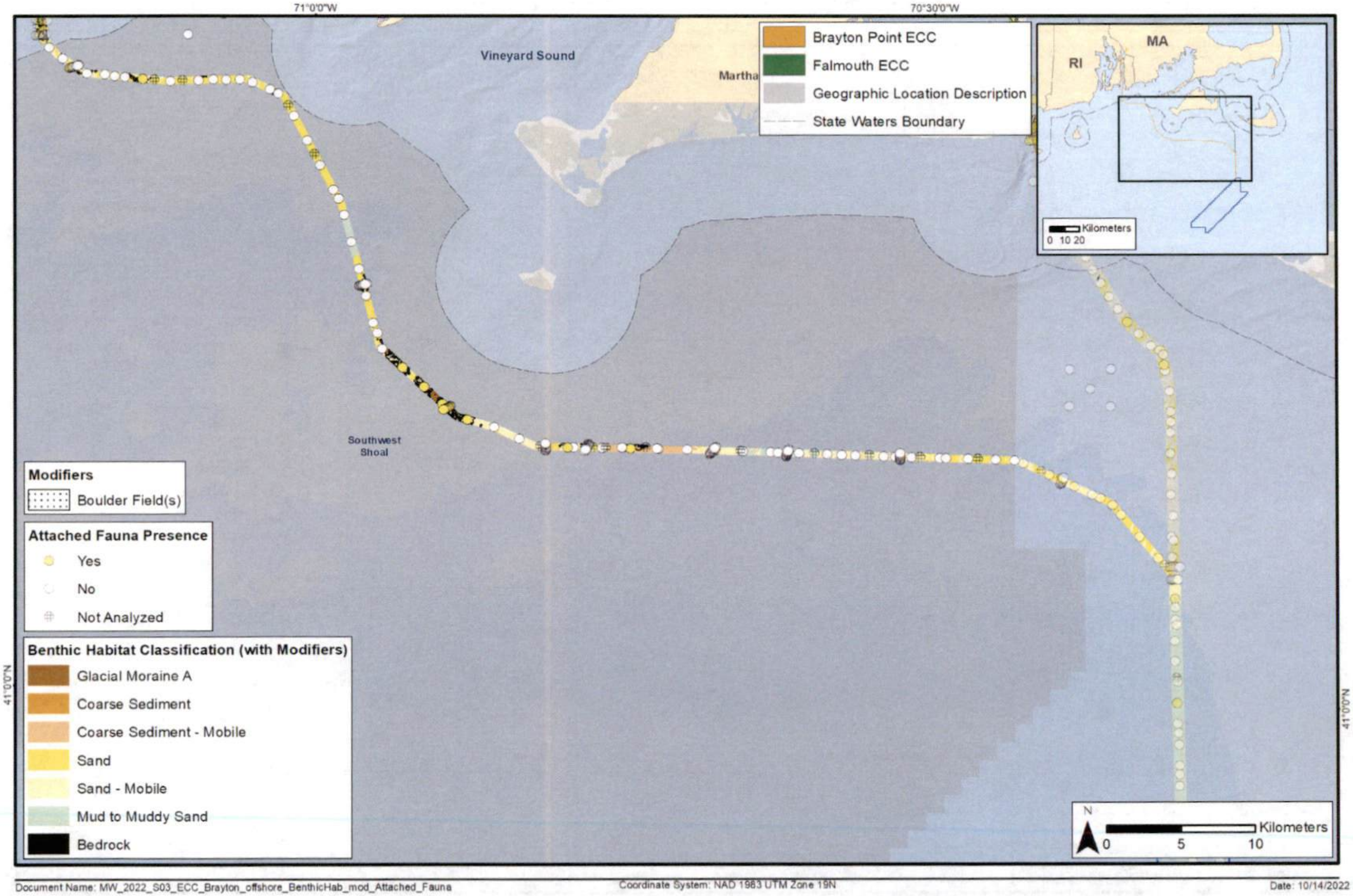

Figure 3-16. Benthic habitat types with modifiers mapped and ground-truth CMECS Attached Fauna presence at the Brayton Point ECC (1 of 2)

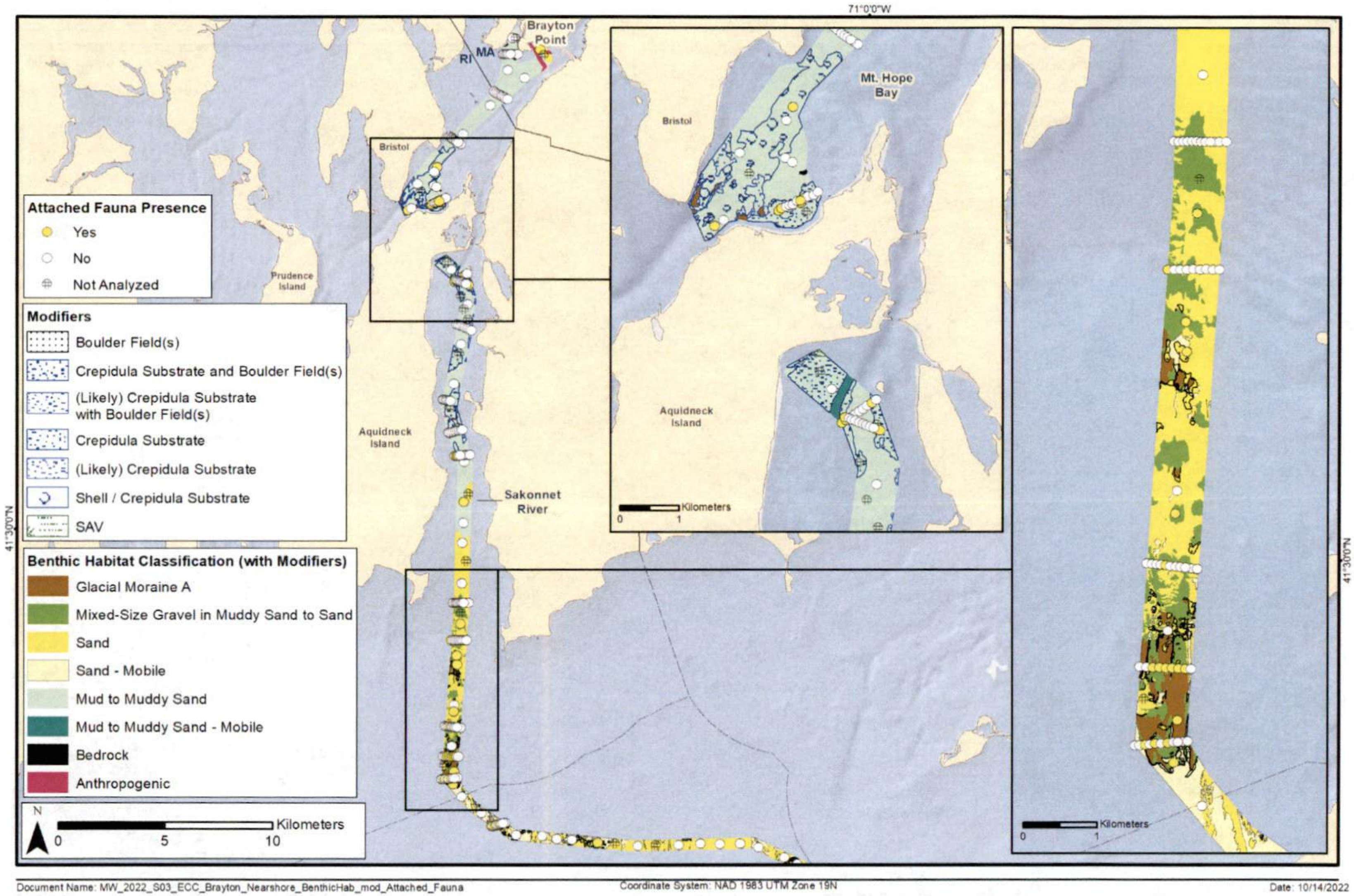

Figure 3-17. Benthic habitat types with modifiers mapped and ground-truth CMECS Attached Fauna presence at the Brayton Point ECC (2 of 2)

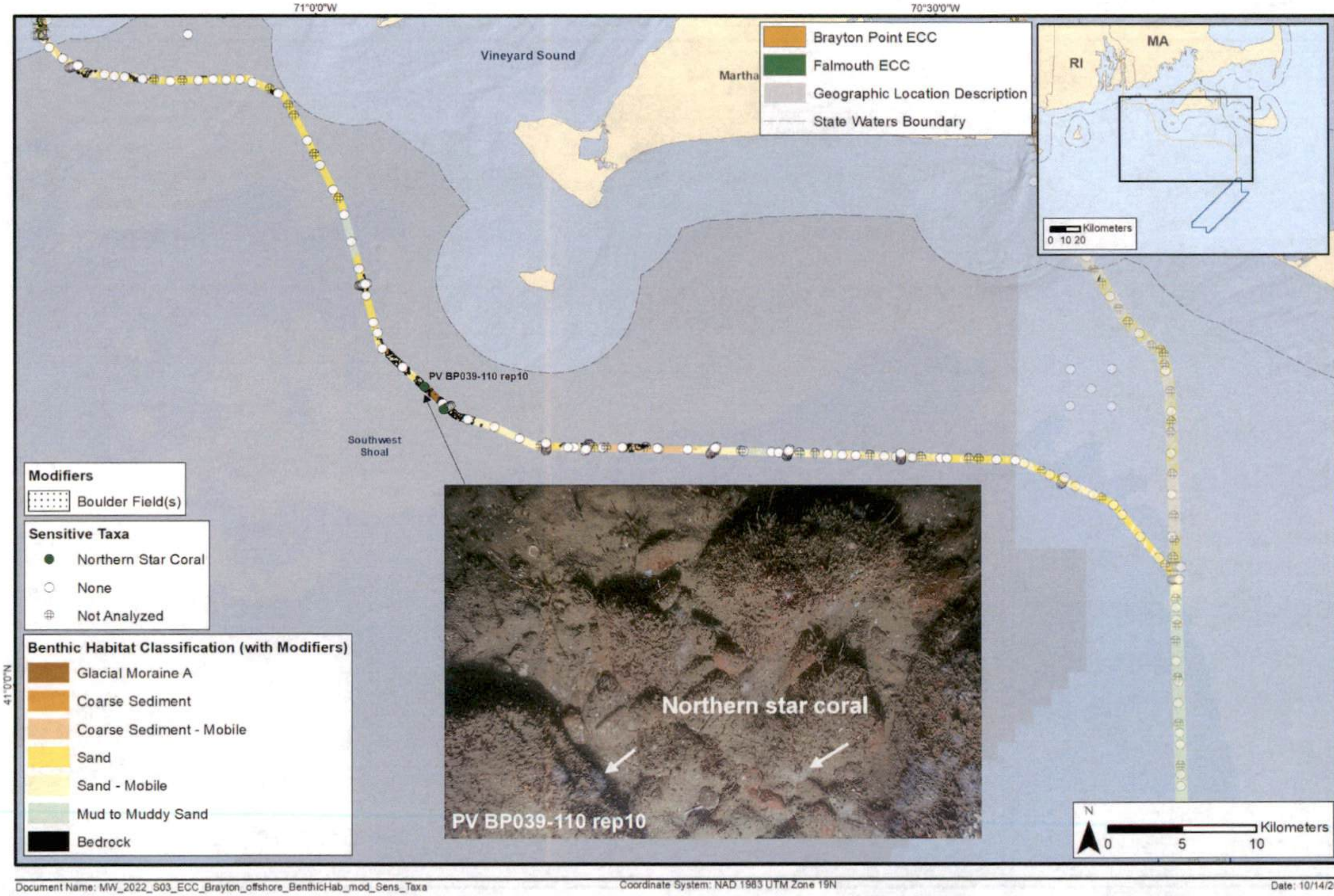

Figure 3-18. Benthic habitat types with modifiers mapped and ground-truth sensitive taxa presence at the Brayton Point ECC (1 of 2)

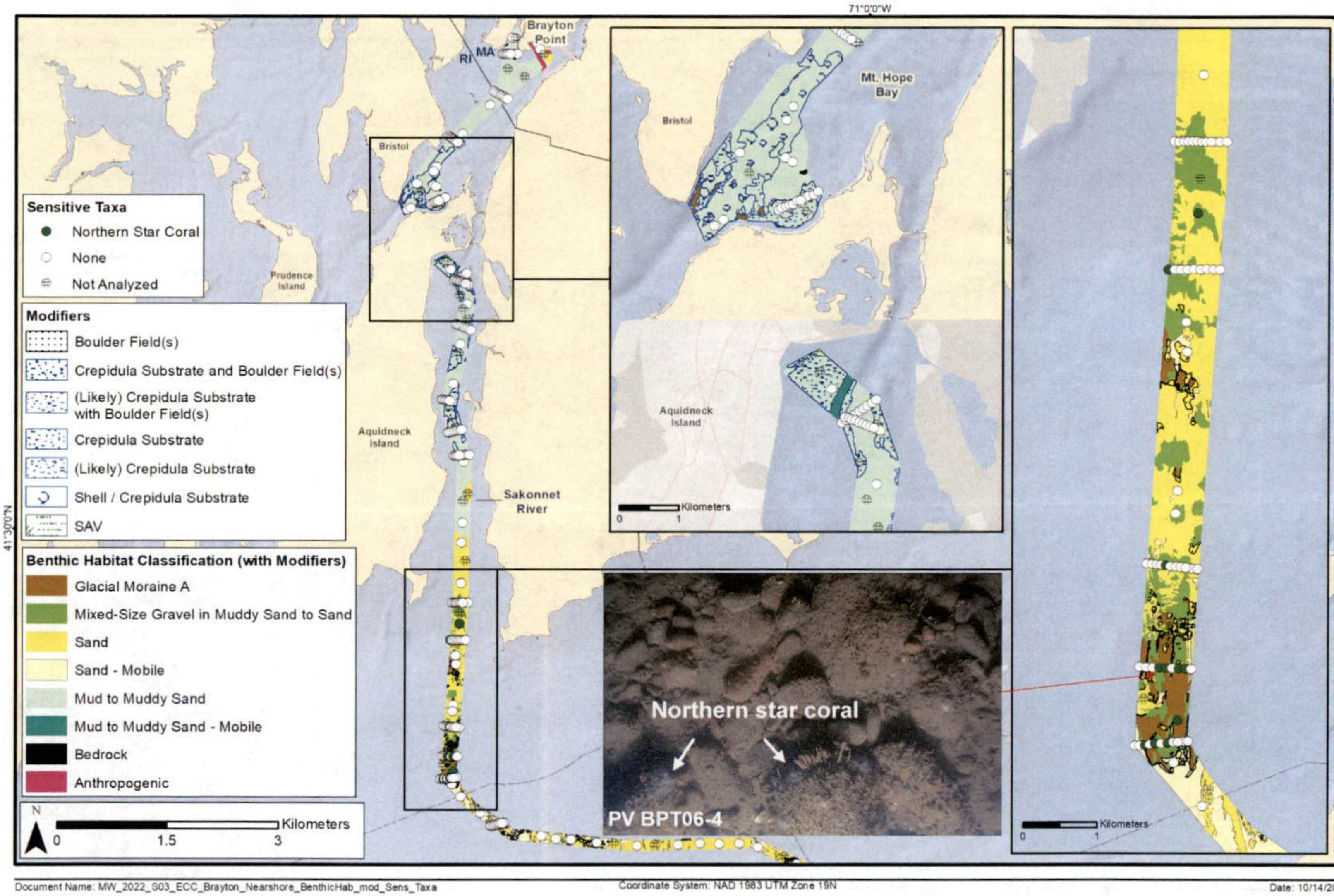

Figure 3-19. Benthic habitat types with modifiers mapped and ground-truth sensitive taxa presence at the Brayton Point ECC (2 of 2)

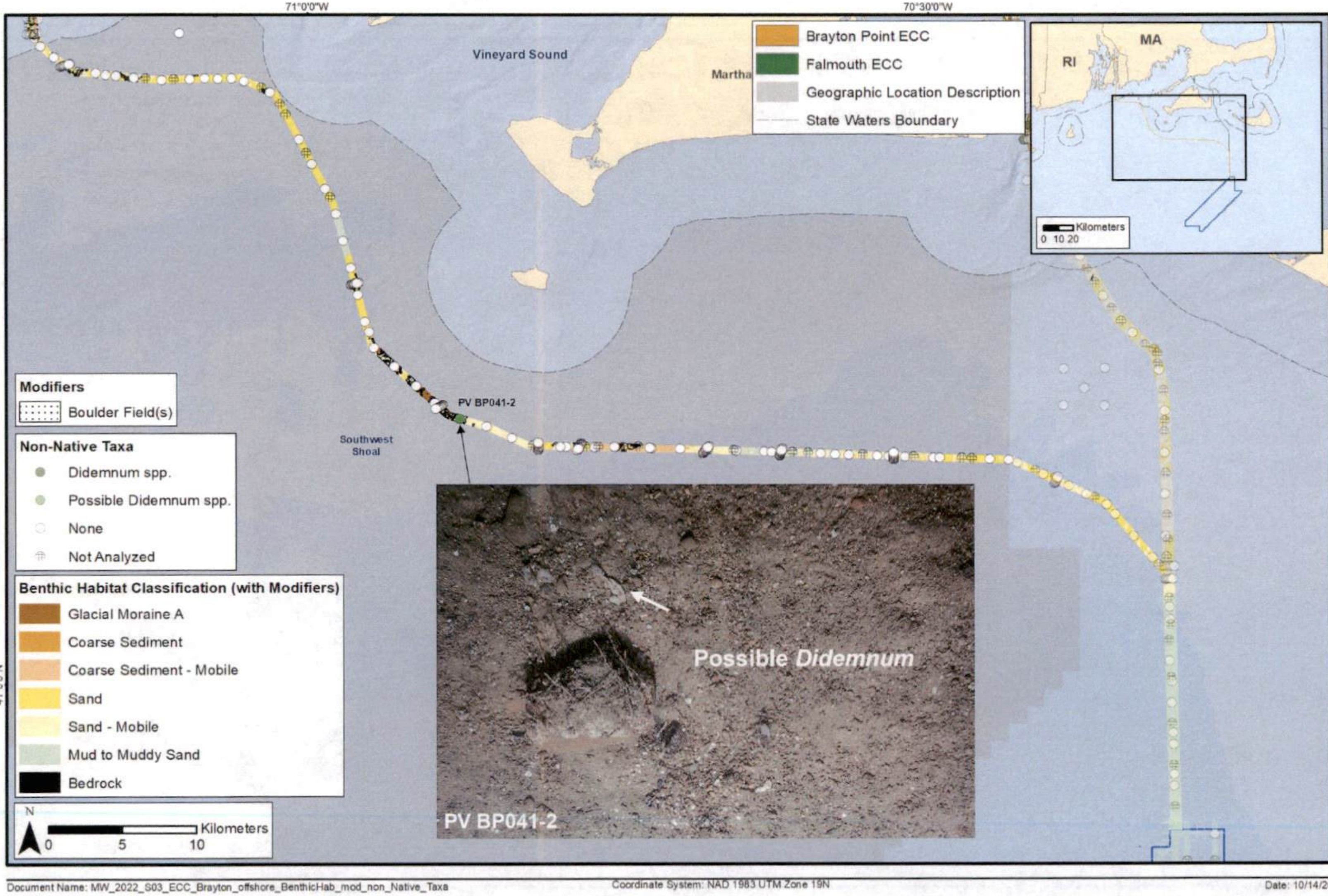

Figure 3-20. **Benthic habitat types with modifiers mapped and ground-truth non-native taxa presence at the Brayton Point ECC, possible *Didemnum* spp. at BP041 recorded in Summer 2021**

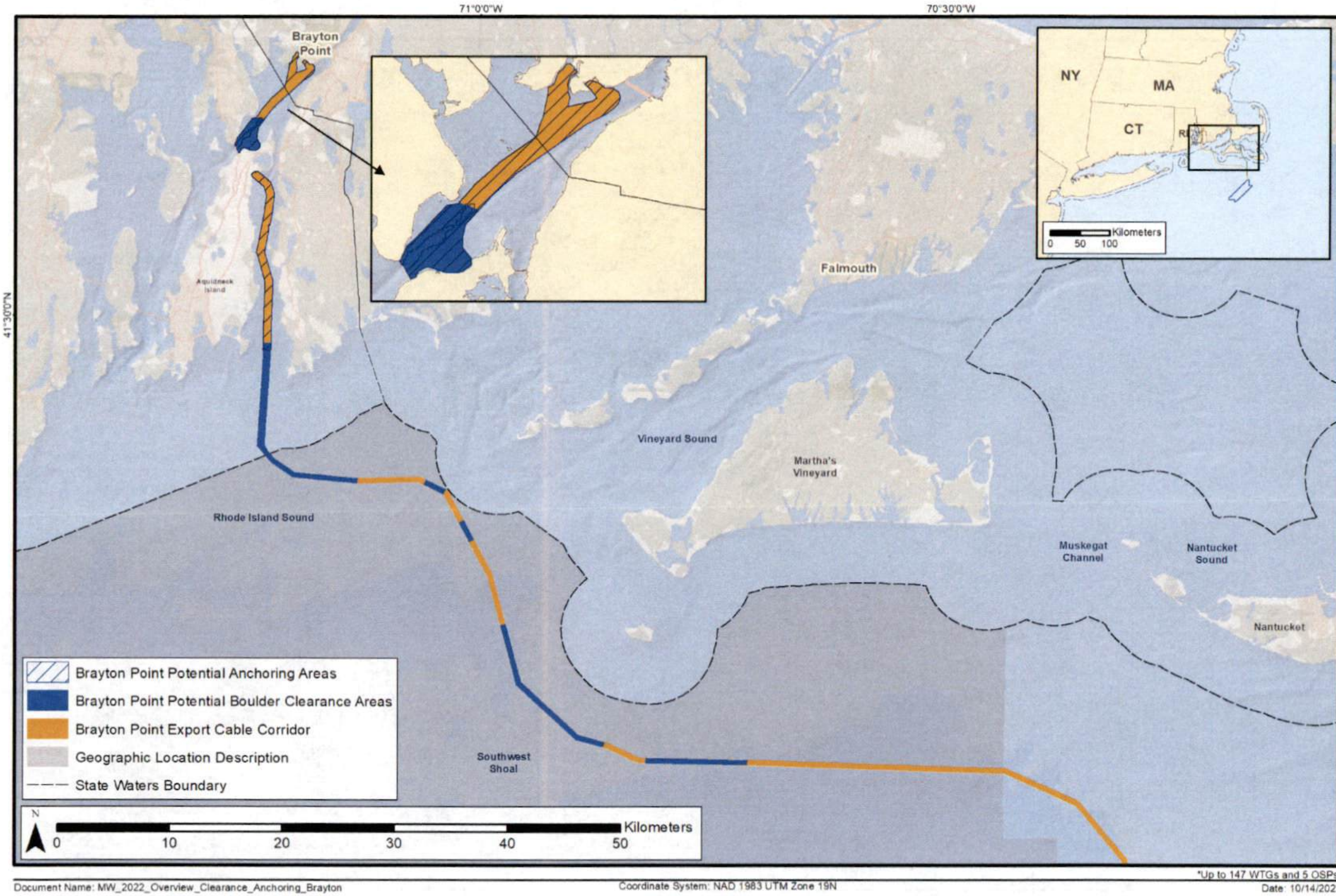

Figure 4-1. **Map of ECC depicting segments where various seafloor preparation and installation temporary disturbances activities, such as sand wave clearance, boulder clearance and removal, and anchoring, could potentially occur**

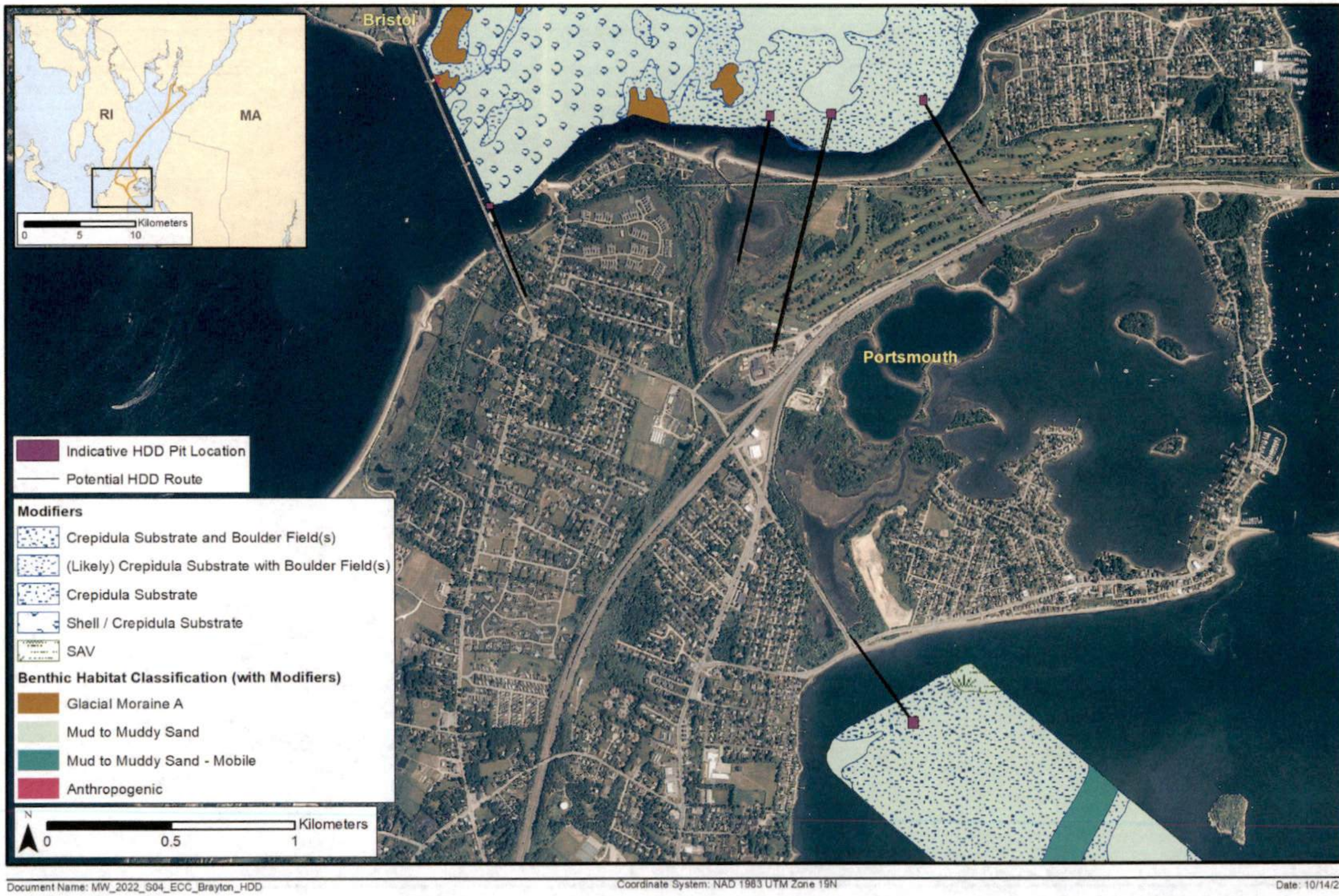

Figure 4-2. **Export cable corridor and four optional locations for four HDD pits on both sides of Aquidneck Island along with benthic habitat types with modifiers**

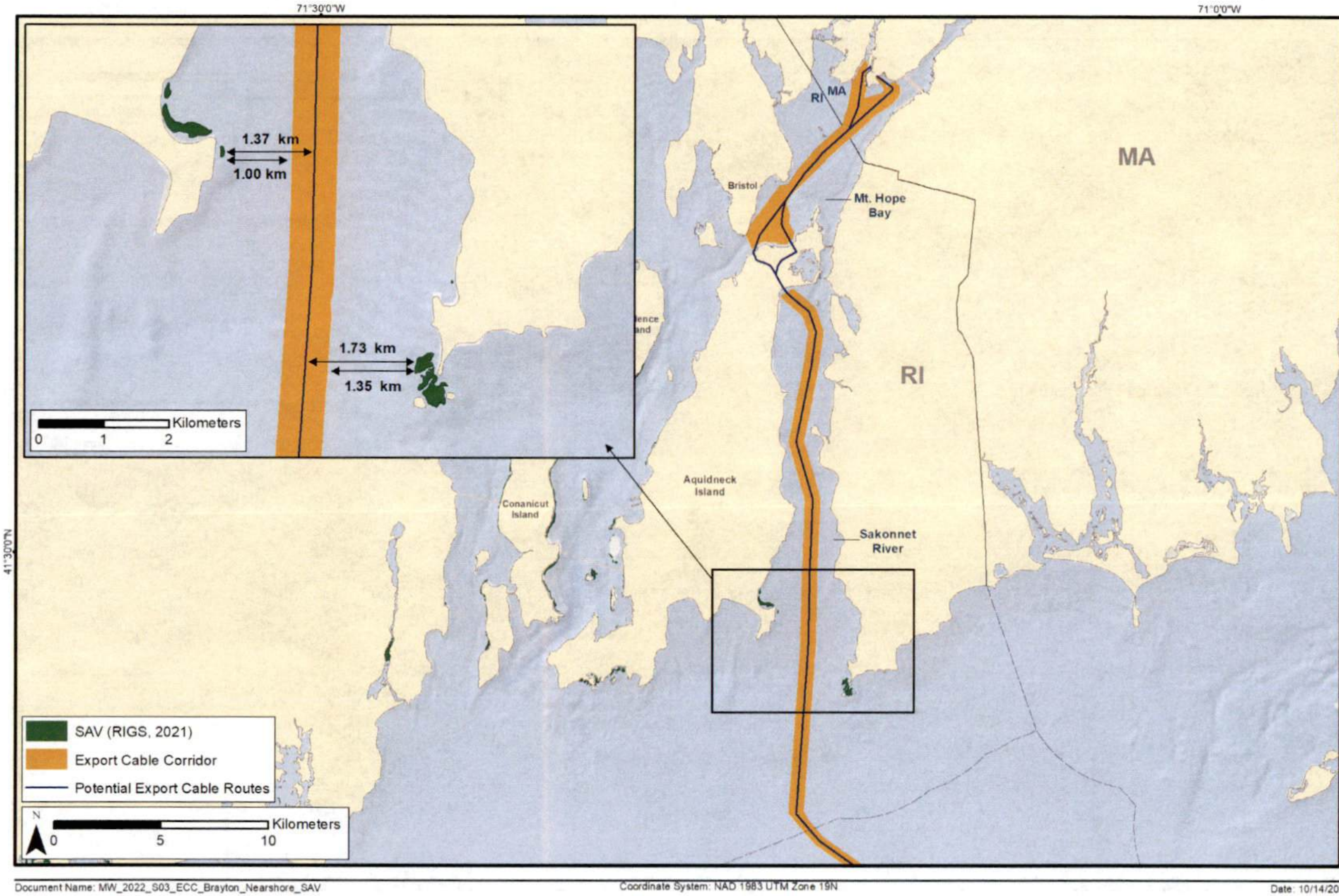

Figure 4-3. Indicative cable route and corridor in RI State Waters and state data on SAV beds; distances between SAV beds and the indicative cable route and corridor are indicated

Figure 4-4. **Likely presence of SAV mapped based on distinct side-scan sonar data at the east edge of the cable corridor south of Aquidneck Island**

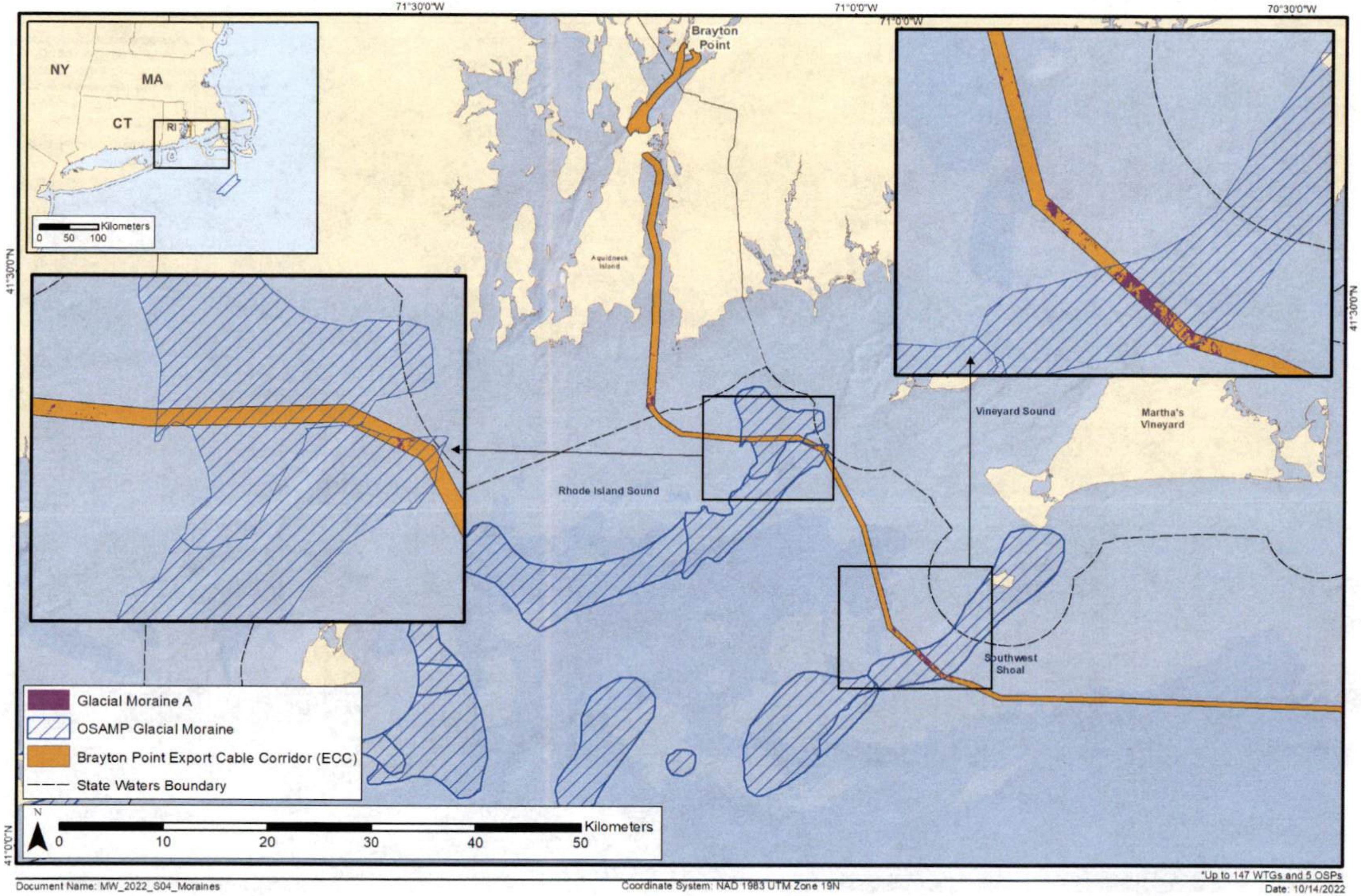

Figure 4-5. Glacial moraines as identified in the RI Ocean Special Area Management Plan and glacial moraines distribution as mapped by Mayflower Wind

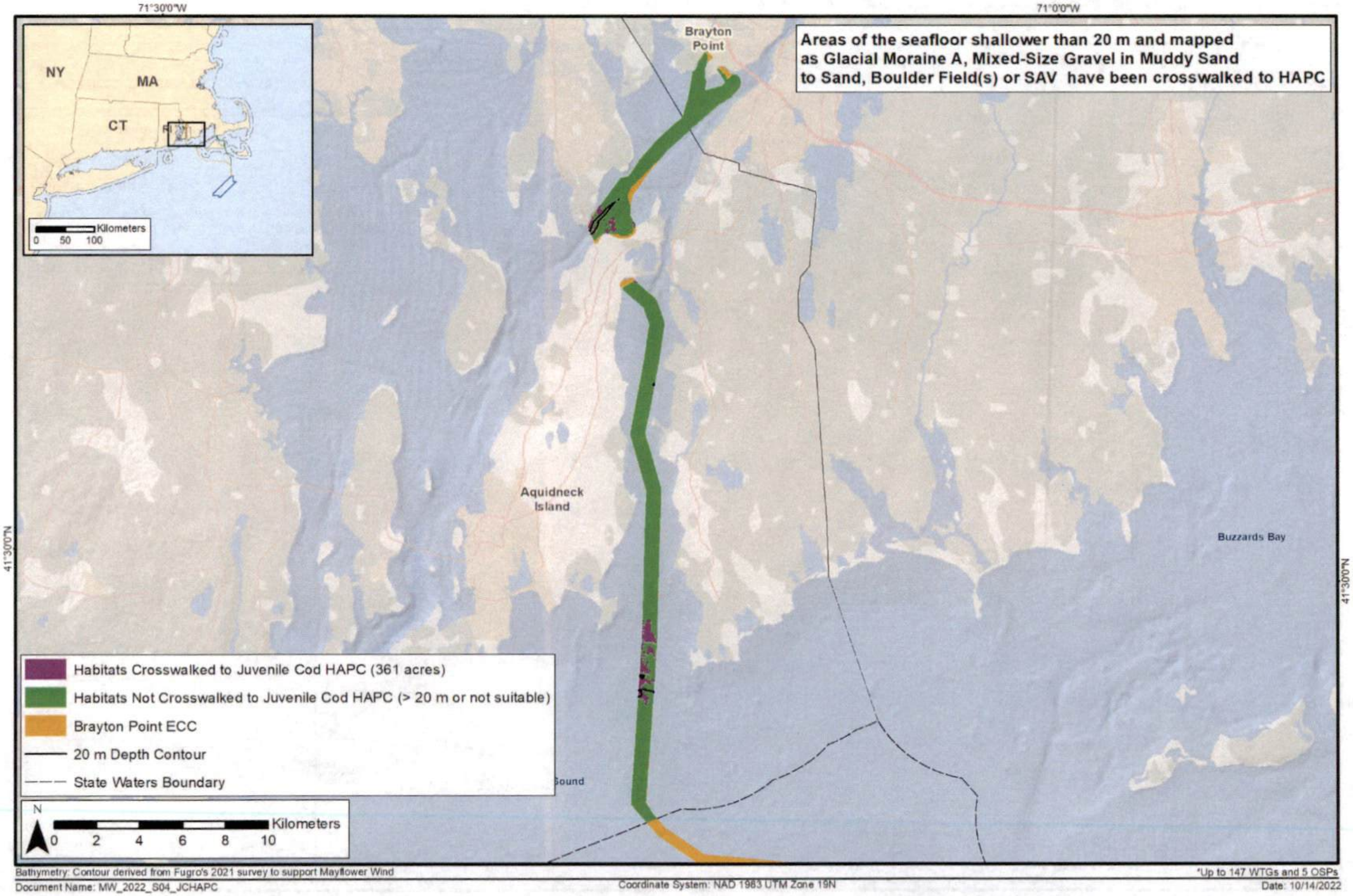

Figure 4-6. **Habitats crosswalked to juvenile cod HAPC at the Brayton Point ECC, along with the 20-m depth contour**

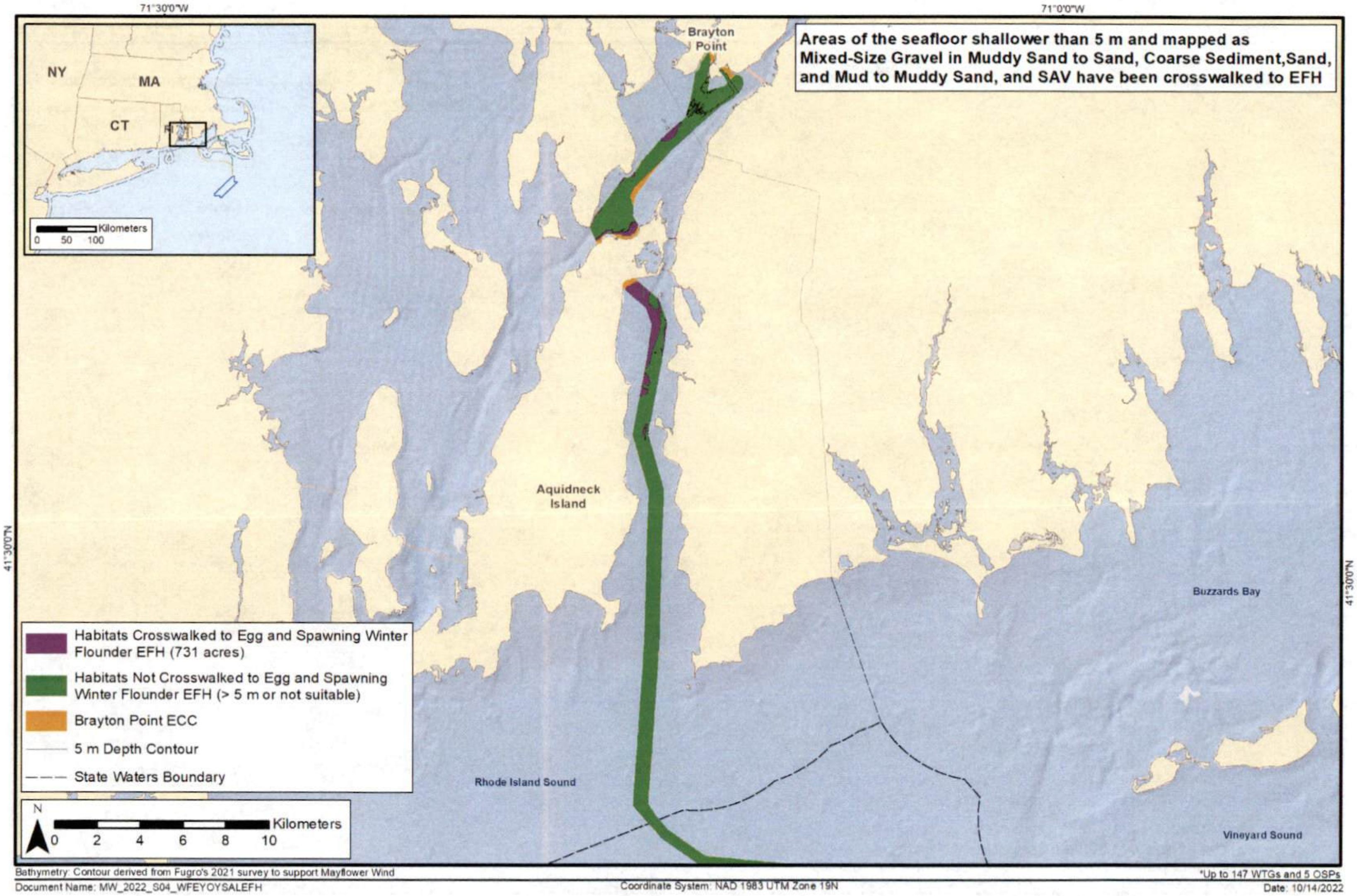

Figure 4-7. Habitats crosswalked to winter flounder egg and spawning adult EFH at the Brayton Point ECC

MAYFLOWER WIND

Benthic Habitat Mapping to Support State Permitting Applications - Brayton Point ECC for RI State Waters and GLD - ATTACHMENTS

Document Number	MW01-COR-PRT-RPT-0112
Document Revision	A
Document Status	Final
Owner/Author	INSPIRE Environmental
Issue Date	October 28, 2022
Security Classification	Confidential
Disclosure	For use by Mayflower Wind and Authorized Third Parties

List of Attachments

Attachment A Inventory of Benthic Sample Types Collected at Each Sampling Location Across Surveys

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - RI State Waters	BP003-BP072	SPI/PV, Grab, GrabCam	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP004-BP073	SPI/PV	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP005	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - RI State Waters	BP006	SPI/PV	-
Brayton Point ECC - RI State Waters	BP007	SPI/PV	-
Brayton Point ECC - RI State Waters	BP008	SPI/PV	-
Brayton Point ECC - RI State Waters	BP009	SPI/PV	-
Brayton Point ECC - RI State Waters	BP010-BP085	Grab, GrabCam	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP011	SPI/PV	-
Brayton Point ECC - RI State Waters	BP012	Grab, GrabCam	-
Brayton Point ECC - RI State Waters	BP013	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - RI State Waters	BP014	SPI/PV	-
Brayton Point ECC - RI State Waters	BP015	SPI/PV	-
Brayton Point ECC - RI State Waters	BP016	SPI/PV	-
Brayton Point ECC - RI State Waters	BP017	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - RI State Waters	BP018	Grab, GrabCam	-
Brayton Point ECC - RI State Waters	BP019	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP020	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP021	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP022	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP023	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP024	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP025	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP026-BP105	SPI/PV	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP027	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP028	Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP029	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP030	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP031	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP032	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP033	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP034	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP035	SPI/PV, Grab, GrabCam	-
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Brayton Point ECC - Federal Waters, GLD	BP037	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP038	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP039-BP110	SPI/PV, Grab, GrabCam	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP040A	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP041	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP042	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP043-BP111	SPI/PV	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP044	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP045	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP046-BP117	Grab, GrabCam	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP047-BP119	SPI/PV	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP048-BP120	SPI/PV	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP049	SPI/PV, Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP050	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP051	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP052	Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP053	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP054	SPI/PV	-

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - Federal Waters, GLD	BP055	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP056	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP057	SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BP058	Grab, GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BP059	SPI/PV	-
Brayton Point ECC - RI State Waters	BP074	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP075	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP076	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP077	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP078	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP079	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP080	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP081	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP082	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP083	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP084	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP086	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP087	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP088	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP089	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP090	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP091	-	GrabCam
Brayton Point ECC - RI State Waters	BP092	-	SPI/PV, GrabCam
Brayton Point ECC - RI State Waters	BP093	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - RI State Waters	BP094	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP095	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP096	-	Grab, GrabCam
Brayton Point ECC - RI State Waters	BP097	-	SPI/PV, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP098	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP099	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP100	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP101	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP102	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP103	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP104	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP106	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP107	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP109	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP112	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP113	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP114	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP115	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP116	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP118	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP121	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP122	-	SPI/PV, Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP123	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP124	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP125	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP126	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP127	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP128	-	SPI/PV

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - Federal Waters, GLD	BP129	-	Grab, GrabCam
Brayton Point ECC - Federal Waters, GLD	BP130	-	SPI/PV
Brayton Point ECC - Federal Waters, GLD	BP140	-	SPI/PV
Brayton Point ECC - RI State Waters	BPALT03	SPI/PV	-
Brayton Point ECC - RI State Waters	BPALT04	SPI/PV	-
Brayton Point ECC - RI State Waters	BPALT05	SPI/PV	-
Brayton Point ECC - RI State Waters	BPALT06A	SPI/PV	-
Brayton Point ECC - RI State Waters	BPT01-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-2	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-3	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-4	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-5	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-6	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-7	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-8	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT02-9	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-2	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-3	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-4	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-5	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-6	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-7	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-8	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT03-9	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-2	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-3	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-4	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-5	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-6	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-7	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-8	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT04-9	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-2	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-3	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-4	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-5	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-6	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-7	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-8	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT05-9	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-1	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-2	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-3	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-4	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-5	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-6	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-7	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT06-8	Transect SPI/PV	-

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - RI State Waters	BPT06-9	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT07	Grab, GrabCam, Transect GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BPT08	Grab, GrabCam, Transect GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BPT09	Grab, GrabCam, Transect GrabCam	-
Brayton Point ECC - RI State Waters	BPT10	Transect GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BPT11	Transect GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BPT12	Transect GrabCam	-
Brayton Point ECC - Federal Waters, GLD	BPT13-1	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-2	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-3	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-4	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-5	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-6	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-7	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-8	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT13-9	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-1	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-2	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-3	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-4	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-5	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-6	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-7	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-8	Transect SPI/PV	-
Brayton Point ECC - Federal Waters, GLD	BPT14-9	Transect SPI/PV	-
Brayton Point ECC - RI State Waters	BPT20-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT20-11	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-11	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-12	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT22-13	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-3	-	Transect SPI/PV

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - RI State Waters	BPT23-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT23-11	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-13	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-14	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-15	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-16	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-17	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-18	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT24-19	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT25	-	Transect GrabCam
Brayton Point ECC - RI State Waters	BPT26-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT26-11	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-9	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT27-10	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT28	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT29-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-9	-	Transect SPI/PV

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - Federal Waters, GLD	BPT29-10	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT29-11	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT30	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT31	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT32-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT32-9	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT33	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT34	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT35-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-9	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-10	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT35-11	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT36	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT37-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-9	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-10	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT37-11	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT38	-	Transect GrabCam
Brayton Point ECC - Federal Waters, GLD	BPT40-1	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-2	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-4	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-5	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-6	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-7	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-8	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-9	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-10	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT40-11	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT41	-	Transect GrabCam
Brayton Point ECC - RI State Waters	BPT45-1	-	Transect SPI/PV

Area	StationID	Summer 2021	Spring 2022
Brayton Point ECC - RI State Waters	BPT45-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT45-11	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-1	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-8	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-9	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-10	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-11	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT46-12	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-2	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-3	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-4	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-5	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-6	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-7	-	Transect SPI/PV
Brayton Point ECC - RI State Waters	BPT47-1-3	-	Transect SPI/PV
Brayton Point ECC - Federal Waters, GLD	BPT48	-	Transect GrabCam

Attachment B Summary Benthic Ground-Truth Data Analysis Results

Notes:

IND=Indeterminate

N/A=Not Applicable

Not Analyzed=Station not analyzed for the variable

[1]Replicates: total sampling effort at a station, with each replicate representing a collected sample (i.e., grab sample, SPI/PV image pair, video clip). Transect GrabCam stations were not included in summarization.

[2]Variable determined from the total number of replicates analyzed for that variable

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP003-BP072	1	7	Mud to Muddy Sand	Mud	Varies	N/A	0.60
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP004-BP073	1	5	Mud to Muddy Sand	Mud	Muddy Gravel	75.0	0.50
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP005	1	5	Mud to Muddy Sand - Shell / *Crepidula* Substrate	*Crepidula* Reef Substrate	Gravelly Mud	75.0	0.50
Brayton Point ECC - RI State Waters	SPI/PV	BP006	1	3	Mud to Muddy Sand	Muddy Sand	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BP007	1	3	Mud to Muddy Sand - *Crepidula* Substrate	*Crepidula* Reef Substrate	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BP008	1	3	Mud to Muddy Sand	Mud	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BP009	1	3	Mud to Muddy Sand	Mud	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP010-BP085	1	7	Mud to Muddy Sand	Mud	Gravelly Mud	80.0	0.40
Brayton Point ECC - RI State Waters	SPI/PV	BP011	1	3	Mud to Muddy Sand	Muddy Sand	Fine/Very Fine Sand	66.7	0.67
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP012	N/A	2	Mud to Muddy Sand	Sand	Muddy Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP013	1	5	Sand	Sand	Fine/Very Fine Sand	100.0	0.25
Brayton Point ECC - RI State Waters	SPI/PV	BP014	1	3	Sand	Sand	Fine/Very Fine Sand	66.7	0.67
Brayton Point ECC - RI State Waters	SPI/PV	BP015	1	3	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Sand	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BP016	1	3	Sand - Mobile	Gravelly	Gravelly Sand	66.7	0.67
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP017	1	5	Sand	Sand	Fine/Very Fine Sand	100.0	0.25
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP018	N/A	2	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP019	1	5	Mixed-Size Gravel in Muddy Sand to Sand	Gravel Mixes	Varies	N/A	1.00
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP020	1	3	Sand - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP021	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP022	1	3	Sand - Mobile	Gravel Mixes	Sandy Gravel	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP023	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP024	1	5	Sand	Sand	Fine/Very Fine Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP025	1	3	Sand	Muddy Sand	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP026-BP105	1	5	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Fine/Very Fine Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP027	1	3	Sand - with Boulder Field(s)	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP028	N/A	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.50
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP029	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP030	1	3	Sand	Sandy Mud	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP031	1	3	Sand	Sandy Mud	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP032	1	3	Mud to Muddy Sand	Mud	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP033	1	3	Mud to Muddy Sand	Mud	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP034	1	3	Sand	Muddy Sand	Fine/Very Fine Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP035	1	5	Sand	Muddy Sand	Gravelly Muddy Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP036	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP037	1	3	Sand - Mobile	Sand	Medium Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP038	1	3	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP039-BP110	2	10	Glacial Moraine A	Gravelly	Gravelly Sand	37.5	0.63
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP040A	1	3	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP041	1	3	Sand - Mobile with Boulder Field(s)	Varies	Varies	N/A	1.00
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP042	1	5	Sand - Mobile	Sand	Medium Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP043-BP111	2	8	Sand - Mobile	Gravelly	Gravelly Sand	57.1	0.29
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP044	1	3	Coarse Sediment - Mobile	Muddy Sand	Gravelly Muddy Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP045	1	3	Coarse Sediment - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP046-BP117	N/A	4	Coarse Sediment - Mobile	Gravel Mixes	Varies	N/A	1.00
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP047-BP119	1	5	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP048-BP120	1	5	Coarse Sediment - Mobile	Muddy Sand	Gravelly Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP049	1	5	Sand - Mobile	Sand	Very Coarse/Coarse Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP050	1	3	Coarse Sediment - Mobile	Sandy Mud	N/A	100.0	0.33

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP051	1	3	Mud to Muddy Sand	Muddy Sand	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP052	N/A	2	Mud to Muddy Sand	Sand	Muddy Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP053	1	3	Sand - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP054	1	3	Sand - Mobile	Muddy Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP055	1	3	Sand - Mobile	Sandy Mud	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP056	1	3	Sand - Mobile	Muddy Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP057	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP058	N/A	2	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP059	1	3	Sand - Mobile	Muddy Sand	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP074	1	5	Mud to Muddy Sand - Shell / *Crepidula* Substrate	Mud	Muddy Sandy Gravel	75.0	0.50
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP075	N/A	2	Mud to Muddy Sand - Shell / *Crepidula* Substrate	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP076	1	5	Mud to Muddy Sand	Mud	Gravelly Muddy Sand	75.0	0.50
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP077	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP078	1	5	Mud to Muddy Sand - Shell / *Crepidula* Substrate	Gravel Mixes	Sandy Gravel	75.0	0.50
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP079	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravels	Pebble/Granule	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP080	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravel Mixes	Muddy Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP081	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP082	N/A	2	Mud to Muddy Sand	Gravel Mixes	Muddy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP083	N/A	2	Mud to Muddy Sand	Gravelly	Gravelly Mud	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP084	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravelly	Gravelly Mud	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP086	N/A	2	Mud to Muddy Sand - *Crepidula* Substrate	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP087	N/A	2	Mud to Muddy Sand	Gravelly	Gravelly Mud	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP088	N/A	2	Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP089	1	5	Mud to Muddy Sand	Sand	Fine/Very Fine Sand	100.0	0.25
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP090	N/A	2	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	GrabCam	BP091	N/A	1	Mixed-Size Gravel in Muddy Sand to Sand	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	GrabCam, SPI/PV	BP092	1	4	Mixed-Size Gravel in Muddy Sand to Sand	Gravels	Gravel Pavement	66.7	0.67
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP093	1	5	Mixed-Size Gravel in Muddy Sand to Sand	Varies	Varies	N/A	0.50
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP094	N/A	2	Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP095	N/A	2	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP096	N/A	2	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	GrabCam, SPI/PV	BP097	1	4	Glacial Moraine A	Gravel Mixes	Sandy Gravel	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP098	1	5	Sand	Sand	Medium Sand	100.0	0.25
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP099	1	5	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	0.25
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP100	1	5	Sand - with Boulder Field(s)	Gravelly	Gravelly Sand	50.0	0.75
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP101	N/A	2	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP102	N/A	2	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP103	1	3	Sand	Muddy Sand	N/A	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP104	1	3	Sand - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP106	N/A	2	Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP107	N/A	2	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP109	1	3	Sand - with Boulder Field(s)	Sand	Fine/Very Fine Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP112	N/A	2	Coarse Sediment - Mobile	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP113	1	5	Coarse Sediment - Mobile	Muddy Sand	Varies	N/A	0.75
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP114	N/A	2	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP115	N/A	2	Coarse Sediment - Mobile	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP116	1	3	Sand - with Boulder Field(s)	Sand	Medium Sand	100.0	0.33

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP118	N/A	2	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP121	N/A	2	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP122	1	5	Sand - Mobile	Sand	Medium Sand	75.0	0.50
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP123	N/A	2	Mud to Muddy Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP124	1	3	Sand - Mobile	Sand	Medium Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP125	N/A	2	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP126	1	3	Sand - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP127	N/A	2	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP128	1	3	Sand	Sand	Fine/Very Fine Sand	100.0	0.33
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP129	N/A	2	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP130	1	3	Sand - Mobile	Sand	Medium Sand	66.7	0.67
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP140	1	3	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BPALT03	1	3	Mud to Muddy Sand - Shell / *Crepidula* Substrate	Mud	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BPALT04	1	3	Mud to Muddy Sand - Shell / *Crepidula* Substrate	*Crepidula* Reef Substrate	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BPALT05	1	3	Mud to Muddy Sand	Mud	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	SPI/PV	BPALT06A	1	3	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	0.33
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT01-1	1	1	N/A	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-1	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-2	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-5	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-6	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-7	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-8	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-9	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-1	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-2	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-5	1	1	Mud to Muddy Sand - *Crepidula* Substrate	*Crepidula* Reef Substrate	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-6	1	1	Mud to Muddy Sand - *Crepidula* Substrate	*Crepidula* Reef Substrate	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-7	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-8	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-9	1	1	N/A	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-1	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-2	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-3	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-5	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-6	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-7	1	1	Mud to Muddy Sand	IND	IND	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-8	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-9	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-1	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravel Mixes	Muddy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-2	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-3	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-4	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Muddy Sand	100.0	N/A

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-5	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-6	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-7	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-8	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-9	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-1	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-2	1	1	Sand - with Boulder Field(s)	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-3	1	1	Glacial Moraine A	Gravel Mixes	Muddy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-4	1	1	Glacial Moraine A	Gravel Mixes	Muddy Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-5	1	1	Glacial Moraine A	Gravel Mixes	Muddy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-6	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-7	1	1	Glacial Moraine A	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-8	1	1	Glacial Moraine A	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-9	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT07	N/A	2	Sand - Mobile with Boulder Field(s)	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT08	N/A	2	Sand - with Boulder Field(s)	Sand	Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT09	N/A	2	Sand	Sand	Muddy Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-1	1	1	N/A	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-2	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-3	1	1	Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-4	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-5	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-6	1	1	Coarse Sediment - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-7	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-8	1	1	Coarse Sediment - Mobile	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-9	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-1	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-2	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-3	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-4	1	1	Sand - Mobile	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-5	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-6	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-7	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-8	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-9	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-1	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-2	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-5	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-6	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-7	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-8	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-9	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-10	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-11	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-1	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-2	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-5	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-8	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-9	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-10	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-11	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Sandy Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-12	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-13	1	1	Mud to Muddy Sand - *Crepidula* Substrate with Boulder Field(s)	Sandy Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-1	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-2	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-5	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-6	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-7	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-8	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-9	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-10	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-11	1	1	Mud to Muddy Sand - *Crepidula* Substrate	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-1	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-2	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-3	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-4	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-5	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-13	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-14	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-15	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-16	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-17	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-18	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-19	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-1	1	1	N/A	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-2	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-3	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-4	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-5	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-6	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-7	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-8	1	1	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-9	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-10	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-11	1	1	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-1	1	1	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-2	1	1	Sand - with Boulder Field(s)	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-3	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-4	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-5	1	1	Sand - Mobile with Boulder Field(s)	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-6	1	1	Sand - Mobile with Boulder Field(s)	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-7	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-8	1	1	Sand - with Boulder Field(s)	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-9	1	1	Sand - Mobile with Boulder Field(s)	Sand	Very Coarse/Coarse Sand	100.0	N/A

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-10	1	1	Sand - Mobile with Boulder Field(s)	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-1	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-2	1	1	Glacial Moraine A	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-3	1	1	Glacial Moraine A	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-4	1	1	Sand - Mobile with Boulder Field(s)	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-5	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-6	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-7	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-8	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-9	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-10	1	1	Sand - with Boulder Field(s)	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-11	1	1	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-1	1	1	N/A	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-2	1	1	Sand - Mobile with Boulder Field(s)	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-3	1	1	Sand - Mobile with Boulder Field(s)	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-4	1	1	Sand - Mobile with Boulder Field(s)	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-5	1	1	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-6	1	1	Glacial Moraine A	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-7	1	1	Sand - Mobile with Boulder Field(s)	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-8	1	1	Glacial Moraine A	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-9	1	1	Sand - Mobile with Boulder Field(s)	Gravelly	Gravelly Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-1	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-2	1	1	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-3	1	1	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-4	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-5	1	1	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-6	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-7	1	1	Coarse Sediment - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-8	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-9	1	1	Coarse Sediment - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-10	1	1	Coarse Sediment - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-11	1	1	Coarse Sediment - Mobile	Gravelly	Gravelly Muddy Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-1	1	1	Sand - Mobile	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-2	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-3	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-4	1	1	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-5	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-6	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-7	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-8	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-9	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-10	1	1	Coarse Sediment - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-11	1	1	Coarse Sediment - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-1	1	1	N/A	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-2	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-3	1	1	Mud to Muddy Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-4	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-5	1	1	Mud to Muddy Sand	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-6	1	1	Mud to Muddy Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-7	1	1	Sand - Mobile	Sand	Very Coarse/Coarse Sand	100.0	N/A

Area	Sample Type	Station ID	SPI/PV Surveys (n)	SPI/PV, Grab, GrabCam Replicates[1] (n)	Mapped Habitat Type	SPI/PV, Grab, GrabCam, Predominant Substrate Group	SPI/PV, Grab, GrabCam, Predominant Substrate Subgroup	Percent Predominance of Substrate Subgroup[2] (%)	Substrate Subgroup Categorical Variability[2]
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-8	1	1	Sand - Mobile	Muddy Sand	N/A	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-9	1	1	Sand - Mobile	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-10	1	1	Sand - Mobile	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-11	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-1	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-2	1	1	Sand - Mobile	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-3	1	1	Glacial Moraine A	Gravels	Gravel Pavement	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-4	1	1	Glacial Moraine A	Sand	Very Coarse/Coarse Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-5	1	1	Glacial Moraine A	Gravels	Gravel Pavement	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-6	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-7	1	1	Glacial Moraine A	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-8	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-9	1	1	Sand - with Boulder Field(s)	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-10	1	1	Sand - Mobile with Boulder Field(s)	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-11	1	1	Sand - Mobile with Boulder Field(s)	Gravel Mixes	Sandy Gravel	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-1	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-2	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-3	1	1	Mixed-Size Gravel in Muddy Sand to Sand	IND	IND	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-4	1	1	Mixed-Size Gravel in Muddy Sand to Sand	IND	IND	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-5	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-6	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-7	1	1	Mixed-Size Gravel in Muddy Sand to Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-8	1	1	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-9	1	1	Sand	Sand	Medium Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-10	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-11	1	1	Sand	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-12	1	1	N/A	Sand	Fine/Very Fine Sand	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-1-3	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-2	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-3	1	1	Mud to Muddy Sand	Sandy Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-4	1	1	Mud to Muddy Sand	Mud	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-5	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-6	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-7	1	1	Mud to Muddy Sand - *Crepidula* Substrate	N/A	N/A	100.0	N/A

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP003-BP072	Soft Sediment Fauna	100.0	0.20	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP004-BP073	Soft Sediment Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP005	Mollusk Reef Biota	80.0	0.40	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP006	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP007	Mollusk Reef Biota	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP008	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP009	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP010-BP085	Soft Sediment Fauna	80.0	0.40	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP011	Soft Sediment Fauna	66.7	0.67	IND	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP012	Soft Sediment Fauna	50.0	1.00	Attached Fauna	Yes	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP013	Soft Sediment Fauna	80.0	0.40	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP014	Soft Sediment Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BP015	Attached Fauna	100.0	0.33	Inferred Fauna	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	SPI/PV	BP016	Attached Fauna	66.7	0.67	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP017	Inferred Fauna	60.0	0.40	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP018	Soft Sediment Fauna	100.0	0.50	None	No	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP019	Varies	N/A	0.60	None	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP020	Inferred Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP021	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP022	Varies	N/A	1.00	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP023	Inferred Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP024	Inferred Fauna	60.0	0.40	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP025	Inferred Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP026-BP105	Inferred Fauna	66.7	0.67	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP027	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP028	Soft Sediment Fauna	100.0	0.33	Varies	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP029	Inferred Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP030	Inferred Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP031	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP032	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP033	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP034	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP035	Inferred Fauna	60.0	0.40	Varies	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP036	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP037	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP038	Attached Fauna	66.7	0.67	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP039-BP110	Attached Fauna	75.0	0.38	Varies	Yes	None	Northern Star Coral
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP040A	Attached Fauna	100.0	0.33	N/A	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP041	Attached Fauna	100.0	0.33	Inferred Fauna	Yes	Possible *Didemnum* spp.	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP042	Soft Sediment Fauna	40.0	0.60	Varies	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP043-BP111	Inferred Fauna	50.0	0.50	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP044	Soft Sediment Fauna	66.7	0.67	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP045	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP046-BP117	Soft Sediment Fauna	100.0	0.50	Varies	Yes	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP047-BP119	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP048-BP120	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP049	Soft Sediment Fauna	100.0	0.20	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP050	Soft Sediment Fauna	66.7	0.67	Varies	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP051	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP052	Soft Sediment Fauna	100.0	0.50	Varies	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP053	Inferred Fauna	66.7	0.67	Varies	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP054	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP055	Inferred Fauna	66.7	0.67	Varies	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP056	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP057	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP058	Soft Sediment Fauna	100.0	0.50	Soft Sediment Fauna	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP059	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP074	Soft Sediment Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP075	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP076	Inferred Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP077	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP078	Attached Fauna	100.0	0.33	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP079	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP080	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP081	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP082	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP083	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP084	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP086	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP087	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP088	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP089	IND	100.0	0.33	IND	No	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP090	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	GrabCam	BP091	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	GrabCam, SPI/PV	BP092	Attached Fauna	100.0	0.33	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam, SPI/PV	BP093	Attached Fauna	100.0	0.33	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP094	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP095	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Grab, GrabCam	BP096	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	GrabCam, SPI/PV	BP097	Attached Fauna	100.0	0.33	Soft Sediment Fauna	Yes	None	Northern Star Coral
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP098	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP099	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP100	Soft Sediment Fauna	66.7	0.67	Varies	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP101	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP102	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP103	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP104	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP106	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP107	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP109	Inferred Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP112	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP113	Soft Sediment Fauna	100.0	0.33	Varies	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP114	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP115	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP116	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP118	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP121	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam, SPI/PV	BP122	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP123	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP124	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP125	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP126	Soft Sediment Fauna	100.0	0.33	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP127	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP128	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BP129	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP130	Inferred Fauna	66.7	0.67	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	SPI/PV	BP140	Soft Sediment Fauna	66.7	0.67	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BPALT03	Soft Sediment Fauna	100.0	0.33	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BPALT04	Mollusk Reef Biota	100.0	0.33	N/A	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BPALT05	Inferred Fauna	100.0	0.33	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	SPI/PV	BPALT06A	Attached Fauna	100.0	0.33	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT01-1	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-1	Attached Fauna	100.0	N/A	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-2	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-3	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-5	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-6	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-7	N/A	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-8	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT02-9	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-2	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-4	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-5	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-6	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-7	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-8	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT03-9	Inferred Fauna	100.0	N/A	Mollusk Reef Biota	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-1	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-2	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-3	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-4	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-5	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-6	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-7	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-8	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT04-9	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-1	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-2	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-3	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-4	Inferred Fauna	100.0	N/A	N/A	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-5	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-6	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-7	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-8	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT05-9	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-1	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-2	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-3	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-4	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-5	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-6	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-7	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-8	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT06-9	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT07	Soft Sediment Fauna	100.0	0.50	None	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT08	Soft Sediment Fauna	100.0	0.50	Varies	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Grab, GrabCam	BPT09	Soft Sediment Fauna	100.0	0.50	Soft Sediment Fauna	No	Not Analyzed	Not Analyzed
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-6	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-7	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-8	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT13-9	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-6	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-7	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-8	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT14-9	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-1	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-5	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-6	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-7	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-8	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-9	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-10	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT20-11	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	Not Analyzed	Not Analyzed
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-1	Attached Fauna	100.0	N/A	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-2	Attached Fauna	100.0	N/A	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-3	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-4	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-5	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-8	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-9	Attached Fauna	100.0	N/A	N/A	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-10	Attached Fauna	100.0	N/A	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-11	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-12	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT22-13	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-1	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-2	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-3	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-4	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-5	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-6	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-7	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-8	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-9	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-10	Inferred Fauna	100.0	N/A	Attached Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT23-11	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-2	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-3	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-4	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-13	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-14	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-15	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-16	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-17	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-18	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT24-19	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-1	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-2	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-3	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-4	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-5	Attached Fauna	100.0	N/A	Soft Sediment Fauna	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-6	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-7	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-8	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-9	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-10	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT26-11	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-1	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-3	Attached Fauna	100.0	N/A	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-4	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-5	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-6	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-7	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-8	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-9	Inferred Fauna	100.0	N/A	N/A	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT27-10	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-2	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-3	Inferred Fauna	100.0	N/A	Attached Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-6	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-7	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-8	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-9	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-10	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT29-11	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-1	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-2	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-3	Attached Fauna	100.0	N/A	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-4	Soft Sediment Fauna	100.0	N/A	Attached Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-5	Attached Fauna	100.0	N/A	N/A	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-6	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-7	Attached Fauna	100.0	N/A	Soft Sediment Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-8	Soft Sediment Fauna	100.0	N/A	Attached Fauna	Yes	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT32-9	Attached Fauna	100.0	N/A	Inferred Fauna	Yes	None	Northern Star Coral
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-5	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-6	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-7	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-8	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-9	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-10	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT35-11	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-6	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-7	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-8	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-9	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-10	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT37-11	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-1	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-3	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-4	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-5	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-6	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-7	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None

Area	Sample Type	Station ID	SPI/PV, Grab, GrabCam, Predominant Biotic Subclass	Percent Predominance of Biotic Subclass[2] (%)	Biotic Subclass Categorical Variability[2]	SPI/PV, Grab, GrabCam, Predominant Co-occurring Biotic Subclass	SPI/PV, Grab, GrabCam, Attached Fauna Presence	PV Non-Native Taxa Type	PV Sensitive Taxa Type
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-8	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-9	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-10	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - Federal Waters, GLD	Transect SPI/PV	BPT40-11	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-1	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-2	Soft Sediment Fauna	100.0	N/A	Inferred Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-3	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-4	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-5	Attached Fauna	100.0	N/A	N/A	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-6	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-7	Soft Sediment Fauna	100.0	N/A	Attached Fauna	Yes	None	Northern Star Coral
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-8	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-9	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-10	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT45-11	None	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-1	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-2	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-3	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-4	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-5	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-6	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-7	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-8	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-9	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-10	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-11	Soft Sediment Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT46-12	IND	100.0	N/A	IND	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-1-3	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-2	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-3	Inferred Fauna	100.0	N/A	Soft Sediment Fauna	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-4	Inferred Fauna	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-5	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-6	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None
Brayton Point ECC - RI State Waters	Transect SPI/PV	BPT47-7	Mollusk Reef Biota	100.0	N/A	N/A	No	None	None

SOUTHCOAST WIND

SouthCoast Wind 1 Project
Attachment I: Sediment Sample Grain Size Analytical Results

Revised: February 2023

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TABLE 1. GRAIN SIZE DATA – SUMMER 2021 SEDIMENT SAMPLES COLLECTED DURING BENTHIC SURVEYS

Sample ID	Alpha ID		Grain Size (%)										
		Analysis Date	Cobbles	% Coarse Gravel	% Fine Gravel	% total Gravel	% Coarse Sand	%Medium Sand	%Fine Sand	% Total Sand	% Silt Fine	%Clay Fine	%Total Fines
		Particle Size (mm)	76 - 256	19 - 76	4.76 - 19		2 - 4.76	0.42 - 2	0.074 - 0.42		0.0039 - 0.074	0.0039 - <	
21SU-MW0521-BP003	L2140583-37	08/17/2021 09:15	ND	ND	1.5	1.5	11.2	20.1	9.8	41.1	46.4	10.8	57.4
21SU-MW0521-BP003	L2140583-37	08/30/2021 20:09	ND	ND	1.5	1.5	10.4	6	3.9	41.1	46.4	10.8	57.4
21SU-MW0521-BP005	L2140583-35	08/17/2021 09:15	ND	ND	6.2	6.2	17.9	26.1	13.3	57.3	29.5	7	36.5
21SU-MW0521-BP005	L2140583-35	08/30/2021 20:09	ND	ND	6.2	6.2	8.2	8.2	6.3	57.3	29.5	7	36.5
21SU-MW0521-BP012-BG	L2140583-01	08/17/2021 09:15	ND	ND	ND	ND	0.4	3	85.1	88.5	10.4	1.1	11.5
21SU-MW0521-BP012-BG	L2140583-01	08/17/2021 09:29	ND	ND	ND	ND	0.4	3.1	48.1	88.5	10.4	1.1	11.5
21SU-MW0521-BP013-BG	L2140583-02	08/17/2021 09:15	ND	ND	ND	ND	0.2	5.4	75.4	81	17.1	1.9	19
21SU-MW0521-BP013-BG	L2140583-02	08/17/2021 09:29	ND	ND	ND	ND	1.1	17.4	57.9	81	17.1	1.9	19
21SU-MW0521-BP017-BG	L2140583-04	08/17/2021 09:15	ND	ND	ND	ND	1	2.2	88.4	91.6	7.6	0.8	8.4
21SU-MW0521-BP019-BG	L2140583-06	08/17/2021 09:15	ND	ND	8	8	22.6	47.9	14.5	85	6.3	0.7	7
21SU-MW0521-BP019-BG	L2140583-06	08/17/2021 09:29	ND	ND	8	8	21.6	22.7	3.2	85	6.3	0.7	7

Source: Laboratory Reports are in COP Appendix M.2, Benthic and Shellfish Resources Characterization Report Addendum #2, Attachment 5

TABLE 2. GRAIN SIZE DATA – SPRING 2022 SEDIMENT SAMPLES COLLECTED DURING BENTHIC SURVEYS

Sample ID	Date	Boulder	Cobbles	Pebble	Granule	% Very Coarse Sand	% Coarse Sand	% Medium Sand	% Fine Sand	% Very Fine Sand Sand	Silt	Clay	Analysis
22SP-MW0521-084	3/20/2022	ND (0.100)	ND (0.100)	3.8	6.5	16.3	9.4	4.1	2.7	2.6	45	9.6	Wentworth
22SP-MW0521-084	3/20/2022	ND (0.100)	5.9	10.3	16.2	9.2	7.9	4.4	21.5	52.3	10	62.3	USCS
22SP-MW0521-085	3/20/2022	ND (0.100)	ND (0.100)	0.7	2.2	5.8	7.6	7	10.7	5.7	53.1	7.2	Wentworth
22SP-MW0521-085	3/20/2022	ND (0.100)	0.6	0.8	1.4	1	9.8	18.5	29.3	56.7	12.6	69.3	USCS
22SP-MW0521-086	3/20/2022	ND (0.100)	ND (0.100)	9.8	12.9	17.9	12.4	6.6	4.7	4.7	26.5	4.5	Wentworth
22SP-MW0521-086	3/20/2022	ND (0.100)	11.8	16.9	28.7	12.7	8.6	4.4	25.7	38.3	7.3	45.6	USCS
22SP-MW0521-086-DUP	3/20/2022	ND (0.100)	ND (0.100)	31.2	17.2	18.7	11.8	6	7.5	5.5	1.8	0.3	Wentworth
22SP-MW0521-086-DUP	3/20/2022	ND (0.100)	3.5	16.7	20.2	18.1	12	6	36.1	37.7	6	43.7	USCS
22SP-MW0521-087	3/20/2022	ND (0.100)	ND (0.100)	1.1	4	4.7	3.2	2.4	3.6	15.7	53.8	11.5	Wentworth
22SP-MW0521-087	3/20/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	2.6	8.9	11.5	77.3	11.2	88.5	USCS
22SP-MW0521-088	3/20/2022	ND (0.100)	ND (0.100)	1.2	2.2	1.8	1.4	1.2	26.6	51.1	13.1	1.4	Wentworth
22SP-MW0521-088	3/20/2022	ND (0.100)	ND (0.100)	0.1	0.1	1.1	1.5	75.1	77.7	19.9	2.3	22.2	USCS
22SP-MW0521-089	3/21/2022	ND (0.100)	ND (0.100)	0.1	0.1	0.2	0.5	7.2	50.1	38.5	3	0.3	Wentworth
22SP-MW0521-089	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	0.2	1	90.8	92	7.3	0.7	8	USCS
22SP-MW0521-090	3/21/2022	ND (0.100)	ND (0.100)	0.1	0.4	0.8	2.7	16.7	51.8	22.9	4.1	0.5	Wentworth
22SP-MW0521-090	3/21/2022	ND (0.100)	0.1	0.1	0.2	0.6	4	89.2	93.8	5.4	0.6	6	USCS
22SP-MW0521-093	3/21/2022	ND (0.100)	ND (0.100)	0.1	0.1	1.2	6.8	45.3	42.9	1.3	2.1	0.2	Wentworth
22SP-MW0521-093	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	0.9	11.9	82.9	95.7	3.9	0.4	4.3	USCS
22SP-MW0521-094	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	0.1	0.7	4.2	38.9	37.4	2.7	14.8	1.2	Wentworth
22SP-MW0521-094	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	5.6	92.1	97.7	2.1	0.2	2.3	USCS
22SP-MW0521-095	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	0.2	0.8	6	46.7	43.3	2.1	0.8	0.1	Wentworth

Sample ID	Date	Boulder	Cobbles	Pebble	Granule	% Very Coarse Sand	% Coarse Sand	% Medium Sand	% Fine Sand	% Very Fine Sand Sand	Silt	Clay	Analysis
22SP-MW0521-095	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	0.1	10.1	89.3	99.5	0.5	ND (0.100)	0.5	USCS
22SP-MW0521-095-DUP	3/21/2022	ND (0.100)	ND (0.100)	0.2	0.4	2.2	8	32.4	52.5	2.2	1.9	0.2	Wentworth
22SP-MW0521-095-DUP	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	0.4	17.5	81	98.9	1	0.1	1.1	USCS
22SP-MW0521-096	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	0.1	0.2	6.8	57.5	32.2	1.4	1.6	0.2	Wentworth
22SP-MW0521-096	3/21/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	0.1	10.5	87.8	98.4	1.5	0.1	1.6	USCS
22SP-MW0521-72	4/01/2022	ND (0.100)	ND (0.100)	28.5	9.6	6.5	4.5	1.7	4.1	3.4	35.4	6.3	Wentworth
22SP-MW0521-72	4/01/2022	ND (0.100)	5.3	5.4	10.7	28.5	15.4	8.1	52	30.8	6.5	37.3	USCS
22SP-MW0521-72-DUP	4/01/2022	ND (0.100)	ND (0.100)	26.2	10	4.1	3.6	3.4	3	4.7	34.3	10.7	Wentworth
22SP-MW0521-72-DUP	4/01/2022	ND (0.100)	12.3	12.4	24.7	24	12.4	5.9	42.3	27.7	5.3	33	USCS
22SP-MW0521-73	4/01/2022	ND (0.100)	ND (0.100)	23.8	9	8.1	6.4	3.8	4.6	5.9	33.3	5.1	Wentworth
22SP-MW0521-73	4/01/2022	ND (0.100)	3.1	3.1	6.2	16.4	7.9	3.5	27.8	54.6	11.4	66	USCS
22SP-MW0521-74	3/31/2022	ND (0.100)	ND (0.100)	20.8	12	4.2	7.6	5.7	9.2	10.3	24.6	5.6	Wentworth
22SP-MW0521-74	3/31/2022	ND (0.100)	9.8	9.7	19.5	25.3	17.1	14.8	57.2	19.1	4.2	23.3	USCS
22SP-MW0521-75	3/31/2022	ND (0.100)	ND (0.100)	2.7	4.8	7	17	41.3	21	0.9	4.8	0.5	Wentworth
22SP-MW0521-75	3/31/2022	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100)	4.6	25.8	63.1	93.5	5.7	0.8	6.5	USCS
22SP-MW0521-76	3/31/2022	ND (0.100)	ND (0.100)	8.2	8.5	5.5	4.9	6.4	21.4	18.5	23.3	3.3	Wentworth
22SP-MW0521-76	3/31/2022	ND (0.100)	2.7	2.7	5.4	14.6	18.1	39.1	71.8	20.5	2.3	22.8	USCS
22SP-MW0521-77	3/31/2022	ND (0.100)	ND (0.100)	10.2	9.8	7.6	14.7	7	21	13	14.6	2.1	Wentworth
22SP-MW0521-77	3/31/2022	ND (0.100)	13.2	15.5	28.7	12.1	28.7	27.3	68.1	2.8	0.4	3.2	USCS
22SP-MW0521-77-DUP	3/31/2022	ND (0.100)	ND (0.100)	28	10.7	8.3	12.9	6.9	14.4	9.2	7.8	1.8	Wentworth
22SP-MW0521-77-DUP	3/31/2022	ND (0.100)	6	5.9	11.9	13.3	28.2	33.7	75.2	11.6	1.3	12.9	USCS
22SP-MW0521-78	3/31/2022	ND (0.100)	ND (0.100)	23.1	9.2	8.3	7.7	7.5	31.7	5.8	5.9	0.8	Wentworth
22SP-MW0521-78	3/31/2022	ND (0.100)	16	17.1	33.1	11.2	18.2	29.8	59.2	6.6	1.1	7.7	USCS
22SP-MW0521-79	3/31/2022	ND (0.100)	ND (0.100)	88.3	3.4	2	1.4	0.7	0.6	0.2	2.9	0.5	Wentworth

Sample ID	Date	Boulder	Cobbles	Pebble	Granule	% Very Coarse Sand	% Coarse Sand	% Medium Sand	% Fine Sand	% Very Fine Sand Sand	Silt	Clay	Analysis
22SP-MW0521-79	3/31/2022	ND (0.100)	8	8.1	16.1	27.3	18.5	7.5	53.3	26.8	3.8	30.6	USCS
22SP-MW0521-80	3/30/2022	ND (0.100)	ND (0.100)	52.8	13.9	6	4.6	1.7	3.5	3.2	11.2	3.1	Wentworth
22SP-MW0521-80	3/30/2022	ND (0.100)	10.1	20.4	30.5	18.8	16.1	9.9	44.8	20.6	4.1	24.7	USCS
22SP-MW0521-81	3/30/2022	ND (0.100)	ND (0.100)	1.4	13.2	2.5	15.2	42.8	16.3	2.4	5.3	0.9	Wentworth
22SP-MW0521-81	3/30/2022	ND (0.100)	0.5	0.6	1.1	2.9	14.5	70.9	88.3	9.6	1	10.6	USCS
22SP-MW0521-82	3/30/2022	ND (0.100)	ND (0.100)	19.5	13.4	5.1	3.1	2.7	5.1	7.8	36.2	7.1	Wentworth
22SP-MW0521-82	3/30/2022	ND (0.100)	2.6	17.9	20.5	19.8	12.1	11.9	43.8	31.5	4.2	35.7	USCS
22SP-MW0521-83	3/30/2022	ND (0.100)	ND (0.100)	ND (0.100)	27.9	8.7	5.8	3.5	3.4	5.7	36.2	8.8	Wentworth
22SP-MW0521-83	3/30/2022	ND (0.100)	3.9	4	7.9	23.8	16.5	9.6	49.9	35.1	7.1	42.2	USCS

Source: Fugro QC of Alpha results

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment J: Magnetic Field Modeling Report

Revised: February 2023

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GRADIENT

May 17, 2022

Mayflower Wind Energy LLC
110 Federal Street
Boston, MA 02110

Re: Magnetic Field Analysis Report for Rhode Island (RI) Energy Facility Siting Board (EFSB) Application Submittal

Dear Sir or Madam:

This cover letter accompanies the Magnetic Field Analysis Report for the Mayflower Wind Brayton Point Project Cable Systems that was prepared by POWER Engineers, Inc. (POWER Engineers). The Magnetic Field Analysis Report summarizes model-predicted reasonable maximum magnetic field (MF) levels for the proposed Mayflower Wind offshore and onshore export cables that will deliver approximately 1,200 MW of clean, renewable energy from offshore wind generated in federal waters to a point of interconnection to the regional transmission system at Brayton Point in Somerset, Massachusetts. The export cable system includes two high-voltage direct current (HVDC) power cables at a nominal voltage of +/-320 kV DC and one dedicated communications cable.

The POWER Engineers modeling analysis is focused on magnetic fields because the electric fields arising from the voltage on the offshore export cables will be completely shielded by cable materials, and there will also be no aboveground electric fields from the onshore underground conductors due to shielding by the cables. This cover letter was prepared to compare the model-predicted MF levels for the HVDC export cables at the proposed landfall site and along the onshore underground route segment in Rhode Island to health-protective exposure guidelines, and to assess the potential for harmful impacts to marine organisms, including commercially and recreationally important fish species and benthic organisms, from the MF levels predicted for the HVDC offshore export cables.

In Rhode Island, the proposed export cable route includes a short, intermediate onshore crossing of Portsmouth after the HVDC cables come onshore *via* horizontal directional drilling (HDD) beneath Island Park Beach at depth (based on the preliminary site-specific engineering design, estimated to be 25 feet [7.6 meters] and 40 feet [12.2 meters] for the two conductors). The HVDC cables will cross Aquidneck Island for approximately 2 miles (3.2 km) in underground duct banks installed along proposed routes following Boyd's Lane and Anthony Road.

Mayflower Wind also identified a design variation to the Project intended to provide flexibility for the future expansion of the electric system in the Brayton Point area to accommodate the likely need to connect additional new renewable energy generation. This "Noticed Variation" would facilitate the delivery of up to an additional 1,200 MW of renewable clean energy by "right-sizing" certain facilities (primarily trenching and conduits for onshore underground transmission cables) while minimizing overall impacts to the community and environment. The Noticed Variation would involve sizing underground infrastructure on Aquidneck Island for the HVDC export cables to include spare conduits at landfall and onshore that would be capable of accommodating an additional 1,200 MW HVDC circuit consisting of an additional two power cables and one communications cable.

Mayflower Wind is committed to fully developing and delivering energy from its offshore Lease Area and believes it is prudent and efficient planning to provide for the potential that all the energy from the Lease Area could be delivered to points of interconnection at or near Brayton Point, pending additional study of regional grid considerations as part of the interconnection process managed by ISO New England. Mayflower Wind wishes to provide for this contingency to do the right thing by not only prudently planning but also avoiding/minimizing impacts to the community and the environment. Developing the project in this way would mean less disturbance of the natural and developed environment by conducting earthwork and civil construction onshore in a single campaign.

Peak maximum DC MF levels ranging from 181 to 433 milligauss (mG) were obtained at 1 meter above the ground surface for the three representative HVDC onshore duct bank configurations that were modeled, including a single circuit duct bank, a double circuit duct bank, and an alternate double circuit duct bank. The Noticed Variation model cases evaluate the double circuit duct bank with one 1,200 MW circuit installed. Although the Noticed Variation does not include a request for approval of additional export cables at this time, for informational purposes only, results are also presented for an indicative future scenario with a second 1,200 MW circuit installed.

For each duct bank configuration, the MF levels drop off very rapidly with increasing lateral distance from the cables, for example, ranging from 3.5 to 30.5 mG at 25 feet (7.6 meters) from the duct bank centerlines and 0.47 to 8.0 mG at 50 feet (15.2 meters) from the duct bank centerlines. For the Island Park Beach (Boyd's Lane) landfall site, a peak maximum MF level of 261 mG was obtained at the ground surface above the cable centerline; due to the approximately 21 foot (6.4 meter) separation distances of the +/- conductors at the landfall site, MF levels at the landfall site fall off more slowly with lateral distance than for the onshore duct bank configurations, with decreased MF levels of 174 mG and 79 mG at lateral distances of 25 feet and 50 feet, respectively, from the centerline between the two unbundled cables. On Aquidneck Island along the proposed onshore export cable route, the earth's steady (DC) geomagnetic field has a magnitude of approximately 512 mG, meaning that only MF levels in the immediate vicinity of the onshore underground duct banks along Boyd's Lane will appreciably differ from the earth's DC geomagnetic field.

The state of Rhode Island has not adopted standards for electric and magnetic fields (EMFs) from HVDC transmission lines or other sources that can be compared to the model-predicted DC MFs. There are also no US federal standards limiting general public or occupational exposure to EMFs from HVDC transmission lines. Scientists have not reported any confirmable chronic health risks for the weak steady EMFs associated with HVDC power transmission; this is consistent with the fact that humans have lived for tens of thousands of years in the presence of the earth's DC geomagnetic field, which is not known to adversely interact with biological processes or directly affect human health.

As summarized in Table 1, international health and safety organizations have established health-based exposure guidelines for DC MFs (also known as steady MFs) applicable to both the general public and occupational populations based on preventing transient sensory effects including vertigo and nausea. In particular, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has established a general public exposure guideline of 4,000,000 mG for steady MFs (ICNIRP, 2009). This exposure guideline encompasses safety factors in order to be sufficiently protective of the general public. Given potential harms to individuals with implantable medical devices possibly containing ferromagnetic materials (*e.g.*, pacemakers and cardiac defibrillators), ICNIRP recommends that such individuals not be exposed to steady MFs above 5,000 mG (ICNIRP, 2009). More recently, the International Committee on Electromagnetic Safety (ICES) within the Institute of Electrical and Electronics Engineers (IEEE) conducted an updated review of the scientific and medical research literature, and retained its safety guidelines for general public exposure to steady MFs of 1,180,000 mG and 3,530,000 mG for head and trunk exposure and limb exposure, respectively (IEEE, 2019). Importantly, each of these health-protective MF guidelines are far above the modeled DC MFs predicted for either the ground surface at the Island Park

Beach landfall site or at a height of 1 meter along Boyd's Lane in Portsmouth for the representative onshore underground duct bank configurations.

Table 1 DC MF Guidelines Established by Health and Safety Organizations

Organization	MF Guideline
General Public	
International Commission on Non-Ionizing Radiation Protection (ICNIRP) (exposure to any part of the body)	4,000,000 mG[(a)]
Institute of Electrical and Electronics Engineers (IEEE) Standard C95.6	1,180,000 mG[(b)] 3,530,000 mG[(c)]
Occupational	
International Commission on Non-Ionizing Radiation Protection (ICNIRP)	20,000,000 mG[(d)] 80,000,000 mG[(e)]
American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs)	20,000,000 mG[(f)] 200,000,000 mG[(g)] 5,000 mG[(h)]

Notes:
DC = Direct Current; MF = Magnetic Field; kV/m = Kilovolts Per Meter; mG = Milligauss.
(a) Applies to exposures to any part of the body (ICNIRP, 2009).
(b) Applies to head and of trunk exposure (IEEE, 2019).
(c) Applies to exposure of limbs (IEEE, 2019).
(d) Applies to head and of trunk exposure (ICNIRP, 2009).
(e) Applies to exposure of limbs (ICNIRP, 2009).
(f) ACGIH TLV for general workplace whole body exposure (ACGIH, 2020).
(g) ACGIH TLV for general workplace limb exposure (ACGIH, 2020).
(h) ACGIH TLV for workers with implanted ferromagnetic or electronic medical devices (ACGIH, 2020).

The entire offshore export cable route will consist of HVDC submarine cables, and the POWER Engineers Magnetic Field Analysis predicted DC MF levels at the seafloor (or above the concrete mattress for the unburied installation case) associated with three representative installation scenarios for the HVDC offshore export cables: (1) the typical installation case that will be used wherever practicable, where the two DC conductors are bundled together (along with a communications cable) and buried at a target depth of 2 meters, (2) a worst-case installation case where the bundled conductors are laid directly on the seafloor surface and covered by a concrete mattress, such as at a cable crossing location, and (3) an unbundled installation case where the two DC conductors are separately buried approximately 50 meters (164 feet) apart at a target depth of 2 meters– to be used as needed to ensure safe installation and repair of the separate cables, as well as to minimize risk of damage to both cables from threats such as anchor strike. As shown in the POWER Engineers Magnetic Field Analysis Report, the highest modeled MF levels for these offshore export cable installation scenarios would occur directly above the cables (peaking at 123 mG for the typical installation case, and ranging from 1,909 to 3,785 mG across the two other possible installation cases), with a rapid reduction in MF levels with increasing lateral and vertical distance from the cables, *e.g.*, decreasing proportional to the square of the distance from the bundled cables. For example, for the two bundled cable installation scenarios where MF cancellation is increased by the bundling of two cables with current in equal but opposite polarity, the analysis shows 93->99% reductions in MF levels at lateral distances of ±25 feet (±7.6 meters) from the cable bundle centerlines as compared to the maximum MF levels directly above the cable bundles; and at lateral distances of ±25 feet, there is little difference in MF levels for the buried *versus* the surface-laid cables. Only for the two atypical installation cases, cases (2) and (3), will MF levels above the offshore export cables appreciably differ from the earth's steady (DC) geomagnetic field, and only within short distances from the cables.

No regulatory thresholds or guidelines for allowable EMF levels in marine environments have been established for either HVDC or HVAC transmission. There is a growing body of evidence suggesting that

EMFs from HVDC cables may be perceptible to some electromagnetic (EM)-sensitive marine species, but there remains a lack of evidence indicating potential harmful impacts at the population- or community-level for the various types of marine species which may experience exposure to DC EMFs from submarine export cables (CSA Ocean Sciences Inc. and Exponent, 2019; Gill and Desender, 2020; SEER, 2022; Taormina *et al.*, 2018). Several different types of studies have been conducted in recent years, including experimental field studies, experimental laboratory studies, and field surveys, with a limited number of inconsistent findings of subtle behavioral responses and physiological changes from some studies. For example, Hutchison *et al.* (2020) observed minor behavioral responses of both Little skates (*Leucoraja erinacea*) and American lobsters (*Homarus americanus*) for *in situ* enclosure experiments conducted on top of the Cross Sound Cable (CSC), a buried submarine HVDC cable (330 MW, ±150 kV) that runs between Connecticut and Long Island. They did not report evidence of a barrier effect as both species were observed to freely cross over the cable, but their findings included several responses indicative of increased exploratory/foraging behavior for the Little skate, and more limited evidence of a subtle behavioral exploratory response for the American lobster. Despite the usage of highly elevated DC MF levels, laboratory experimental studies have frequently reported an absence of evidence of adverse biological responses. For example, Taormina *et al.* (2020) conducted laboratory experiments of juvenile European lobsters (*Homarus gammarus*) for higher DC MF gradients (as high as 2,250 mG), observing no changes in sheltering behavior or exploratory behavior. For a laboratory study where several different types of marine benthic (seafloor) species were exposed to highly elevated DC MFs (37,000 mG) over several week time periods, Bochert and Zettler (2004) observed no differences in survival between exposed and control test organisms that included North Sea prawn (*Crangon crangon*), round crab (*Rhithropanopeus harrisii*), glacial relict isopod (*Saduria entomon*), blue mussel (*Mytilus edulis*), and young flounder (*Plathichthys flesus*).

It is important to distinguish the types of subtle behavioral responses and physiological changes that have been observed in some research studies from evidence of potential harmful impacts at the population- and community-level (Taormina *et al.*, 2018). Moreover, since exposures to elevated MF levels from submarine cables will be limited to small areas along the seafloor in the immediate vicinity of the submarine export cables, it is important to consider the low exposure potential of most marine species. For example, because they breathe at the sea surface and have large migratory ranges, marine mammals such as sea turtles and whales would not be expected to spend significant amounts of time at the seafloor in the vicinity of specific submarine export cables. Overall, although knowledge gaps remain and there is a need for continued research, the weight of the currently available evidence does not provide support for concluding there would be population-level harms to marine species from EMF associated with HVDC submarine transmission.

This conclusion regarding a lack of evidence of population-level harms to marine species from HVDC-related EMFs is supported by findings from recent governmental reports and expert state of the science reviews. For example, the U.S. Bureau of Ocean Energy Management (BOEM) released a report in 2019 aimed at summarizing what is currently known about potential EMF impacts in coastal marine environments, with a specific focus on fish species of commercial or recreational importance in southern New England (CSA Ocean Sciences Inc. and Exponent, 2019). This report includes an 8-page executive summary, a 36-page technical discussion, and a 7-page reference list with 92 specific citations. It addresses potential risks to marine species posed by both AC and DC fields. Overall, based on its review of the state of the knowledge regarding potential EMF-related impacts on marine life, the authors concluded, "The operation of offshore wind energy projects is not expected to negatively affect commercial and recreational fishes within the southern New England area. Negligible effects, if any, on bottom-dwelling species are anticipated. No negative effects on pelagic [*i.e.*, in upper layers of the open sea] species are expected due to their distance from the power cables buried in the seafloor" (CSA Ocean Sciences Inc. and Exponent, 2019). This conclusion is based on the growing number of recent research studies published by US and European researchers, as well as information available from fish surveys conducted in Europe where both AC and DC submarine export cables have been operated in coastal environments for more than a decade.

With respect to findings from fish surveys in Europe, the study authors concluded, "During this time, many surveys have been conducted to determine if fish populations have declined following offshore wind energy project installation. The surveys have overwhelmingly shown that offshore wind energy projects and undersea power cables have no effect on fish populations [72,80,81,82]. Fish assessed as part of these surveys include flounder and other flatfish, herring, cod, and mackerel. These are similar to species harvested along the U.S. Atlantic coast" (CSA Ocean Sciences Inc. and Exponent, 2019).

Another recent example is the review of the current knowledge relevant to EMF-related risks to marine organisms from electric cables and marine renewable energy devices that was included in the Ocean Energy Systems (OES)- Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World. OES-Environmental, which currently consists of 16 partner nations, was established in 2010 by the International Energy Agency (IEA) Ocean Energy Systems (OES). The 2020 EMF review, which was authored by Andrew B. Gill and Marieke Desender of the United Kingdom's Centre for Environment, Fisheries and Aquaculture Science, discussed how a number of targeted studies have contributed to an increase in the knowledge base since the analogous publication in the 2016 State of the Science Report, which highlighted significant gaps in the knowledge base. Gill and Desender (2020) observed that new research, including both field and laboratory studies, has included some detectable EMF-related effects and responses (*e.g.*, behavioral, physiological, developmental, and genetic) on a limited number of individual species, but emphasized that these findings are not generally for EMF strengths associated with marine renewable energy (MRE) projects. Overall, based on their updated review of the available science, Gill and Desender (2020) concluded, "Based on the knowledge to date, biological or ecological impacts associated with MRE subsea power cables may be weak or moderate at the scale that is currently being considered or planned. It is important, however, to acknowledge that this assessment comes from a handful of studies and that data about impacts are scarce, so significant uncertainties concerning electromagnetic effects remain." While this conclusion is not specific to DC cables, many of the recent studies discussed in the review were for DC fields. Gill and Desender (2020) highlighted the continued lack of conclusive evidence as to any harmful effects and the need for additional research targeting other receptor species, sensitive life stages, and different EMF exposures (sources, intensities).

Most recently, in February 2022, the U.S. Offshore Wind Synthesis of Environmental Effects Research (SEER) webinar #4 "Electromagnetic Fields & Vessel Collision: Effects on Marine Life from Offshore Wind Energy" included the following conclusion: "Overall, the effects of EMF have been considered minor to negligible and a less significant issue than other environmental effects at OSW [offshore wind] farms, but confidence remains low" (SEER, 2022).

In summary, for a conservative modeling analysis that assumed cable currents based on maximum (100 percent capacity) wind farm output[1], modeled DC MFs predicted for the ground surface at the Island Park Beach (Boyd's Lane) landfall site and at a height of 1 meter along Boyd's Lane in Portsmouth are well-below health-based exposure guidelines for DC MFs. In addition, MF modeling for the offshore export cables showed that DC MF levels will be increased only for small areas along the seafloor around certain localized cable locations where conservative (and atypical) installation conditions are present, contributing to highly localized deviations from the earth's DC geomagnetic field. As discussed above, the weight of the currently available scientific evidence does not provide support for concluding there would be population-level harm to marine species from EMFs associated with HVDC submarine transmission.

[1] The wind farm is expected to operate at an annual-average capacity factor of around 50 percent; thus, much of the time, the actual output and MF attributable to the Project export cables will be correspondingly lower than the values discussed in this letter, which are for maximum output.

Sincerely,

GRADIENT

Christopher M. Long

Christopher M. Long, Sc.D., DABT
Principal
email: clong@gradientcorp.com

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MAYFLOWER WIND

Brayton Point Project Cable Systems

Magnetic Field Analysis

Revision 0

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POWER ENGINEERS

MAGNETIC FIELD ANALYSIS

PREPARED FOR:

MAYFLOWER WIND

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B	2022-05-06	Appvl	JTL	ELB	CMB	Issued for Appvl
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"Issued For" Definitions:

- "Prelim" means this document is issued for preliminary review, not for implementation
- "Appvl" means this document is issued for review and approval, not for implementation
- "Impl" means this document is issued for implementation
- "Record" means this document is issued after project completion for project file

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INTRODUCTION

This report documents a magnetic field study completed by POWER Engineers, Inc. (POWER) for Mayflower Wind Energy, LLC (Mayflower). The study examines eight (8) cable configurations associated with the portions of the Mayflower Wind project in the Rhode Island and Massachusetts jurisdictions, both offshore in state waters and onshore on Aquidneck Island and Brayton Point. These configurations are listed below and described in the Cable Installation Scenarios section. Preliminary cable sizes and drawings of the circuit configurations are located in Appendix A and Appendix B.

1. HVDC offshore, bundled configuration, 6.6 ft (2.0 m) burial depth[1].
2. HVDC offshore, bundled, on seafloor under a 1.0 ft (0.3 m) thick concrete mattress.
3. HVDC offshore, non-bundled, cables separated by 164 ft (50 m), 6.6 ft (2.0 m) burial depth.
4. HVDC landfall horizontal directional drills (HDD), beach case under Island Park Beach near Boyd's Lane and Park Avenue. Cable depths are 25 ft (7.6 m) and 40 ft (12.2 m) below the surface with a 15 ft (4.6 m) horizontal separation.
5. HVDC onshore, single circuit duct bank, 3.2 ft (0.96 m) burial depth.
6. HVDC onshore, double circuit duct bank, 3.3 ft (1.01 m) burial depth.
7. HVDC onshore, alternate double circuit duct bank, 3.4 ft (1.03 m) burial depth.
8. HVAC onshore, single circuit duct bank (two cables per phase), 3.3 ft (1.01 m) burial depth.

POWER has calculated magnetic field in milligauss (mG) for the above configurations. Interpretation of results and comparison to industry limits will be performed by others. Human exposure to electric fields is negligible when a cable includes a grounded sheath and/or armor. This is the case for the Mayflower wind project. Therefore, calculation of the small external electric fields due to voltages induced on cable sheaths and/or armor is not included in the study.

METHODOLOGY AND INPUT DATA

Magnetic fields are the result of electron flow (current) in conductors. DC current produces a static magnetic field and AC current produces a time varying magnetic field. POWER used the COMSOL Multiphysics finite element software (version 5.6) for the analysis and verified results with hand calculations. Currents in each case are assumed to be balanced. This means that the currents for all conductors in each case sum to zero.

Magnetic field results for the seabed installation scenarios were reported at the sea floor. The offshore exception to this is Case 2 where fields are reported at the surface of the cement mattress. Per typical industry practice, onshore magnetic fields are reported at 3.28 ft (1.0 m) above ground. The onshore exception is the landfall beach case. While it is standard practice to report EMF values at a height of 1 meter above the ground surface, we assumed that a person could be lying flat on the beach. Therefore, we conservatively reported the landfall magnetic field results at the ground surface. Magnetic fields are proportional to current and inversely proportional to the distance from the current carrying conductor. Therefore, magnetic fields at any non-zero height above the surface will be lower than what is reported at the surface.

[1] Burial depths in this document are from the surface of the seafloor or surface of the earth to the top of the respective cable.

When conductor groups include currents flowing in opposite directions, they can be arranged so that external magnetic fields partially cancel. Better cancellation of magnetic fields is achieved by reducing the spacing between the conductors. However, spacing between conductors is sometimes constrained by other factors. For example, the cable spacing of the un-bundled cables offshore in Case 3 is determined to facilitate safe installation and repair of the separate cables, as well as to minimize risk of damage to both cables from threats such as anchor strike. Conductor spacing within onshore duct banks is also constrained by thermal considerations. Multi-circuit results reported in the next section are based on geometric arrangements that maximize magnetic field cancellation. Table 1 summarizes the study inputs.

Table 1. Study Inputs

Parameter	Value	Comments
AC Frequency	60 Hz	
Nominal AC voltage	345 kV	Line-to-line rms. Maximum voltage is 362 kV.
Total AC Power	1200 MW	
AC current per cable	1120 Amps rms [a]	Based on two cables per phase.
Nominal DC voltage	±320 kV	Pole-to-ground
Total DC Power	1200 MW	600 MW on each pole.
DC current per cable	1974 Amps DC	Based on one cable per pole and 5% reduced pole voltage.
AC cable sheath current	0 Amps	Based on single point sheath bonding.
GCC current	0 Amps	Induced voltage and current in the GCCs are neglected [b].
DC sheath and armor current	0 Amps	No voltage induced due to static magnetic fields.
Non-magnetic material μ_r	1.0	Magnetic permeability of soil, air, water, Al, Cu, stainless steel.

[a] Calculated at 0.95 per unit voltage, 0.95 power factor, and rounded up to the nearest 10 amps. Total current per phase is 2240 Amps rms.

[b] GCC currents have minor cancelling effects that would slightly reduce surface level magnetic fields. Neglecting these currents results in a slightly overestimated magnetic field.

CABLE INSTALLATION SCENARIOS

Submarine Cable Scenarios Offshore and at Landfall

Mayflower Wind selected Model Cases 1-4 to capture representative configurations for the HVDC submarine transmission systems offshore and in the sea-to-shore transition at landfall. Some or all of these configurations will be present in the installed project equipment.

Case 1: HVDC offshore, bundled configuration, 6.6 ft (2.0 m) burial depth

This model case represents the typical configuration offshore, with all offshore export cables (two submarine power cables and one submarine communications cable) installed together in a bundled configuration and buried in the seabed. Mayflower Wind will install the offshore export cables in a bundled configuration where practicable.

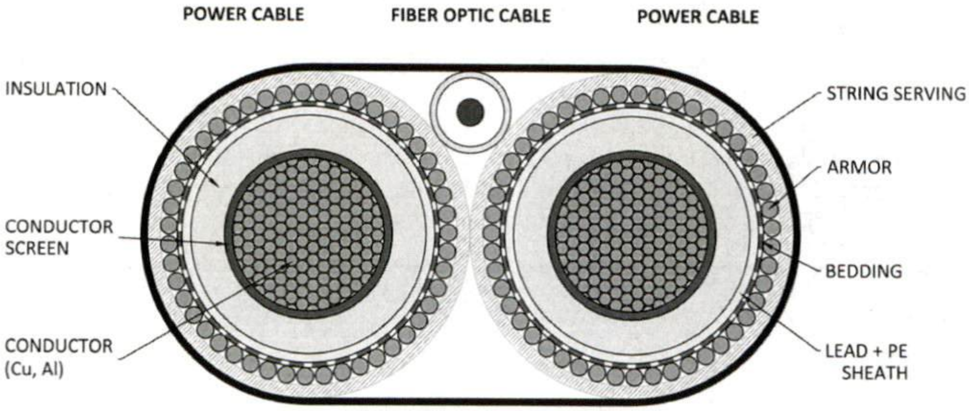

Figure 1: Typical HVDC Offshore Export Cable Bundled Configuration

Case 2: HVDC offshore, bundled, on seafloor under a 1.0 ft (0.3 m) thick concrete mattress

This model case represents the bundled configuration offshore, as described in Case 1 and illustrated in Figure 1. However, in certain local areas (including at crossings of existing pipelines such as those in the Sakonnet River), cable burial in the seabed may not be possible. In this case, the cables will be protected by means of secondary protection material (i.e., mattresses, rock) placed on top of the cables after installation. A typical example with representative geometry and thickness of cover is presented in this model case.

Case 3: HVDC offshore, non-bundled, cables separated by 164 ft (50 m), 6.6 ft (2.0 m) burial depth

As noted in Case 1, Mayflower Wind will install the offshore export cables in a bundled configuration where practicable. However, there may be portions of the route, including the approach to the landfall HDDs, where the cables must be installed separately (non-bundled). In this case, adequate separation will need to be maintained between the cables to ensure that they can be safely installed, maintained, and repaired (if needed). This model case represents a typical horizontal spacing between separately installed offshore export cables.

Case 4: HVDC landfall horizontal directional drills (HDD), beach case under Island Park Beach near Boyd's Lane and Park Avenue.

One cable is at a depth of 25 ft (7.6 m) below the surface and the other is at a depth of 40 ft (12.2 m). The horizontal spacing between cables is 15 ft (4.6 m). The offshore export cables will be brought to shore at each landfall location via HDD. Each submarine power cable will be installed in a separate HDD borehole and conduit. The trajectory of the HDDs will result in deeper burial of the cables beneath sensitive nearshore areas, including under Island Park Beach which is depicted in this model case. The cable depth represented in this model case is the current preliminary design depth of the cables at the landfall location at Boyd's Lane on Aquidneck Island.

Onshore Cable Scenarios

Mayflower Wind selected Model Cases 5-8 to capture representative configurations for the HVDC and HVAC underground transmission systems onshore. These configurations were evaluated as part of the preliminary engineering effort for the Project.

Case 5: HVDC onshore, single circuit duct bank, 3.2 ft (0.96 m) burial depth

This Model Case captures a typical configuration for an underground, concrete-encased duct bank that can accommodate two HVDC power cables and one dedicated communications cable.

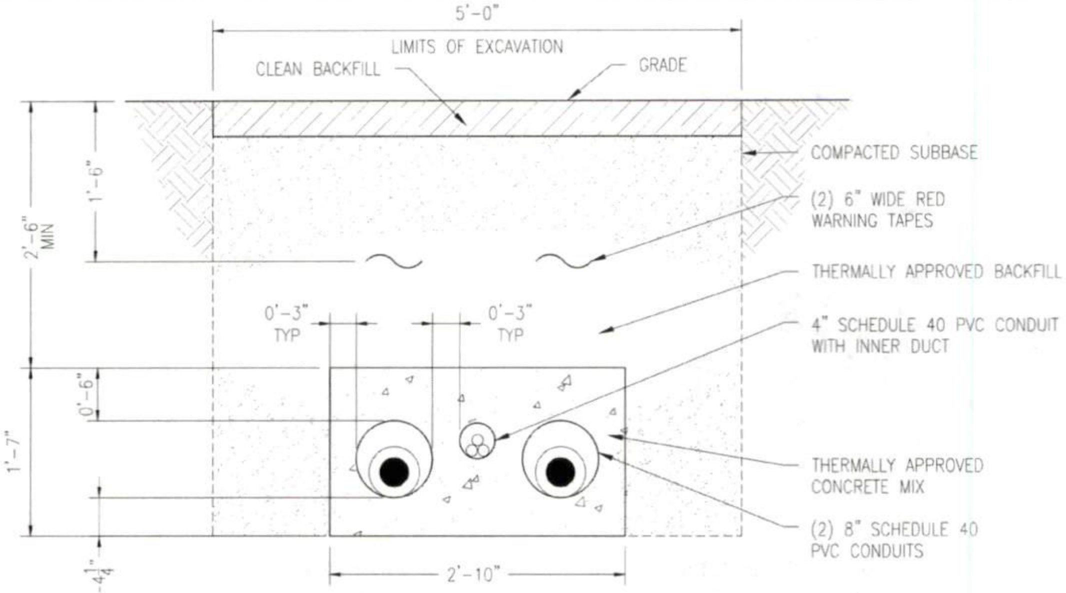

Figure 2: Typical HVDC Onshore Trench without the Noticed Variation

Case 6: HVDC onshore, double circuit duct bank, 3.3 ft (1.01 m) burial depth

This Model Case captures Mayflower Wind's Noticed Variation.

Mayflower Wind has identified a design variation to the Project, referred to as the Noticed Variation, which would involve the design and conditional construction of certain right-sized transmission facilities along the same onshore routes to enable the delivery of up to an additional 1,200 MW of renewable clean energy. The Noticed Variation would involve sizing underground infrastructure to include spare conduits and vaults at landfall and onshore, capable of accommodating an additional 1200 MW HVDC circuit.

Model Case 6 represents a typical configuration for an underground, concrete-encased duct bank that can accommodate four power cables and associated communication and ancillary cables in a single trench.

The Magnetic Field Results section reports results for the Noticed Variation, which includes two spare conduits for an additional circuit, as shown in Figure 3. Although the Noticed Variation does not incl ude a request for approval of additional export cables at this time, for informational purposes only, results are also presented for an indicative future scenario with a second 1200 MW circuit installed.

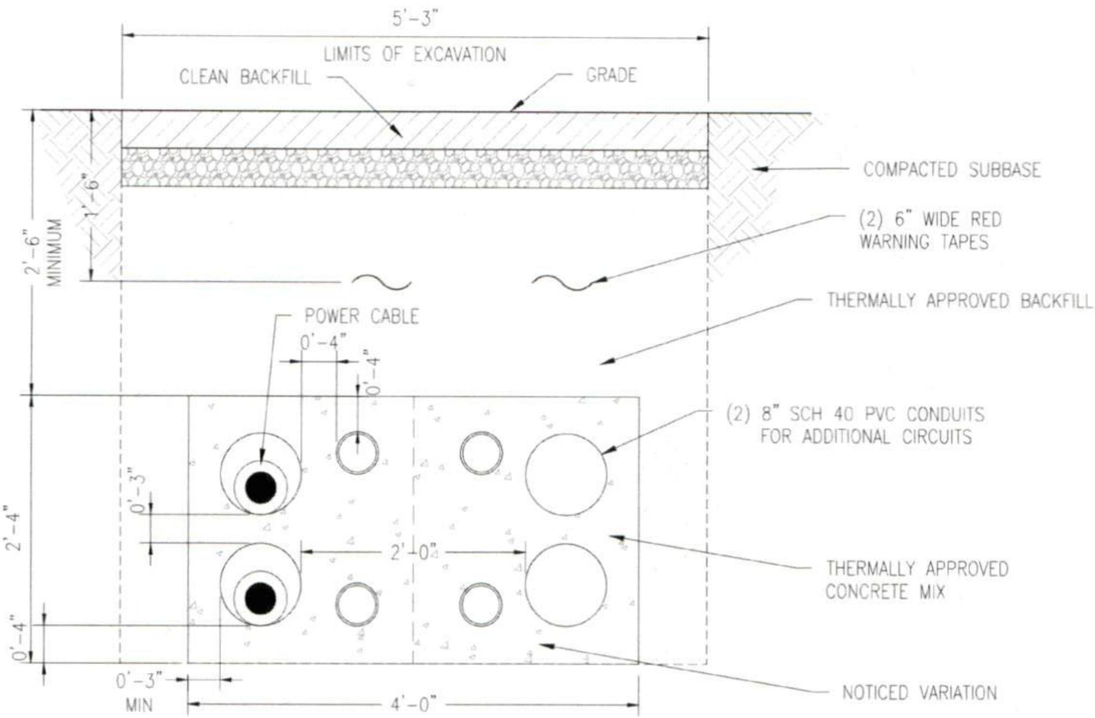

Figure 3: Typical HVDC Onshore Trench with the Noticed Variation

Case 7: HVDC onshore, alternate double circuit duct bank, 3.4 ft (1.03 m) burial depth

This Model Case captures an alternate configuration for Mayflower Wind's Noticed Variation.

Model Case 7 represents an alternate configuration for an underground, concrete-encased duct bank that can accommodate four power cables and associated communication and ancillary cables in a single trench.

The Magnetic Field Results section reports results for the scenario with two spare conduits for an additional circuit. Although the Noticed Variation does not include a request for approval of additional export cables at this time, for informational purposes only, results are also presented for an indicative future scenario with a second 1200 MW circuit installed.

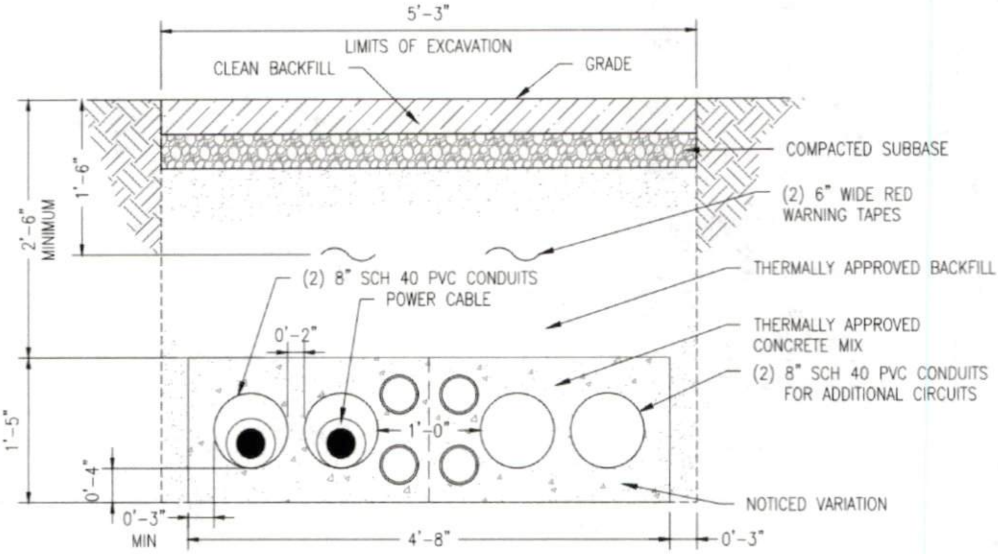

Figure 4: Alternate HVDC Onshore Trench with the Noticed Variation

Case 8: HVAC onshore, single circuit duct bank (two cables per phase), 3.3 ft (1.01 m) burial depth

This Model Case captures the typical configuration of an underground, concrete-encased duct bank that can accommodate three HVAC phases (each with two power cables per phase) and associated communication and ancillary cables in a single trench.

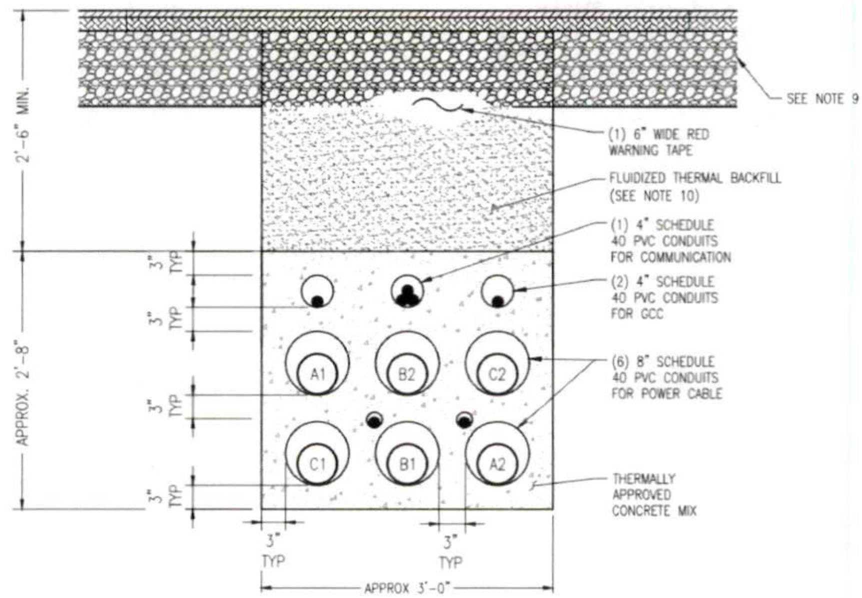

Figure 5: Typical HVAC Onshore Trench

MAGNETIC FIELD RESULTS

Table 2 lists the peak magnetic field results for each case. Corresponding profile plots are located in Figures 6 through 13.

Table 2. Study Results

Case		Magnetic Field [a] (milligauss [b])				Figure
		Max	10 ft	25 ft	50 ft	
1	HVDC offshore, bundled, 6.6 ft burial depth.	123	38.7	8.4	2.2	6
2	HVDC offshore, bundled, on seafloor under a 1.0 ft concrete mattress.	3785	55.7	9.0	2.2	7
3	HVDC offshore, non-bundled, 164 ft cable separation, 6.6 ft burial depth.	1909	1120	579	360	8
4	HVDC landfall HDD, beach case, 25 ft, and 40 ft burial depths.	261	250	174	79.0	9
5	HVDC onshore, single circuit duct bank, 3.2 ft burial depth.	433	140	30.5	8.0	10
6	HVDC onshore, double circuit duct bank, 3.3 ft burial depth.	252 (181) [c]	101 (37.4)	20.6 (3.9)	5.2 (0.53)	11
7	HVDC onshore, alternate double circuit duct bank, 3.4 ft burial depth.	259 (188) [c]	95.8 (34.9)	18.9 (3.5)	4.7 (0.47)	12
8	HVAC onshore, single circuit duct bank (2 cables per phase), 3.3 ft burial depth.	66.7 [d]	13.9	1.5	0.20	13

[a] *Magnetic field results at maximum and at varying distances from the centerline (or from cable in separated offshore case).*
[b] *Milligauss is a unit of magnetic flux density; however, the generic term "magnetic field" is used throughout this document.*
[c] *Values in parenthesis include an additional 1200-MW circuit with identical loading.*
[d] *Field values for the AC case are root-mean-square (rms).*

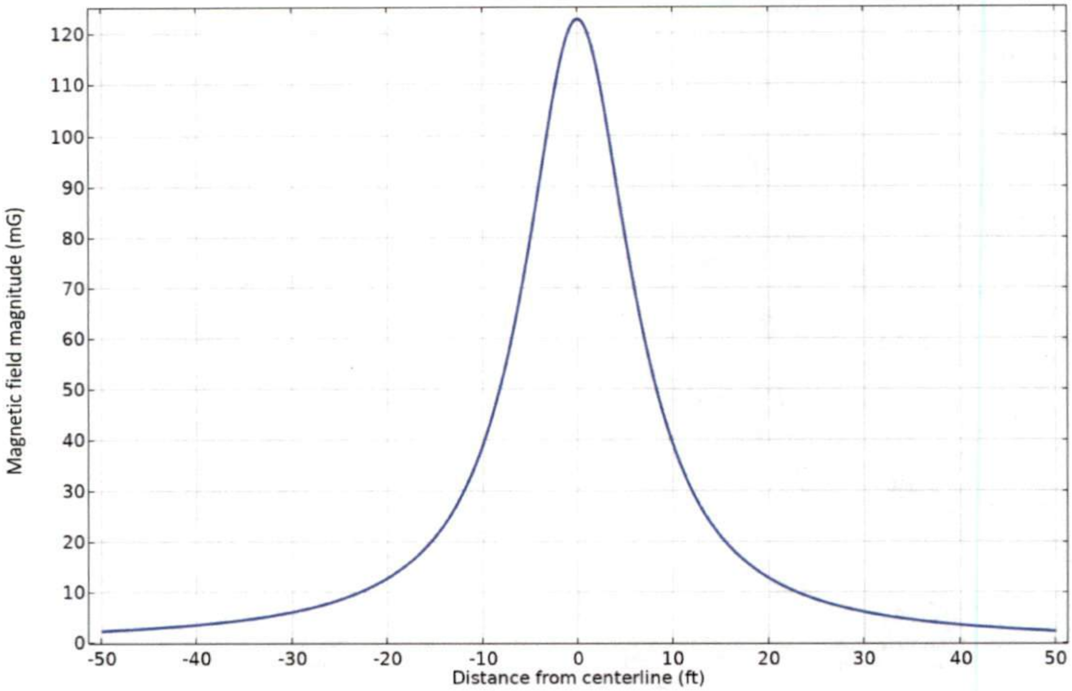

Figure 6. Magnetic field at the seafloor for Case 1: HVDC offshore, bundled, 6.6 ft (2.0 m) burial depth.

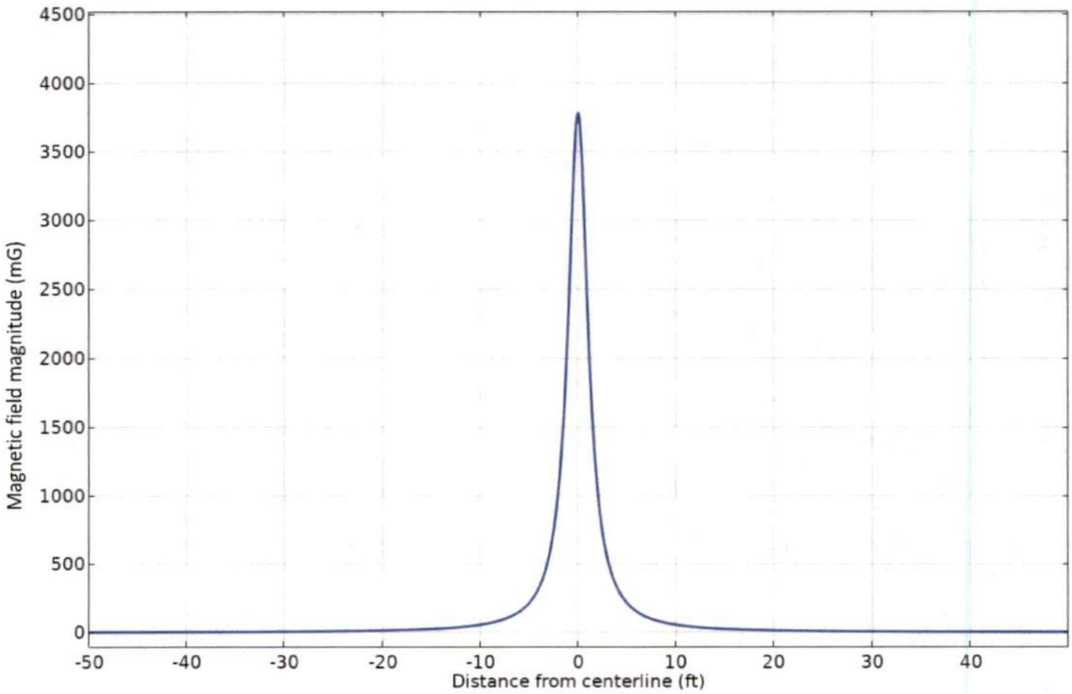

Figure 7. Magnetic field above the concrete mattress for Case 2: HVDC offshore, bundled, 1.0 ft (0.3 m) concrete mattress.

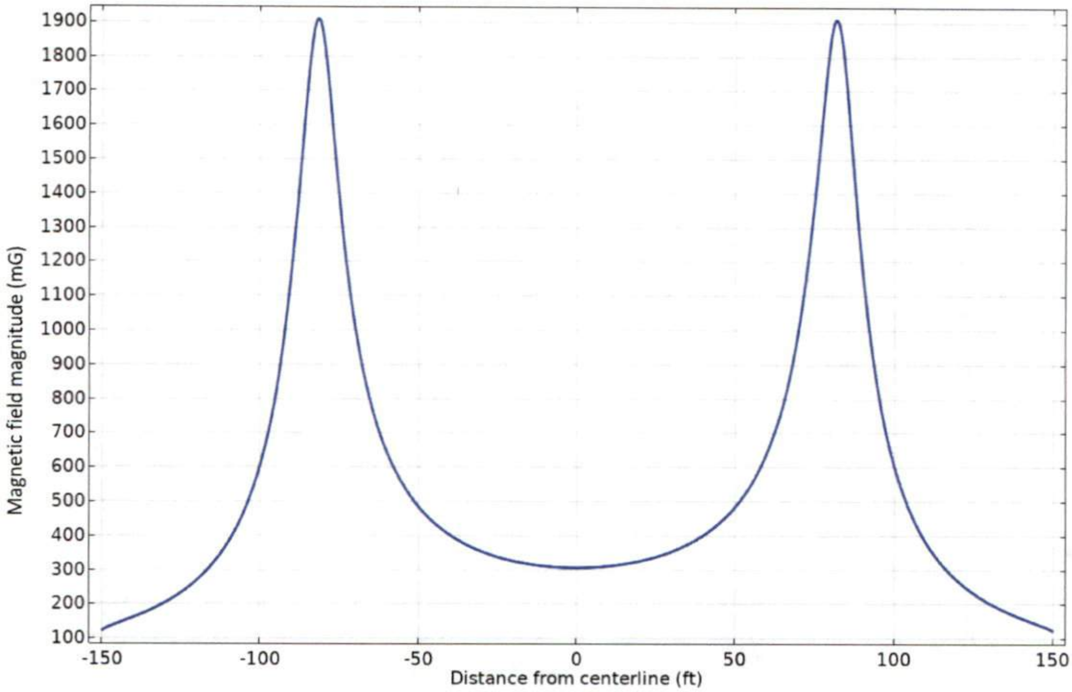

Figure 8. Magnetic field at the seafloor for Case 3: HVDC offshore, non-bundled 164 ft (50 m) separation, 6.6 ft (2.0 m) burial depth.

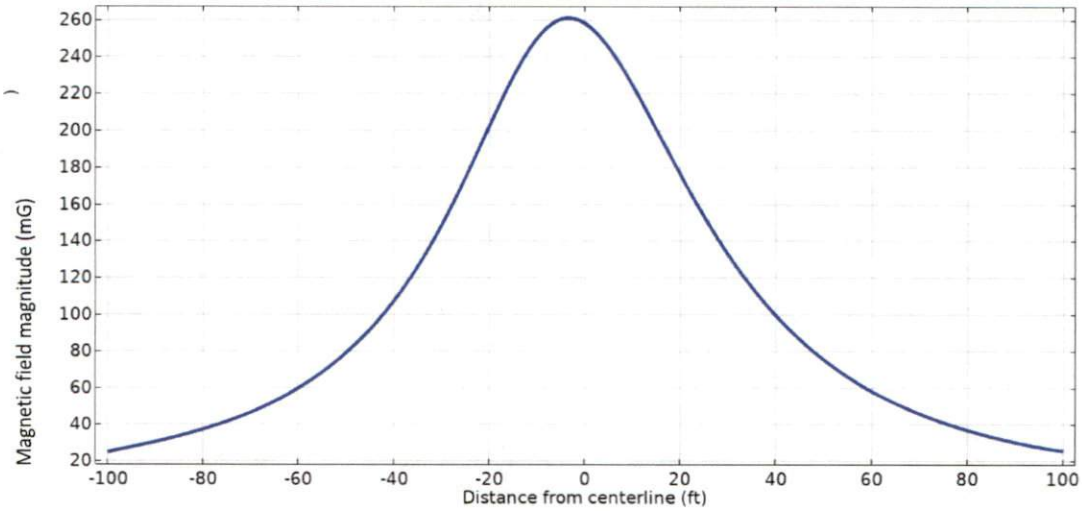

Figure 9. Magnetic field at the surface for Case 4: HVDC HDD landfall case, 25 ft (8.2 m) and 40 ft (12.2 m) burial depths and 15 ft (4.6 m) horizontal spacing.

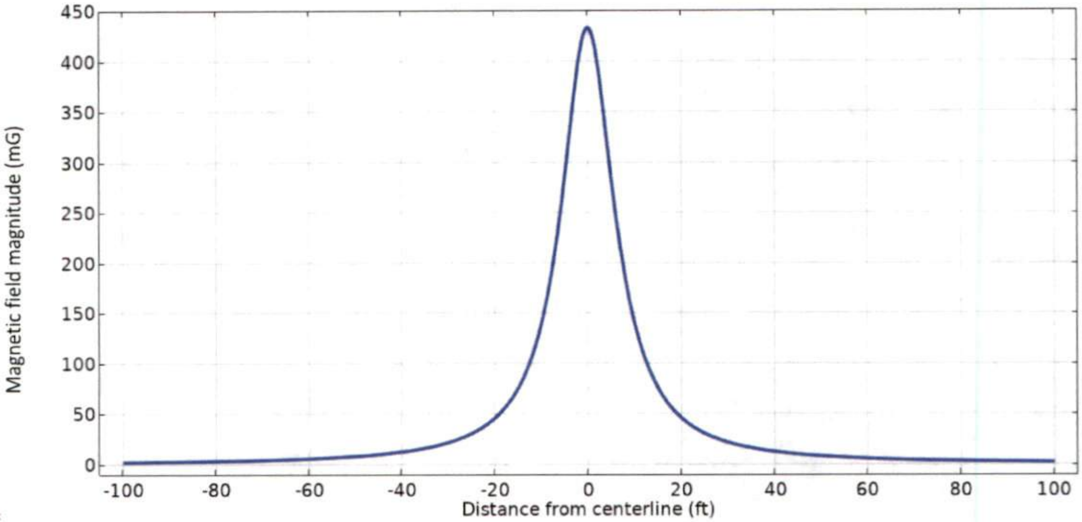

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Figure 10. Magnetic field at the earth surface for Case 5: HVDC onshore, single circuit, 3.2 ft (0.95 m) burial depth. (Model case does not include spare conduits for the Noticed Variation)

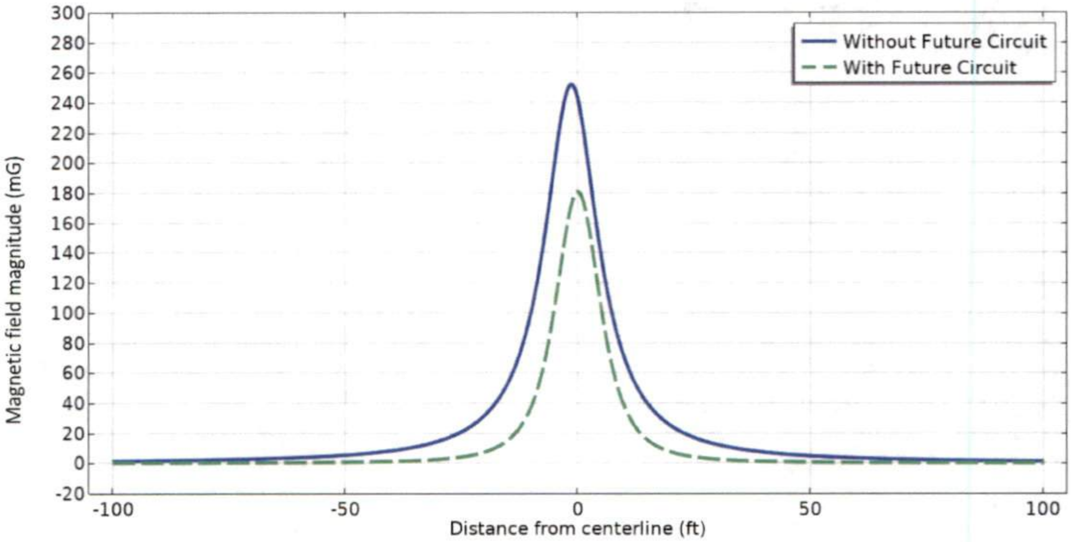


Figure 11. Magnetic field at the earth surface for Case 6: HVDC onshore double circuit duct bank, 3.3 ft (1.01 m) burial depth.

Note: *The blue line predicts MF for the Noticed Variation with empty spare conduits (as proposed). The green dashed line is an indicative future scenario that predicts MF with a second 1200 MW circuit installed. The reduction is due to field cancelling effects introduced by the second circuit.*

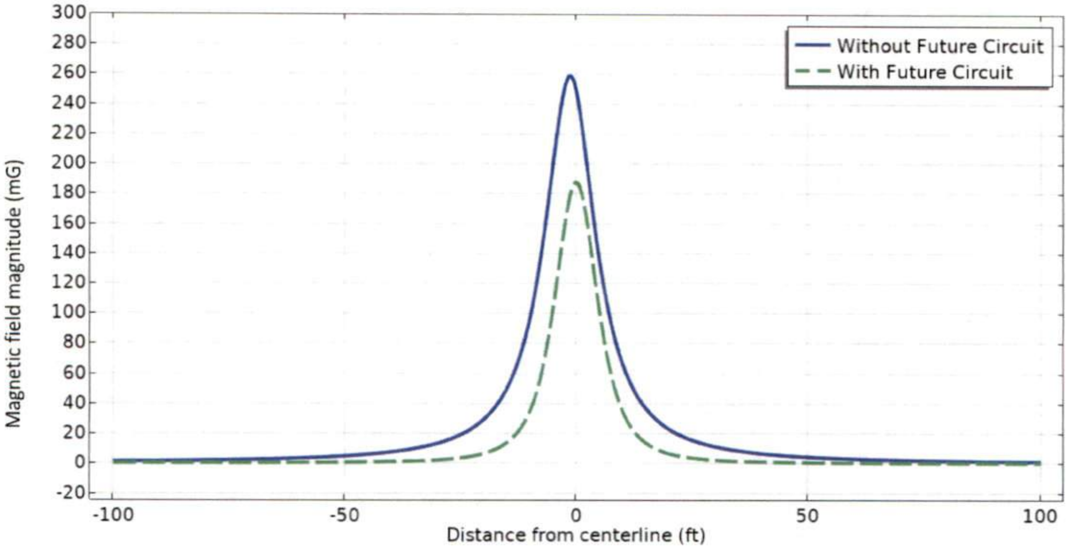


Figure 12. Magnetic field at the earth surface for Case 7: HVDC onshore alternate double circuit duct bank, 3.4 ft (1.03 m) burial depth.

Note: *The blue line predicts MF for the Noticed Variation with empty spare conduits (as proposed). The green dashed line is an indicative future scenario that predicts MF with a second 1200 MW circuit installed. The reduction is due to field cancelling effects introduced by the second circuit.*

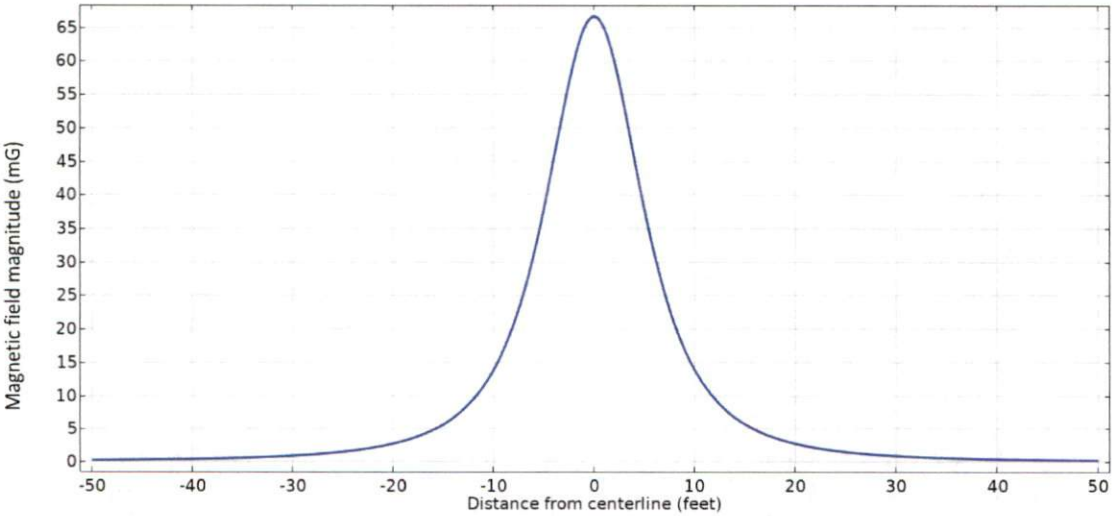
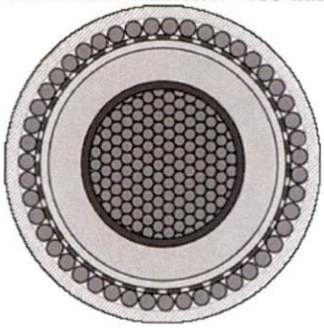


Figure 13. Magnetic field at the surface of the earth for Case 8: HVAC onshore, 3.3 ft (1.01 m) burial depth.

APPENDIX A – CABLE GEOMETRIES

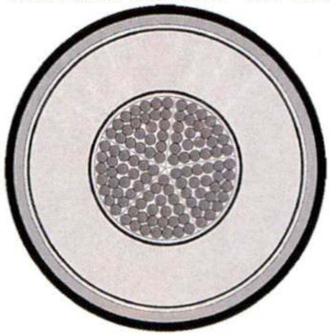
Approximate Submarine ±320 kV DC Cable Geometry (cable size provided by Mayflower)

Conductor core diameter: ≈48 mm (≈1.9 in)
Cable outer diameter: ≈133 mm (≈5.2 in)



Approximate Underground ±320 kV DC Cable Geometry (cable size provided by Mayflower)

Conductor core diameter: ≈63 mm (≈1.9 in)
Cable outer diameter: ≈119 mm (≈5.2 in)



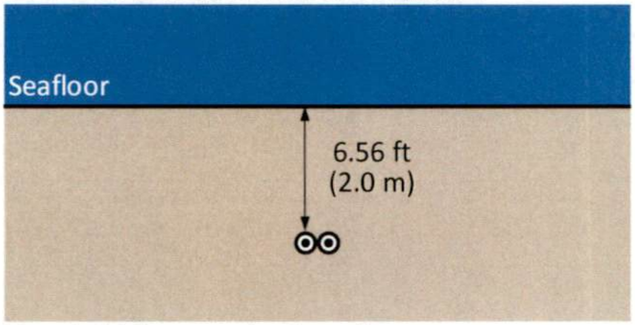
Approximate Underground 345 kV AC Cable Geometry (3000 kcmil cable size estimated by POWER based on desired ampacity of 1004 Amps AC rms per cable).

Conductor core diameter: ≈48 mm (≈1.89 in)
Cable outer diameter: ≈140 mm (≈5.5 in)

APPENDIX B – CIRCUIT GEOMETRIES

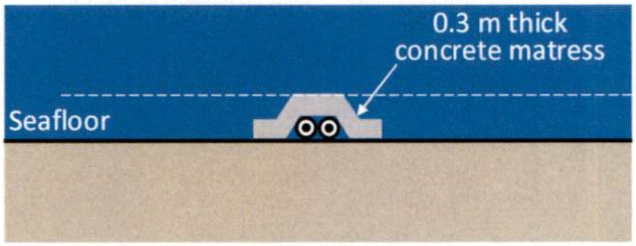
The drawings below are simplified diagrams showing relative cable placement. Depths are measured from the seafloor or earth surface to the top of the respective cable. Horizontal separation is measured from cable centers. Horizontal separation for bundled is therefore equal to one cable diameter.

Case 1: ±320 kV DC offshore, bundled configuration.



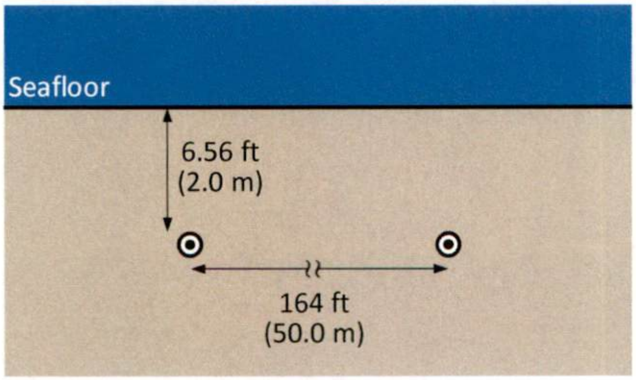
Magnetic field is measured at the sea floor.

Case 2: ±320 kV DC offshore, bundled and covered with concrete mattress.



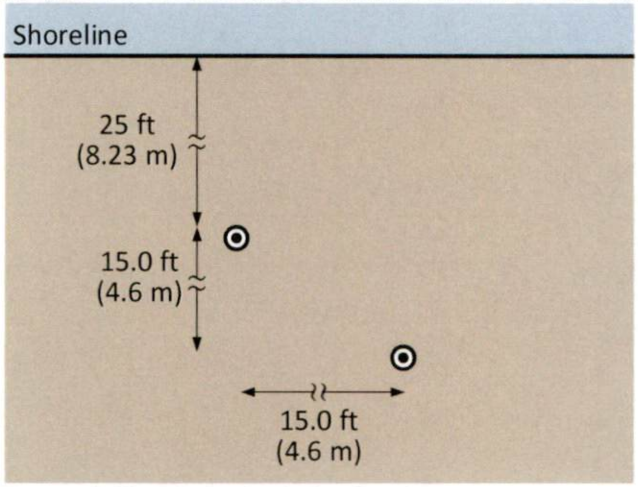
Magnetic field is measured along the dashed line (0.3 meters above top of cables).

Case 3: ±320 kV DC offshore, non-bundled.



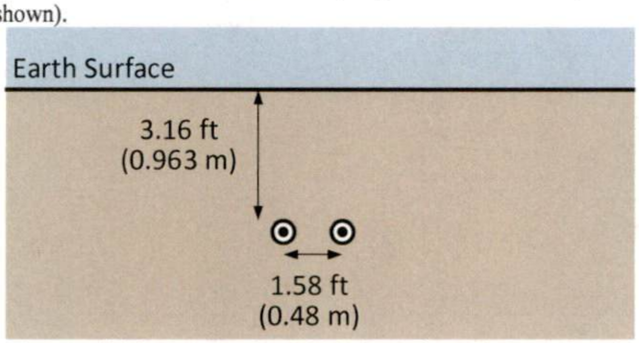
Magnetic field is measured at the sea floor.

Case 4: ±320 kV DC HDD landfall case under Island Park Beach near Boyd's Lane and Park Avenue.



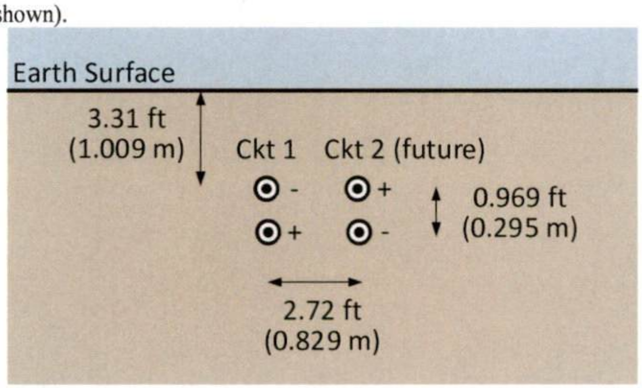
Magnetic field is measured at the beach surface.

Case 5: ±320 kV DC HVDC onshore, single circuit duct bank (conduit, engineered backfill, marketer tape etc. not shown).



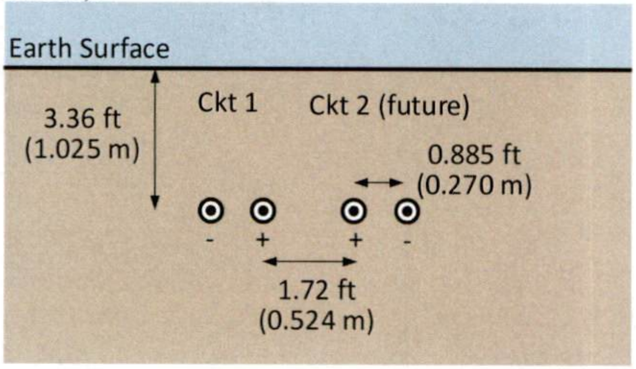
Magnetic field is measured at 3.28 ft (1 m) above the ground surface.

Case 6: ±320 kV DC HVDC onshore, double circuit duct bank (conduit, engineered backfill, marketer tape etc. not shown).



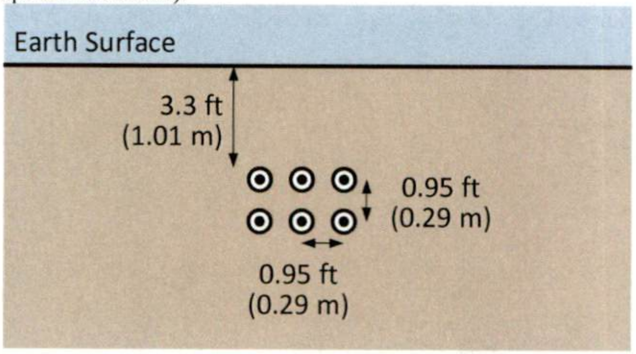
Magnetic field is measured at 3.28 ft (1 m) above the ground surface.

Case 7: ±320 kV DC HVDC onshore, alternate double circuit duct bank (conduit, engineered backfill, marketer tape etc. not shown).



Magnetic field is measured at 3.28 ft (1 m) above the ground surface.

Case 8: 345 kV HVAC onshore single circuit (two cables per phase) duct bank conduit, engineered backfill, marketer tape etc. not shown).



Magnetic field is measured at 3.28 ft (1 m) above the ground surface.
Phasing top: A1-B2-C2, bottom: C1-B1-A2. Results assume the angle of A1 equals the angle of A2; likewise, with B1, B2 and C1, C2.

SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment K: Fisheries Monitoring Plan

Revised: February 2023

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SOUTHCOAST WIND

Fisheries Monitoring Plan – SouthCoast Wind – Rhode Island Waters

Document Number	SC01-CML-PRO-EXE-0001
Document Revision	A
Owner/Author	INSPIRE Environmental
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Disclosure	For use by SouthCoast Wind and Authorized Third Parties

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A	Brian Gervelis	Erin Healy Joel Southall	Jennifer Flood	2-Feb-23	Draft

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List of Figures

Glossary

Acronym	Definition
BAG	Before-After Gradient
BOEM	Bureau of Ocean Energy Management
C	Celsius
COP	Construction and Operations Plan
CPUE	catch per unit effort
d	day
dB	decibel
ECC	Export Cable Corridor
EMF	electric and magnet fields
FMP	Fisheries Monitoring Plan
ft	feet
HVDC	high-voltage direct current
IAC	Inter-Array Cable
INSPIRE	INSPIRE Environmental
kHz	kilohertz
km	kilometer
m	meter
mm	millimeter
MA	Massachusetts
MA/RI WEA	Massachusetts/Rhode Island Wind Energy Area
MATOS	Ocean Tracking Network or the Mid-Atlantic Acoustic Telemetry Network
µPa	micropascals
MRIP	Marine Recreational Information Program
nm	nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
OSAMP	Ocean Special Area Management Plan
OSP	Offshore Substation Platform
QA/QC	quality assurance/quality control
RI	Rhode Island
RIDEM	Rhode Island Department of Environmental Management
RIDMF	Division of Marine Fisheries
RIVTS	RIDEM DMF Ventless Trap Survey
ROSA	Responsible Offshore Science Alliance
s	second
WTG	Wind Turbine Generator

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1. Introduction

The SouthCoast Wind Lease Area OCS-A 0521 (Lease Area) encompasses 127,388 acres (51,552 hectares) and will include up to five offshore substation platforms (OSPs), up to 147 wind turbine generators (WTGs), and submarine inter-array cables (IACs) connecting WTGs and OSPs. The OSPs and WTGs will occupy one of the 149 possible positions, which will conform to a 1.0 nautical mile (nm) x 1.0 nm (1.9 kilometers [km] x 1.9 km) grid layout. The grid is oriented in east-west rows and north-south columns, consistent with the layout adopted by SouthCoast Wind and other developers in the Massachusetts/Rhode Island Wind Energy Area (MA/RI WEA). The Lease Area is located entirely in Federal Waters, 26 nm (48 km) south of Martha's Vineyard, 20 nm (37 km) south of Nantucket, and 51 nm (94 km) southeast of the Rhode Island coast (Figure 1).

The SouthCoast Wind Project (the Project) includes two separate export cable corridors (ECCs) that will make landfall at Falmouth, MA and Brayton Point in Somerset, MA (Figure 1).

The Brayton Point ECC extends northward from the Lease Area in Federal Waters before entering Rhode Island (RI) state waters from RI Sound. The Brayton Point ECC then continues in RI state waters and travels northward through the Sakonnet River, crosses Aquidneck Island in Portsmouth, RI, and extends through Mount Hope Bay before crossing into MA state waters to make landfall in Somerset, MA (Figure 1). The Study Area of this Fisheries Monitoring Plan (FMP) is the RI state waters portion of the Brayton Point ECC.

In addition to supporting a diversity of recreational activities, such as tourism, transportation, and industry, RI state waters provide vital habitat for fish (RIDEM 2023). This FMP focuses on a subset of commercial and recreational fishery species based on input from Rhode Island State agencies and fishery stakeholders and concurrent research projects to capitalize on existing efforts. Initial consultation by both INSPIRE Environmental and SouthCoast Wind with RIDEM and local commercial and recreational fishermen, reviews of other fisheries monitoring surveys in the area, and reviews of both commercial and recreational fishing effort and landings in the area, including the fisheries baseline assessment in SouthCoast Wind's Construction and Operations Plan (COP), were used to determine the appropriate species and surveys. These species include channeled whelk (*Busycotypus canaliculatus*), knobbed whelk (*Busycon carica*), striped bass (*Morone saxatillis*), summer flounder (*Paralichthys dentatus*), tautog (*Tautoga onitis*), and little tunny (i.e., false albacore, *Euthynnus alletteratus*).

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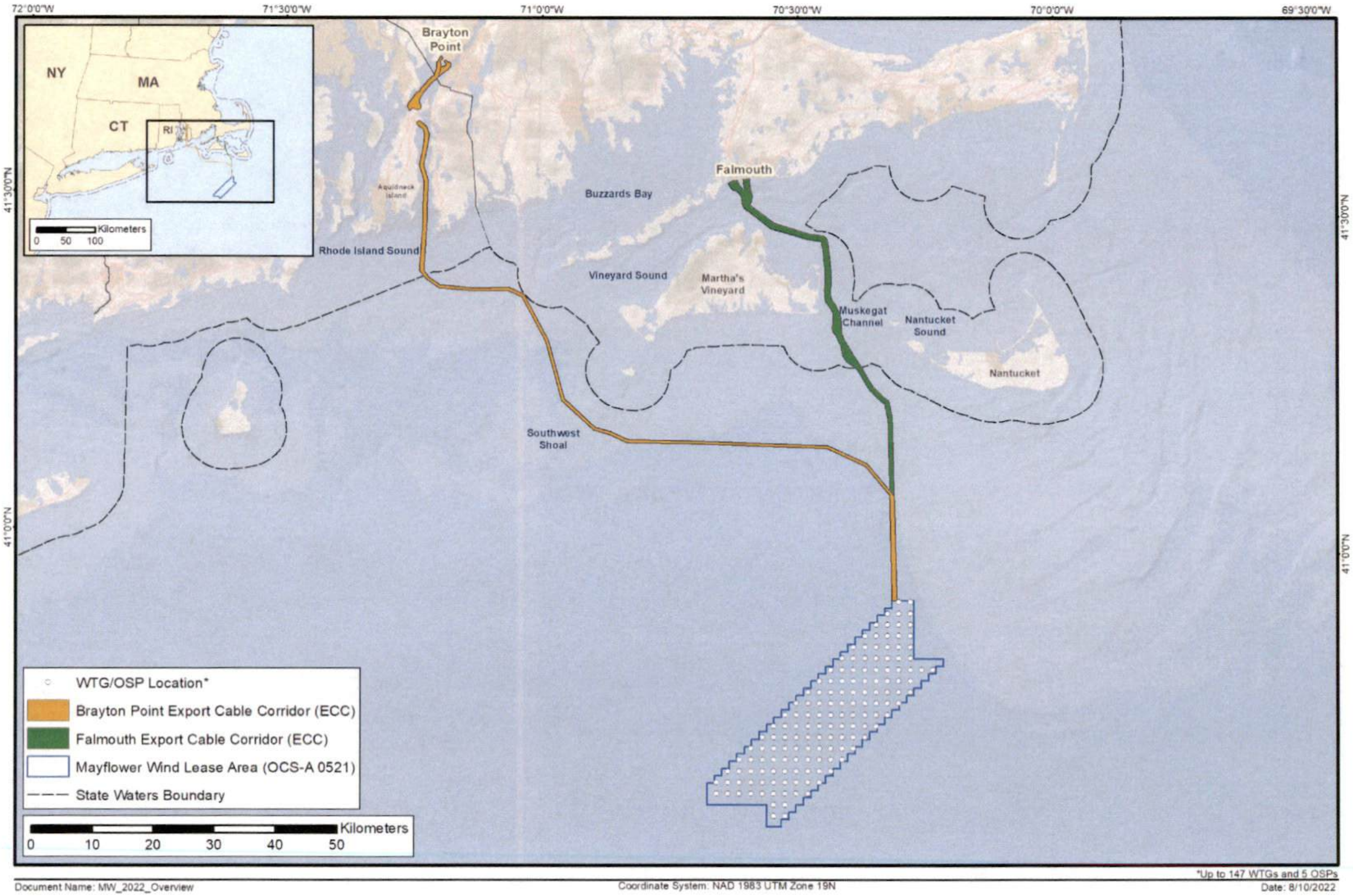

Figure 1. **Location of the SouthCoast Wind Lease Area with proposed wind turbine generator (WTG)/offshore substation platform (OSP) foundation positions and offshore export cable corridors (ECCs).**

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2. Overview of Fisheries Monitoring

This Fisheries Monitoring Plan (FMP) was developed in accordance with the RI Ocean Special Area Management Plan (OSAMP) and applicable sections of the RI Code of Regulations, notably 650-20-05 RI Code R. §11.9.9 (Baseline Assessment Requirements in state waters), and also with recommendations set forth in the Bureau of Ocean Energy Management (BOEM) "Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf" (BOEM, 2019). These sections of the RI Code of Regulations state, in summary, that a baseline biological assessment of commercially and recreationally species shall be conducted for two years pre-construction, during each year of construction, and three years post-construction using surveys appropriate for the species identified and for the nature of the offshore development being assessed (in this case, SouthCoast Wind). The BOEM guidelines state that a fishery survey plan should aim to:

- Identify and confirm which dominant benthic, demersal, and pelagic species are using the project site, and when these species may be present where development is proposed;
- Establish a pre-construction baseline which may be used to assess whether detectable changes associated with proposed operations occurred in post-construction abundance and distribution of fisheries;
- Collect additional information aimed at reducing uncertainty associated with baseline estimates and/or to inform the interpretation of research results; and
- Develop an approach to quantify any substantial changes in the distribution and abundance of fisheries associated with proposed operations.

BOEM also provides guidance related to survey gear types that can be used to conduct fisheries monitoring surveys including otter trawl, beam trawl, gillnet/trammel net, and ventless traps if those gear types will effectively sample species identified as appropriate target species. BOEM guidelines stipulate that two years of pre-construction fisheries monitoring data are recommended, and that data should be collected across all four seasons. Consultations with BOEM and other agencies are encouraged during the development of FMPs. BOEM also encourages wind developers to review existing data, and to seek input from the local fishing industry to select survey equipment and sampling protocols that are appropriate for the area of interest.

Additional fisheries monitoring guidance was obtained from the Responsible Offshore Science Alliance (ROSA) "Offshore Wind Project Monitoring Framework and Guidelines" (2021). These guidelines build on existing BOEM guidance, outlining the fundamental elements to include in offshore wind fisheries monitoring plans and associated studies for commercial-scale offshore wind farms and identifying the primary resources to help draft and review such plans. Based on existing BOEM guidance and best practices developed to date, these guidelines help to:

- Streamline project monitoring plan development and review by providing comprehensive standardized recommendations for monitoring marine resources affected by offshore wind development projects;
- Ensure project monitoring plans and supporting studies are effectively designed to provide necessary information that can be used to understand and minimize adverse impacts on marine resources from offshore wind development consistent with established BOEM, National Marine Fisheries Service (NMFS), and state guidelines, best science practices, and decision maker and developer data needs;

- Encourage the use of standardized protocols to collect and analyze biological and environmental data that can be integrated with existing survey data and other research;
- Support the integration of monitoring efforts across multiple spatial and temporal scales (site-specific to regional/ecosystem and before/after construction);
- Focus monitoring efforts on important commercial and recreational species, habitats, and other resources that may be impacted by or vulnerable to offshore wind development; and
- Encourage proactive engagement, collaboration, and involvement among State and Federal agencies, research institutions, wind developers, and fishery members and representatives.

This FMP will be revised through an iterative process, and survey protocols and methodologies have been and will continue to be refined and updated based on feedback received from stakeholder groups. Most of the research described in this plan will be performed on contracted commercial and recreational fishing vessels whenever practicable.

3. Fisheries Monitoring

3.1 Summary of Existing Fisheries Monitoring

Existing fishery independent and dependent data were identified and reviewed during the development of this FMP. Several established fisheries independent surveys have been conducted within RI state waters, specifically within the vicinity the Brayton Point ECC. These surveys and reports provide examples of ongoing and recent work that help to characterize marine communities throughout RI state waters, including Narragansett Bay. This section provides a summary of fisheries monitoring within the area of interest prior to construction of the Project.

For over 38 years, the Rhode Island Department of Environmental Management's (RIDEM) Division of Marine Fisheries (RIDMF) continues to develop and employ a series of finfish monitoring programs in RI's coastal and estuarine waters, including the area transited by the Brayton Point ECC. Such finfish monitoring programs include:

- The RI Coastal Trawl Survey (seasonal, est. 1979; monthly, est. 1990): Otter trawl surveys that consist of seasonal surveys within coastal waters and monthly surveys within Narragansett Bay for assessing the status of finfish and crustaceans in RI state waters (RIDMF, 2022a). Of the 13 fixed stations that are sampled monthly in Narragansett Bay, four stations reside within the Sakonnet River (n = 2) and Mount Hope Bay (n = 2) areas; an additional 26 stations (14 of which are randomly selected) are sampled seasonally in the Narragansett Bay area during the spring (April – May) and fall (September – October) (RIDMF, 2022a).
- The Ventless Fish Pot Survey (est. 2013): An annual survey conducted monthly between April and October to evaluate the abundance and biological characteristics of structure-oriented finfish using fish pots set at randomly stratified locations in Narragansett Bay, including Mt. Hope Bay and the Sakonnet River. The most recent 2021 fish pot survey caught and recorded 14 different finfish species where 97% of the catch consisted of scup (56%), black sea bass (39%), and tautog (2%). In addition to identifying spatiotemporal trends and tracking annual cohorts of finfish with low catchability in demersal trawl surveys, the 2021 fish pot survey opportunistically sampled nine unique vertebrate species, including the commercially important channeled and knobbed whelk (RIDMF, 2022a).
- The RI Narragansett Bay Juvenile Finfish Seine Survey (est. 1988): A monthly beach seine survey to monitor the relative abundance and distribution of juvenile life history stages for finfish species that hold commercial

and recreational importance in Narragansett Bay, including Mt. Hope Bay and the Sakonnet River. This survey samples juvenile fish at 18 fixed stations around the coastal margins of Narragansett Bay from June through October of each year using 1/4-inch mesh beach seine (130 ft [39.62 m] long X 6 ft [1.67 m] deep). Other biological and environmental variables measured during this survey include total length of captured fish as well as bottom temperature, salinity, and dissolved oxygen at each station (RIDMF, 2022a).

- The RI Acoustic Receiver Array (est. 2019): A non-extractive acoustic monitoring method to collect baseline movement data on tagged species that reside and migrate through RI state waters. Through a collaboration with the Atlantic Shark Institute, RIDEM deployed 21 acoustic receivers off RI's coast in 2020, where two receivers were positioned near the mouth of the Sakonnet River. Although RIDEM does not currently conduct a comprehensive finfish tagging program, the seasonal acoustic receiver array records tagged animals deployed during other regional efforts. From May through December 2020, 13,086 detections from nine unique finfish and shark species were recorded throughout RI's acoustic receiver array. Of the recorded detections, 11,271 detections were captured for 193 different striped bass at 20 different stations, including 861 detections in the Sakonnet River study area. Striped bass presence was largely seasonal, with a peak in detections during the summer (July – August) with fewer detections during late spring (May – June) and throughout the fall (September – December) (RIDMF, 2021).

Additional data sources that characterize baseline conditions in the Study Area include:

- Life history assessment of channeled whelk and knobbed whelk in Narragansett Bay, Mount Hope Bay, and Little Narragansett Bay (Angell, 2018).
- Trends in catch and effort in the Rhode Island commercial whelk fishery (Angell, 2021).
- Recreational fishing catch and effort estimates for Rhode Island from the NOAA Fisheries' Marine Recreational Information Program (MRIP) (https://www.fisheries.noaa.gov/data-tools/recreational-fisheries-statistics-queries).

3.2 Fishing Activity in the Study Area

Commercial fishing activity within the proposed area of the Brayton Point ECC was characterized using several sources of publicly available information from Federal and State regulatory agencies. Despite the numerous finfish and invertebrate species targeted in RI state waters, the commercial fishery for channeled and knobbed whelk is of great interest and importance to the local fishing community. Between 2007 and 2011/2012, fishing effort for channeled and knobbed whelk increased substantially due to severe declines in the southern New England commercial lobster (*Homerus americanus*) fishery and dramatic increases in ex-vessel prices for whelks (Angell, 2021). Commercial whelk landings occur year-round, but most landings occur between May and December, often peaking in June and October when whelk reproductive activity is low. Whelk landings are reported throughout Narragansett Bay and are especially prevalent in the Sakonnet River, which represented roughly 30% of all whelk landings in 2021 (RIDMF, 2022b).

Several recreationally valuable fisheries are active within Rhode Island State Waters, including the Sakonnet River and Mount Hope Bay areas that will be transited by the Brayton Point ECC. The fishery species identified in this FMP, specifically striped bass, summer flounder, tautog, and little tunny (i.e., false albacore), were selected based on their overall catch rates and social importance to fishery stakeholders (e.g., Kim et al., 2023). For example, of the 27 species groups reported by NOAA Fisheries' MRIP, tautog, little tunny, summer flounder, and striped bass were among the top eleven groups harvested in RI state waters during 2022 (Personal communication from the

National Marine Fisheries Service, Fisheries Statistics Division. [January 13, 2023]). Although harvesting rates for these species are known to fluctuate drastically based on regulations and availability, they remain a cornerstone resource for fishing communities in Rhode Island and the greater southern New England region.

3.3 Proposed Channeled and Knobbed Whelk Trap Survey

SouthCoast Wind will conduct a trap survey to monitor whelk relative abundance and size structure along commercially fished sections of the Brayton Point ECC in the Sakonnet River. The survey will identify potential impacts from the short-term disturbance of submarine cable installation on the localized channeled and knobbed whelk resources. The cable laying process could disrupt the benthic habitats utilized by whelk species; as these areas become re-worked and sediment suspension occurs. Once the Project becomes operational, potential changes in electric and magnetic fields (EMF) are of interest (Taormina et al., 2018). Given the life history and habitat preferences of whelk, these species are susceptible to impacts from construction and operation processes.

Cable installation and mattressing practices could potentially affect both channeled and knobbed whelk as they are resident to inshore areas of RI (Angell, 2021). Both species inhabit sandy and muddy subtidal waters, preying on shellfish species such as the hard clam (*Mercenaria mercenaria*), the soft-shell clam (*Mya arenaria*), the Atlantic surf clam (*Spisula solidissima*), the blue mussel (*Mytilus edulis*), or the slipper shell (*Crepidula fornicata*) (Nelson et al., 2018). Whelk activity levels and feeding are thermally controlled, as channeled whelk bury into the sediment when temperatures become too hot or too cold (Magalhaes, 1948). Additionally, Wilcox (2013) showed that whelk burrow and stop feeding when water temperatures drop below 8°C. The movement of whelk are limited, and seasonal migrations of less than several kilometers are typical (Sisson, 1972; Edmundson, 2016). This sedentary lifestyle is exacerbated by slow growth, late maturation, and limited larval dispersal (Hancock, 1963; Berg and Olsen, 1988; Gendron, 1992; Shelmeradine et al., 2007; Angell, 2021). Species exhibiting these characteristics are typically vulnerable to the physical disturbances such as those created by export cable placement, which increases the need for monitoring.

A Before-After Gradient (BAG) whelk trap survey will be conducted to evaluate channeled and knobbed whelk relative abundance within the Brayton Point ECC in the Sakonnet River pre-, during, and post-construction. Additionally, the proposed study will characterize the size structure of both whelk and bycaught species caught within the Study Area. Pre-construction data collection from this study will be used to evaluate whether detectable changes occurred to the relative abundance or size structure of the whelk resource during and after construction.

To the extent possible, this survey will pair knowledge from local whelk fishermen with designs from trap surveys conducted within RI state waters. Currently, no standardized survey protocol exists for whelk in RI state waters. This FMP will aim to leverage a survey design from other regional surveys such as the RIDEM DMF Ventless Trap Survey (RIVTS). The RIVTS annual survey was modified to be used in a BAG design and will be applied along the RI state waters portion of the Revolution Wind Export Cable Route (Revolution Wind, LLC and INSPIRE Environmental, 2021). This FMP proposes a similar design which will be paired with trap configurations identified as reputable by the local whelk fishery. To allow for alignment with best fishing practices and to minimize interaction with local commercial operations, SouthCoast Wind has consulted with local whelk fishermen to provide input on station locations, various aspects of gear design, and survey timing. SouthCoast Wind will continue an open dialogue with local commercial fishermen to ensure best practices and survey gear and design are acceptable to the industry.

3.3.1 Survey Design and Methods

The BAG survey design will allow for the characterization of the pre-construction whelk community present in areas of the Brayton Point ECC fished commercially for whelk. Sampling will continue during and post-construction to quantify any changes in relative abundance or size structure could be attributed to the installation and operation of export cables within the Study Area. Sampling effort will be focused on sites along a spatial gradient within the Brayton Point ECC, rather than using a reference location that may not wholly represent conditions within the work area (Methratta, 2020). An additional strength of this design is that it does not assume homogeneity across sampling sites within the Project Area and presents an opportunity to monitor changes in spatial relationships over time (Methratta, 2020).

Sampling will occur from May to November to align with the commercial fishery for whelk within Narragansett Bay. Four stations will be selected with input from the commercial fishing industry along the Brayton Point ECC in the Sakonnet River.

At each of the four sampling stations, three six-trap strings will be laid parallel to the export cable and placed at three distance range categories: impact, middle, and furthest. One string will be set on top of the cable as the impact gradient, one string placed 15-30 m from the impact string will act as the middle gradient, and one string 50 m or greater from the impact string will serve as the furthest gradient (Figure 2). These distance categories are supported by EMF modeling results of buried high-voltage direct current (HVDC) cables from Normandeau (2011) and align with gradients proposed for the nearby ventless trap survey described in the Revolution Wind FMP (Revolution Wind, LLC and INSPIRE Environmental, 2021).

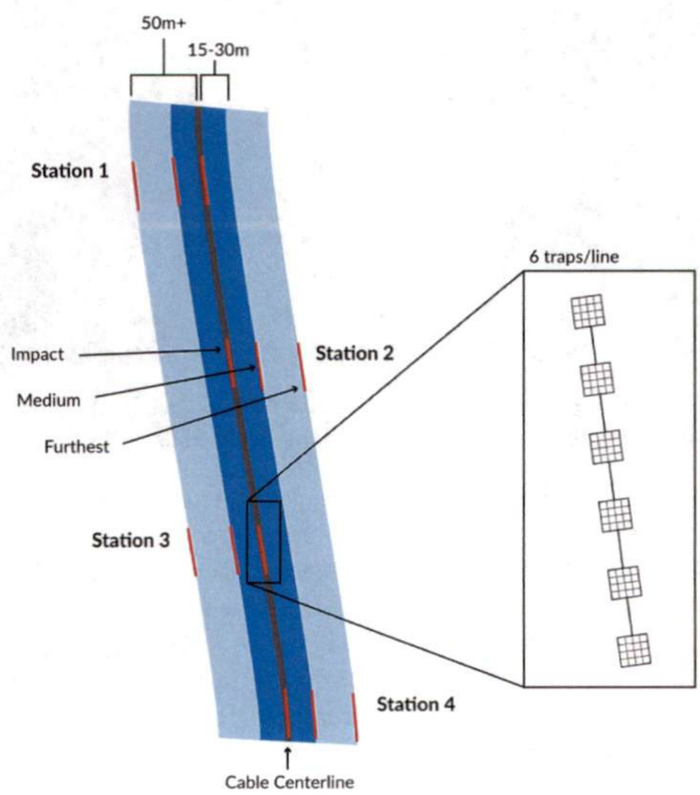

Figure 2. A concept of the study design highlighting the gear configuration and string locations in relation to Brayton Point ECC (adapted from Revolution Wind, LLC and INSPIRE Environmental, 2021). Stations will alternate along either side (east or west) of the cable.

Attempts to set gear within the correct gradients contain varying degrees of error. SouthCoast Wind will leverage the experience of the captain of the fishing vessel performing the survey work to set strings as close to the target stations as possible. Station locations may be modified at the captain's discretion to avoid gear conflicts with the local whelk fishery, minimize risk of gear loss, or if safety issues arise if the location was not modified. Stations may also be moved to more appropriate locations prior to the start of the survey, as cable micro-siting has not yet been determined.

In the absence of standardized whelk survey practices, SouthCoast Wind has consulted with the local whelk fleet regarding trap design. Various trap designs are utilized within the industry and include traps made from either vinyl-coated mesh or wood (Figure 3). Trap design for this survey will be selected in consultation with the captain of the fishing vessel performing the survey work. All traps will be rigged with a rope bridal system and separated by 30 m of groundline when tied to the string, resulting in a groundline length of roughly 150 m. Appropriate surface gear will also be included to visibly mark the beginnings and ends of each string; all gear configurations will comply with regulatory standards for the fishery. Bait will be consistent with that used in the commercial fishery and may include options such as horseshoe crab (*Limulus polyphemus*), rock crab (*Cancer irroratus*), or hard clam (*Mercenaria mercenaria*).

Figure 3. Examples of whelk trap designs from Oliveira et al. (2013) (left) and C-Trap (C-Trap, 2023) (right), that could be used to survey along the Brayton Point ECC.

All whelk and bycaught species caught will be separated by species, enumerated, and weighed to obtain catch per unit effort (CPUE) estimates on a per trap basis. To maintain a record of all species caught, additional bycaught species will be separated and enumerated. To collect shell measurements for whelk caught, a measuring board fitted with a sliding edge will be used to record shell height, width, and length to the nearest millimeter (mm) (Figure 4). Bycaught finfish length sampling will be species dependent and utilize either fork length or total length, depending on the standard for each species to the nearest centimeter (cm). Any American lobster (*Homarus americanus*) or Jonah crab (*Cancer borealis*) caught will be sampled in accordance with regional survey sampling protocols. For lobster, these parameters include recording carapace length (to the nearest mm), sex, shell hardness, shell disease state, egg stage for egg-bearing females, cull status, and note the presence/absence of a V-notch. For Jonah crab, these parameters include recording carapace width measurements, sex, presence/absence of eggs, molt condition, and shell disease state.

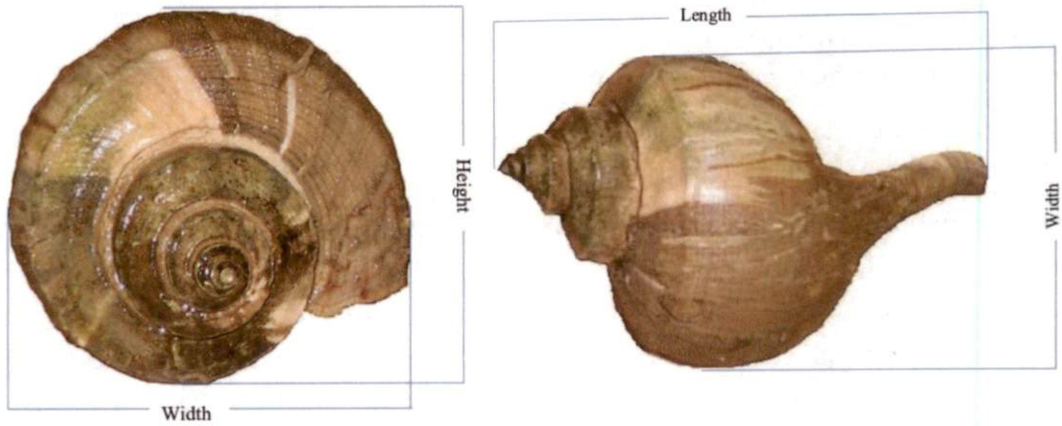

Figure 4. A diagram of shell measurements collected on whelk species from Oliveira et al. (2013).

To gather data on environmental variables, temperature loggers will be attached to one of the center traps in each trawl. Temperature sensors will remain on the gear through the duration of the survey to collect continuous data on water temperature variability during survey months. These data can be used to relate changes in CPUE to varying environmental conditions. A suite of station data will be collected prior to setting and hauling traps that include:

- Start and end dates (MM/DD/YYYY)
- Start and end times (HH:MM)
- Water depth (m)
- Start latitude and longitude (in decimal degrees)
- End latitude and longitude (in decimal degrees)
- Sediment type
- Soak time
- Bait type
- Bottom temperature (°C)
- Air temperature (°C)
- Wind speed
- Wind direction
- Wave height

3.3.2 Data Management and Analysis

By conducting sampling during all three phases of the Project (pre-, during and post-construction), the whelk trap survey will allow for quantification of any detectable changes in relative abundance and size structure, as a function of distance from the cable. Monitoring results will undergo standardized quality assurance/quality control (QA/QC) checks before being stored in a secure, relational database, with yearly findings presented in annual reports. Annual reports will place emphasis on descriptive and quantitative comparisons of whelk metrics at increasing distances from the Brayton Point ECC. Spatial, seasonal, and annual relative abundance and size distribution trends will be presented for whelk species; CPUE and size structure of bycaught species will also be described.

The primary question to be addressed is whether whelk metrics (either abundance of individual whelk species or size structure) will change relative to distance from the Brayton Point ECC following installation of export cables. This research question can be framed using the following hypotheses:

- HØ-Whelk metrics will not change over time and will remain consistent with respect to the distance from the export cable.
- H1-Whelk metrics will change over time and will not be consistent with respect to distance from the export cable.

Analyses presented in the final synthesis report will focus on identifying changes along the Brayton Point ECC between pre-and post-construction time periods. Several regression approaches (Generalized Linear Model, Generalized Additive Models, or mixed-effect models) can be compared to examine relationships between whelk CPUE and explanatory variables. Information on depth and water bottom temperature may be considered as covariates in the model to evaluate their influence on whelk catches. Habitat data collected during SouthCoast Wind geophysical surveys could also potentially be considered to evaluate the influence of habitat on whelk abundance.

An adaptive sampling strategy will be employed, whereby data collected early in the Study will be analyzed to assess statistical power and modify the sampling scheme or sampling intensity as needed (Field et al., 2007). Upon completion of the first year of sampling, a power analysis (e.g., Gerrodette, 1987) will be conducted to evaluate the power of the sampling design. The intra-annual variance associated with the relative abundance estimates for dominant species in the catch will be calculated. Power curves will be used to demonstrate how statistical power varies as a function of effect size and sample size (i.e., number of samples per area). A single two-tailed alpha (0.10) will be evaluated during the power analysis. The results of the power analysis after the first year of the Study will be considered and could be used to modify monitoring protocols in subsequent years. The decision to modify sampling will be made after evaluating several criteria including the amount of variability in the data, the statistical power associated with the study design, and the practical implications of modifying monitoring protocols.

3.4 Acoustic Telemetry

3.4.1 Survey Design

SouthCoast Wind will conduct acoustic telemetry monitoring along the Brayton Point ECC at the mouth of the Sakonnet River. This Study will use a receiver array of fixed station acoustic receivers to monitor the movements, presence, and persistence of several commercially and recreationally important species (e.g., striped bass, summer flounder, tautog, and little tunny). The focal species and receiver array design were determined based on work proposed or conducted along other wind project cable routes and consultation with local stakeholders, area researchers, and State agencies (South Fork Wind, LLC and INSPIRE Environmental, 2022; Sunrise Wind LLC, 2022; Kim et al., 2023).

Acoustic telemetry can be used to monitor animal presence and movements across a range of spatial and temporal scales. Individuals tagged with an acoustic transmitter that pass within the range (tens to hundreds of meters) of an acoustic receiver provide information on an animal's presence, movements, and behavior at a fine scale within the area of interest. The use of this technology has grown over the last decade with hundreds to thousands of receivers deployed along the U.S. East Coast (Hussey et al., 2015; Freiss et al., 2021). By utilizing information collected across receiver arrays and shared through established data sharing networks, telemetry can also monitor animal presence and movement over a range of spatial scales (tens to hundreds of kilometers) and time scales (e.g., months to years). Therefore, acoustic telemetry is an ideal technology to monitor presence, residency, and movements of species within WEAs and cable corridors using non-lethal methods and to evaluate short and long-term impacts of wind energy projects on these movement parameters.

Acoustic telemetry has been used to investigate the behavior and movements of fish species in offshore wind areas in Europe. Reubens et al. (2013) monitored juvenile cod residency patterns, habitat use, and seasonal movement at the C-Power offshore wind farm in the North Sea and found that the majority of cod aggregated near the foundations and were resident within the wind farm for extended periods of time in the summer and autumn. Winter et al. (2010) tagged sole (n=40) and cod (n=47) with acoustic transmitters and tracked their movements within the Egmond aan Zee wind farm and a nearby reference area. They concluded that sole did not exhibit avoidance of the wind farm, nor did they appear to be attracted to the foundations. Instead, seasonal movements were interpreted as occurring at spatial scales larger than the wind farm.

Several acoustic telemetry projects are ongoing or proposed at offshore wind lease sites along the U.S. East Coast. Scientists from the Massachusetts Division of Marine Fisheries, the University of Massachusetts Dartmouth School for Marine Science and Technology, Rutgers University, The Nature Conservancy, Woods Hole Oceanographic Institution, and the Northeast Fisheries Science Center are using acoustic telemetry (fixed and mobile) to monitor habitat preference and utilization of spawning Atlantic cod in and around Cox Ledge within the South Fork (South Fork Wind, LLC and INSPIRE Environmental, 2022) and Revolution Wind (Revolution Wind, LLC and INSPIRE Environmental, 2021) lease areas. Researchers from the Anderson Cabot Center for Ocean Life and INSPIRE Environmental are conducting a long-term acoustic telemetry project examining the presence and persistence of several highly migratory species within the nine lease areas comprising the MA/RI WEA. Researchers from Rutgers University and Delaware State University are using multiple acoustic methods to monitor several different species both within and around the Ocean Wind lease area off the New Jersey coast (Ocean Wind, LLC, 2021). Researchers from Monmouth University, Stony Brook University, and the Cornell Cooperative extension are also using acoustic telemetry to monitor the potential effects of EMF on fish and invertebrate species along the export cable routes of the South Fork and Sunrise Wind Farms (South Fork Wind, LLC and INSPIRE Environmental, 2022; Sunrise Wind LLC, 2022).

3.4.2 Survey Methods

A receiver array comprised of 12 receivers is proposed for deployment along the Brayton Point ECC (Figure 5). Vemco VR2AR acoustic release omnidirectional receivers will provide maximum coverage for robust and rigorous reporting. The VR2AR-X receivers can detect a tagged individual from a radius of 700 to 1,100 m from the receiver location depending on sea conditions, ambient noise, and transmitter strength. Each receiver will be equipped with a mooring recovery system that will utilize the receiver's acoustic release mechanism to deploy a retrieval line once the receiver is recalled to allow for recovery of the mooring used to anchor the receiver in place which eliminates the creation of marine debris (Figure 6). This, combined with the intentional placement of the array and individual receivers, the limited vertical profile of the receivers, the minimal mooring weight, and notifications SouthCoast Wind and researchers will issue to alert mariners to receiver locations, will mitigate potential interference with fishing and other marine uses. The receivers will be deployed in early spring and retrieved in late fall to ensure seasonal overlap with the target species. Detection data collected by the receivers will be downloaded upon retrieval at the conclusion of the annual monitoring period.

Vemco acoustic transmitters will be deployed on several species of interest specifically including, but not limited to, striped bass, summer flounder, tautog, and little tunny. Local fishing vessels with experience in both fishing for target species and in cooperative research efforts will be used as research platforms. Fish will be tagged within the area in and around the receiver array on targeted tagging trips conducted onboard local, for-hire recreational fishing vessels. Fish will be captured via rod-and-reel utilizing tackle appropriate for each species.

Individuals will be surgically implanted with various Vemco acoustic transmitters depending on the size of the fish. Transmitters will be deployed during the pre-construction period of the Project (two years). Larger individuals (e.g., striped bass) will be implanted with a V16 ultrasonic transmitter (69 kilohertz (kHz), high-power output = 158 decibels (dB) re 1 micropascals (μPa) at 1 m, random transmitter delay = 120 seconds (s), life span = 2,435 days (d)). Medium to small individuals will be tagged with either a V13 (69 kHz, high-power output = 151 dB re 1 μPa at 1 m, random transmitter delay = 180 s life span = 648 d) or a V9 (69 kHz, high-power output = 152 dB re 1 μPa at 1m, random transmitter delay = 120 s life span = 520 d). Once the transmitter has been inserted, the incision will be closed with absorbable interrupted sutures. All surgical implements will be cleaned with CIDEX® OPA solution before and after each surgery to deter bacterial infection.

3.4.3 Data Management and Analysis

The resulting detection data downloaded from acoustic receivers will be analyzed with the overall goal of establishing pre-construction information on species presence and persistence in the vicinity of the Brayton Point ECC. The primary questions to be addressed are – what is the presence, persistence, and space utilization of the species of interest around the Brayton Point ECC? These research questions can be framed using the following hypotheses:

- $H_ø$-Species presence, persistence, and movements will not change between time periods (before and after).
- H_1- Species presence, persistence, and movements will change between time periods (before and after).

Short- and long-term presence, site fidelity (i.e., residency/persistence), fine- and broad-scale movement patterns, and inter-annual presence within the ECC (i.e., whether individuals return to the receiver array each year) will be examined. Any detection data obtained through participation in regional telemetry data sharing networks (see below) will be incorporated into analyses, particularly to examine the distribution and movements of species beyond the boundaries of the Study Area. Analyses will include detailed detection history plots for each tagged individual that depict all detections logged for an animal over the course of each year. Summary tables and figures will be generated that describe: the number of times each fish was detected by receivers within the receiver array, the detection history for each fish, the total number of receivers each individual was detected on, movements within the receiver array, and monthly patterns in presence and persistence. In addition to the fine-scale acoustic monitoring achieved by the proposed receiver array, broad-scale movement data will be accomplished through participation in regional telemetry data sharing programs by obtaining detection data from our tagged animals detected within receiver arrays deployed by other researchers in the greater Atlantic region.

All detection data of animals tagged by other researchers and recorded by the acoustic receivers in this study will be distributed to those researchers through participation in regional telemetry networks such as the Ocean Tracking Network or the Mid-Atlantic Acoustic Telemetry Network (MATOS). Detection data obtained for transmitters that are not deployed as part of this Study will be disseminated to the tag owners (it is the policy of regional data sharing programs that the 'owner' of the data is the entity that purchased and deployed the transmitter, not the entity that detected it on their receiver). Inclusion of these detection data in analyses will be requested of the tag's owner (i.e., metadata on the species detected, number of detections, amount of time the animal was detected in our receiver array, etc.). Participation in data sharing networks will increase both the spatial and temporal extent of monitoring for species tagged as part of this study and allow for the collection of additional data on the presence and persistence of other marine species tagged with acoustic transmitters in and around the Brayton Point ECC.

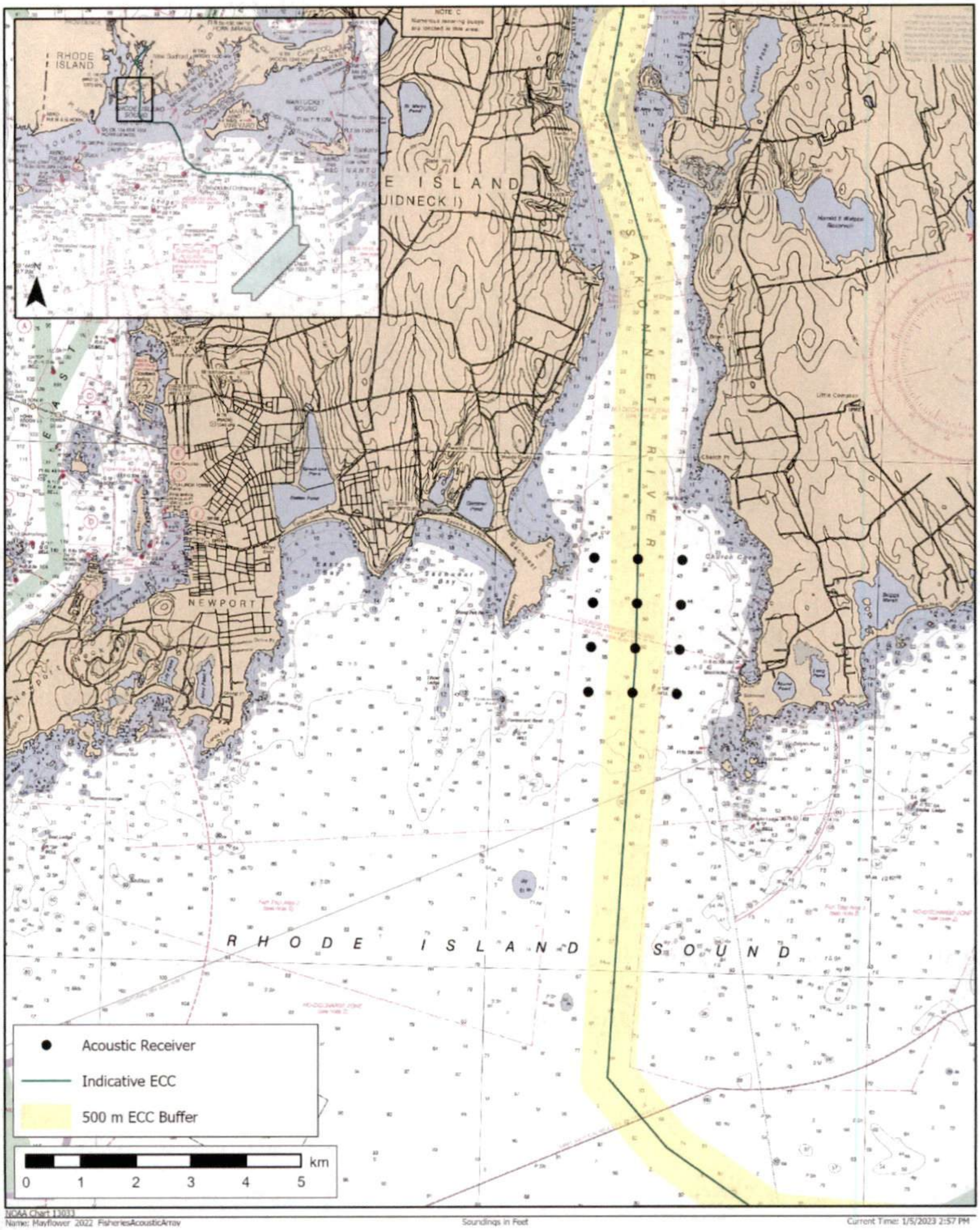

Figure 5. Proposed receiver locations along the Brayton Point ECC

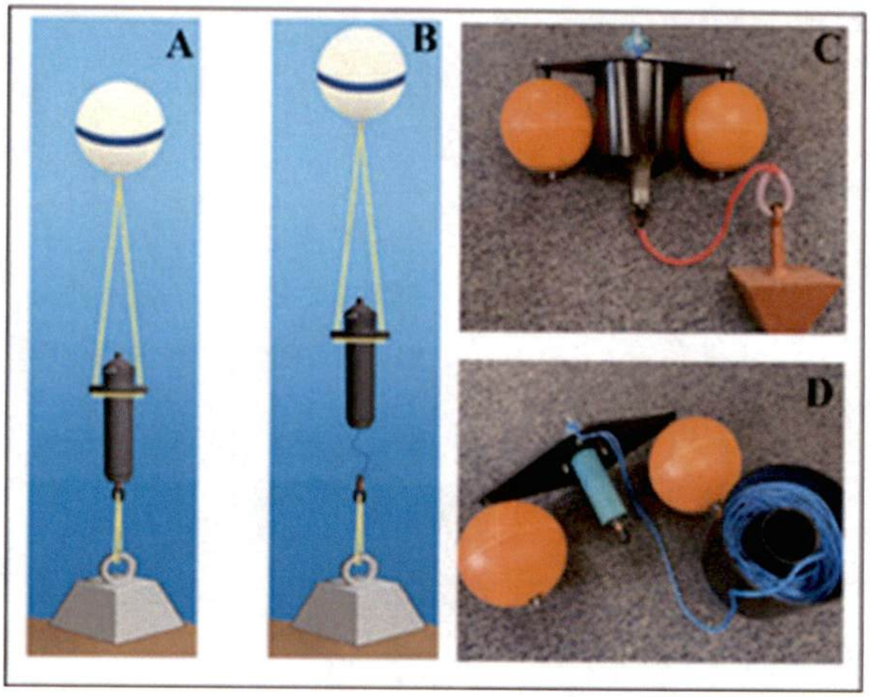

Figure 6. **(A, B) Diagram of Vemco VR2AR (Acoustic Release) receiver submerged (A) and triggered to release (B). (C, D) Mooring Systems recovery mooring acoustic release system showing canister and recoverable pyramid anchor. (D) Shows "triggered" VR2AR trailing a high strength Dynema rope allowing retrieval, recovery, and redeployment of the whole mooring system.**

4. Data Management, Reporting, and Data Sharing

The fisheries and benthic monitoring data will be managed by SouthCoast Wind. Data may be shared with relevant State and Federal agencies and other stakeholders upon request. Data will be prepared and disseminated annually and will undergo rigorous quality control and assurance audits prior to release.

Proper data management and traceability are integral to analysis and accurate interpretation and reporting. The surveys described in this monitoring plan will follow a rigorous system to inspect data throughout all stages of collection, processing, and analysis. This data management system will provide a high level of confidence in the accuracy of the data being reported. Data management will include methods for data collection, data storage and archiving, QA/QC audits, distribution and dissemination protocols and best practices, and analyses. Metadata will be developed for each survey dataset which will include descriptions of data fields, data processing, QA/QC procedures, etc.

An annual report will be prepared upon the conclusion of each year of sampling for each survey type. These reports will be shared with relevant State and Federal resource agencies, as applicable. A final, synthesis report will be prepared for each survey after the final year of post-construction sampling has concluded. That report will evaluate the survey findings during the pre- and post-construction survey time periods. The Project team will disseminate annual results to agencies and stakeholders through an in-person meeting or webinar to solicit questions or feedback on the survey results, protocols, etc., as applicable.

Data requests submitted to SouthCoast Wind will be dealt with on a case-by-case basis. Any data derived from this FMP provided to end users will be presented in a format that is comparable and consistent with other regional fisheries datasets in consultation with relevant State and Federal agencies. SouthCoast Wind will amend the above data sharing protocols as needed in accordance with current data sharing efforts and guidance being developed through ROSA.

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SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment L: UXO Risk Assessment

(Confidential - Provided Under Separate Cover)

Revised: February 2023

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SOUTHCOAST WIND

SouthCoast Wind 1 Project

Attachment M: Abutters List and Mapping

Revised: February 2023

Prepared for: SouthCoast Wind Energy LLC

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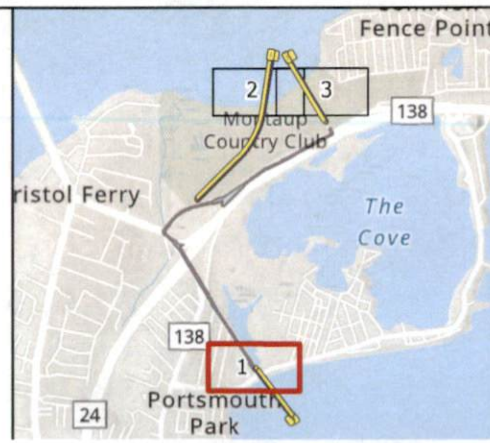
MSPARCELID	MSTYPE	MSLOCATION	Y	MSMSTATE	MSMZIP
25-50		0 PARK AVE	OWN	RI	02842-4640
19-89		0 BOYDS LN	OUTH	RI	02871-4938
20-1		0 WALNUT ST	LD	RI	02879-6109
24-56		0 PARK AVE	T	RI	02840
25-1		0 PARK AVE	A	MA	02777-1446
500-1	RAIL ROW	0 RAILROAD TRA(MILES)	NCE	RI	02903
7-9		0 BRISTOL FERRY	OUTH	RI	02871
8-1		500 ANTHONY R	OUTH	RI	02871
7-8		0 BAY VIEW AVE	OUTH	RI	02871
ROW	ROAD ROW	<Null>		<Null>	<Null>

ADDITIONAL ABUTTERS TO BE NOTIFIED					
	ROAD ROW	143 HEDLY STREE	OUTH	RI	02871
	STATE ROADWAYS	TWO CAPITOL HI	ENCE	RI	02903
		790 AQUIDNECK	TOWN	RI	02842
		280 MELROSE ST	NCE	RI	02907
	CORPORATE ADDRESS	P.O. BOX 1439	KINGSTOWN	RI	02852
	GRAND BELLEVUE TRAIN STATION	1 ALEXANDER RO	OUTH	RI	02871
	STATE WATERS	235 PROMENADE	NCE	RI	02908
	STATE WATERS	4808 TOWER HIL	ELD	RI	02879-1900

.EGEND

- Onshore Export Cable Route Corridor Limit of Disturbance
- Horizontal Directional Drill Trajectory
- Boyds Lane Horizontal Directional Drill Staging Area
- Right-of-Way
- Abutters Adjacent to Offshore Export Cable Corridor Landfall Location
- Portsmouth Tax Parcel



SOUTHCOAST WIND

ABUTTERS ADJACENT TO OFFSHORE EXPORT CABLE CORRIDOR LANDFALL LOCATIONS PANEL 1

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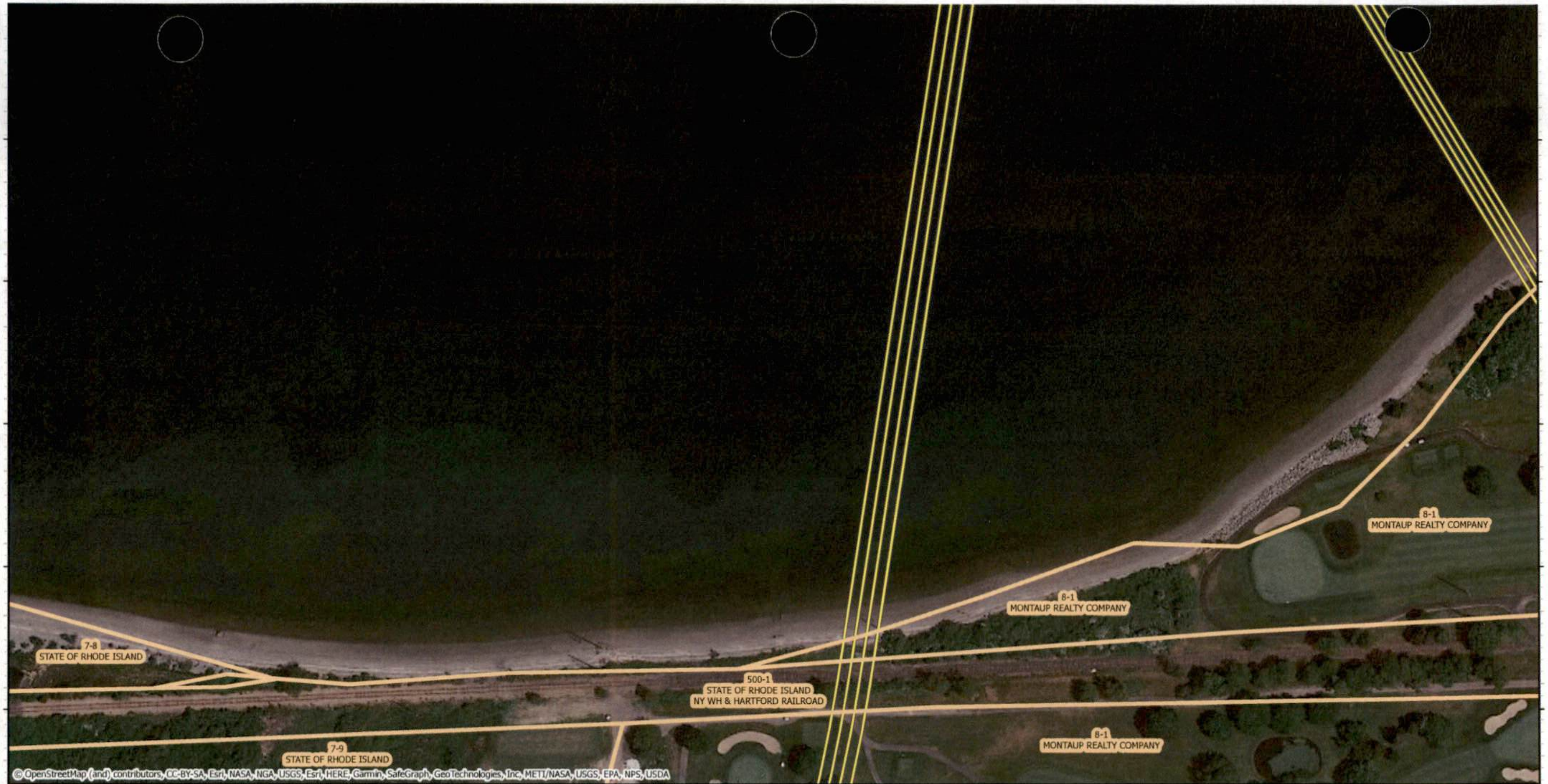
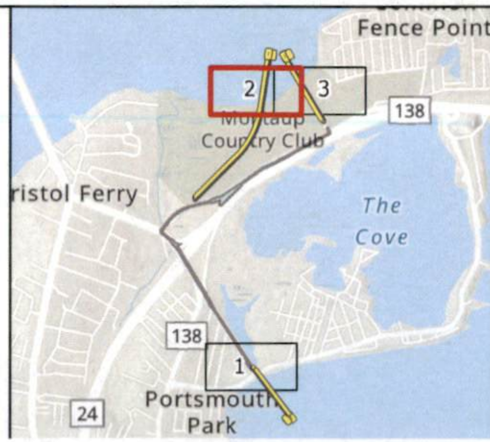
Feet



.EGEND

- Horizontal Directional Drill Trajectory
- Abutters Adjacent to Offshore Export Cable Corridor Landfall Location
- Portsmouth Tax Parcel Boundary



SOUTHCOAST WIND

ABUTTERS ADJACENT TO OFFSHORE EXPORT CABLE CORRIDOR LANDFALL LOCATIONS PANEL 2

Date: 3/9/2023
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Scale: 1:2,400

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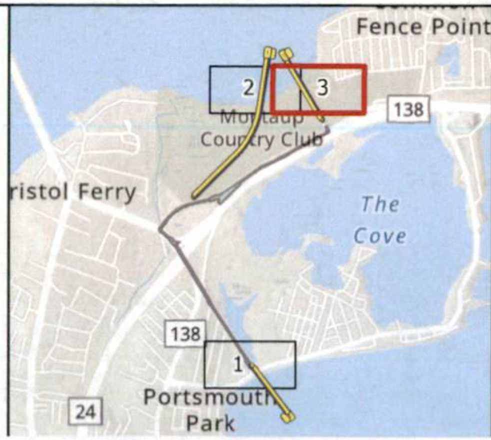
Feet

LEGEND

- Horizontal Directional Drill Trajectory
- Abutters Adjacent to Offshore Export Cable Corridor Landfall Location
- Portsmouth Tax Parcel Boundary



SOUTHCOAST WIND

ABUTTERS ADJACENT TO OFFSHORE EXPORT CABLE CORRIDOR LANDFALL LOCATIONS PANEL 3

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Feet