RevWind Exhibit 1(A)

Environmental Report

RevWind Exhibit 1(A)

Application for a Major Energy Facility

Revolution Wind Project

Volume I

December 30, 2020

Submitted to

Rhode Island Energy Facility Siting Board

Submitted by

Revolution Wind

Powered by Ørsted & Eversource

Prepared by

vhb

ENERGY FACILITY SITING BOARD ENVIRONMENTAL REPORT

Revolution Wind Project

North Kingstown, Rhode Island

PREPARED FOR

Revolution Wind, LLC
56 Exchange Terrace, Suite 300
Providence, RI 02903

PREPARED BY

vhb

1 Cedar Street, Suite 400
Providence, RI 02903
401.272.8100

DECEMBER 2020

This page intentionally left blank.

Table of Contents

List of Appendices

List of Tables

List of Figures

Acronyms and Abbreviations

3D	3-dimensional
AAI	All Appropriate Inquiry
AC	Alternating Current
AEP	Annual Exceedance Probability
AGL	Above ground level
AIS	Automatic Identification Systems on vessels
ACI	American Concrete Institute
ASCE	American Society of Civil Engineers
ASSF	Areas Subject to Storm Flowage
Amp	Ampere
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BFE	Base Flood Elevation
BMPs	Best Management Practices
BOEM	Bureau of Ocean Energy Management
CBI	Chlorophyll Bloom Index
CECs	Chemical contaminants of emerging concern
CBI	Chlorophyll Bloom Index
CFR	Code of Federal Regulations
CREC	Controlled Recognized Environmental Condition
CRMP	Coastal Resources Management Plan
CGS	Connecticut General Statute
CSA	CSA Ocean Sciences Inc.
CVA	Certified Verification Agent
dB	Decibel, a logarithmic unit of measurement that can be used to express the magnitude of a sound.
dB(A)	Decibel, on the A-weighted scale.
DoD	Department of Defense
EDR	Environmental Design & Research, Landscape Architecture, Engineering and Environmental Services, D.P.C.
EFSA	Energy Facility Siting Act

EFSB	Energy Facility Siting Board
EIS	Environmental Impact Statement
EMF	Electric and magnetic fields
EFH	Essential Fish Habitat
EFSA	Energy Facility Siting Act, R.I.G.L. §§ 42-98-1 *et seq.*
ELUR	Environmental Land Use Restriction
EMS	Emergency Medical Services
ERP/OSRP	Emergency Response Plan/Oil Spill Response Plan
ER	Environmental Report
ESA	Federal Endangered Species Act, 16 U.S.C. § 1531 *et seq.*
Eversource	Eversource Investment, LLC
EC4	Executive Climate Change Coordinating Council
FAA	Federal Aviation Administration
FDR/ FIR	Facility Design Report and Fabrication and Installation Report
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIRs	Fishing Industry Representatives
FAB/HAB	Fishermen's Advisory Board and Habitat Advisory Board
FL	Fisheries Liaison
FR	Fishing Industry Representatives
G&G	Geophysical and geotechnical
GARFO	NOAA Greater Atlantic Region Fisheries Office
G	Gauss
GD	General Dynamics/Electric Boat
GHGs	Greenhouse gases
GWSA	Global Warming Solutions Act
HAPs	Hazardous air pollutants
HDD	Horizontal Directional Drill
HSG	Hydrologic Soil Group
HVAC	High voltage alternating current
Hz	Hertz
ICES	The International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation
ITS	Incidental Take Statement
IPaC	Information for Planning and Consultation

IEEE	Institute of Electrical and Electronic Engineers
Inspire	Inspire Environmental LLC
ICF	Interconnection Facility
IMO	International Maritime Organization
ISO-NE	ISO New England, Inc.
kcmil	1,000 circular mils
KOPs	Key Observation Points
kV	Kilovolt
kV/m	Kilovolts per meter
LAER	Lowest Achievable Emission Rate
Ldn	Day-night average sound level
Leq	Energy-average sound level
LGIA	Large Generator Interconnection Agreement
LNAPL	Light Non-Aqueous Phase Liquid
LNMs	Local Notice to Mariners
LT	Landscape types
MARPOL	International Convention for the Prevention of Pollution from Ships
MF	Magnetic field
MHWL	Mean High Water Line
µg/L	Microgram per liter
MoUs	Memoranda of Understanding
mG	milliGauss. Equals 1/1000 Gauss (see Magnetic Field).
MMPA	Marine Mammal Protection Act, 16 U.S.C. § 1361 *et seq*.
MARPOL	IMO International Convention for the Prevention of Pollution from Ships
MRE	Marine Renewable Energy
MODF	Mineral Oil Dielectric Fluid
MVP	Monitor Values Report
MW	Megawatt.
ng/L	Nanograms per liter
NAAQS	National Ambient Air Quality Standards
NBWTR	Narragansett Bay Estuary Program State of Narragansett Bay and Its Watershed Technical Report
NCCR	United States Environmental Protection Agency (USEPA) National Coastal Condition Report IV

NEMA	National Electrical Manufacturers Association
NHPA	National Historic Preservation Act, 54 U.S.C. § 300101 *et seq.*
NOAA	National Oceanic and Atmospheric Administration
NTSC	National Transportation Safety Council
NRCS	Natural Resource Conservation Service
NEPOOL	New England Power Pool
NERC	North American Electric Reliability Corporation
NAVD88	North American Vertical Datum of 1988
NLEB	Northern long-eared bat (*Myotis septentrionalis)*
NESC	National Electrical Safety Code
NMFS	National Marine Fisheries Service
NPCC	Northeast Power Coordinating Council
NSRA	Navigation Safety Risk Assessment
NSRs	Noise sensitive receptors
O&M	Operations and Maintenance
OCS	Outer Continental Shelf
OER	Office of Energy Resources
OnSS	Onshore Substation
OSS	Offshore Substation
Orsted	Orsted North America Inc.
OSHA	United States Occupational Safety and Health Administration
OH	Overhead
PAHs	polynuclear aromatic hydrocarbons
PAL	Public Archaeology Laboratory, Inc.
PCBs	Polychlorinated biphenyls
Phase I ESA	Phase I Environmental Site Assessment
PPA	Power Purchase Agreement
POI	Point of interconnection
PLA	Project labor agreement
PLGR	Pre-Lay Grapnel Run
QDC	Quonset Development Corporation
QGID	Quonset General Industrial District
QLID	Quonset Light Industrial District
QMUDD	Quonset Mixed-Use Development District
QOSCD	Quonset Open Space and Conservation District

REC	Recognized Environmental Condition
RWEC-RI	Revolution Wind Export Cable within Rhode Island state territorial waters.
ROSA	Responsible Offshore Science Alliance
RODA	Responsible Offshore Development Alliance
Rhode Island ESA	Rhode Island Endangered Species of Animals and Plants Act, R.I.G.L. § 20-37-3
RI CRMC	Rhode Island Coastal Resources Management Council
RICR	Rhode Island Code of Regulations
RIDEM	Rhode Island Department of Environmental Management
RIDOT	Rhode Island Department of Transportation
RIGIS	Rhode Island Geographic Information System
R.I.G.L.	Rhode Island General Laws
RIHPHC	Rhode Island Historic Preservation and Heritage Commission
RINHP	Rhode Island Natural Heritage Program
RIPDES	Rhode Island Pollutant Discharge Elimination System
RIPTA	Rhode Island Public Transit Authority
RIPUC	Rhode Island Public Utilities Commission
RI WAP	RI Wildlife Action Plan
RI-MA WEA	Rhode Island-Massachusetts Wind Energy Area
ROW	Right-of-way
RPS	RPS Group
RTE	Rare, threatened, or endangered
RWF	Revolution Wind Farm
SCADA	Supervisory Control and Data Acquisition
SESC Plan	Soil Erosion and Sediment Control Plan
SF_6	Sulfur hexafluoride
SHPOs	State Historic Preservation Offices
SMPs	Soil Management Plans
SPCC plan	Spill Prevention, Control, and Countermeasure plan
Tech	Tech Environmental, Inc.
TMDL	Total Maximum Daily Load
TNEC	The Narragansett Electric Company d/b/a National Grid
TOYR	Time-of-year restriction
TJBs	Transition Joint Bays

UXO and MEC	Unexploded Ordnance and Munitions and Explosives of Concern
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA/EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
URI	University of Rhode Island
VSA	Visual Study Area
VSR	Visually Sensitive Resources
V/m	Volts per meter
VHB	Vanasse Hangen Brustlin, Inc.
VOCs	Volatile organic compounds
WWTF	Wastewater treatment facilities
XLPE	Cross Linked Polyethylene

Glossary and Terms

Alternating Current (AC)	An electric current which reverses its direction of flow periodically. (In the United States this occurs 60 times a second --60 cycles or 60 Hertz). This is the type of current supplied to homes and businesses.
Ampere (Amp)	A unit of measure for the flow of electric current.
Bundle	Two or more wires joined together to operate as a single phase.
Cable	A fully insulated conductor installed underground.
Circuit Breaker	A switch that automatically disconnects power to the circuit in the event of a fault condition. Located in substations.
Circuit	A system of conductors (three conductors or three bundles of conductors) through which an electric current is intended to flow, and which may be supported above ground by transmission structures or placed underground.
Conductor	A metallic wire or cable which serves as a path for electric current to flow.
Conduit	Pipes, typically encased in concrete to house and protect underground power cables or other subsurface utilities.
Certified Verification Agent (CVA)	The CVA is nominated by the project developer and approved by BOEM. The CVA reviews project design documents and ensures that projects are designed, fabricated, and installed in conformance with accepted engineering practices and the Facility Design Report and Fabrication and Installation Report.
Day-Night Average Sound Level (Ldn)	Single value that represents the same acoustic energy as fluctuating levels that exist over a 24-hour period. The Ldn considers how loud sound events are, how long they last, how many times they occur over a 24-hour period, and whether they occur during the day (7:00 AM to 10:00 PM) or night (10:00 PM to 7:00 AM).
Decibel (dB)	A logarithmic unit of measurement that can be used to express the magnitude of a sound.
Decibel, on the A-weighted scale (dB(A))	A decibel weighted to emphasize the range of frequencies where human hearing is most sensitive.
Demand	The total amount of electric power required at any given time by an electric supplier's customers.
Distribution Line or System	Power lines that operate between 4 kV and 35 kV that transport electricity to the customer.
Double-Circuit	Two circuits on one structure.
Duct	Pipe for underground power cables (see also Conduit).

Duct Bank	A group of ducts or conduit usually encased in concrete in a trench.
Electric Field	A field produced as a result of voltages applied to electrical conductors and equipment; usually measured in units of kilovolts per meter.
Electric Transmission Facilities	The facilities (≥69 kV) that transmit electrical energy from generating plants to substations.
Energy-Average Sound Level (Leq)	Leq is a single value that represents the same acoustic energy as the fluctuating levels that exists over a given period. The Leq considers how loud noise events are during the period, how long they last, and how many times they occur. Leq is commonly used to describe environmental noise and relates well to human annoyance.
Environmental Monitor	Inspects environmental conditions within the construction site, reviews the contractors' compliance with environmental permit conditions during the construction phase of a project, and makes recommendations for corrective actions to protect sensitive environmental resources proximate to a construction site.
Fault	A failure or interruption in an electrical circuit (a.k.a. short circuit).
Facility Design Report and Fabrication and Installation Report (FDR/ FIR)	The FDR provides specific details of the design of any facilities, including cables and pipelines that are outlined in a BOEM-approved Construction and Operations Plan. The FIR demonstrates how the facilities will be fabricated and installed in a manner that conforms to developer responsibilities listed in CFR §585.105(a).
Freshwater Wetland Rules	CRMC Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast (650-RICR-20-00-02)
Gauss (G)	A unit of measure for magnetic fields. 1G equals 1,000 milliGauss.
Glacial till	Type of surficial geologic deposit that consists of boulders, gravel, sand silt, and clay mixed in various proportions. These deposits are predominantly nonsorted, nonstratified sediment and are deposited directly by glaciers.
Gneiss	Light and dark, medium- to coarse-grained metamorphic rock characterized by compositional banding of light and dark minerals, typically composed of quartz, feldspar and various amounts of dark minerals.
Horizontal Directional Drill (HDD)	Subsurface installation technique that will create an underground conduit through which an export cable may come ashore and join an onshore transmission cable within a transition joint bay (i.e., a sea-to-shore transition)
Host Community	The Town of North Kingstown
Hertz (Hz)	A measure of the frequency of alternating current; expressed in units of cycles per second.

Interconnection Facility (ICF)	The TNEC Davisville Substation serves as the point of interconnection for the Project. The ICF is a modification of the Davisville Substation to facilitate the interconnection.
Interconnection ROW	ROW (right of way) of underground transmission lines between the OnSS and the ICF.
ISO New England, Inc.	The independent system operator of the electric transmission system in New England.
kcmil	1,000 circular mils, approximately 0.0008 square inches. A measure of conductor cross-sectional area.
Kilovolts per meter (kV/m)	A measurement of electric field strength.
Landfall Work Area	Location on the shore in Quonset Business Park of Quonset Point in North Kingstown, Rhode Island, considered for a sea-to-shore export cable transition
Load	Amount of power delivered upon demand at any point or points in the electric system. Load is created by the power demands of customers' equipment (residential, commercial, and industrial).
Megawatt (MW)	Megawatt equals 1 million watts. A measure of the work electricity can do.
Onshore Facilities	Landfall Work Area, Onshore Transmission Cable, Onshore Substation, Interconnection ROW, ICF and overhead ROW.
Onshore Substation (OnSS)	New onshore substation facility to be located proximate to the existing TNEC Davisville substation
Offshore Substation (OSS)	New offshore substation within BOEM Lease Area OCS-A 0486
Overhead (OH)	Electrical facilities carried above-ground on supporting structures.
Phase	Transmission and distribution AC circuits are comprised of three conductors that have voltage and angle differences between them. Each of these conductors is referred to as a phase.
Power Purchase Agreement (PPA)	A financial agreement between two parties. The Project has three PPAs with the States of Connecticut and Rhode Island.
Power Transformer:	A device used to transform voltage levels to facilitate the efficient transfer of power from the generating plant to the customer. A step-up transformer increases the voltage while a step-down transformer decreases it. Power transformers have a high voltage and a low voltage winding for each phase.
Pre-Lay Grapnel Run (PLGR)	PLGR runs will be undertaken to remove any seabed debris along the export cable route. A specialized vessel will tow a grapnel rig along the centerline of each cable to recover any debris to the deck for appropriate licensed disposal ashore.
Revolution Wind, LLC	Owner and future owner of the Project, Project Applicant. Formerly DWW Rev I, LLC.

Revolution Wind Farm (RWF)	Comprised of up to 100 wind turbine generators, inter-array cables, offshore substation link cable and up to two offshore substations, all of which will be located within federal waters on the OCS.
Revolution Wind Onshore Project Study Area	500-foot radius from the OnSS and TNEC parcels, the Onshore Transmission Cable route, and the Landfall Work Area.
Revolution Wind Project Area	The limits of work associated with the Project subject to EFSB jurisdiction, including the RWEC-RI Corridor, Landfall Work Area, Onshore Transmission Cable route and ROW, OnSS including access road and stormwater management features, and ICF including the underground cables from the OnSS to the ICF.
Right-of-way (ROW)	Right-of-way. Corridor of land within which a utility company holds legal rights necessary to build, operate and maintain power lines.
RI-MA WEA	Rhode Island-Massachusetts Wind Energy Area. Area within which the RWF will be constructed.
RWEC-RI	Revolution Wind Export Cable within state territorial waters from the boundary of Rhode Island state waters to the onshore transition joint bay at Quonset Business Park.
Schist	Light, silvery to dark, coarse to very coarse-grained, strongly to very strongly layered metamorphic rock whose layering is typically defined by parallel alignment of micas. Primarily composed of mica, quartz and feldspar; occasionally spotted with conspicuous garnets.
Shield Wire	Wire strung at the top of transmission lines intended to prevent lightning from striking transmission circuit conductors. Sometimes referred to as static wire or aerial ground wire. May contain glass fibers for communication use.
Sulfur hexafluoride. (SF_6)	A colorless, odorless and nonflammable gas used as an electrical insulator in high voltage equipment.
Steel Pole Structure	Transmission line structure consisting of tubular steel pole(s) with arms or other components to support insulators and conductors.
Step-down Transformer	See Power Transformer.
Step-up Transformer	See Power Transformer.
Substation	A fenced-in yard containing switches, power transformers, line terminal structures, and other equipment enclosures and structures. Voltage change, adjustments of voltage, monitoring of circuits and other service functions take place in this installation.
Switching Station	Same as substation except with no transformers. Switching of circuits and other service functions take place in this installation.
Terminal Point	The substation or switching station at which a transmission line terminates.

Terminal Structure	Structure typically within a substation that ends a section of transmission line.
TNEC ROW	ROW containing overhead transmission lines including the Davisville Transmission Tap lines and the overhead lines connecting the ICF to the Davisville Substation.
Total Maximum Daily Load (TMDL)	Maximum allowed pollutant load to a water body without exceeding water quality standards.
Transmission Line	An electric power line operating at 69,000 or more volts.
Volts per meter (V/m)	A measure of electric field strength.
Voltage	A measure of the electrical pressure which transmits electricity. Usually given as the line-to-line root-mean square magnitude for three-phase systems.
Watercourse	Rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, public or private.
Wetland	Land, including submerged land, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial or floodplain by the USDA, Natural Resources Conservation Service. Wetlands include federally jurisdictional wetlands of the U.S. and navigable waters, freshwater wetlands or coastal resources regulated by a state or local regulatory authority. Jurisdictional wetlands are classified based on a combination of soil type, wetland plants, and hydrologic regime, or state-defined wetland types.
Wire	See Conductor.
Cross Linked Polyethylene (XLPE)	A type of underground cable insulation.

Executive Summary

Revolution Wind, LLC (formerly known as DWW Rev I, LLC) ("Revolution Wind"), a 50|50 joint venture partnership between Orsted North America Inc. ("Orsted") and Eversource Investment LLC ("Eversource"), proposes to construct the Revolution Wind Project ("Project"), an offshore wind farm that will deliver approximately 704 megawatts ("MW") of renewable energy to the States of Rhode Island and Connecticut. The Project will provide clean, reliable offshore wind energy that will significantly increase the renewable energy available to Rhode Island and Connecticut and reduce carbon emissions across the region. The Project will displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by attracting new investments and job growth opportunities.

Revolution Wind developed the Project in direct response to the ambitious clean energy goals of the State of Rhode Island. The Project significantly advances Rhode Island's renewable energy directives set forth in the State energy plan – Energy 2035 – which calls for Rhode Island to "increase sector fuel diversity, produce net economic benefits, and reduce greenhouse gas emissions by 45 percent by the year 2035" in part "through support for state and federal offshore wind projects." The Project plays an integral role in advancing Rhode Island's goal of procuring 1,000 MW of renewable energy by 2020 and 100% Renewable Energy Future by 2030, set forth in Governor Gina Raimondo's Executive Order No. 20-01. Moreover, the Project meets the State of Rhode Island's needs under the Resilient Rhode Island Act to reduce greenhouse gas emissions to eighty percent (80%) below 1990 levels by the year 2050.

Rhode Island and Connecticut have awarded Revolution Wind five Power Purchase Agreements ("PPAs") to-date, totaling approximately 704 MW of generation capacity. These PPAs help meet the region's expressed need and demand for additional renewable energy resources. The Project will fulfill Revolution Wind's obligations to both Connecticut and Rhode Island in accordance with the PPAs and provide substantial environmental and economic benefits.

The Project components include wind turbine generators in federal waters on the Outer Continental Shelf ("OCS") in the designated Bureau of Ocean Energy Management ("BOEM") Renewable Energy Lease Area OCS-A 0486 ("Lease Area"), which at its closest edge, is approximately 15 miles southeast of the Rhode Island coast. The Project's subsea export cable comes into Rhode Island State Waters and lands in the Town of North Kingstown to connect to The Narragansett Electric Company d/b/a National Grid's ("TNEC") Davisville Substation. The components of the Project within the jurisdiction of the Energy Facility Siting Board ("EFSB") include approximately 23 miles of subsea cable, 1 mile of Onshore Transmission Cables, an Onshore Substation and an Interconnection Facility (including the associated transmission lines).

Revolution Wind undertook a multi-phased approach to evaluate siting alternatives for the Project by considering the need for the Project in the Rhode Island and across the region, cost, and potential environmental and socio-economic factors. The Project balances each of the three components required for consideration by the EFSB.

Revolution Wind is committed to supporting offshore wind education and supply chain and workforce development for the growing offshore wind industry in Rhode Island and Connecticut. Revolution Wind has memoranda of understanding with both states setting forth the specific initiatives and commitments to be undertaken – positioning both states as offshore wind leaders.

Accordingly, Revolution Wind seeks a license to construct and operate the Project to ensure the safe and reliable transmission of renewable electric power to customers within Rhode Island and Connecticut. As described in greater detail in the remaining sections of this Environmental Report, as well as Revolution Wind's application, the Project satisfies the EFSB's standards on need, cost justification, the absence of unacceptable harm to the environment, and enhancement to the socio-economic fabric of the State, as set forth Rhode Island General Law § 42-98-11. Revolution Wind respectfully requests that the EFSB grant the license for the Project.

1

Standards

1.1 Report Preparation and Responsibility

This Environmental Report ("ER") supports Revolution Wind's, a 50|50 joint venture between Orsted and Eversource, application to the EFSB for the siting, development, and construction of the Project, connecting into TNEC's Davisville Substation. The focus of this ER includes the onshore components and the portion of the Revolution Wind Export Cable within Rhode Island State Waters ("RWEC-RI"), 3 nautical mi [5.5 km] from the Rhode Island coast.

This ER has been prepared under the direction of Kenneth Bowes, Eversource Vice President of Siting and Permitting for the Project. Numerous employees of Eversource, Orsted, and TNEC, including planners, engineers, and legal counsel, contributed. The description of the affected natural and social environments and impact analyses were prepared by Vanasse Hangen Brustlin, Inc. ("VHB") and other consultants to Revolution Wind including:

- INSPIRE Environmental LLC ("INSPIRE") for finfish, benthic assessment, and commercial fisheries
- The Public Archaeology Laboratory, Inc. ("PAL") for cultural resources
- RPS Group ("RPS") for hydrodynamic and sediment transport modeling
- Tech Environmental, Inc. ("Tech") for air quality and emissions
- Environmental Design & Research, Landscape Architecture, Engineering and Environmental Services, D.P.C. ("EDR") for visual resources
- Exponent, Inc. for electric and magnetic fields ("EMF") assessment and analysis of health effects of EMF
- Guidehouse for an analysis of jobs and economy
- CSA Ocean Sciences Inc. ("CSA") for analysis of potential impacts to marine mammals and sea turtles

1.2 Compliance with EFSB Requirements

Compliance with the requirements of Rule 1.6 of the EFSB Rules of Practice and Procedure (445-Rhode Island Code of Regulations ["RICR"]-00-00-1) (the "EFSB Rules") is addressed in the Project Application which is filed with the EFSB herewith.

2

Project Summary

2.1 Introduction

Revolution Wind proposes to construct the Project, an offshore wind farm and associated transmission facilities that will deliver approximately 704 MW of clean wind power through five awarded PPAs with the States of Rhode Island and Connecticut. This Project will provide clean, reliable offshore wind energy that will significantly increase the renewable energy delivered to Rhode Island and Connecticut, reducing carbon emissions across the region. The Project will displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by reducing energy costs to attract new investments and job growth opportunities.

The State of Rhode Island has set ambitious clean energy goals. Consistent with the State Guide Plan Energy 2035, Governor Gina Raimondo proposed to increase the State's clean energy portfolio ten-fold to 1,000 MW by 2020, in large part through support for state and federal offshore wind projects. Building on this foundation, the Governor issued an Executive Order in January 2020 committing Rhode Island to be powered by 100 percent renewable electricity by 2030. Executive Order No. 20-01, Advancing a 100% Renewable Energy Future for Rhode Island by 2030 (Jan. 17, 2020). These goals have made Rhode Island a national leader with respect to climate change resiliency. The Project will play an integral role in meeting these aggressive targets and was developed in direct response to Rhode Island's and Connecticut's needs to increase the renewable energy load serving each State. Beyond mere consistency with State policies, the Project will facilitate the plans of both Rhode Island and Connecticut to meet their targets for renewable energy, economic growth in the renewable energy sector, and greenhouse gas reductions. The Project extends beyond Rhode Island ("RI") State Waters and includes components in federal waters (i.e., outside of the EFSB's jurisdiction), both on the OCS in the designated BOEM Lease Area, and within federal waters outside of the Lease Area.

Specifically, the Project will include the following offshore and onshore components:

Offshore

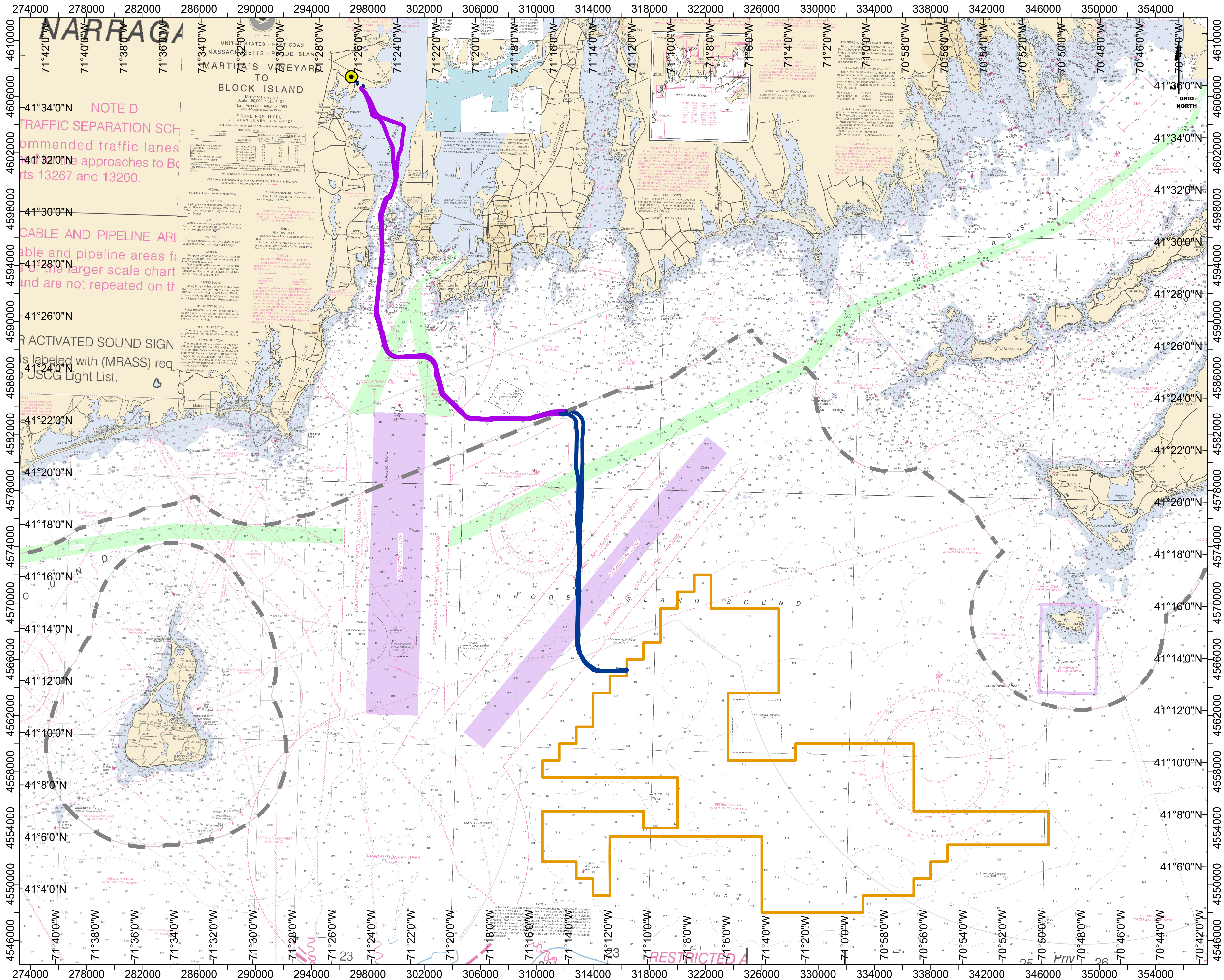
- Up to 100 Wind Turbine Generators ("WTGs") connected by a network of Inter-Array Cables ("IAC") in federal waters;
- Up to two Offshore Substations ("OSSs") connected by an OSS-Link Cable in federal waters; and
- Up to two submarine export cables (referred to as the Revolution Wind Export Cable ["RWEC"], generally co-located within a single corridor within federal and RI State Waters [i.e., RWEC-RI]).

Onshore

- Landfall Work Area located at Quonset Business Park in North Kingstown, Rhode Island, which will include two transmission joint bays ("TJBs");
- Two underground transmission circuits (referred to as the Onshore Transmission Cable), co-located within a single corridor;
- New Onshore Substation ("OnSS") and Interconnection Facility ("ICF") located adjacent to the existing TNEC Davisville Substation. The ICF is an expansion of TNEC's existing Davisville Substation;
- New Interconnection right-of-way ("ROW") connecting the OnSS to the ICF (underground); and
- Overhead ROW ("TNEC ROW") connecting the ICF to TNEC's Davisville Substation. The overhead transmission line is a reconfiguration of existing overhead lines.

The portion of the Project within the EFSB's jurisdiction includes the RWEC-RI, the Landfall Work Area, the Onshore Transmission Cable, the OnSS, the Interconnection ROW, the TNEC ROW, and IFC. See Figure 2-1 below for both offshore and onshore Project components.

Revolution Wind undertook a careful multi-phased approach to evaluating siting alternatives for the Project. As described below, Revolution Wind has considered the need for the Project in the State and region, the cost, and the potential environmental and socio-economic benefits and impacts.



Revolution Wind
Figure 2-1
Project Location
NORTH KINGSTOWN, RI

Legend
- OnSS
- RWEC-OCS
- RWEC-State Waters
- RWF Boundary Lease Area OCS-A 0486

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
NOAA Raster Nautical Charts (RNC): NOAA Office of Coast Survey

Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 2500 5000 7500 Meters

0 9,000 18,000 27,000 Feet

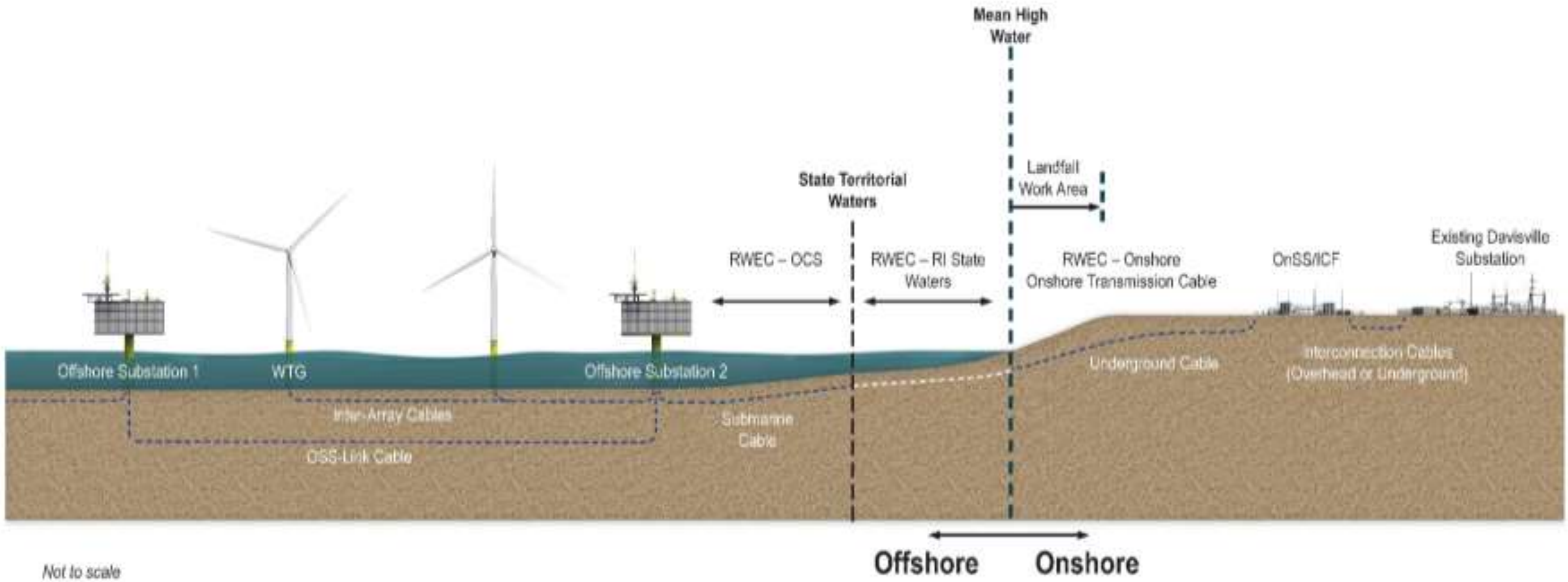
Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

Figure 2-2 Project Concept Diagram



This ER details the Project, discusses the alternatives considered and analyzed, describes the specific natural and social features that have been assessed for the evaluation of impacts, discusses potential impacts, presents avoidance, minimization, and mitigation measures for potential impacts associated with the construction of the Project, and describes permit requirements.

- Section 3 details the Project's purpose and need, which includes a description of the Project's development.
- Section 4 provides a detailed description of each of the Project's components, and discusses construction practices, operations and maintenance ("O&M") practices, community outreach, estimated Project costs, and anticipated Project schedule.
- Section 5 provides an analysis of alternatives to the Project with reasons for the rejection of each alternative.
- Sections 6 and 7 provide detailed descriptions of all natural (Section 6) and social characteristics (Section 7) within the Offshore and Onshore Project Study Areas ("Study Area").
- Section 8 identifies any Project impacts on the natural and social environments.
- Section 9 summarizes proposed avoidance, minimization, and mitigation measures which, when implemented will effectively offset impacts associated with the Project.
- Finally, Section 10 lists the federal, state, and local government agencies that exercise permitting and licensing authority and from which Revolution Wind will be required to obtain approvals prior to constructing the Project.

2.2 Project Description and Proposed Action

Revolution Wind proposes to construct and operate the Project, which will have a nameplate capacity of approximately 704 MW, as approved by Independent System Operator of New England ("ISO-NE"). The wind farm portion of the Project (referred to as the Revolution Wind Farm ["RWF"]) will be located in federal waters on the OCS in the designated BOEM Lease Area and is not within the jurisdiction of EFSB. The closest edge of the Lease Area is approximately 15 statute miles (mi) (13 nautical miles [nm], 24.1 kilometers [km]) southeast of the Rhode Island coast. The wind farm will contain up to 100 WTGs connected by a network of IACs, up to two OSSs and an OSS-link Cable connecting the two OSSs. The Project also includes the RWEC through both federal waters and state waters of Rhode Island. The RWEC-RI is approximately 23 miles long and will make landfall at Quonset Business Park in North Kingstown, Rhode Island. The Onshore Transmission Cable will continue underground, and a new OnSS, Interconnection ROW, ICF and TNEC ROW will be constructed to interconnect to the existing electric transmission system at the Davisville Substation, which is owned and operated by TNEC in North Kingstown, Rhode Island.

The Project components and locations presented in this ER have been selected based on environmental and engineering site characterization studies completed to date. Revolution Wind anticipates that construction will begin as early as Q3 2022 with installation of the onshore components and initiation of seabed preparation activities such as clearing of debris and obstructions along the RWEC-RI. The Project will be commissioned and operational as early as Q4 2023.

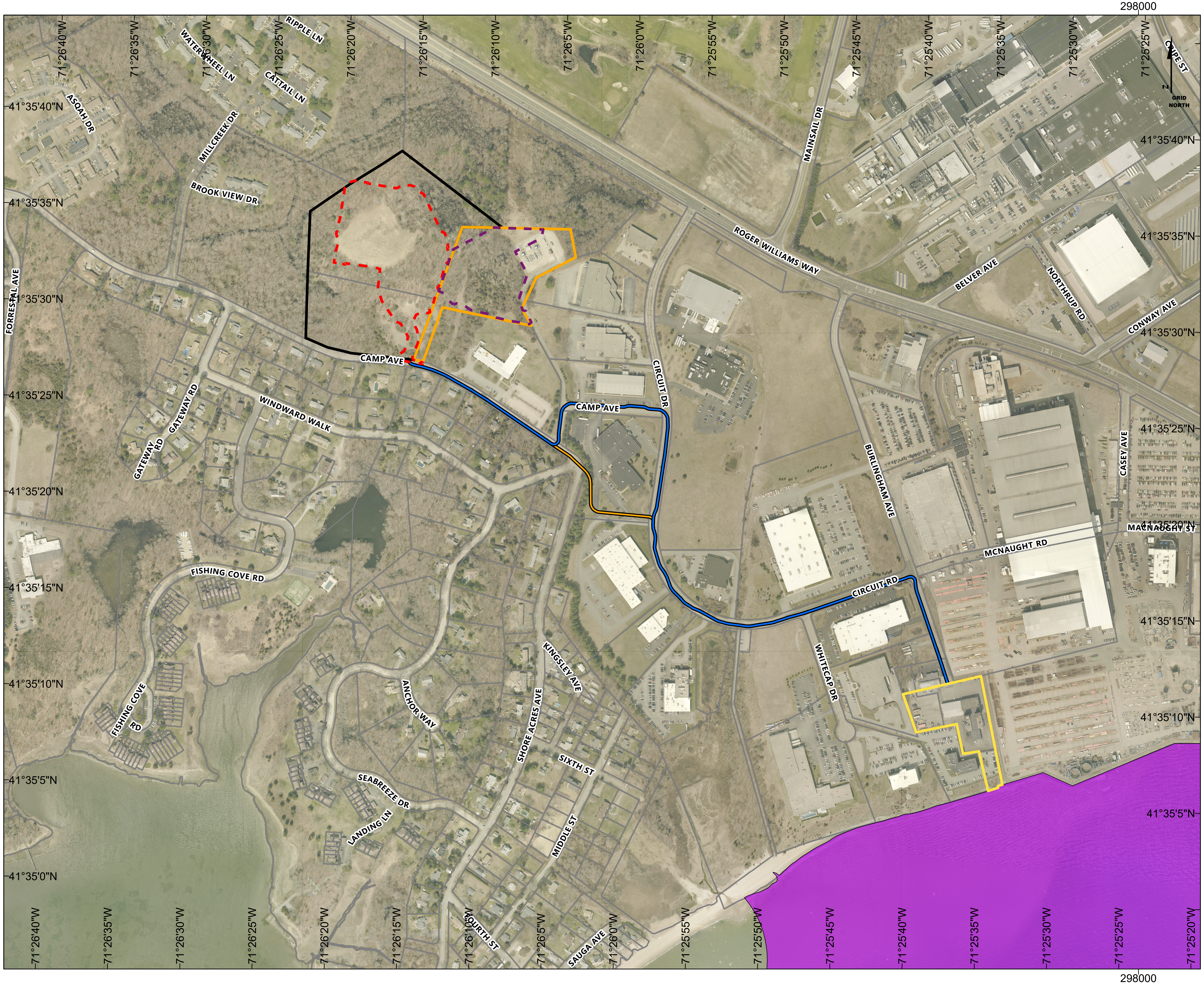
The Project components subject to EFSB jurisdiction include the following:

- The RWEC-RI, which includes two submarine cables, each measuring up to 23 mi;
- The Landfall Work Area, which totals up to 3.1 ac (1.3 ha) and includes the onshore portion of the RWEC-RI, two underground TJBs for jointing the RWEC-RI to the Onshore Transmission Cable, a portion of the Onshore Transmission Cable, and temporary construction access;
- An Onshore Transmission Cable that is approximately 1 mi (1.6 km) long, with a maximum disturbance corridor of 25 ft (7.6 m) (30 ft [9.1 m] at splice vaults) and maximum disturbance depth of 13 ft (4 m) (15 ft [1.4 m at splice vaults]);
- An OnSS with an operational footprint of approximately 4 ac (1.6 ha). Additionally, the OnSS will include a compacted gravel driveway, stormwater management features and associated landscaped or managed vegetated areas within the approximate 7.1 acres (2.9 ha) construction footprint, inclusive of the operational footprint of the facility;
- An Interconnection ROW between the OnSS and ICF consisting of two underground transmission lines with a length of up to approximately 519 feet (158.2 m) that will connect the OnSS to the proposed ICF. The underground transmission line will have an approximate 40-foot-wide ROW subject to periodic vegetation management;
- An ICF that consists of a 115kV ring-bus with an operational footprint of 1.6 ac (0.6 ha). The ICF will also include a paved access road, stormwater management features, and associated landscaped or managed vegetated areas within the approximate 4 ac (1.6 ha) construction footprint. This construction footprint includes the TNEC ROW discussed below; and
- The reconfiguration of overhead segments of the existing Davisville Transmission Tap lines (approximately 122 feet) and new overhead lines approximately 744 feet long between the ICF and the Davisville Substation on property owned by TNEC proximate to the TNEC Davisville Substation in North Kingstown, Rhode Island.[1] The TNEC ROW will have up to 120-feet-wide centered on each circuit where vegetation will be periodically managed.

See Figures 2-3 and 2-4 for the offshore and onshore Project area. More detailed information for the Project description is in Section 4.

1 Upgrades to the existing Davisville Substation and electrical grid beyond the substation may be necessary. Potential upgrades are not known at this time as the required Independent System Operator System Impact and Facility studies have not been finalized. The execution of any upgrades at the existing substation and of the broader electrical grid, and the specific, permitting, engineering, and design requirements to achieve the upgrades, will be performed by TNEC.

This page intentionally left blank.



Revolution Wind

Figure 2-3

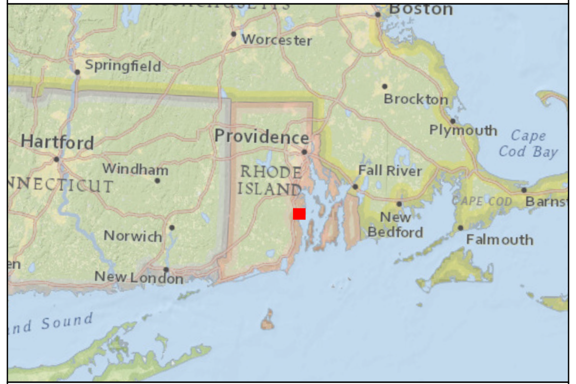
Onshore Project Location

NORTH KINGSTOWN, RI

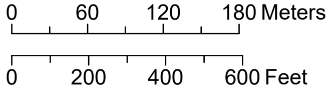
Legend

- Onshore Transmission Cable
- Alternative Cable Route Segment
- Substation Limit of Work
- ICF Limit of Work
- Landfall Area
- RWEC-RI State Waters
- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Parcel Boundary

Service Layer Credits: RIDEM/Tax_Parcels: RI State, 37 Towns
National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Rhode Island Aerial Photographs (Spring 2018; State Plane):



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

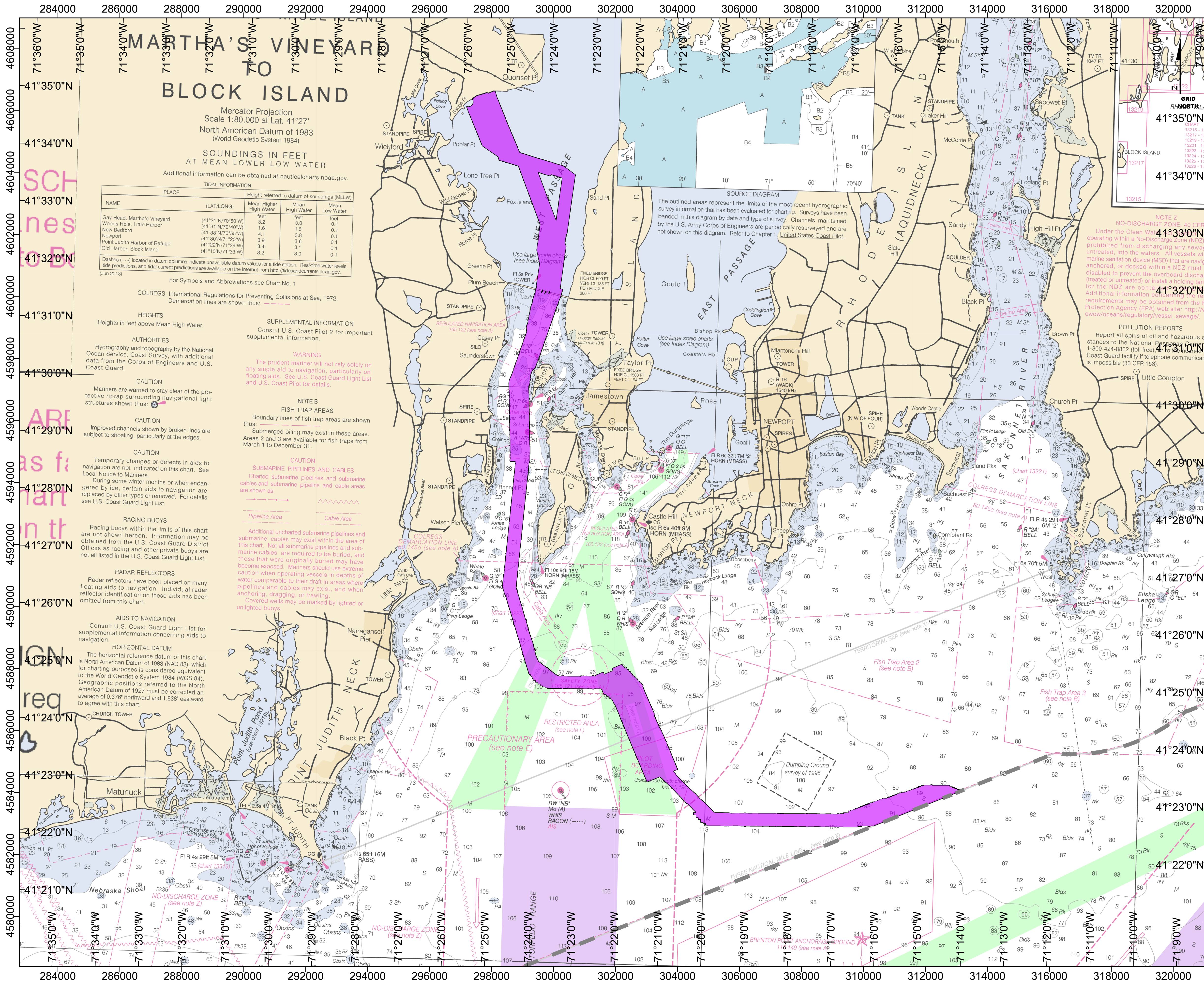


Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.



Revolution Wind

Figure 2-4
Project Location
State Waters

Legend

- RWEC-RI State Waters
- OnSS
- 3-Nautical Mile State Water Boundary

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
NOAA Raster Nautical Charts (RNC): NOAA Office of Coast Survey

Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 1000 2000 3000 Meters

0 4,000 8,000 12,000 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind

Powered by Ørsted & Eversource

This page intentionally left blank.

2.3 Purpose and Need

The purpose of the Project is to provide clean, reliable offshore wind energy that will significantly increase the renewable energy supply available to Rhode Island and Connecticut consumers and reduce carbon emissions across the region. The Project will displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by reducing energy costs to attract new investments and job growth opportunities.

Revolution Wind developed the Project in direct response to the expressed needs of the States of Rhode Island and Connecticut to increase the renewable energy load serving each state. Specifically, the Project significantly advances Rhode Island's renewable energy directives set forth in the State energy plan – Energy 2035 – which calls for Rhode Island to "increase sector fuel diversity, produce net economic benefits, and reduce greenhouse gas emissions by 45 percent by the year 2035" in part "through support for state and federal offshore wind projects." The Project also contributes 400 MW of renewable energy toward Rhode Island's ambitious goal of procuring 1,000 MW of renewable energy by 2020 and converting Rhode Island to 100% renewable energy by 2030, set forth in Governor Gina Raimondo's executive orders. Moreover, the Project contributes to the State of Rhode Island's needs under the Resilient Rhode Island Act to reduce greenhouse gas emissions to eighty percent (80%) below 1990 levels by the year 2050.

More detailed information regarding the Purpose and Need is provided in Section 3.

2.4 Alternatives

Revolution Wind undertook a multi-phased approach to evaluate siting alternatives for the Project that included the potential grid interconnection points ("POIs"), RWEC-RI, OnSS, and Onshore Transmission Cable. Transmission and interconnection facilities are necessary to transfer electricity generated by the Project to the broader electrical grid. This specifically requires conveying electricity from the offshore wind farm to existing onshore electrical transmission facilities associated with the Project.

In order to accept the maximum electricity produced by the Project, Revolution Wind evaluated substations with operating capacities of 115 kV or higher as potential grid POIs. Four POIs were evaluated and were identified as Davisville POI, Kent County POI, Brayton Point POI, and Pottersville POI. Each POI was evaluated based on proximity to coastline, available lands to support the OnSS, and existing infrastructure with capacity to accept the electricity produced by the Project. Routing alternatives for the RWEC-RI were assessed including evaluating the interconnection point to the onshore transmission grid; conflicts with existing onshore and offshore environmental and anthropogenic constraints and uses; distance between the lease area and potential POIs. The preferred route was identified as entering the Narragansett Bay via the West Passage and interconnecting at the Davisville POI. This alternative accommodates the full generation capacity of the Project and results in minimal resource impacts due to the shortest overall transmission route offshore and onshore, existing bathymetry, favorable geology, avoidance of use conflicts and environmental constraints, available land for interconnection equipment, favorable zoning, and beneficial reuse of contaminated properties.

The OnSS analysis evaluated three potential properties, the Quonset Development Corporation ("QDC") Davisville Substation Property, the Fujifilm Substation Property, and the QDC Mainsail Substation Property. All the properties were evaluated based on size, topography, accessibility, soil conditions, contamination, wetlands, floodplains, rare species, vegetation clearing, land use and zoning, sensitive receptors, noise impacts, visual impacts, real estate, and existing utility conflicts. The QDC Davisville Substation Property is the preferred alternative based on the proximity to the POI, which balances environmental concerns and cost, and has the support of QDC and the Town of North Kingstown.

The Onshore Transmission Cable route was evaluated based on the preferred RWEC route, landfall location, and the OnSS. Four potential routes were identified: Blue Beach Alternative, Whitecap Drive Alternative, Hayward West Alternative, and the Quonset Business Park Route Alternative. These alternatives were evaluated based on individual landfall locations and as Emissive Energy Alternatives, where each alternative utilizes the Emissive Energy rear parking lot. Each alternative was evaluated based on the length of the underground cable, installation infrastructure, reliability concerns, wetlands, contamination, rare species, vegetation clearing, route analysis, utilities, estimated construction schedules, and estimated construction costs. The Quonset Business Park Route Alternative was selected as the preferred alternative and the design was advanced. The Emissive Energy Alternative for this route is also included within this filing.

As summarized above, Revolution Wind has evaluated multiple alternatives for both offshore and onshore components of the Project. Based on this analysis, Revolution Wind has determined that routing the RWEC-RI through the West Passage of Narragansett Bay to Quonset Point, installing the Onshore Transmission Cables underground using the Quonset Business Park Route, building a new OnSS on the QDC Davisville Substation site adjacent to and connecting to TNEC's existing Davisville Substation, and building a new ICF on TNEC's Davisville Substation parcel are superior to the other alternatives considered.

More detailed information on Alternatives can be found in Section 5.

2.5 Environmental Effects and Mitigation

The Project design will continue to be refined and the Project will be constructed in a manner that avoids and minimizes the potential for adverse environmental impacts. Each Project component (i.e., RWEC-RI, Landfall Work Area, Onshore Transmission Cable, OnSS, Interconnection ROW, ICF, and TNEC ROW) was evaluated for potential impacts to geology, soils, surface water and groundwater, vegetation, wetlands, wildlife, fisheries, marine mammals, social and economic impacts, land use, visual resources, noise, transportation, cultural resources, air quality, safety and public health, and electric and magnetic fields. Overall, best management practices ("BMPs") have been incorporated into the design and all construction activities for the Onshore Facilities will be completed in compliance with the Rhode Island Pollutant Discharge Elimination System (250-RICR-150-10-1.1 et seq.) ("RIPDES") General Permit, which includes a site-specific Soil Erosion and Sediment Control ("SESC") Plan and weekly monitoring until soils are stabilized after construction.

More detailed information is presented in Section 6, 8, and 9.

2.5.1 Geology and Soils

Impacts to geological resources during construction resulting from seafloor disturbance and sediment suspension and deposition during the installation of the RWEC-RI will occur in the immediate area of installation and will be direct and short-term. Once buried, the area above the cable will recover as part of ongoing processes associated with dynamic marine sediments. Similarly, direct, short-term impacts to geologic resources and soils are anticipated for the Onshore Facilities. However, all earth disturbances will be conducted in compliance with the SESC Plan and BMPs such as the installation of straw bales and siltation fencing, and the re-establishment of vegetation.

2.5.2 Surface Water and Groundwater

Surface water will be directly and temporarily disturbed from seafloor disturbance and sediment suspension and deposition during construction of the RWEC-RI. All vessels will be required to comply with all regulatory requirements for management of onboard fluids and fuels and will be equipped with spill containment and cleanup materials in the event of an accidental spill or release. If horizontal directional drilling ("HDD") is used at the landfall location, an HDD contingency plan will be developed and BMPs will be implemented during construction. Construction of the offshore segment of the RWEC-RI will not impact groundwater.

There are no surface waters within the Onshore Facilities limit of work, with the closest stream being approximately 192 feet to the northwest of the OnSS limit of work. Dewatering may be required during excavation for the onshore portion of the RWEC-RI, TJBs, and Onshore Transmission Cable, and ICF transmission line structures. However, if necessary, the dewatering methods that will be employed, in conjunction with the implementation of the SESC Plan and BMPs, will protect groundwater resources. Therefore, there are no anticipated impacts to surface or groundwater.

2.5.3 Vegetation Clearing

There is no vegetation clearing associated with construction of the offshore RWEC-RI. However, cable burial activities may result in indirect impacts to adjacent submerged aquatic vegetation ("SAV") beds from sediment deposition and potential direct impacts to SAV may occur within a possible material storage area for the RWEC-RI. If SAV will be affected by the Project, mitigation measures will be developed and submitted to the applicable agencies. The Landfall Work Area will require temporarily clearing approximately 3,760 square feet (0.09 ac) of upland herbaceous vegetation that will be restored once construction is complete.

The Onshore Transmission Cable will be installed within existing paved parking lots and roadways and will not require vegetation clearing. However, if minor disturbance of landscaped areas is required for installation, all areas will be restored upon completion of the Project. In addition, if the alternative access route is implemented, it will require removal of a limited number of trees within a hedgerow that runs parallel to Shore Acres Avenue as well as very minor temporary disturbance of maintained lawn.

Construction of the OnSS will require clearing approximately 147,053 square feet[2] (3.4 ac) of vegetation and the ICF will require clearing approximately 124,000 square feet[3] (2.8 ac) of vegetation. Vegetation management will occur on a periodic basis to maintain vegetation at shrub-height within the 30-foot-wide perimeter of the OnSS, the approximate 40-foot-wide ROW for the underground transmission line connecting the OnSS to the ICF, a 10-foot-wide perimeter of the ICF, and within the 120-foot-wide TNEC ROW. Vegetation control methods will employ Integrated Vegetation Management ("IVM") practices including manual cutting, mowing and the prescriptive use of herbicides.

2.5.4 Wetlands

The Project will continue to be refined and the Project will be designed to reduce wetland impacts through measures including avoidance, minimization, and mitigation (where required by the Rhode Island Coastal Resources Management Council ("RI CRMC"). There are no freshwater wetland impacts associated with construction of the Onshore Transmission Cable or the Landfall Work Area. There are no direct wetland impacts associated with the OnSS; however, construction of the OnSS will permanently impact 8,197 square feet (0.2 ac) and temporarily impact 12,930 square feet (0.3 ac) of an Area of Land Within 50-Feet ("Wetland Buffer"). Construction and maintenance of the TNEC ROW will require clearing approximately 3,800 square feet (0.1 ac) of an isolated wetland, 800 square feet (0.02 ac) of a forested wetland, and 7,300 square feet (0.2 ac) of a Wetland Buffer. This vegetation clearing will result in habitat conversion because it will be maintained. The TNEC ROW will also require approximately 40 linear feet of an Area Subject to Storm Flowage ("ASSF") to be culverted for a new gravel access road. All proposed temporary and permanent wetland alterations must be permitted by federal and state regulating agencies, including the U.S. Army Corps of Engineers ("USACE") and RI CRMC.

2.5.5 Wildlife, Fisheries, and Marine Mammals

The Project will result in temporary and permanent impacts to local wildlife during construction and O&M from land disturbance, habitat alteration, noise, traffic, and lighting. The Landfall Work Area and Onshore Transmission Cable will have limited impacts to wildlife due to the developed nature of the area but may include direct mortality or injury to wildlife during construction. The OnSS, ICF, Interconnection ROW, and TNEC ROW will have additional impacts to wildlife from habitat conversion and habitat loss. In addition, the isolated wetland on the ICF parcel exhibits characteristics of a special aquatic site that could potentially support amphibian breeding (i.e., potential vernal pool). VHB performed an inventory of the OnSS Onshore Facilities except for the ICF and overhead transmission lines, and a review of record data to identify any rare, threatened, or endangered ("RTE") species.

2 The approximate 3.4 acres of clearing for the OnSS includes construction of the access road, grading, stormwater management features, the OnSS, and the portion of the Interconnection ROW that is on the OnSS parcel.

3 The approximate 2.8 acres of clearing for the ICF includes clearing for grading, the ICF, the portion of the Interconnection ROW that is on the ICF parcel, and the OH ROW that will connect the ICF to TNEC's Davisville Substation.

Construction of the Project will continue to be refined and the Project will be designed to minimize impacts to wildlife and avoid impacts to RTE species.

Construction of the Project may result in both direct and indirect short-term impacts to marine mammals, sea turtles, and fisheries. However, avoidance, minimization, and mitigation measures will be incorporated into Project design and construction.

2.5.6 Air Quality

The primary causes of potential air quality impacts from the RWEC-RI and the Onshore Facilities include air emissions from vessels, vehicles, helicopters, and stationary engines associated with construction and O&M. Most of the RWEC-RI emissions will occur over relatively short spans of time during construction, and occur offshore, so impacts to air quality near populated areas will be limited in duration. There are no anticipated impacts to air quality during O&M of the RWEC-RI. Similarly, emissions during construction of the Onshore Facilities could have direct, short-term impacts to air quality. The only air emissions anticipated during O&M would result from maintenance of an emergency generator and an occasional maintenance vehicle, and these would not be expected to result in a decrease of air quality within the surrounding area of the Onshore Facilities.

2.6 Social and Economic Effects and Mitigation

The following subsections summarize the social and economic impacts of the Project. More detailed information can be found in Section 7, 8, and 9.

2.6.1 Population

Population impacts to North Kingstown (the "Host Community") could result from the influx of local and non-local construction and operations personnel. Direct impacts during the construction period would be short-term, and accordingly, it is unlikely that non-local workers will relocate families to the area. Population increases related to the operation of the Project are expected to be small relative to the size of the local workforce under existing conditions. No residential displacements are expected to occur as a result of the Project.

Local populations could be affected by noise and traffic impacts during the construction period. Noise impacts would be temporary and are not expected to exceed parameters set by local ordinances except for as needed for specific activities. While working within the streets, traffic impacts may include construction detours and increased vehicular traffic, though the scale of these impacts will depend on the overall construction schedule and any time of year restrictions ("TOYR") due to recreational use or winter moratoriums that are imposed upon the Project.

2.6.2 Employment and Economic Impacts

Guidehouse performed an evaluation of the direct[4], indirect[5], and induced jobs[6]; labor earnings[7]; gross output[8]; and economic value added[9] expected from the Project (inclusive of the RWF, RWEC, and Onshore Facilities). Based on this evaluation, the Project would have beneficial effects for the national economy across both phases – construction and operations – with an expected gross output (i.e., the sum value of all goods and services at all stages of production resulting from the Project) of roughly $1,360.3 million and value add (the best indicator of economic development benefits to the local economy) of roughly $737.9 million. As summarized in Table 8-11, for Rhode Island, the expected gross output and value add are $726.8 million and $390.6 million, respectively. This includes the generation of 3,059 direct, indirect, and induced jobs during the construction phase, and 233 direct, indirect, and induced annual jobs during the operations phase (Guidehouse, 2020).

Installation activities associated with the RWEC-RI are generally expected to have short-term, localized effects on fishing grounds because of potential navigation safety measures (such as a small safety zone around the cable installation vessel(s)). During operations and maintenance, commercial and recreational fisheries are expected to experience limited or no effects from the presence of the RWEC-RI because it will be buried beneath the seabed. The United States Coast Guard's ("USCG") stated policy is that "in the United States vessels will have the freedom to navigate through [wind farms], including export cable routes." (See Coast Guard Navigation and Vessel Inspection Circular 01-19 dated 1 August 2019.) Therefore, commercial fishermen will be able to continue to fish along the RWEC-RI corridor and co-exist with the Project. Commercial and recreational fisheries and any applicable mitigation will be fully addressed through the RI CRMC review process.

2.6.3 Land Use

The Onshore Facilities will require easements with private landowners within the Quonset Business Park that is managed by the QDC; otherwise, the remainder of the Onshore Facilities – except for the OnSS, Interconnection ROW, ICF, and TNEC ROW - would be located within rights-of-way owned by either the QDC or the Town of North Kingstown.

The OnSS and part of the Interconnection ROW are sited on currently undeveloped properties within the Quonset Business Park. They would typically require a "Major Variance"

4 Direct jobs are on-site labor and professional services. On-site labor is given in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Construction jobs are given as FTE job-years since they are spread over a multi-year construction period. Some construction jobs will last only a portion of a year while others may last the entire expected construction period of three years. Operations jobs are given as annual FTE jobs over the entire operating period.

5 Indirect jobs are driven by the increase in demand for goods and services from direct on-site spending from the Project.

6 Induced jobs are driven by the local expenditures of those receiving payments within the first two job categories or increased household spending by workers.

7 Labor earnings are the additional earnings (wages and employer paid benefits) associated with the additional local jobs.

8 Gross output is the sum value of all goods and services at all stages of production resulting from the Project.

9 Value added is the best indicator of economic development benefits to the local economy. The sum total of value added of all enterprises and self-employed in a given state comprises that state's GDP. These values are the sum of earnings from capital and labor or the difference between total gross output and the cost of intermediate inputs. It is comprised of payments made to workers, proprietary income, other property type income, indirect business taxes, and taxes on production and imports less subsidies.

as well as review and approval by the QDC and the Town of North Kingstown Planning Commission. Per the Energy Facility Siting Act ("EFSA") (Rhode Island General Law [R.I.G.L.] § 42-98-1 et seq.), however, the EFSB's permitting authority supersedes QDC and local jurisdiction in this case. Therefore, no special permitting or other approvals from local jurisdictions would be required.

The remainder of the Interconnection ROW, ICF, and TNEC ROW are sited on the same parcel as the existing TNEC Davisville Substation. The Interconnection ROW will be buried. The ICF and TNEC ROW are compatible with existing uses as they represent a modification of an existing use. The ICF includes the addition of a 115kV six-breaker ring bus to enable a more reliable connection between the Project (two 115kV underground duct bank connections) and the existing TNEC Davisville Substation, and the electrical grid beyond. The TNEC ROW is a reconfiguration of existing overhead lines.

Construction of the Onshore Facilities are expected to have short-term land use impacts, particularly to the privately-owned properties for which easements would be required. Existing land uses and related activities would fully resume following construction. The Onshore Facilities are not expected to result in long-term impacts. Except for the OnSS and part of the Interconnection ROW, Onshore Facilities will not permanently change land uses. Overall, no induced land use changes are expected.

2.6.4 Visual Resources

Where visible at near foreground distances, the proposed Onshore Facilities would introduce new industrial/utility structures into the landscape. At a maximum height of 80 feet and set back over 200 feet from the road, the proposed OnSS, ICF, and TNEC ROW will not be out of scale or character with the existing types of development currently present in the vicinity, such as the existing Davisville Substation, or the structures at nearby Quonset Business Park. As such, it is anticipated that the Project will result in negligible visual impacts to the public resources present in the Visual Study Area ("VSA"). Some Camp Avenue residences are likely to experience limited visual impacts as a result of the vegetative clearing associated with the ICF, OnSS and the OnSS access driveway. While these impacts are expected to alter the existing views experienced by the residents directly adjacent to the Project, they are generally localized and can be minimized through implementing site specific measures, such as visual screening.

2.6.5 Noise

Landfall construction of the RWEC-RI will either use HDD or open cut trenching to install the cable. Construction sound levels at the nearest residences would be approximately 5 to 10 dBA quieter using HDD during cable installation rather than open-cut construction methods. However, the HDD site would require a period of increased sound levels associated with the site preparation. Additionally, HDD operations may require construction during the night when there is a greater potential for noise impact. However, as described in Section 7.5, ambient sound measurements at M1 near Blue Beach were 49 dBA (Leq) during the day and 44 dBA (Leq) during the night. Therefore, HDD operations would generate sound below ambient conditions during both the daytime and nighttime ambient conditions and would not be expected to cause significant adverse noise impacts.

Onshore Transmission Cable construction would result in sound levels from 84 to 89 dBA (Leq(8h)) at a distance of 50 feet for all construction phases. At 100 and 200 feet from the transmission cable construction, construction sound would be approximately 6 and 12 dBA lower, respectively. Since construction progresses along the cable route during this period, the exposure to construction noise is of a substantially shorter duration at any particular location along the route. All potential cable routes would go along residences on Camp Avenue which are generally setback about 50 feet from the route. The OnSS and ICF construction sound would approximately 54 to 64 dBA at the nearest residential receptors on Cattail Lane, Brook View Drive, and Camp Avenue, which is generally 10 to 15 dBA above ambient conditions. The Onshore Transmission Cable, OnSS, and ICF construction phase noise would generally occur during daytime hours and would be within all applicable state and local noise standards.

Once constructed, the only components of the Project that will emit sound will be the OnSS and two line traps associated with the ICF 115kV ring bus. The highest sound level at an NSR is 43.9 dBA at 129 Cattail Lane. This sound level is below the EPA guideline of 48.6 dBA (Leq), which is equivalent to a day-night average sound level of 55 dBA (Ldn), and therefore complies with the EPA guidance for exterior noise. Operational sound from the OnSS and ICF would also be below 50 dBA at the nearest residential property lines and below 70 dBA at the nearest commercial/industrial property lines which is below the Town of North Kingston, RI Noise Ordinance limits.

2.6.6 Transportation

Construction-related traffic, including commuting of the construction workforce, will add to the local traffic volume on public roads. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project. The addition of this traffic is not expected to result in any significant congestion or change in level of service along any of the roadways proximate to the Project. Project operations are not expected to significantly increase local traffic volume on public roads, or otherwise affect traffic congestion or change operating conditions along any of the local roadways. The Project will develop a Traffic Management Plan in coordination with local and state authorities, as appropriate, to mitigate impacts to vehicular traffic during construction.

Quonset Business Park is served by public bus transportation operated by the Rhode Island Public Transit Authority (“RIPTA”). Dependent on construction activities along the Onshore Transmission Cable route, Revolution Wind may need to coordinate a temporary detour to existing bus routes.

The impacts of traffic on marine navigation were evaluated in a detailed Navigation Safety Risk Assessment (“NSRA”) prepared for the Project. Primary conclusions of the NSRA included that vessel traffic near the Project area is light and recreational/pleasure vessels represent the greatest proportion of vessel tracks in the Study Area. Project-related vessels will be navigated by trained, licensed vessel operators who will adhere to navigational rules and regulations. USCG-approved navigation lighting is required for all vessels during construction of the RWEC. All vessels operating between dusk and dawn are required to turn on navigation lights. Project construction activities will be carried out in close coordination with the USCG.

Portions of the Project including the ICF, the OnSS, Onshore Transmission Cable and Landfall Work Area are proximate to Quonset Airport ("KOQU") in North Kingstown, Rhode Island. Revolution Wind will submit a Form 7460-1 for FAA review for the applicable Project components. The FAA will conduct an aeronautical study to determine if there would be any hazards to air navigation and what mitigation measures might be necessary.

2.6.7 Cultural Resources

Revolution Wind has and continues to conduct surveys to identify buried archaeological sites in areas of potential ground disturbance. Revolution Wind is consulting with the Rhode Island Historic Preservation and Heritage Commission ("RIHPHC") and Native American Tribes to determine an appropriate approach to the identification and protection of deeply-buried archaeological or other cultural resources that may be present within the Area of Potential Effect ("APE"), consistent with the RIHPHC guidelines.

A Marine Archaeological Resources Assessment was also completed for the Project. Marine archaeologists meeting professional qualifications established by BOEM reviewed site-specific geological and geophysical survey data and extant public and proprietary databases containing information on shipwrecks, downed aircraft, or other potentially significant marine archaeological resources within the Project and surrounding areas. Ecological, geological, and cultural contexts were also developed to assist in the identification of potential submerged pre-contact Native American cultural resources.

2.6.8 Safety and Public Health

The proposed facilities will be designed, built, and maintained in accordance with the standards and codes as described in Section 4.4. Accordingly, public safety and health will be protected. Following construction of the facilities, clear markings with warning signs to alert the public to potential hazards if climbed or entered will be applied where appropriate.

2.6.9 Electric and Magnetic Fields

Electric and Magnetic Fields ("EMF") are created by voltage (electric field) and electric current (magnetic field).

Revolution Wind calculated the 60-Hz magnetic fields from the proposed Onshore Transmission Cable at the maximum loading of the Revolution Wind Farm. The magnetic field will be strongest at the surface of the cable and will decrease rapidly with distance from the cables. The voltage applied to the conductors within the cable creates an electric field but will not be a direct source of any electric field above ground due to the cable construction, duct bank, and burial underground (Exponent, 2020c).

Revolution Wind also calculated the electric and magnetic field levels associated with the Offshore Export Cable. The strongest magnetic field will occur at the surface of the steel armoring around the Offshore Export Cable and will decrease rapidly with distance. The magnetic-field levels in seawater were calculated to be well below limits published by the International Committee on Electromagnetic Safety ("ICES") and the International Commission on Non-Ionizing Radiation Protection ("ICNIRP") intended to protect the health and safety of the general public. Calculated magnetic-field levels also were found to be below reported thresholds for effects on the behavior of magnetosensitive marine organisms and calculated induced electric-field levels were found to be below reported detection thresholds of local electrosensitive marine organisms (Exponent, 2020c).

All measured (and calculated) magnetic-field levels are well below the ICNIRP reference level of 2,000 mG and the ICES maximum permissible exposure limit of 9,040 mG for the general population.

2.7 Conclusion

Revolution Wind will improve the energy system reliability and state and energy security in a cost-effective manner that minimizes environmental and social impacts. The Project will provide clean, reliable offshore wind energy that will increase significantly the volume of renewable energy delivered to Rhode Island and Connecticut and will significantly advance Rhode Island's renewable energy directives set forth in the State Energy Plan, Energy 2035.

Mitigation will be provided for all impacts to state and federal regulated wetland resources. Impacts to rare, threatened, or endangered species will be addressed through appropriate avoidance or minimization techniques. Impacts to cultural resources will be fully evaluated through investigation and coordination with BOEM, the RIHPHC and Native American Tribes in accordance with Section 106 of the National Historic Preservation Act ("NHPA"). The potential for significant impact to other environmental or social receptors in the Project vicinity is expected to be minimal. To the extent that impacts cannot be avoided, they will be addressed through avoidance, minimization, and mitigation techniques as discussed in Section 9 of this ER.

3

Purpose and Need

3.1 Statement of Need

This section addresses the statutory requirement that a proposed energy facility "is necessary to meet the needs of the state and/or region for energy of the type to be produced by the proposed facility." R.I. Gen. Laws § 42-98-11(b)(1).[10] The Project will provide clean, reliable offshore wind energy that will significantly increase the renewable energy delivered to Rhode Island and Connecticut. Both Rhode Island and Connecticut have adopted substantial renewable portfolio standards and clean energy targets to address issues associated with climate change and the corresponding current and future demand for zero carbon, reliable renewable energy.

Revolution Wind developed the Revolution Wind Project in direct response to the expressed needs of the States of Rhode Island and Connecticut to increase the renewable energy load serving each state. Specifically, Revolution Wind significantly advances Rhode Island's renewable energy directives set forth in the State energy plan – Energy 2035[11] – which calls for Rhode Island to "increase sector fuel diversity, produce net economic benefits, and reduce greenhouse gas emissions by 45 percent by the year 2035" in part "through support for state and federal offshore wind projects." Energy 2035 at 2. The Project also contributes approximately 400 MW of renewable energy toward Rhode Island's ambitious goal of procuring 1,000 MW of renewable energy by 2020 and converting Rhode Island to 100% renewable energy by 2030, set forth in Governor Gina Raimondo's executive orders. Moreover, the Project meets the State of Rhode Island's needs under the Resilient Rhode

10 This "need" assessment is one of the three findings necessary for a license. The other two are that "[t]he proposed facility is cost-justified" and "will not cause unacceptable harm to the environment and will enhance the socio-economic fabric of the state." R.I.G.L. § 42-98-11(b)(2) and (3).

11 "Energy 2035" refers to State Guide Plan Element Report # 120, Energy 2035, Rhode Island State Energy Plan, dated October 8, 2015, produced by the Rhode Island Department of Administration, Division of Planning.

Island Act to reduce greenhouse gas emissions to eighty percent (80%) below 1990 levels by the year 2050.

Similarly, the Project meets the State of Connecticut's stated energy needs. Connecticut specifically has directed the reduction of fossil fuel use and a transition to renewable energy. Connecticut selected the Project as part of a solicitation for renewable energy projects called for by the 2018 Connecticut Comprehensive Energy Strategy[12] to achieve Connecticut's renewable energy goals and to advance the transition to renewable energy. The Project helps Connecticut meet its need to reduce greenhouse gas emissions by 80 percent below 2001 levels by 2050 as established in the Global Warming Solutions Act ("GWSA") in 2008, Conn. Gen. Stat. § 22a-200a, as well as the 2030 interim target of 45 percent below the 2001 levels. Conn. Gen. Stat. § 22a-200a(a).

Additionally, the Project will improve energy system reliability and state and regional energy security. The Project will enhance the economic competitiveness of the region by reducing energy costs, which will attract additional investment in the region. Finally, by accelerating the transition to a renewable energy future that reduces greenhouse gas emissions, the Project will support the sustainability of the natural environment and improve quality of life in the region. For all these reasons, as more fully explained below, the Project satisfies the requirement that "[c]onstruction of the proposed facility is necessary to meet the needs of the state and/or the region for energy of the type to be produced by the proposed facility." R.I. Gen. Laws § 42-98-11(b)(1).

3.1.1 Project Purpose

The purpose of the Project is to provide clean, reliable offshore wind energy that will increase significantly the renewable energy load available to Rhode Island and Connecticut consumers and reduce carbon emissions across the region. It will displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by reducing energy costs to attract new investments and job growth opportunities. Rhode Island and Connecticut have adopted substantial renewable portfolio standards and clean energy targets to address issues associated with climate change, highlighting the current and future demand for the Project. In response to this expressed need and demand, Revolution Wind has been awarded five PPAs to date, totaling approximately 704 MW of generating capacity.

In Rhode Island, Revolution Wind has entered into the Rhode Island[13] PPA with TNEC to provide approximately 400 MW of wind power to the State of Rhode Island.

12 "2018 Connecticut Comprehensive Energy Strategy" refers to the Comprehensive Energy Strategy dated February 8, 2018 pursuant to Conn. Gen. Stat. § 16a-3d by the Connecticut Department of Energy and Environmental Protection.

13 The "Rhode Island PPA" refers to the Offshore Wind Generation Unit Power Purchase Agreement between The Narragansett Electric Company, d/b/a National Grid, as Buyer and DWW Rev I, LLC as Seller, dated December 6, 2018, which the Rhode Island Public Utilities Commission approved in Report and Order No. 23609 dated June 7, 2019. This Report and Order is referred to herein as the "Rhode Island PPA Approval."

In Connecticut, Revolution Wind has entered into four separate PPAs – the Connecticut PPAs[14] – to provide a total of approximately 304 MW of wind power to the State of Connecticut. The Revolution Wind Project will fulfill Revolution Wind's obligations to Rhode Island and Connecticut in accordance with the Rhode Island PPA and the Connecticut PPAs and provide substantial environmental and economic benefits.

3.1.2 Statement of Need Standard

The EFSA, R.I. Gen. Laws §§ 42-98-1 et seq., requires an applicant to make a three-part showing to the EFSB before a license is granted for the proposed facility:

1. Construction of the proposed facility is necessary to meet the needs of the state and/or region for energy of the type to be produced by the proposed facility.
2. The proposed facility is cost-justified, and can be expected to produce energy at the lowest reasonable cost to the consumer consistent with the objective of ensuring that the construction and operation of the proposed facility will be accomplished in compliance with all of the requirements of the laws, rules, regulations, and ordinances, under which, absent this chapter, a permit, license, variance, or assent would be required, or that consideration of the public health, safety, welfare, security and need for the proposed facility justifies a waiver of some part of the requirements when compliance cannot be assured.
3. The proposed facility will not cause unacceptable harm to the environment and will enhance the socio-economic fabric of the state.

R.I. Gen. Laws § 42-98-11(b). This section of the application addresses the first prong of this three-part showing – whether the Project meets the needs of Rhode Island, Connecticut and the New England region for the clean, renewable offshore wind energy it will produce.

As part of the determination as to whether a facility meets the "need" requirement under R.I. Gen. Laws § 42-98-11(b)(1), the EFSA directs that a proposed energy facility must be "justified by long term state and/or regional energy need forecasts." R.I. Gen. Laws § 42-98-2(2). The EFSA also provides that a proposed facility "shall be consistent with the state's established energy plans, goals, and policy." R.I. Gen. Laws § 42-98-2(6). As part of its analysis, the EFSB analyzes whether the proposed facility is consistent with the (Energy 2035. R.I. Gen. Laws § 42-98-9(e); EFSB Order No. 140 at 17. In addition to Energy 2035, the EFSB also will evaluate whether the Project comports with other energy plans and goals for Rhode

14 The "Connecticut PPAs" refers collectively to the four separate PPAs between Revolution Wind and electric utilities in Connecticut. Those PPAs are: (1) RPS Class I Renewable Generation Unit Power Purchase Agreement between The Connecticut Light and Power Company d/b/a Eversource Energy and DWW Rev I, LLC, dated October 1, 2018, (2) RPS Class I Renewable Generation Unit Power Purchase Agreement between The United Illuminating Company and DWW Rev I, LLC, dated October 1, 2018, (3) Amended and Restated Zero Carbon Emissions Class I Renewable Generation Unit Power Purchase Agreement between The United Illuminating Company [Buyer] and DWW Rev I, LLC [Seller], dated November 22, 2019, and (4) Amended and Restated Zero Carbon Emissions Class I Renewable Generation Unit Power Purchase Agreement between The Connecticut Light and Power Company d/b/a Eversource Energy [Buyer] and DWW Rev I, LLC [Seller], dated November 22, 2019. PURA approved the first two of the Connecticut PPAs in its Decision dated December 19, 2018 in Docket No. 18-06-37, **Error! Reference source not found.**. PURA approves the third and fourth of the Connecticut PPAs in its Decision dated November 27, 2019 in Docket No. 18-05-04, PURA Implementation of June Special Session Public Act 17-3.

Island, Connecticut and the region set forth in energy policy documents as a factor in determining whether a proposed facility is needed. See e.g., EFSB Order No. 140 at 14-21.

3.1.3 Revolution Wind Project is Needed to Meet Long-Term State and Regional Energy Needs

The State of Rhode Island and the entire New England region have established a commitment to securing an energy future driven by renewable resources. Specific to the Project, Rhode Island and Connecticut have statutory requirements for utilities in their states to procure significant volumes of clean energy to achieve that goal, and the regulatory authorities in both states have approved PPAs for energy to be generated by the Project. The Project, therefore, meets the "need" requirement under the EFSA for two reasons: (1) it will provide substantial amounts of energy to meet the expected demand of customers in Rhode Island and Connecticut, and (2) it will provide clean energy from renewable resources that is necessary for Rhode Island and Connecticut to meet their renewable energy goals.

A. The Project is needed to meet State and regional energy needs.

1. <u>The Rhode Island PPA demonstrates the need for the energy generated by the Project.</u>

   The Rhode Island Public Utilities Commission (the "RIPUC") approved the PPA between TNEC and Revolution Wind pursuant to the Affordable Clean Energy Security Act – R.I. Gen. Laws §§ 39-31-1 et. seq. The General Assembly made five findings as the basis for the statute:

   1) The state and New England face significant short and long-term energy system challenges that may undermine the reliable operation of the bulk electric system and spur unsustainable levels of price volatility, and that these challenges may have a substantial impact on energy affordability for ratepayers and undermine the economic competitiveness of our state by serving as a detriment to capital investment and job growth; and

   2) Planned retirements of fossil-fuel, nuclear, and other electric generators, along with lack of new interstate natural gas pipeline infrastructure and capacity into the region, may exacerbate these conditions; and

   3) Rhode Island benefits from a holistic energy strategy that pursues both local investment in clean energy resources, such as energy efficiency and renewable distributed generation, and regional investment in energy infrastructure projects that strengthen system reliability and diversify our supply portfolio. The combination of these strategies advances our economic development interests and environmental quality; and

   4) Rhode Island is committed to the increased use of no-and low-carbon energy resources that diversify our energy supply portfolio, provide affordable energy to consumers, and strengthen our shared quality of life and environment, and new energy infrastructure investments may help facilitate the development and interconnection of such resources; and

5) Rhode Island is part of an integrated, regional energy system and addressing these challenges, while meeting state policy goals, requires a coordinated, multi-state approach built upon collaboration and utilizing appropriate expertise and stakeholder processes of regional entities including, but not limited to, the New England State's Committee on Electricity, ISO-NE and the New England Power Pool ("NEPOOL") that takes into account affordability, energy security, reliability, fuel diversity, and environmental sustainability

R.I. Gen. Laws § 39-31-1. The General Assembly also identified three specific purposes of the statute:

1) Secure the future of the Rhode Island and New England economies, and their shared environment, by making coordinated, cost-effective, strategic investments in energy resources and infrastructure such that the New England states improve energy system reliability and security; enhance economic competitiveness by reducing energy costs to attract new investment and job growth opportunities; and protect the quality of life and environment for all residents and businesses;

2) Utilize coordinated competitive processes, in collaboration with other New England states and their instrumentalities, to advance strategic investment in energy infrastructure and energy resources, provided that the total energy security, reliability, environmental, and economic benefits to the state of Rhode Island and its ratepayers exceed the costs of such projects, and ensure that the benefits and costs of such energy infrastructure investments are shared appropriately among the New England States; and

3) Encourage a multi-state or regional approach to energy policy that advances the objectives of achieving a reliable, clean-energy future that is consistent with meeting regional greenhouse gas reduction goals at reasonable cost to ratepayers.

R.I. Gen. Laws § 39-31-2.

The Rhode Island PPA provides that Revolution Wind will deliver approximately 400 MW of wind power to National Grid. Rhode Island PPA at § 4. This is equivalent to approximately 25% of Rhode Island's summer electric generating capacity.[15] EFSB Order No. 140 at 29.[16] In approving the Rhode Island PPA, the RIPUC noted that it would create an economic benefit to Rhode Island in excess of $400 million. Rhode Island PPA Approval at 11. This includes $86.967 million in energy market price savings to Rhode Island energy customers. Id. at 9. The RIPUC also concluded that "the PPA is consistent with the region's greenhouse

15 Source: US EIA, Rhode Island State Electricity Profile 2018, https://www.eia.gov/electricity/state/rhodeisland/index.php

16 Notably, the EFSB identified the energy to be generated by the Revolution Wind project as a basis for its conclusion that the Invenergy gas fired power plant did not satisfy the "need" requirement. EFSB Order No. 140 at 29. This conclusion demonstrates that the EFSB already has recognized and acknowledged that the energy to be generated by Revolution Wind is expected to be among the generating resources necessary to meet Rhode Island and the Southeastern New England region's energy needs in the short term and the long term.

gas reduction targets." Id. at 13; see also id. at 18 ("[T]he Rhode Island PUC herein has approved the subject PPA as being consistent with state policy . . . .").

As part of the Rhode Island PPA approval process, the RIPUC requested and received an advisory opinion[17] from the Rhode Island Office of Energy Resources ("OER"). OER endorsed the Rhode Island PPA, stating that the "Revolution Wind offshore wind project represents a game changer for the Ocean State that will result in significant energy, economic, and environmental benefits for years to come." OER Advisory Opinion at 3.

Overall, the RIPUC's approval of the Rhode Island PPA demonstrates that the State has already determined that: (1) there is a need for renewable energy to serve Rhode Island customers safely, reliably, and cost-effectively, and to meet state and regional clean energy goals to reduce greenhouse gases, and (2) the Project, through the Rhode Island PPA, will help meet that need.

2. The Connecticut PPAs demonstrate the need for the energy generated by the Project.

The Connecticut PPAs will provide approximately 304 MW of wind power to Connecticut customers. These PPAs represent a significant contribution to the Connecticut utilities' capacity to provide a reliable supply of energy to their Connecticut customers.

Connecticut selected Revolution Wind pursuant to Conn. Gen. Stat. §§ 16a-3h and 16a-3m. Under Conn. Gen. Stat. § 16a-3h, the Commissioner of Energy and Environmental Protection had to consider "whether the proposal is consistent with requirements to reduce greenhouse gas emissions in accordance with section 22a-200a" and "whether the proposal is consistent with the policy goals outlined in the Comprehensive Energy Strategy adopted pursuant to section 16a-3d[,]" among numerous other considerations. Under Conn. Gen. Stat. § 16a-3m, the selection of the Project reflected the Commissioner of Energy and Environmental Protection conclusion that it will contribute to local source requirements for electric generation, reduce greenhouse gas emissions, enhance fuel diversity, and align with the 2018 Connecticut Comprehensive Energy Strategy.

Thus, in addition to the Rhode Island PPA approval determination of need, the State of Connecticut also has made a determination that the Project is necessary for Connecticut to meet its energy needs.

B. The Project is Needed to Achieve State and Regional Energy Policy Goals

1. The Project is Consistent with Energy 2035

The EFSA directs that any project must be consistent with Energy 2035. Energy 2035 identified offshore wind as Rhode Island's "most significant renewable

17 This advisory opinion is R.I. Office of Energy Resources Advisory Opinion, *In re The Narragansett Elec. Co. d/b/a National Grid Review of Power Purchase Agreement Pursuant to R.I. Gen. Laws § 39-31-1 et seq.*, Dkt. No. 4929 (RIPUC Mar. 22, 2019), and is referred to herein as the "OER Advisory Opinion."

energy resource." Energy 2035 at 15. Significantly, Energy 2035 established the goals to "increase sector fuel diversity, produce net economic benefits, and reduce greenhouse gas emissions by 45 percent by the year 2035." Energy 2035 at 34. To achieve these goals, Energy 2035 recommended numerous policy actions, including the promotion of local and regional renewable energy. Energy 2035 at 62-63. To achieve this goal, Energy 2035 specifically prescribed procuring additional renewable energy "through support for state and federal offshore wind projects." Energy 2035 at 63.

The Project aligns with the findings, goals and recommendations of Energy 2035. As part of the RIPUC approval process for the Rhode Island PPA, OER evaluated the Project for consistency with Energy 2035. OER concluded that the Project aligned with each of the "three major themes – Security, Cost-Effectiveness, and Sustainability" and advanced the Plan's interest in "increase[ing] sector fuel diversity, produc[ing] net economic benefits, and reduc[ing] greenhouse gas emissions by 45 percent (below 1990 levels) by 2035." OER Advisory Opinion at 31 Specifically, the Project will advance Energy 2035's "security goal measured by increasing fuel diversity above 2013 levels." "Within the context of non-carbon electric resource potential assumed for 2035 by the Plan, this single project will fall within the 'aggressive' bandwidth for offshore wind deployment in Rhode Island, thereby outpacing earlier expectations by more than a decade." Id. The Project "will also enhance system reliability and resiliency as a new, non-gas fired resource interconnected to the grid." Id. at 31-32.

OER also concluded that the Project advanced Energy 2035's goal of sustainability and found it "consistent with a key strategy supported by the Plan – the promotion of local and regional renewable energy resources." Id. at 34. Specifically, OER concluded that the Project represented the kind of "bold step[ ] to increase the generation and use of clean, renewable sources of energy" envisioned by Energy 2035:

> Achievement of this strategy has taken form in Governor Raimondo's 1,000 MW by 2020 goal. This call for ten-fold increase in the state's clean energy portfolio, while balancing consumer affordability and system reliability impacts, can be responsibly advanced by approval of this contract. *Energy 2035's* modeling suggested that the state "should aim to bring online over 500 MW of local renewable energy projects through expansion of the State's successful renewable energy procurement policies . . . *and through support for state and federal offshore wind projects."* The proposed contract is well in-line with the State Energy Plan's recommendation.
>
> Id. at 34 (emphasis in original).
>
> The well-reasoned OER analysis reflects the reality of the Project; it aligns perfectly with the Energy 2035 framework and will allow Rhode Island to make substantial progress toward its goals for its energy future.

> Accordingly, it clearly satisfies the aspect of the "need" analysis that the proposed facility be consistent with Energy 2035.

2. The Project Furthers Other Rhode Island Energy Policy Goals

A leader nationally with respect to climate change resiliency, Rhode Island has adopted numerous ambitious clean energy policies and priorities in addition to Energy 2035. The Project helps advance many of them.

For example, in January 2020, Governor Gina Raimondo issued an Executive Order committing Rhode Island to be powered by 100 percent renewable electricity by 2030. Executive Order No. 20-01, Advancing a 100% Renewable Energy Future for Rhode Island by 2030 (Jan. 17, 2020). This Executive Order committed Rhode Island "to mitigating economy-wide greenhouse gas emissions and their effect on climate change, while spurring new and innovative opportunities for investment and job growth throughout the state's clean energy economy." Id. The Executive Order further found that "a clean and affordable future electric grid will require a diverse combination of responsibly-developed resources to power our economy while maintaining reliability, including, but not limited to, offshore wind, solar, on-shore wind, and storage." Id.

This Executive Order built upon the Governor's 2017 announcement of a strategic goal to increase the State's clean energy to a total of 1,000MW of clean energy projects by the end of 2020. Indeed, OER already has acknowledged the Project as a key component in meeting this ambitious metric. The Rhode Island Clean Energy Portfolio Report for Quarter 2 of 2020 indicates that Rhode Island has achieved 923 MW towards this goal, with 430MW attributable to offshore wind. This number includes the approximately 400MW from the Project awarded under the Rhode Island PPA.

Likewise, Rhode Island has targeted to have at least 20,000 clean energy jobs by 2020. At the conclusion of 2019, Rhode Island had 16,348 jobs in the clean energy economy, up 77.3 percent since 2014. See 2020 Rhode Island Clean Energy Industry Report, *available at* www.energy.ri.gov/cleanjobs/. Notably, clean energy jobs accounted for 66 percent of new jobs created since 2014. *Id.* The Project features prominently in the most recent Clean Energy Industry Report. The report notes that the Project "is expected to create more than 1,100 construction jobs and will include $40 million in port infrastructure improvements in Rhode Island." Id. The report goes further to speak to the long-term job-creation impacts of the Project:

> Initial job impacts of the project can already be identified, as companies such as Boston Wind, Orsted, and GEV Wind have located U.S. Headquarters in the state. In March of 2020, Orsted announced the opening of a new innovation hub in Providence and Quonset. The hub will identify, foster, and finance enterprises related to offshore wind, with a focus on next generation technology and related innovation in the offshore wind energy field. Over the coming year, the industry will add

> jobs in port infrastructure development, scientific and technical services, financing, and legal, accounting, and other support services. As construction commences, a large number of supply chain jobs from manufacturing to shipping and boatbuilding will be created.

Id.

Moreover, in 2014, the General Assembly passed the Resilient Rhode Island Act. That act created the Rhode Island Executive Climate Change Coordinating Council (RIEC4), which is charged with working to achieve greenhouse gas reduction targets: 10 percent by 2020, 45 percent by 2035, and 80 percent by 2050. As reflected by the OER's analysis of the Project's consistency with Energy 2035, the Project is an integral part of achieving these goals.

Accordingly, the Project is a critical component of Rhode Island's overall plan to achieve the state's renewable energy goals. Beyond mere consistency with Energy 2035, the Project plays a key role in Rhode Island's plan to meet its targets for renewable energy, economic growth in the renewable energy sector, and greenhouse gas reductions.

3. The Project Furthers Connecticut and Regional Clean Energy Goals

Like Rhode Island, Connecticut also has aggressive clean energy policies including a renewable portfolio standard that requires its electric distribution companies to procure nearly half of all energy from renewable sources by 2030, which the Project supports.

For nearly a decade, Connecticut's energy goal has been to foster a cheaper, cleaner, more reliable energy future for its businesses and residents. The 2018 Connecticut Comprehensive Energy Strategy specifically identified the solicitations that led to the selection of the Project as important to the furtherance of Connecticut's energy goals. 2018 Connecticut Comprehensive Energy Strategy at 14, 30-31. These solicitations helps Connecticut to meet its target of reducing greenhouse gas emissions by 80 percent below 2001 levels by 2050 as established in the GWSA in 2008, Conn. Gen. Stat. § 22a-200a, as well as the 2030 interim target of 45 percent below the 2001 levels, Conn. Gen. Stat. § 22a-200a(a). The 2018 Connecticut Comprehensive Energy Strategy further notes that these goals "necessitate increases in: renewable energy generation . . . As part of this transformation, fossil fuel use will decline over time and be displaced by increased renewable generation and electricity use." 2018 Connecticut Comprehensive Energy Strategy at 12.

Connecticut and Rhode Island also joined with the other New England states to work together to achieve a cleaner, more reliable, and more affordable energy future. The New England states are part of the Regional Greenhouse Gas Initiative, which is a cooperative effort to reduce CO_2 emissions from the power sector.

These are examples of the numerous pronouncements and policies that the State of Connecticut, other New England states individually, and the region's leaders collectively, have made setting forth a clear vision for an energy future that consists of clean renewable energy generation that enhances reliability and sustainability, while reducing the environmental impact of power generation.

The Project unquestionably furthers these goals, as the RIPUC, OER, and Connecticut Public Utilities Regulatory Authority all have concluded. The more than 700 MW of clean energy to be delivered to Rhode Island and Connecticut will increase the percentage of energy generation for those states, and for New England as a whole, from clean, renewable resources. That, in turn, will contribute to the reduction of greenhouse gas emissions and bolster efforts to combat climate change. The policies of the New England states, therefore, have expressed a clear need for additional renewable energy generation. The Project is a critical generating facility to fulfilling those policy goals.

4

Proposed Action and Project Description

4.1 Introduction

The Project includes construction of the RWF on the OCS within the Lease Area and the Rhode Island-Massachusetts Wind Energy Area ("RI-MA WEA"), the RWEC, and the Onshore Facilities, which will reinforce the existing transmission system within Rhode Island with a clean, renewable energy source. Specifically, the Project will include the following offshore and onshore components:

Offshore

- Up to 100 WTGs connected by a network of IACs in federal waters;
- Up to two OSSs connected by an OSS-Link Cable in federal waters; and
- Up to two submarine export cables RWEC, generally co-located within a single corridor within federal and RI State waters (RWEC-RI).

Onshore

- Landfall Work Area located at Quonset Business Park in North Kingstown, Rhode Island, which will include TJBs;
- Two underground transmission circuits (referred to as the Onshore Transmission Cable), co-located within a single corridor;
- New OnSS and ICF located adjacent to the existing Davisville Substation; and
- New Interconnection ROW connecting the OnSS to the ICF (underground) and the TNEC ROW connecting the ICF to TNEC's Davisville Substation. The overhead transmission line is a reconfiguration of existing overhead lines.

The portion of the Project within EFSB's jurisdiction includes the RWEC-RI, the Landfall Work Area, the Onshore Transmission Cable, the OnSS, the Interconnection ROW, the TNEC ROW, and the ICF that will connect to TNEC's existing Davisville Substation. Once constructed, the

ICF and the TNEC ROW will become part of TNEC's Davisville Substation, to be owned, operated, and maintained by TNEC.

In this section of the ER, the overall scope of the Project within EFSB's jurisdiction is identified and the individual components are described. This section also details Revolution Wind's construction and maintenance practices, safety and public health considerations, community outreach practices, estimated costs, and the anticipated schedule for the Project.

4.2 Onshore Substation and Interconnection Facility

A new OnSS, Interconnection ROW, TNEC ROW, and ICF will be constructed adjacent to the existing TNEC Davisville Substation to support interconnection of the Project to the existing electrical transmission grid. Design and construction of the OnSS and ICF are described further in the following subsections. See Appendix A for Project site plans.

4.2.1 Onshore Substation Design

The OnSS will be designed to meet applicable Rhode Island State Building Code/2015 International Building Code, American Society of Civil Engineers ("ASCE") Standards, National Electric Safety Code ("NESC"), all applicable Institute of Electrical and Electronics Engineers ("IEEE") standards, and local climate and geotechnical conditions. The engineering of these facilities proposes gas-insulated switchgear system bay positions. Major equipment associated with the OnSS is summarized in Table 4-1.

Table 4-1 Onshore Substation Facility Equipment

Equipment	Maximum Number Required
Major Electrical Equipment	
Synchronous Condenser Transformer	2
Auto Transformer	2
Shunt Reactor	4
Harmonic Filter	2
275kV and 115kV Gas Insulated Switchgear	1 (lot)
Synchronous Condenser Heat Exchanger	2
Control House	1

Synchronous Condenser Building Equipment	
Synchronous Condenser	2
Lube Oil Skid	2
Water Skid	2
Vacuum Pump	2
Auxiliary Transformer	2

The OnSS will occupy an operational footprint measuring up to 4 ac (1.6 ha) and will connect to the ICF with two 115-kV underground transmission cables that are up to approximately 519-feet (158.2 m). Maximum height of OnSS equipment will be up to 45 ft (13.7 m) with shielding masts measuring up to 65 ft (19.8 m) tall. Additionally, the OnSS will include a compacted gravel driveway, stormwater management features, and associated landscaped or managed vegetated areas totaling up to 7.1 acres (2.9 ha) inclusive of the up to 4-ac (1.6-ha) operational footprint of the facility. The underground transmission lines will be maintained free of woody vegetation that exceeds 15 feet in height.

The OnSS will be equipped with a Supervisory Control and Data Acquisition ("SCADA") system. The SCADA system's main function will allow for operation and monitoring of local systems remotely by dispatch type personnel. Backup power for the OnSS will be provided via a 50-kW generator supplied with fuel by portable propane tanks.

The OnSS will require various oils, fuels, and lubricants to support its operation (Table 4-2). Major equipment which contains oil will be mounted on concrete foundations with concrete secondary insulating fluid containment designed for 110 percent containment and in accordance with industry and local utility standards. A Spill Prevention, Control, and Countermeasure ("SPCC") plan will be developed in with EPA SPCC requirements (Title 40 Code of Federal Regulations ["CFR"] Part 112). Sulfur hexafluoride ("SF_6") gas will be used for electrical insulation in some switchgear components; OnSS devices containing SF_6 will be equipped with integral low-pressure detectors to detect SF_6 gas leakage, which will notify the dispatch center for response should they occur.

Table 4-2 Maximum Potential Quantities of Oils, Fuels, Lubricants, and SF_6 for the Onshore Substation

Oil/Fuel/Lubricant/Gas Type	Maximum Quantity
Transformer Insulating Fluid	60,000 gallon (gal) (227,125 liters [L])
Synchronous Condenser Lubricating Fluid	1,000 gal (3,785 L)
Propane (Generator)	240 gal (908 L)
SF_6	40,000 pounds (lbs) (18,144 kg)

4.2.2 Interconnection Facility Design

The Davisville Substation serves as the point of interconnection for the Project. As part of the System Impact Study in accordance with ISO-NE's Open Access Transmission Tariff, the

Project requires the 115kV side of Davisville Substation to be converted to a 115-kV six-breaker ring bus to enable a more reliable connection between the Project (two 115kV underground duct bank connections), the existing two 115-kV overhead line and the existing Davisville Substation, and the ISO-NE Transmission System.

The six-breaker ring bus will be an air-insulated system consisting of circuit breakers, disconnect switches, structural steel, instrument and station service transformers, and associated miscellaneous equipment (i.e. insulators, surge arresters, electrical fittings and hardware). To support more timely cutovers, a new prefabricated control house will also be installed. Major equipment associated with the ICF is summarized in Table 4-3.

Table 4-3 Interconnection Facility Equipment

Equipment	Maximum Number Required
115 kV breakers	6
Breaker Disconnect switches	12
Line disconnects	4
Line traps	2
CCVTs (3-phase sets)	6
Open air bus work	1 (Lot)
Control building	1
Station Service Transformer	2

The ICF will occupy an operational footprint measuring up to 1.6 ac (0.6 ha). Maximum height of ICF equipment will be up to 45 ft (13.7 m) with shielding masts measuring up to 55 ft (16.7 m) tall. Additionally, the ICF will include an asphalt paved driveway, stormwater management features, and associated landscaped or managed vegetated areas totaling up to 4.0 acres (1.6 ha) inclusive of the up to 1.6 ac (0.6 ha) operational footprint of the facility.

The ICF will connect to the Davisville Substation with two 115-kV overhead transmission circuits totaling approximately 744 feet (266 m) in length. The transmission lines will be supported on single circuit structures measuring up to 60 feet (18 m) tall. The Project will also rebuild an approximately 122-foot segment of the existing 115kV Davisville Transmission tap lines. The two circuits will be combined on double circuit structures measuring up to 80 feet tall, and total approximately 1,340 feet (408 m) in length. These overhead transmission facilities will be located within the TNEC ROW, which will require a up to 120- foot wide cleared ROW centered on each circuit to be maintained free of woody vegetation that exceeds 20 feet (6.1 m) in height.

4.2.3 Onshore Substation and Interconnection Facility Construction

The sequence in constructing the OnSS and the ICF under normal circumstances is described in Table 4-4. Once construction is complete, temporary disturbance areas beyond the operational footprint of both the OnSS and ICF will be restored to pre-construction conditions. It is anticipated that construction of the OnSS and ICF will take approximately 12 months. It is assumed construction of both the OnSS and ICF will each generate approximately 1,500 cubic yards (cy) (1,147 m^3) of solid waste. This material will be disposed of in a landfill and/or recycling center.

Table 4-4 Typical Construction Sequence

Activity/Action	Construction Summary
Surveys and Protection of Sensitive Areas	Work at the OnSS and ICF site will begin with the survey, staking and protection of any sensitive areas. Access to the work site will then be established and the required safety measures will be implemented. Surveys for Unexploded Ordnance ("UXO") and Munitions and Explosives of Concern ("MEC") will be performed by certified technicians prior to and during excavation activities in accordance with applicable guidance, if required.
Clearing and Grading	The work site will be cleared of vegetation, and temporary environmental erosion controls such as swales and erosion control socks will be installed in accordance with BMPs. These controls will be maintained until the site is restored and stabilized. The work site will be graded as needed for the proposed designs.
Installation of Foundations	Installation of foundations will require excavation to support construction of and installation of Project components. Blasting is not expected; however, if required, the appropriate blasting plans and approvals will be obtained prior to any such activity. All the major equipment will be installed upon completion of concrete foundations and cable duct banks. The equipment will be rigged and placed on the concrete foundations. The rigging company who acts as sub-contractor to the equipment manufacturer is responsible for all logistical services, e.g. engineered rigging and hauling plans, routing, permitting, clearance checking, escort, police escort, load analysis of transport, as well as dimensional restrictions. Upon installation of the equipment on the foundations, alignment checking will be performed, and when required anchoring and temporary protection from weather will be applied. Upon placing the equipment, all attachments will be completed associated with each equipment. When required, the equipment will be filled with insulating fluid and/or insulating gas.
Restoration	Restoration of any disturbed areas and appropriate landscaping will be performed as necessary. Environmental controls will be removed, though some may remain until the area is completely stabilized.
Commissioning	Upon the acceptance testing of the OnSS control center and upon TNEC's Davisville Substation upgrades being completed and put into service, the commissioning of the OnSS and ICF will commence. Prior to energization, all equipment will be tested to confirm proper operation. Energization is a sequential process that energizes the equipment and facilities in a logical order to coordinate with the equipment and system requirements to meet the Project milestones. The testing and commissioning will be performed by licensed testing personnel. The work will be performed in accordance with the applicable industry standards. The commissioning will be performed in strict adherence to ISO-NE's protocol on receiving permits and clearances.

Contingency staging and laydown areas also include previously disturbed areas owned by the QDC; staging/laydown in these areas will not require grading but may require graveling, erosion control, fencing, etc. The temporary disturbances will be associated with temporary work areas and staging/laydown areas. OnSS equipment and steel support structures are expected to be supported by reinforced concrete foundations suitable for existing soil conditions and coastal storm/flood events.

4.2.4 Access Road Construction

Access roads and driveways will be required to provide access and egress to the OnSS, the ICF, and the new transmission structures. As depicted in Appendix A, the OnSS will be accessed from Camp Avenue via a 540-foot long 18-foot wide compacted gravel driveway leading to the southern side of the OnSS where a gated entrance provides the primary access to the substation and accommodates larger trucks needed for large equipment delivery. The driveway will have a maximum grade of 5 percent. At approximately driveway station 3+80, a secondary access driveway splits off to the east leading to a secondary gated access point on the east side of the OnSS for smaller vehicles. The secondary access driveway is 560 feet long. Compacted gravel access routes will be constructed within the OnSS yard, providing access to the OnSS equipment, condenser building and control house. The total length of these internal access routes is approximately 2,170 feet.

The ICF will be accessed via a driveway heading west from the existing TNEC Davisville Substation driveway. The gated ICF driveway will be approximately 120-feet long and, consistent with TNEC standards, the 18-foot wide driveway will be paved. Within the ICF, a paved access route will be constructed that will provide access to the ICF equipment and control house, and access to the existing Davisville Substation. The length of these internal access routes is approximately 900 feet. Site plans for the ICF are provided at Appendix A.

In order to access the proposed double and single circuit structures within the new TNEC ROW, a gravel roadway will be constructed. Currently, TNEC accesses their transmission line ROW by driving around the existing substation in a counterclockwise direction. The Project will extend the 16-foot wide compacted native material roadway from a point on the north side of Davisville Substation, west and south to provide access to transmission structures GT 39, GT 40, GT 41, LT 99, LT 100 and LT 101. At roadway station 0+89, this 385-foot long access roadway will cross a drainage channel regulated by the RI CRMC as an ASSF. In order to maintain the function of the ASSF to convey drainage, a reinforced concrete culvert will be installed under the roadway. Per TNEC's design standards, the roadway will meet American Association of State Highway and Transportation Officials' ("AASHTO") HS25 loading criteria.

4.2.5 Installation of Foundations

Foundations will be needed to support the OnSS and ICF equipment and some of the proposed transmission structures. A Project specific geotechnical analysis has not been completed at the time of filing but will be needed to develop the ultimate design for foundations. Based on a preliminary review of publicly available soil and surficial geological data, Revolution Wind is anticipating that foundations for the proposed OnSS and ICF equipment may need to be cast in place concrete foundations supported on driven piles. The proposed control houses and condenser building will be set on cast in place concrete slab foundations constructed on concrete footings.

It is anticipated that the transmission structure installation for the TNEC ROW will involve the use of concrete caisson foundations and direct embedding of the structures. Direct embedding will involve excavating a hole that can accommodate the structure to a depth of at least 10% of the structure height plus 2 feet. Where direct embedding is not practicable, a reinforced concrete caisson foundation will be installed. Concrete caisson foundation construction typically involves the excavation of a 6- to 12-foot diameter hole to a depth sufficient to support the loads applied to the structure. Project specific geotechnical data will be collected prior to the final design of the structure, including required depth. Anchor bolts will be used to tie the structure and foundation together. Concrete caisson foundations may be excavated with a large drilling rig, a tire-mounted backhoe, or track excavator. Once the foundation form is placed in the excavated hole, native soil backfill will be placed around the outside of the foundation form and the segregated topsoil will be spread over the disturbed areas. Excess soil will be permanently removed and spread in appropriate upland areas within the Project's ROW and seeded and mulched to prevent erosion. Excess soils will be spread at a distance sufficient to prevent transport of the soils into waterbodies. Alternatives to concrete caisson foundations will also be considered.

All applicable water quality standards for surface waters will be complied with during installation of the foundations. If dewatering is required, one of the methods discussed in Section 4.5.3 will be implemented. Temporary wood construction matting will typically be utilized for access roads and work areas within sensitive ecological areas and will be removed after construction is complete. If existing grades have the potential to cause erosion that can enter a protected resource, erosion controls will be placed between the work activity and the protected resource prior to commencing work.

4.2.6 Wire Installations

The new overhead conductors from the ICF to the new structures will be installed using stringing blocks and tensioning equipment. The tensioning equipment is used to pull the conductors through the stringing blocks and to achieve the desired sag and tension condition. During the stringing operation, temporary guard structures or boom trucks will be placed at crossings of existing utility lines to ensure safety and the continued operation of other utility equipment. To minimize any disturbance to soils and vegetation, existing access roads will be used to the fullest extent possible in the placement of pulling and tensioning equipment. In some locations, temporary pulling pads may need to be constructed.

The equipment that will typically be used during the wire installation operation includes puller-tensioners and conductor reel stands that will be located at the stringing sites. Bucket trucks and platform cranes will be used to mount stringing blocks on the structures.

4.2.7 Onshore Substation and Interconnection Facility Commissioning

Commissioning of the OnSS and ICF will include Site Acceptance Testing and Site Integration Testing. To verify the high-voltage system of the OnSS, the system will be energized using the TNEC source line G-185S and L-190 and tested to confirm that all high-voltage apparatus, switching philosophy, protection, and metering apparatus associated with high-voltage equipment operate as per the design. Each system on the OnSS and ICF will be integrated, displayed, and controlled using a SCADA Control System at the TNEC control center.

4.2.8 Onshore Substation and Interconnection Facility Operations and Maintenance

Revolution Wind will monitor the OnSS remotely on a continuous basis. The ICF will be managed and operated by TNEC. The equipment in the OnSS will be configured with systems (SCADA) that will alarm upon detecting equipment problems, unintended shutdowns, or other issues. In addition, the OnSS will be inspected at periodic intervals, in accordance with manufacturer recommendations. Revolution Wind will put in place an established and documented program for the maintenance of all equipment critical to reliable operation.

Preventive maintenance will be performed on the OnSS, ICF, and line equipment, and planned outages will be conducted in accordance with the North American Electric Reliability Corporation ("NERC")/ Northeast Power Coordinating Council, Inc. ("NPCC") Standard-TOP-003-1, and protective system maintenance will be performed in accordance with the NPCC PRC 005-2 standard. Equipment will be maintained in accordance with the Large Generator Interconnection Agreement ("LGIA"); maintenance will be completed by qualified personnel in accordance with applicable industry standards and good utility practice to provide maximum operating performance and reliability.

Vegetation management will occur on the OnSS and the ICF parcels. The OnSS will have a 30-foot-wide perimeter around the fence line that will be maintained, the Interconnection ROW will have a 40-foot maintained ROW, the ICF will have a 10-foot wide perimeter around the fence line that will be maintained, and the TNEC ROW will have 120-foot-wide maintained ROW. Vegetation management within the referenced perimeters around the OnSS and ICF and within the Interconnection and TNEC ROW's will be managed to promote a low-growing plant community dominated by grasses, flowers, ferns, and herbaceous plants. All woody vegetation including trees and shrubs will be removed and discouraged from becoming established by on-going IVM maintenance, including manual cutting, mowing and the prescriptive use of herbicides plus the use of environmental controls. The method of control is determined following inspections of the site scheduled for maintenance. The current maintenance cycle for vegetation control utilizing IVM practices is three or four years depending on the vegetation composition, facilities and site conditions. The cycle is based on the average growth rates of targeted species following maintenance. If vegetation is so thick or tall that they interfere with testing or maintenance, a narrow path directly over the conduit can be mowed. The allowed mature plant height may be modified, up to 15 ft (4.6 m) in height at maturity by species, to accommodate established herbaceous or woody plant communities that not only protect the electric facility and reduce long-term maintenance, but also enhance wildlife habitat, forest ecology and aesthetic values. The ICF and TNEC ROW will be maintained by TNEC and to TNEC Vegetation Management standards.

4.3 Onshore Transmission Cable

The Onshore Transmission Cable will be jointed with the RWEC-RI at two TJBs, which will be co-located within the Landfall Work Area. The entire Landfall Work Area is approximately 3.1 ac (1.3 ha) and will require permanent easements for the Onshore Transmission Cable and

Landfall Cable of approximately 1.3 ac (0.5 ha). Easements will be granted by the property owners to Revolution Wind.

The RWEC-RI and Onshore Transmission Cable have different design and construction parameters; therefore, these transmission components are described separately. The Onshore Transmission Cable is described in this section while the RWEC and TJBs are described in Section 4.5.

4.3.1 Design

The Onshore Transmission Cable will consist of two 275-kV high voltage alternating current ("HVAC") circuits, each with three individual cables (six cables total) that will be encased within a single concrete duct bank. There will also be one fiber optic cable per circuit (two total fiber optic cables) installed within the duct bank. Given the proposed length to the OnSS, splice vaults[18] are required for the Onshore Transmission Cable. Two splice vaults per circuit will be required at locations along the proposed route. See Figures 4-1 and 4-2 below for details on a typical configuration of underground transmission circuits and a cross section of the Onshore Transmission Cable.

18 A splice vault is a structure made of concrete, located at designated locations along the cable route to house the underground splices accompanying the cable system. Splice vault locations are determined based on the cable manufacturer's pulling tension and sidewall pressure limits and are directly correlated to the alignment of the cable system.

Figure 4-1 Typical Installation Configuration of Underground Onshore Transmission Circuits

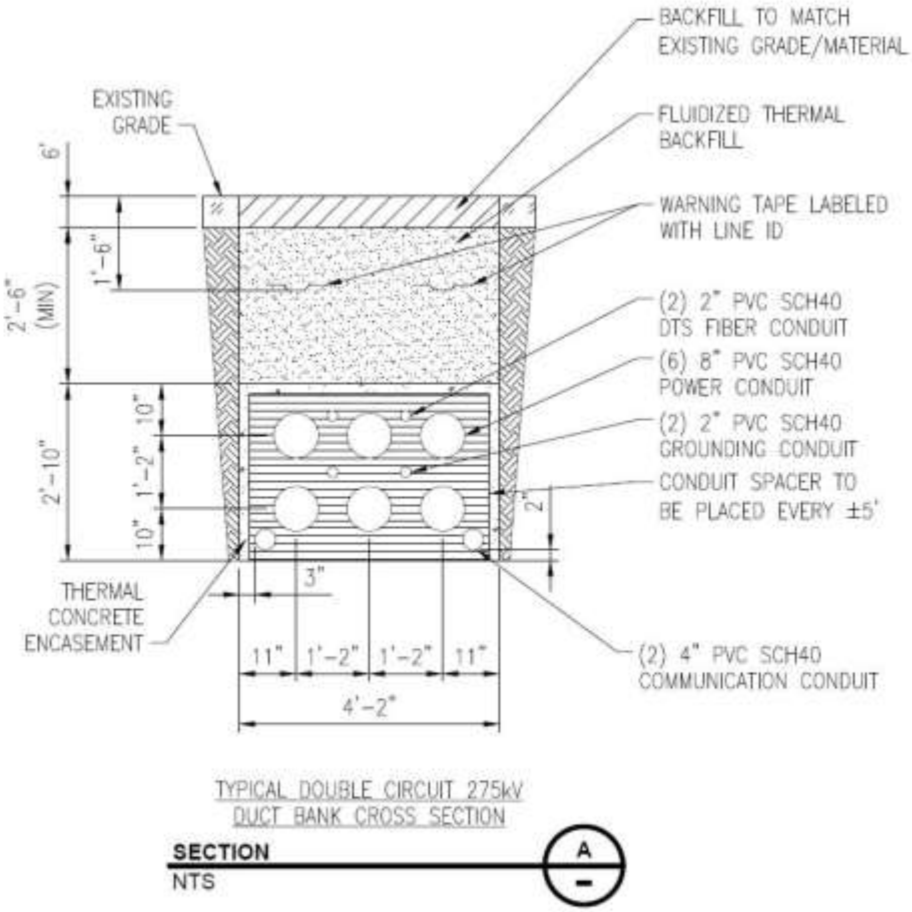
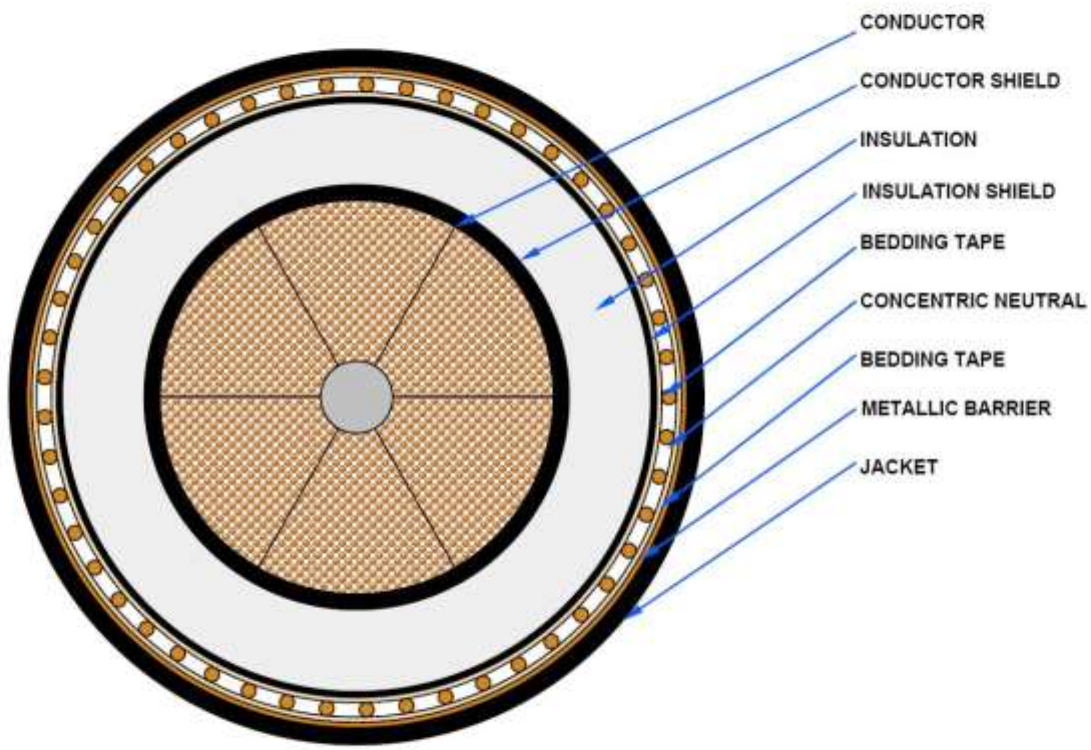


Figure 4-2 Cross Section of Onshore Transmission Cable



The OnSS will be equipped with two above ground circuit terminal structures, that are connected to the 275-kV substation equipment. The Onshore Transmission Cable will terminate at these steel structures, transitioning the cables from underground to above ground and thereby completing the connection from the OSSs within the RWF to the OnSS. The maximum design scenario for the Onshore Transmission Cable is provided in Table 4-5.

Table 4-5 Onshore Transmission Cable Maximum Design Scenario

Onshore Transmission Cable Characteristics	Design Scenario
Number of HVAC Cables / Fiber Optic Cables	6 / 2
Voltage of Cable Circuit	275 kV
Cable Diameter	5.1 in (13 centimeters [cm])
Target Burial Depth (below ground level)	3 to 6 ft (0.9 to 1.8 m)
Maximum Disturbance Depth	13 ft (4 m); 15 ft (4.6 m) at Splice Vaults
Approximate Cable Length	1 mi (1.6 km)
Disturbance Corridor (Total Width)[1]	25 ft (7.6 m)

Onshore Transmission Cable Characteristics	Design Scenario
Disturbance Area at nested Splice Vaults (Total Width by Total Length)[2]	30 x 75 ft (9.1 x 22.8 m)
Temporary Ground Disturbance[3]	3.1 ac (1.3 ha)
Operational Right-of-Way (Total Width)[4]	20 ft (6 m)

1 The disturbance corridor reflects the area needed for installation of the Onshore Transmissions Cable. Within this area, an approximate 8-ft (2.4-m)-wide trench will be excavated to support installation of the duct banks.
2 One splice vault per circuit (two total) will be required at the approximate midway point along the Onshore Transmission Cable route.
3 Permanent ground disturbance is not anticipated with construction of the Onshore Transmission Cable as the cable will be installed underground and areas disturbed during construction will be restored to pre-existing conditions post-construction.
4 The operational ROW for the Onshore Transmission Cable reflects the maximum corridor needed to support future access to the concrete duct bank or splice vaults located on private land and beyond the limits of the public road ROW.

4.3.2 Construction

Construction of the Onshore Transmission Cable will involve site preparation, vault and duct bank installation, cable installation, cable jointing, final testing, and final restoration, as described in Table 4-5. The Onshore Transmission Cable has been sited within previously disturbed areas, generally following existing public roadways except for the landfall location and a second private property crossing needed to transition from Circuit Drive to Camp Avenue in Quonset Business Park (called Emissive Energy Alternate route, see Figure 2-3 in Section 2.2). Installation of the Onshore Transmission Cable will generally require excavation of an approximate 8-ft (2.4-m)-wide trench within a 25-ft (7.6-m)-wide temporary disturbance corridor; however, the disturbance area at the splice vaults will be 30-ft (9.1-m)-wide by 75-ft (22.8-m)-long. The Onshore Transmission Cable will be installed within a duct bank, buried to a target depth of 3 to 6 ft (0.9 to 1.8 m) to top of duct bank and consistent with local utility standards. The splice vaults will be buried to a depth of up to 15 ft (4.6 m) to the bottom of the vault. The entire temporary disturbance corridor will be restored to pre-construction conditions following installation of the Onshore Transmission Cable.

Construction of the Onshore Transmission Cable, from the TJBs to the OnSS, will result in up to 3 ac (1.2 ha) of temporary ground disturbance; permanent disturbances are not anticipated. Design and construction parameters of the TJBs are discussed in Section 4.2; the area of disturbance associated with TJBs are presented in Table 4-6 below with disturbance estimates for the RWEC. It is anticipated that construction of the Onshore Transmission Cable will take approximately 12 months.

Table 4-6 Typical Underground Transmission Cable Construction Sequence

Activity/Action	Construction Summary
Site Preparation	Site preparation involves the surveying and staking the proposed Onshore Transmission Cable alignments, implementation of the specified traffic control measures required to perform the work, and soil erosion control methods to prevent runoff into the existing infrastructure. This stage of the construction will also include identification of any existing underground utilities (DigSafe or test pits) along the proposed alignment.
Clearing and Grading	The work area for the cable route will be cleared of vegetation, and temporary environmental erosion controls such as swales and erosion control socks will be installed in accordance with BMPs. These controls will be maintained until the site is restored and stabilized. Portions of the work area may also require grading.
Vault and Duct Bank Installation	The conduits will be encased in an approved concrete duct bank design installed via open trench for the majority of the Project. Once excavated, the open trench will be supported by a shoring system, if necessary. The conduits will be arranged per the design drawings and held in place using conduit spacers to allow the concrete to be poured and set between each duct without allowing the formation of any air pockets or voids. Once the concrete has been poured, it will be allowed to set up to a specific strength before the trench is backfilled. This operation will be repeated until all conduit and concrete has been installed to the specified jointing locations (i.e., manholes, termination structures, etc.). At the completion of the installation, all conduits will be proofed and mandreled[1] to verify continuity of the raceway for cable installation.
Cable Installation	Upon completion of the proofing and mandreling of the conduits, cable pulling operations can begin. The cable will be pulled through the ductbank to the vault and-or terminal structure and is cut leaving a sufficient amount of slack to perform the jointing operations. Once pulling has been completed, the cables will be tested for jacket integrity to ensure no damage incurred during pulling. The cables will then be sealed to prevent moisture ingress until splicing/jointing operations can be performed.
Cable Splicing/Jointing	Cable jointing refers to the splicing and/or terminating of the cables. Splicing and terminating is performed once all the cables for a specific section have been successfully pulled into the jointing bay/vault or termination structure. Once splicing and terminating is complete, the cables and accessories will be secured to the associated racking systems with the use of cable clamps. This mitigates lateral movements experienced by the cable during operation.
Final Restoration Activities	Once the duct bank has been installed, permanent restoration as required by the governing authority will be completed. For roadway installations this will include the installment of the road subbase and base layers followed by the surface layer (i.e., concrete or asphalt). For installations outside of roadways, such as greenbelt areas, final restoration typically involves backfilling to the original grade elevation and hydroseeding to prevent soil erosion.

1 Mandrels are used to test the integrity of the conduit runs and remove small amounts of debris.

4.3.3 Operations and Maintenance

To support O&M of the onshore section of the RWEC-RI and the portions Onshore Transmission Cable sited on private land and beyond public road ROW, a 20-ft (6-m)-wide operational ROW centered on the cables will be maintained.

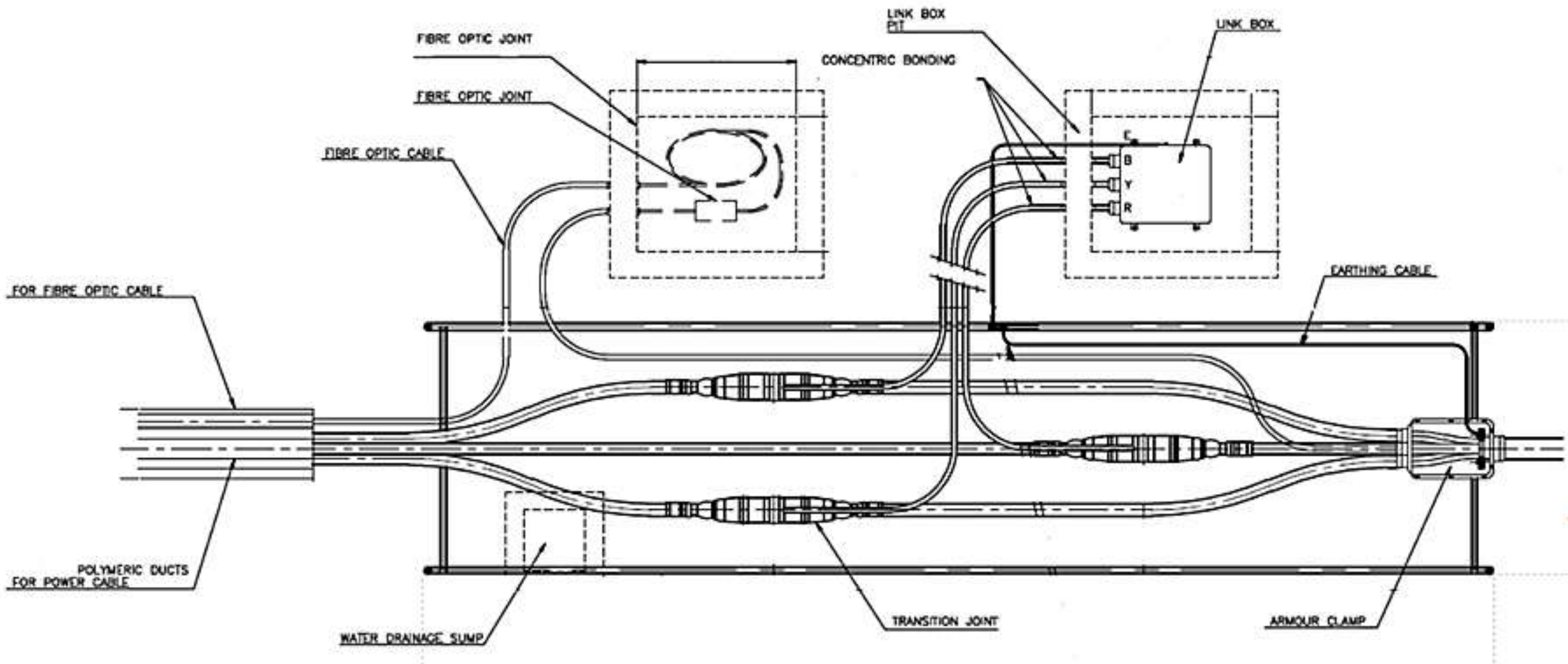
4.4 Revolution Wind Export Cable—Rhode Island

The RWEC-RI will deliver electricity from the OSSs and will be jointed with the Onshore Transmission Cable at the TJBs. The RWEC will traverse both federal and Rhode Island state waters (the portion of the RWEC that is within Rhode Island [i.e., RWEC-RI] State waters is the focus of this EFSB ER). In addition, a relatively short segment of the RWEC-RI (up to 500ft [152 m]) will be located onshore (i.e., beyond the Mean High Water Line [MHWL; as defined by the USACE (33 CFR 329)]) and underground, up to the TJBs. The purpose of a TJB is to provide a clean, dry environment for the jointing of the RWEC and Onshore Transmission Cable as well as protecting the joint once the jointing is completed. TJBs are comprised of cast-in-place or precast concrete vaults that will be placed within an excavation in the Landfall Work Area. There will be two TJBs (i.e., one for each cable of the RWEC). In each TJB, each RWEC cable will be spliced into 3-single conductor onshore cables. The sheaths from the RWEC and the Onshore Transmission Cable will be terminated into the Link Box in the TJBs. The fiber optic cables from the RWEC and Onshore Transmission Cable will be joined inside the communications handhole which is adjacent to the TJB. There will be two TJBs, two Link Boxes, and two Fiber Optic Cable handholes.

A conceptual schematic of the TJBs is provided in Figure 4-3. Each of the co-located TJBs will be up to 67 x 10 x 10 ft (20 x 3 x 3 m); the TJBs will be located entirely within the up to 3.1-ac (1-ha) Landfall Work Area. Access to the Fiber Optic Handhole near the TJBs will be via manhole covers. A precast or cast in place structure will be used for the TJB. The splices would be housed in the TJB, with manhole risers and covers for access from grade.

The following subsections describe the design and construction the RWEC-RI. From a construction perspective, installation techniques will vary by segment of the RWEC-RI. Therefore, there are separate subsections describing construction of the RWEC at the landfall location and more generally in the offshore environment.

Figure 4-3 Transition Join Bay Link Boxes Schematic



4.4.1 Design

The RWEC-RI will consist of up to two 275 kV HVAC subsea cables and will be located within the same approximate 1,312-ft (400-m)-wide submarine ROW. Based on site-specific conditions (e.g., water depth and seabed constraints), each cable of the RWEC-RI will be spaced, where practical, a minimum spacing of 164 ft (50 m) apart; spacing between each cable will be less at landfall (e.g., approximately 23-49 ft [7-15 m]). Each cable of the RWEC-RI will consist of three bundled copper or aluminum conductor cores surrounded by layers of cross-linked polyethylene ("XPLE") insulation and various protective armoring and sheathing to protect the cable from external damage and keep it watertight. Several fiber optic cables will also be included in the interstitial space between the three conductors for continuous monitoring of the RWF. A cross-section of a typical subsea cable is provided in Figure 4-4. The maximum design scenario for the RWEC is provided in Table 4-7.

Figure 4-4 Typical Subsea Cable Cross-Section

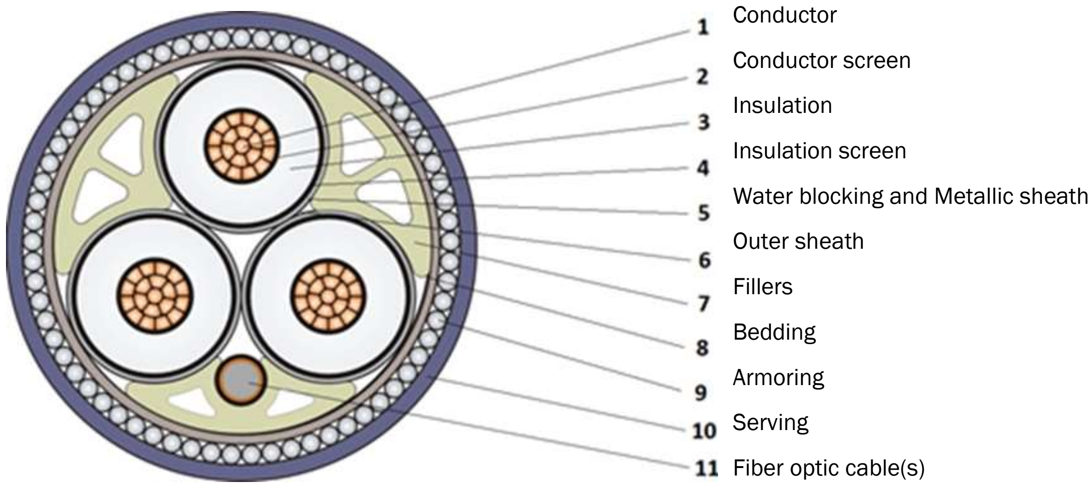


Table 4-7 RWEC-RI Maximum Design Scenario

Export Cable Characteristics	Maximum Design Scenario
Number of Cables	2
Voltage per Cable	275 kV
Cable Diameter	11.8 in (300 mm)
Target Burial Depth (below seabed)	4 to 6 ft (1.2 to 1.8 m)[1]
Maximum Disturbance Depth[2]	10 - 15 ft (3 – 4.5m)
Corridor Length (RI State Waters)	23 mi (37 km)
Disturbance Corridor (Total Width per Cable) [3]	up to 131 ft (40 m)
Operational Right-of-Way (Total Width)[4]	approximate 1,312 ft (400 m)

1 Burial of the RWEC will typically target a depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth for the RWEC will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.

2 Maximum disturbance depth is 10 ft for offshore segment of export cable trench; 15ft for open cut landfall trench.

3 The disturbance corridor reflects the maximum area that will be subject to seafloor preparation prior to cable installation.

4 An operational ROW for the RWEC will be requested in accordance with 30 CFR § 585.200(b). This corridor reflects the approximate survey limits for the RWEC route; the two cables of the RWEC will be sited within this corridor.

4.4.2 Construction

Throughout the majority of the route, the RWEC-RI will be laid and buried using industry standard subsea cable lay and burial methods, as described further in Section 4.4.2.3. Revolution Wind has identified two construction methodologies for installation of the RWEC-RI at the landfall location, open cut and HDD. The installation methodology is currently under review while engineering and environmental analysis are being completed. Revolution Wind continues to work with Federal and State Agencies, as further discussed in Section 4.7 and outlined in Appendix B, to select a preferred construction technique and anticipates that a decision will be made in the first quarter of 2021.

The methodologies for installation of the RWEC-RI are outlined below.

4.4.2.1 Open Cut Landfall Construction

The area of ground and seabed disturbance estimated for construction at the RWEC-RI landfall location using open cut methods is provided in Table 4-8a. Vessel anchoring may be required for cable installation at the landfall. If needed, anchoring will occur within a 1,312 ft (400 m) wide corridor centered on cable routes. The Project will install operational Automatic Identification Systems ("AIS") on all main installation vessels associated with the construction of the Project. AIS will be used to monitor the number of vessels and traffic patterns for analysis and compliance with vessel speed requirements. All vessels will operate in accordance with applicable rules and regulations for maritime operation within U.S. and federal waters. Similarly, all aviation operation, including flying routes and altitude, will be aligned with relevant stakeholders (e.g., the Federal Aviation Administration ["FAA'[).

Table 4-8a Ground/Seabed Disturbance for Installation of RWEC at Landfall[1]

RWEC Landfall Component	Construction Footprint	Operation Footprint
TJBs[2]	1,340 sq ft (408.4 sq m)	-
Landfall Work Area	3.1 ac (1.3 ha)	-
Open Cut Trench Option		
Trenches (Onshore)[3]	0.2 ac (0.1 ha)	-
Trenches (Offshore)[4]	4.6 ac (1.9 ha)	-
Open Cut Trench Total	4.8 ac (2 ha)	-

1 With the exception of total provided for the open cut trench option, disturbance estimates presented in this table are not additive as disturbance types may overlap (i.e., TJBs and onshore trench will be located within the Landfall Work Area).

2 Two TJBs will be installed within the 3.1-ac (1.3-ha) Landfall Work Area (one per cable of the RWEC). Each of the TJBs will be up to 67 x 10 x 10 ft (20 x 3 x 3 m).

3 The onshore trench will be excavated from the MHWL (as defined by the USACE [(33 CFR 329]) to the TJBs located in the Landfall Work Area. The onshore trench will have the following maximum dimensions (LxWxD), inclusive of both cables: 300 x 26.7 x 14 ft (91.4 x 8.1 x 4.3 m).

4 The offshore trench will be excavated approximately from the 10 ft (3 m) water depth contour to the MHWL. The offshore trench will have the following maximum dimensions (LxWxD), inclusive of both cables: 1,000 x 200 x 10 ft (1,524 x 80 x 4 m).

Open cut installation will be completed using traditional excavation methods for onshore through the intertidal area and an excavator or similar equipment on a shallow draught barge or an amphibious excavator for the offshore section of trench. Any temporary onshore spoils will be temporarily stockpiled at the site and all or partially used to backfill the trench following the duct installation. All onshore spoil piles will be managed using BMPs to prevent sedimentation or erosion. If offshore stockpiling and/or dewatering is required, it will be handled in accordance with state and federal requirements. Onshore Cable ducts will be installed in segments with each section of duct being positioned at the bottom of the trench. The portion of the trench receiving the section of duct will then be backfilled leaving the end of the duct section exposed for joining with the next duct segment. Trench stability will be maintained by a proprietary trench support system. Trench reinforcement will be removed before backfilling. Additional duct sections will be installed using the same methodology until the entire onshore duct is installed. The offshore duct sections will be fused onshore and floated out to the offshore excavated trench for installation. The excavation offshore will be completed in sections or in its entirety. The excavated material will be sidecast next to the trench reserved to use later as backfill. Once the trench is excavated the duct will be sunk into place and covered with backfilled. The seaward end of the duct will be temporarily protected using protection such as rock bags until the cables are installed. The seaward end of the duct will be temporarily protected using protection such as rock bags until the cables are installed.

The maximum design scenario for the open cut trench includes a trench depth of up to 15 ft (4.5 m) with 1:3 slopes for the sides of the trench. The offshore segment of the trench will have a disturbance corridor measuring up to 260 ft (80 m), inclusive for both cables. Onshore, where practicable, trench boxes may be utilized to minimize the disturbance width; for the purposes of disturbance calculations presented in Table 4.4-2, a maximum width of up to 131 ft (40 m), inclusive for both cables of the RWEC, is assumed for the onshore segment of the trench.

4.4.2.2 HDD Landfall Construction

Construction methods of HDD are different from open cut and are discussed below. To support HDD installation, a temporary offshore HDD Work Area will be required. The HDD Work Area will be located within the RWEC-RI corridor. Within this work area, HDD exit pits (one per HDD) measuring approximately 164 ft x 33 ft x 10 ft (50 m x 10 m x 3 m) will be excavated or a temporary cofferdam installed.

If a cofferdam is utilized at the offshore exit point of the HDDs it will allow for a dry environment during construction and manage and bentonite. The cofferdams, each measuring up to 164 ft x 33 ft x 10 ft (50 m x 10 m x 3 m) to align with HDD exit pits, may be installed as either a sheet piled structure into the sea floor or a gravity cell structure placed on the sea floor using ballast weight. Installation of the cofferdam would be conducted from an offshore work barge.

- **Sheet Pile Installation**. If the cofferdam is installed using sheet pile, a vibratory hammer will be used to drive the sidewalls and endwalls into the seabed. Installation of a sheet pile cofferdam may take approximately up to 3 days. For HDD, the sidewalls and endwall will be driven to a depth of up to 30 ft (9.1 m); sections of the shoreside endwall will be driven to a depth of up to 6 ft (1.8 m) to facilitate the HDD entering underneath the endwall. After the sheet piles are installed, the inside of the cofferdam will be excavated to approximately 10 ft (3 m). After HDD operations are complete and ducts are installed, piles will be removed in accordance with Project design plans, placed on the work barge, and hauled back to shore.
- **Gravity Cell Installation**. If a gravity cell cofferdam is used, the cell will be lowered onto the seafloor by a crane that is on a work barge. The sidewalls and seaside wall and end wall will be multi skinned to accommodate a rock ballast fill that will stabilize the cofferdam on the seabed. The gravity cell cofferdam may be of a multi-sectional design to allow transportation and assembly at the site. Assembled interior dimensions of the cofferdam will be similar to a sheet pile cofferdam with similar volumes of excavated.
- **No Containment.** If no containment is used, the HDD conduit will terminate in a dredged HDD exit pit. The dredged exit pit will have sloped sides to maintain side walls and exit pit opening. Rock bags maybe installed in the exit pit to support excavation temporarily during drilling activities and cable installation. After the HDD operations are completed the HDD exit pit will be backfilled leaving the duct end uncovered for cable pull in operations.

The area of ground and seabed disturbance estimated for construction at the RWEC-RI landfall location using HDD is provided in Table 4-8b.

Table 4-8b Ground/Seabed Disturbance for Installation of RWEC at Landfall for HDD[1]

RWEC Landfall Component	Construction Footprint	Operation Footprint
Exit Pits/Temporary Cofferdam[1]	0.25 ac (0.1 ha)	-

1 Two exit pits each measuring 164 ft long x 33 ft wide x 10 ft deep (50 m x 10 m x 3 m) will be excavated to facilitate the HDD operation (one per cable of the RWEC-RI). Note, the onshore work area for the HDD operation will be located within the 3.1-ac (1.3-ha) Landfall Work Area.

The HDD methodology will involve drilling underneath the seabed surface and the intertidal area using a drilling rig located within the Landfall Work Area. The process uses drilling heads and reaming tools of various sizes controlled from the rig to create a passage that is wide enough to accommodate the cable duct. Drilling fluid, comprised of bentonite, drilling additives, and water is pumped to the drilling head during the drilling process to stabilize the hole, prevent collapse, and to return the cuttings to the rig site where the cuttings will be separated from the drilling fluids. A temporary sheet pile anchor wall may be installed onshore to provide stability of the HDD rig while conducting drilling activities. The temporary anchor wall is driven to a depth to secure the anchor. In addition to the anchor wall, the workspace may also require the installation of other temporary sheet piles to aid in anchoring of the rig and/or to provide soil stabilization of the excavated area.

Once the reaming has taken place, the duct (assembled offsite) will be floated to site by tugs, connected to the drill string and pulled into the prepared hole towards the drilling rig located at the Landfall Work Area. The drilling rig will be repositioned, and the process will be repeated for drilling and installing the second duct. A pull winch attached to either a piled anchor or a gravity anchor (e.g., a large bulldozer) will then be used to pull the cable through the conduit.

There will be two HDD cable ducts, each with a diameter of 3 ft (900 mm). The maximum length of the cable ducts will be 0.6 mi (1,000 m). A barge or jack-up vessel may be used at this location to assist the drilling process, handle the duct for pull in, and to help transport the drilling fluids and mud back to an appropriate site for treatment, disposal and/or re-use. The jack-up vessel may also utilize a casing installed from the HDD exit pit to the jack-up barge. This casing is supported in the water by cross bars driven into the seabed. The casing provides an encloser to house the drill bit and string once it has exited the seafloor, to the jack-up barge. To minimize the potential risks associated with an inadvertent drilling fluid return/release, Revolution Wind will develop an HDD Contingency Plan prior to construction for the inadvertent release of drilling fluids.

4.4.2.3 Offshore Construction

Offshore, the RWEC-RI (inclusive of two cables) will be installed within the approximate 1,312-ft (400-m)-wide operational ROW. The total width of the disturbance corridor for installation of the RWEC-RI will be up to 131 ft (40 m) per cable, inclusive of any required sandwave leveling and boulder clearance (see Sandwave Leveling and Boulder Clearance subsection below). Dynamic Positioning ("DP") vessels and/or pull ahead anchor vessels will generally be used for cable burial activities.

If anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within an approximate 1,312 ft (400 m) wide corridor centered on cable routes. Anchors associated with cable laying vessels will have a maximum penetration depth of 15 ft (4.6 m).

Burial of the RWEC-RI will typically target a depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth for the RWEC will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment. Where burial cannot occur, sufficient burial depth cannot be achieved, or protection is required due to cables crossing other cables or pipelines, additional cable protection methods may be used (cable protection is discussed further below). The location of the RWEC-RI and associated cable protection will be provided to National Oceanic and Atmospheric Administration's ("NOAA") Office of Coast Survey after installation is completed so that they may be marked on nautical charts.

Installation of the RWEC-RI consists of a sequence of events, including pre-lay cable surveys, seabed preparation, cable installation, joint construction, cable installation surveys, and cable protection, as summarized in Table 4-9. It is anticipated that construction of the RWEC will be completed within approximately 8 months, inclusive of the portion in federal waters. In addition to the summary provided in Table 4-9, the following subsections describe seabed preparation, cable installation methodologies, and cable protection strategies further.

Table 4-9 Typical Export Cable Construction Sequence

Activity/Action	Construction Summary
Pre-lay Cable Surveys	Prior to installation, geophysical surveys will be performed to check for debris and obstructions that may affect cable installation.
Seabed Preparation	Seabed preparation will include required sandwave leveling, boulder clearance and removal of any Out of Service Cables. Boulder clearance trials may be performed prior to wide-scale seabed preparation activities to evaluate efficacy of boulder clearing techniques.
PLGR	PLGR runs will be undertaken to remove any seabed debris along the export cable route. A specialized vessel will tow a grapnel rig along the centerline of each cable to recover any debris to the deck for appropriate licensed disposal ashore.
Cable Installation	The offshore cable laying vessel will move along the pre-determined route. Cable laying and burial may occur simultaneously using a lay and bury tool, or the cable may be laid on the seabed and then trenched post-lay. Alternatively, a trench may be pre-cut prior to cable installation. Cable lay and burial trials within the 131-ft (40-m) wide disturbance corridor may be performed prior to main cable installation activities to test equipment.
Joint Construction	Installation of the RWEC-RI will require offshore subsea joints due to the length of the RWEC-RI (up to two per cable). The joints will be located within the 131-ft (40-m) wide disturbance corridor. The subsea joint will be protected by marinized housing approximately four times the cross-sectional diameter of the cable. The joint housing will be protected using similar methods to those described below for Cable Protection. In case of repair due to damage additional joints may be required during construction.
Cable Installation Surveys	Cable installation surveys will be required, including pre- and post-installation surveys, to determine the cable burial depth. Depending on the instruments selected, type of survey, length of cable, etc. the survey will be completed by equipment mounted to a vessel and/or remote operated vehicle.
Cable Protection	Cable protection in the form of rock berms, rock bags and/or mattresses will be installed as determined necessary by the Cable Burial Risk Assessment. Cable protection will be installed from an anchored or DP support vessel that will place the protection material over the designated area(s).

Sandwave Leveling and Boulder Clearance

Prior to installation of the RWEC-RI, seabed preparation activities including sandwave leveling and boulder clearance will be required. As noted above, any required sandwave leveling and boulder clearance will occur within the 131-ft (40-m) -wide disturbance corridor for each cable of the RWEC-RI.

Based on preliminary geophysical data, Revolution Wind estimates a maximum of 7% of each cable route of the RWEC-RI will require sandwave leveling before the cables can be installed. This is a conservative estimate as it assumes that all seabed features along the route are mobile; the actual number will be refined following the results of the geophysical surveys and additional sediment mobility studies. Sandwave leveling is typically completed for the following reasons:

› Many of the cable installation tools proposed require a relatively flat seabed surface to ensure operational criteria (pitch and roll) of the tools are not exceeded; and

- Sandwaves are generally mobile in nature, therefore, the export cables must be buried in a manner to prevent cable exposure over time. In areas where larger sandwaves exist, this is achieved by removing a portion of the mobile features before installation takes place.

Sandwave leveling will require clearing of the area, most likely using a Trailing Suction Hopper Dredger or Controlled Flow Excavation. Any sediment removed will be relocated within the local area.

- **Trailing Suction Hopper Dredger** is mainly used for dredging loose and soft soils such as sand, gravel, silt or clay. One or two suction tubes, equipped with a drag head, are lowered on the seabed, and the drag head is trailed over the bottom to excavate a trench. This method is typically used for sandwave leveling.
- **Controlled Flow Excavation** is a non-contact methodology. The jetting tool draws in seawater from the sides and then jets this water out at a specified pressure and volume. The tool can be positioned over the sandwaves whereby to level the seabed.

Boulder clearance may be required to relocate boulders within the RWEC-RI route. Revolution Wind assumes up to 70% of each cable route of the RWEC-RI will require boulder clearance. The following two techniques may be used to complete boulder clearance during installation of the RWEC-RI. Boulder clearance will occur prior to installation and will be completed by a support vessel based on pre-construction surveys.

- **Boulder Grab:** A grab is lowered to seabed, over the targeted boulder. Once "grabbed", the boulder is relocated away from the RWEC route.
- **Boulder Plow:** Boulder clearance is completed by a high-bollard pull vessel, with a towed plow generally forming an extended V-shaped configuration, splaying from the rear of the main chassis. The V-shaped configuration displaces any boulders to the extremities of the plow, thus establishing a clear corridor. Multiple passes may be required.

Prior to wide-scale seabed preparation activities, boulder clearance trials may occur within cable corridors to test that the equipment is working properly and is appropriate for the seabed conditions. Each trial would include the deployment and towing of boulder clearing equipment and/or use of boulder grab tool; each trial would be approximately 0.62 mi (1 km, 0.53 nm) in length. It is anticipated that approximately 5 to 10 trials may be necessary in different areas. The trials may also include pre- and post-trial geophysical survey work potentially utilizing a remotely operated vehicle and bathymetric survey equipment. Because trials will occur within cable corridors, the temporary seabed disturbance from these trials is accounted for in estimates provided in Table 4-9.

Offshore Export Cable Installation Methodology

Fugro (2020) has completed geophysical and geotechnical (G&G) surveys of the RWEC-RI corridor to inform cable routing and selection of the most appropriate tools for installation of the RWEC-RI. Based on current understanding of site-specific conditions between the landfall and the RWEC-RI, Revolution Wind will use the following burial tools as the primary installation methodologies.

- **Jet-Plow:** This technique involves the use of water jets to fluidize the soil temporarily opening a channel to enable the cable to be lowered under its own weight or be pushed to the bottom of the trench via a cable depressor. The cable is either installed simultaneously to cable lay operations or after the cable has been laid on the seabed. Typical types of jet-plows include towed jet sleds, tracked jet-trencher, or vertical injectors. Backfill of the trench is expected to occur naturally shortly after installation due to settlement of fluidized sediments and/or trench collapse. Immediately after installation a depression will likely be visible on the seabed as well as tracks/skids from the installation equipment; however, over time this will backfill to the original seabed level. No permanent seabed impacts are associated with this installation methodology.
- **Mechanical Plowing:** There are two types of mechanical plowing considered for cable installation:
  - Simultaneous lay and bury involves pulling a plow along the cable route to simultaneously lay and bury the cable. The plow's share cuts into the soil, opening a temporary trench which is held open by the side walls of the share, while the cable is lowered to the base of the trench via a depressor. This narrow trench infills itself behind the tool, primarily by collapse of the trench walls and/or by natural infill, usually over a relatively brief period. Some plows may use additional jets to fluidize the soil in front of the share. The plow pulling force is either provided by bollard pull (moving vessel) or winches (anchored vessel). Backfill of the trench is expected shortly after installation due to trench collapse. Immediately after installation a trench will likely be visible on the seabed as well as tracks/skids from the installation equipment; however, over time this will restore to the original seabed level. No permanent seabed impacts are associated with this installation methodology.
  - Pre-cut plowing involves pre-cutting a trench in advance of the cable lay operations. Following cable lay, the trench is backfilled via an additional pass using the displaced material to provide sufficient protection to the cable. Trenching may require multiple passes. Pre-cut plowing is suitable to a range of soil conditions and is usually preferred over simultaneous lay and bury plowing when localized challenging ground conditions are expected (i.e., very hard soils and/or where subsurface boulder risk is high). Given that the tool is commonly used to target challenging ground conditions (i.e., very hard soils and/or where subsurface boulder risk is high), the disturbed area created by the plow is not expected to recover quickly. The volume of disturbed material is calculated from the cross-sectional area of the trench along its length; the disturbed area also includes the temporary berms created on the seabed. Temporary seabed impacts include the total area of the skids in contact with the seabed, the trench itself, and spoil on the sides of the trench.
- **Mechanical Cutters** employ either a cutting wheel or an excavation chain to cut a narrow trench into the seabed allowing the cable to sink under its own weight or be pushed to the bottom of the trench via a cable depressor. This installation methodology is typically used for post lay burial operations. Seabed disturbance associated with mechanical cutting is less than that associated with pre-cut plowing, as described above.

Prior to the main cable installation activities, cable lay and burial trials may occur within the 131-ft (40-m) wide disturbance corridor to test the equipment is working properly and is appropriate for the seabed conditions. Each trial includes operating the installation equipment within a portion of the cable corridor, offset from the cable centerline, and may also include installing a proportion of cable. It is anticipated that approximately 5-10 trials may be necessary to test the various pieces of equipment. The trial cable would be recovered towards the end of the cable installation process.

During cable installation there may be scenarios where installation to the target burial depth is not achievable using the primary installation methodologies due to mechanical problems with the trencher, adverse weather conditions, and/or unforeseen soil conditions. Controlled flow excavation (as described above) may be used in these circumstances. When used for cable installation, controlled flow excavation uses stream of water to fluidize the sands around the cable, which allows the cable to settle into the trench under its own weight.

Based on the identified range of installation methods and requirements, Revolution Wind has established a design envelope for installation of the RWEC-RI that reflects the maximum seabed disturbance associated with construction and operation (see Table 4-9). Note, because the cable lay and burial trials described above will occur within the 131-ft (40-m) wide disturbance corridor, the temporary seabed disturbance from these trials is accounted for in estimates provided in Table 4-10.

Upon receipt of the final G&G survey data, the Project will complete final cable route engineering. The purpose of the final cable routing process is to avoid, where possible, features along the route which have the potential to impact cable installation. In the event that features cannot be avoided (such as boulder fields), Revolution Wind will plan appropriate mitigation measures to manage the risks. In addition to final cable routing, the Project will complete a Cable Burial Risk Assessment in which the site conditions will be described in detail, identifying features such as boulder distribution and dimensions, sandwave height and mobility, soil strength and classification, seabed obstructions and UXO and MEC. Following this detailed information on the installation, final technique(s) will be selected and burial requirements will be included in the Facility Design Report ("FDR") and Fabrication and Installation Report ("FIR"), to be reviewed by the Certified Verification Agent ("CVA") and submitted to BOEM prior to construction.

Table 4-10 Maximum Seabed Disturbance for RWEC-RI State Waters Installation[1]

RWEC Disturbance	Construction Footprint	Operation Footprint
General Disturbance Corridor[2]	730 ac (295 ha)	-
Boulder Clearance (70% of route for each cable)	511.3 ac (206.9 ha)	-
Sandwave Leveling (7% of route for each cable)	51.1 ac (20.7 ha)	-
Secondary Cable Protection (10% of route for each cable)[3]	-	22.0 ac (8.9 ha)

1 Disturbance estimates presented in this table are not additive as disturbance types may overlap (e.g., cable protection placed in areas where boulders were cleared). Refer to Table 4-8 for disturbances resulting from installation of the RWEC-RI at the landfall location. Vessel anchoring disturbances are not included; if anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within a 1,312 ft (400 m) wide corridor centered on cable routes.

2 The general disturbance corridor for RWEC–RI State Waters is 131-ft (40-m) -wide. Refer to Table 4-7 for lengths of RWEC–RI State Waters. Boulder clearance, sandwave leveling and secondary cable protection will not extend beyond this corridor. Also, if they are performed along the RWEC-RI, boulder clearance and cable lay/burial trials will occur within this general disturbance corridor.

3 Approximately 24,288 linear feet of cable protection may be warranted, 12,144 linear feet for each cable.

Secondary Cable Protection

Secondary cable protection may be applied where burial cannot occur, sufficient burial depth cannot be achieved due to seabed conditions, or to avoid risk of interaction with external hazards. The need for secondary cable protection in specific locations will be based on the Cable Burial Risk Assessment. Revolution Wind assumes that 10 percent of the route for each cable comprising the RWEC-RI will require secondary cable protection. The area of impact for secondary cable protection is accounted for in Table 4-9. It is assumed that secondary cable protection will measure up to 39 ft (12 m) wide.

One or more of the following cable protection solutions may be used for secondary cable protection. Cable protection solutions implemented will be of the type that minimizes the potential for gear snags, as feasible, and can include the following:

- **Rock berm** involves dumping or placing rock overtop of a cable.
- **Concrete mattresses** are composed of cast concrete blocks interlinked to form a flexible, articulated mat, which can be placed on the seabed over a cable.
- **Fronded mattresses** are concrete mattress with ‘fronds’ that are designed to slow down current and naturally allow sediment to deposit and form a bank over the mattress.
- **Rock bags** are rock-filled mesh bags placed over the cable.

As noted previously, the location of the RWEC and associated cable protection will be provided to NOAA’s Office of Coast Survey after installation is completed so that they may be marked on nautical charts.

Cable Crossings

The RWEC-RI may cross existing submarine assets. There are seven potential existing assets that have been identified to-date along the RWEC-RI, some of which are in close proximity to each other. Their asset status is unknown at this stage and will require further investigation and engineering assessment for determining their status which will be identified in the FDR/FIR.

Cable protection at these crossings will be applied for both In-Service assets as well as Out-of-Service assets that cannot be safely removed and pose a risk to the RWEC-RI. Rock berm or concrete mattress separation layers will be installed prior to cable installation, while the rock berm or concrete mattress cover layers will be installed after cable installation. Any rock berm separation and cover layers and will be installed using suitably approved rock material. The rock berm separation and cover layers are defined by minimum geometry and vertical and horizontal tolerances. The amount of cable protection will be as required for suitable coverage and technical agreements with respective asset owners. It is assumed that up to 1,640 feet (500 m) of cable protection will be required per crossing. The cable protection required for cable crossings is in addition to the secondary cable protection requirements previously described above.

Final crossing designs will be completed in coordination with asset owners and formalized in crossing and proximity agreements, in line with International Cable Protection Committee recommendations.

Chemical and Waste Management

During construction, all chemicals needed for maintenance and operation of equipment will be brought to site aboard vessels and be transported in manufacturer's original packaging or in National Transportation Safety Council ("NTSC") approved tote containers. It is anticipated that any chemicals to be stored on site will be integral with associated equipment and will not be transported independently from this equipment.

During construction, chemicals transfers may take place daily depending on operational requirements of the various contractors. Chemical transfers will be executed in accordance with industry best practices considering health, safety, and environment, and will be in compliance with local, state, and federal regulations. Chemical transfer volumes will be determined by operational requirements of the various contractors, and will be in compliance with all local, state, and federal regulations.

Any chemicals to be treated or disposed of will be transported to typical onshore waste receiving sites within the area that conform to safe and environmentally friendly methods in accordance with local, state, and federal regulations. Revolution Wind will also implement an Emergency Response Plan/Oil Spill Response Plan ("ERP/OSRP").

Revolution Wind will meet applicable regulations and standards, as set by the International Maritime Organization's ("IMO") International Convention for the Prevention of Pollution from Ships ("MARPOL"), the USCG, and the State of Rhode Island, for treatment and disposal of solid and liquid wastes generated during all phases of the Project.

4.4.3 Operations and Maintenance

O&M of the RWEC-RI will be limited to nonroutine maintenance that may require uncovering and reburial of the cables, as well as maintenance of cable protection and infrequent anchoring of maintenance vessels along the RWEC-RI route. Disturbance associated with nonroutine maintenance that may require uncovering and reburial of the cables will be similar to those described above for the construction phase, although the extent of disturbance would be limited to specific areas along the RWEC-RI route.

4.5 Best Management Practices

Best management practices are structural or non–structural measures, practices, techniques or devices employed to avoid or minimize impact to sensitive resources. This section describes BMPs the Revolution Wind will employ during construction and include:

- Construction work hours
- Installation of erosion and sediment controls

- Dewatering methods
- Environmental compliance and monitoring

4.5.1 Construction Work Hours

Consistent with the Town of North Kingstown noise ordinance (Town Code Article VI), typical construction work hours for the Project will be 7:00 a.m. to 6:00 p.m. Monday through Friday when daylight permits and 7:00 a.m. to 5:00 p.m. on Saturdays. Revolution Wind will generally comply with these standard hours except as described below. Some work tasks, such as concrete pours, landfall installation and cable pulling or splicing, once started, must be continued through to completion and may go beyond normal work hours.

In addition, the nature of transmission line construction requires line outages for certain procedures such as transmission line connections, equipment cutovers, or stringing under or over other transmission lines. These outages are dictated by ISO-NE and can be very limited based on regional system load and weather conditions. Work requiring scheduled outages and crossings of certain transportation and utility corridors may need to be performed on a limited basis outside of normal work hours, including Sundays and holidays.

4.5.2 Installation of Erosion and Sediment Controls

Following vegetation clearing and at the initiation of site preparation activities outside of vegetated areas, appropriate erosion control devices such as straw bales, straw wattle, compost mulch tubes, and siltation fencing will be installed using the procedures identified in the Rhode Island Soil Erosion and Sediment Control Handbook, and in accordance with approved plans and permit requirements. The installation of these erosion control devices will be supervised by an environmental monitor. The devices will function to mitigate construction-related soil erosion and sedimentation and will also serve as a physical boundary to separate construction activities from resource areas.

Revolution Wind will prepare a SESC Plan to protect adjacent wetland and water resources during construction. The SESC Plan will specify BMPs including erosion and sediment controls and spill protection measures. Revolution Wind will prepare and implement the SESC Plan in accordance with applicable permit requirements consistent with the Eversource BMP Manual.

4.5.3 Dewatering

Excavation for installation of the Onshore Facilities might require dewatering. Dewatering is required when it is necessary to remove water from an excavation during construction and is driven by field conditions. Several methods can be used to temporarily divert and dewater from areas of excavation, including:

- Filter bags and straw bale containment areas may be used when there is a potential for discharged water to flow overland into wetlands or waterbodies. These containment areas will be located in well-vegetated areas outside of wetlands and more than 100 feet from a waterbody or stream bank.

- Discharge hose filter socks may be used when there isn't enough space to construct sediment basins or enough suitable uplands for overland flow and infiltration. Filter "socks" or bags may be attached to the end for the discharge hose of the pump and used for dewatering. Additional measures such as straw bales may be installed around the filter device for added protection.

If dewatering is required during excavation, one of the abovementioned methods will be used and the SESC Plan and Eversource's BMPs will be implemented to avoid adverse impacts to surface and groundwater. If , contaminated groundwater is encountered during dewatering, it will be managed in accordance with the RIDEM Remediation General Permit.

4.5.4 Restoration of the ROW or Street

Restoration efforts, including final grading, pavement restoration and installation of permanent erosion control devices, will be completed following Project construction. All construction debris will be removed from the Project site and properly disposed. Paved areas will be restored in accordance with Town of North Kingstown or QDC specifications for pavement construction. All disturbed areas outside of roadways will be seeded with an appropriate conservation seed mixture and/or mulched to stabilize the soils in accordance with applicable regulations. Temporary erosion control devices will be removed following the stabilization of disturbed areas. Pre-existing drainage patterns, ditches, roads, walls, and fences will be restored to their pre-construction condition. Additional landscaping may be provided in some areas based on landowner agreements or permit conditions.

4.5.5 Environmental Compliance and Monitoring

Throughout the entire construction process, the services of an environmental monitor will be retained. The primary responsibility of the monitor will be to confirm compliance with federal, state, and local environmental permit requirements and Revolution Wind Project policies. At least weekly and following precipitation events of ¼ inch of rain in 24 hours, the monitor will inspect all locations to determine that the environmental controls are functioning properly and to make recommendations for correction or maintenance, as necessary. In addition to retaining the services of an environmental monitor, the construction contractor will be required to designate an individual to be responsible for the daily inspection and upkeep of environmental controls. This person will also be responsible for providing direction to the other members of the construction crew regarding matters such as wetland access and appropriate work methods. Installation and repair of BMPs and other compliance issues are tracked on an inspection form or action log that is updated and distributed weekly to appropriate personnel. Additionally, all construction personnel will be briefed on Project environmental issues and obligations prior to the start of construction. Regular construction progress meetings will reinforce the contractor's awareness of these issues.

4.6 Safety and Public Health Considerations

Revolution Wind will design, build, and maintain the facilities for the proposed Project so that the health and safety of the public are protected. This will be accomplished through adherence to applicable federal, state, and local regulations, and industry standards and guidelines established for protection of the public. The proposed Project will be designed, built, and maintained in accordance with the NESC.

The facilities will be designed in accordance with sound engineering practices using established design codes and guides published by, among others, the IEEE, the ASCE, the American Concrete Institute ("ACI"), and the American National Standards Institute ("ANSI").

Practices which will be used to protect the public during construction will include, but not be limited to, establishing traffic control plans for construction traffic on local streets to maintain safe driving conditions, restricting public access to potentially hazardous work areas, and use of temporary guard structures at road and electric line crossings to prevent accidental contact with the conductor during installation.

Following construction of the facilities, all transmission structures and substation facilities will be clearly marked with warning signs to alert the public of potential hazards if climbed or entered.

4.7 Project Community Outreach

4.7.1 Introduction

Revolution Wind is committed to robust, inclusive, and transparent public involvement. The Project's approach to public engagement includes 1) stakeholder identification in the area of the proposed Project; 2) public understanding of and education about the Project; 3) public input collection; and 4) information dissemination to the general public and stakeholders that are directly affected by the Project.

The Project has taken into consideration strategies that can be deployed to address concerns related to COVID-19 and accompanying social distancing requirements. These strategies include a shifted focus towards virtual engagement through virtual open houses, an increased social media presence, and the reconsideration of practices such as door-to-door notifications.

Importantly, extensive outreach has occurred over the months leading up to the Project's EFSB filing and will continue. Since 2017, Revolution Wind has been engaged in extensive Project outreach with federal and state agencies, federally recognized Native American Tribes, local agencies in Rhode Island, stakeholders representing a broad range of perspectives, and the general public. More detail can be found in Table 4-11.

4.7.2 Project Stakeholders

This section describes the identification and categorization of Project stakeholders; in addition, it outlines the communication methods that will be utilized to build awareness and understanding about the Project.

Revolution Wind has organized stakeholder outreach into four main categories: Local Communities; State & Federal Elected Officials, Agencies, and Native American Tribes; Public Interest Organizations; and Media.

Revolution Wind has conducted, and will continually update, a detailed analysis of each stakeholder and category to determine their informational needs and how best to meet them through the plan below. This list will also be updated to include additional stakeholders as they are identified.

Interested parties can request to be added to the stakeholder list by contacting Revolution Wind via email or phone or visiting the project website.

Revolution Wind will notify the stakeholder list of planned outreach events and to provide proof of service and may provide notice through email, postal mail, or both.

Local Communities

Among the top priorities for Revolution Wind is to foster positive relationships within the communities in which our Project facilities are located. To facilitate these relationships, Revolution Wind will continue to conduct an ongoing outreach program to introduce the Project, provide updates on the progression of the Project, and gain feedback to develop local support. Members of the local community include, but are not limited to:

- Town Elected Officials
- Affected Town Agencies
- Abutting Landowners, Residents and Impacted Businesses
- Quonset Development Corporation

Equally important to Revolution Wind is the close collaboration with affected landowners as key members of the local communities along the Project's offshore and onshore route, including the Onshore Facilities. A thorough and detailed notification plan has been established to maintain these relationships and will be further explained in the Public Education and Engagement Activities section.

State and Federal Elected Officials, Agencies, and Native American Tribes

Revolution Wind has worked diligently to build a strong base of support among state and federal elected officials, regulatory agencies and Native American Tribes, with proactive outreach occurring upon the Project selection, and continuing throughout the various stages of the Project's development and roll-out phases.

The benefits of the Project to Rhode Island (and Connecticut) are vast, and it is a goal of Revolution Wind to be transparent and provide information to elected officials so that they can stand behind the Project in support. In addition to keeping agencies and elected officials apprised of Project developments, Revolution Wind regularly engages with Native American Tribes to provide updates and discuss survey protocols, schedule and process for activities that may occur on or near tribal land. These regular discussions also include participation in calls hosted by BOEM, including Revolution Wind and tribal representation.

Stakeholders in this category include:

- Office of the Governor
- RI Congressional Delegation

- RI State Senators
- RI State Representatives
- State and Federal Agencies
- Native American Tribes

Public Interest Organizations

A key element to Revolution Wind's commitment to public involvement is our collaboration and coordination with public interest organizations. Revolution Wind continues to cultivate its relationships with a broad group of civic organizations in Rhode Island.

- Environment and Energy Advocacy
- Fisheries and Marine Special Interest Groups and Businesses
- Education, Workforce Development and Organized Labor
- Business and Industry
- Local Civic Associations

Media

Serving as both an individual stakeholder category, as well as a means of communicating with the overall community, traditional and new media will be critical to our public engagement and education. Media outlets serving the Project area will be kept apprised with regular outreach related to Project milestones, notice of public events, and availability for interview and inquiry.

In addition to digital and print media that may have a regional, state-wide or national focus, Revolution Wind will also actively engage with hyper-local media, such as community weeklies and newsletters.

4.7.3 Methods of Public Involvement and Engagement

This section provides an overview of the public outreach and involvement methodologies that will be implemented by Revolution Wind. These methods, as they evolve throughout the Project phases, will serve to formally introduce the Project, drive stakeholder participation in the community and encourage feedback, as well as increase educational awareness of the Project and the reasons behind it.

Revolution Wind will engage directly with communities in the Project area, as well as the broader public through a variety of activities. The methods that will be referenced in this section are intended to keep Project stakeholders informed and to maintain open communication with members of the Project team.

A comprehensive range of communication methods is critical to ensuring that all stakeholders are fully informed, and that the appropriate outreach is conducted to meet the information needs and collect input from a wide and diverse range of stakeholders. These methods, as appropriate, will provide stakeholders with contact information for the Project team, the ability to sign up for Project notifications and an avenue to ask questions and provide input to the Project team.

4.7.4 Project Phases

The Project outreach strategy is phased to allow for the focus and engagement tools to adapt to the communication needs of each phase of the Project's lifecycle. The phased outreach strategy will follow the Project throughout its lifecycle and will progress from project introduction through operation. Revolution Wind team has identified the following phases of activity: Project Introduction, EFSB Application & Rhode Island Environmental filings, Pre-Construction, and Construction.

Phase	Outreach Activity
Project Introduction *(completed)*	• Stakeholder identification and categorization • Development of educational materials and tools • Introductory stakeholder meetings • Development and launch of website and social media • Virtual Project Open Houses • Begin routing analysis and evaluation of stakeholder feedback
EFSB Application	• Evaluate concerns as they arise in the EFSB process. • Begin to develop tools to ensure compliance with any EFSB conditions of approval. • Continue to conduct outreach meetings with all stakeholders to gain additional feedback and provide education. • Continue to identify and refine stakeholder list.
Detail Design/Pre-Construction	• Inform local stakeholders of upcoming activity and provide official notice as required • Ensure that any required permits are in place • Conduct training and educational meetings for field workers
Construction	• All proper notification will already have been provided to abutting landowners and impacted businesses • Focus on a hyper-local approach, addressing any concerns that may arise relating to neighborhood impacts. • Outreach meetings will be held with elected officials and agency staff to keep them apprised of status

- **Project Introduction (completed)**
  - The Project team will begin to identify a preliminary list of stakeholders, as well as strategies to identify further stakeholders as outreach efforts progress.
  - During this initial phase, the Project team will conduct a series of individual meetings and outreach efforts to foster relationships within the community, educate stakeholders on the Project, and solicit feedback that can be incorporated into the detailed design of the Project when feasible.
  - A key objective of these introductory meetings is identifying other stakeholders that need to be engaged by the team, while continuing to build a comprehensive stakeholder list.
  - This phase will also be used to refine tools and methodologies, shape the overall message of the Project, and host outreach efforts such as project open houses and webinars.
- **EFSB Application**
  - The focus of this phase will be to support the Project team moving through the EFSB process and evaluate and respond to questions from interested parties and regulators.
  - During this time, the Project team will continue to conduct outreach meetings with stakeholders, provide public notice of filings and related information, further evaluate and incorporate feedback and gather the necessary tools to prepare for the Detail Design/Pre-Construction Phase.
- **Detail Design/Pre-Construction**
  - The primary focus of this phase is to ensure compliance with the EFSB approval conditions.
  - The Project team will begin to develop the framework of these strategies throughout the initial phases of the Project, implementing them where applicable as a best effort. They will be updated to reflect specific conditions and requirements as they are identified in the proceeding.
  - Additional detail design is developed during this phase as the information becomes available through field investigations, or thorough the discovery process that requires consideration in the final design.
  - During this phase, the Project team will inform local stakeholders of anticipated activity and any design impacts; ensure any permit requirements are prepared for and met; and begin to implement the tools and strategies developed from the EFSB approval conditions.
  - The Project team will also utilize this time to conduct a series of training and educational meetings for crews that will be performing field work, setting expectations that align with the goals of both the community and the Project team.
- **Construction**
  - The focus of this phase will be hyper-local and specific to the area that work is occurring. The Project team will employ all the tools that have been developed and refined throughout the earlier phases and will use them to facilitate communications

focused on timeframes, current details, and work to mitigate any specific concerns that may arise.

- An example of an outreach activity for this Project phase would be engaging with an abutting resident who may temporarily loose driveway access due to construction activity, working directly and individually to mitigate any impacts or concerns.
- This phase will also include a series of high-level updates on construction status with elected officials, local and state agencies and other key stakeholders to keep the appraised of Project development and status.

4.7.5 Stakeholder Consultations To-Date

Revolution Wind has been proactively conducting stakeholder outreach meetings since Project development began in late 2018. These meetings have been held with elected officials, Federal, State and Town agencies, advocacy organizations and several other local communities' stakeholders. Discussions have ranged from general Project introductions, educational partnership and job development opportunities, and the collaborative development of both onshore and offshore cable routing. See Table 4-11 below and Appendix B for meetings with federal and state agencies.

Table 4-11 Stakeholder Engagement

Stakeholders	Summary of Engagements
Local Communities and Government have the potential to be impacted by construction and operation. The Project is committed to engaging with these communities to share information and minimize potential disturbance; Town of North Kingstown, area chambers of commerce, civic groups, residents and businesses.	› Prepared overview of the Project to numerous stakeholders. Continued emails and calls to keep stakeholders apprised of the Project's progress. › Active presence on social media, mailings to abutters and other impacted stakeholders to provide up-to-date information on surveys and other Project activities. › Maintaining involvement and regular correspondence with several local and regional entities, including the Town of North Kingstown and the Quonset Development Corporation.

Stakeholders	Summary of Engagements
Rhode Island State Government can benefit from the Project environmentally and economically. It will help the state fulfill its environmental goals and generate economic and job growth with a new industry.	› Participate in monthly meetings with the Rhode Island Commerce Corporation, Rhode Island's quasi-public economic development agency to ensure the Project is beneficial to Rhode Island's economy › Financial support for Rhode Island's Offshore Wind Effort to foster the development of the offshore wind industry in the state that will focus on business attraction, supply chain growth, and marketing. › Working collaboratively on port utilization planning in regular meetings with local ports, port authorities, and related stakeholders in Rhode Island and Connecticut › Developed planning to optimize supply chain development and the use of local labor including engagement with local businesses and applicable governmental agencies in Rhode Island and Connecticut. › Executed Memorandums of Understanding ("MoUs") with regional labor unions to negotiate in good faith a project labor agreement and the development of training programs. › Engaging with regional companies on project needs to inform and develop local suppliers and equipment providers. Engaging with regional companies on project needs to inform and develop local suppliers and equipment providers.
Non-Governmental Environmental Organizations ("NGEOs") that are interested in the environmental benefits and potential impacts of the Project;	› Participated in regular meetings of the Fisheries and Habitat Advisory Boards, in collaboration with RI CRMC › Participated in externally led initiatives including the ad hoc Habitats Working Group established by the Massachusetts Office of Coastal Zone Management (in collaboration with the Massachusetts Clean Energy Center, the American Wind Energy Association's Offshore Committee, and BOEM) › Held and attended meetings with environmental organizations (such as the Natural Resources Defense Council, National Wildlife Federation, International Fund for Animal Welfare, Conservation Law Foundation, Save the Bay and Sierra Club) to gather input, hear concerns, and share updates regarding the Project's plans and activity status. Attended and supported marine science conferences including NYSERDA State of the Science Workshop 2018 and 2020, Restore America's Estuaries 2020, OCEANOISE2017, the Biennial Conference on the Biology of Marine Mammals in 2017 and 2019, Acoustical Society of America /Acoustics 2017 Boston, The Effects of Noise on Aquatic Life in 2019, American Fisheries Conference, the North Atlantic Right Whale Consortium and Ropeless Gear Consortium annual meeting, biennial National Wind Coordinating Collaborative's Wind Wildlife Research Meeting, as well as industry-specific conferences sponsored by the American Wind Energy Association and the International Partnering Forum

Stakeholders	Summary of Engagements
Fishing Communities & Other Mariners are important stakeholders with which the Project strives to achieve "shared used" of the Lease Area.	› Employ Fisheries Liaisons ("FL") to work directly with myriad fisheries organizations to achieve broad engagement with both the commercial and recreational fishing industries › Utilize Fishing Industry Representatives ("FR") to represent their local fishing port or community and acts as a conduit between the fishing industry and the FL/Project › Employ fisheries observers to serve onboard surveys vessels to promote "real-time" communication with fishermen while on the water and to facilitate positive coexistence with ongoing fishing activity › Partner with the Responsible Offshore Science Alliance ("ROSA") and Responsible Offshore Development Alliance ("RODA") to create an opportunity for the commercial fishing industry to provide direct input to the wind energy industry › Conduct port hours at several significant fishing ports in New England and New York to provide an opportunity for fishermen and mariners to speak directly with Fisheries Liaisons regarding project activities and other questions they may have. › Receive ongoing input on development of fisheries resource studies › Attend North Atlantic and Mid-Atlantic fisheries management council meetings, Massachusetts Fisheries Working Group and RI CRMC Fishermen's Advisory Board and Habitat Advisory Board ("FAB/HAB") meetings › Attend fisheries trade events such as Massachusetts Lobstermen's Association Annual Trade show › Conducted over 2,000 conversations and communications with fisheries businesses and individual fishermen, many of which were face to face meetings, to collect and implement feedback on layout, schedule and other project parameters.
Universities can provide a wealth of valuable data and have served as leaders in both science and job training.	› Worked with several area universities including the University of Rhode Island ("URI") and other institutions to support workforce development, training, and primary research in offshore wind-related fields of study › Financial commitments to Rhode Island institutions of higher education, including URI › Financial commitment to the Rhode Island Department of Labor and Training for workforce development › Financial commitment to University of Connecticut, Avery Point for collaborative science › Financial commitment to Project Oceanology for the development of an offshore wind curriculum › Collaborating with and funding an offshore wind supply chain study with the Thames River Submarine Supply Chain Consortium.

Stakeholders	Summary of Engagements
Labor and Local Business Interests can benefit from the Project through job creation, local purchasing of supplies and equipment and other development and operations support opportunities.	› Executed MOUs with regional labor unions to negotiate in good faith a project labor agreement ("PLA") and the development of training programs. › Engaging with regional companies on project needs to inform and develop local suppliers and equipment providers.

4.7.6 Public Education & Engagement Activities

To effectively communicate and engage with Revolution Wind stakeholders and members of the public, the Project Team has developed a series of tools and methodologies that will be implemented throughout the various phases of the Project. These efforts may vary depending on current phase of the Project but range from the development of a clearly articulated local value proposition and in-person relationship building, to comprehensive and routine status updates and robust media strategies.

The tools implemented by the Project team will include, but are not limited to:

Stakeholder Database

- A Project public involvement database has been created to support outreach activity and communication for Project development. This database builds upon the stakeholder list and will serve as the primary distribution resource across the Project. This list includes the names and contact information for the full group of stakeholders, also including categorization, relationship leads, engagement frequency, issues and concerns and key meeting take-aways, concerns and questions, including those from concerned individuals regardless of their connection to the Project.
- This database will be maintained and constantly adapted and updated throughout the various phases of Project development.

Project Website

- The Project website has been developed and can be found at: revolution-wind.com.
- The overall objective of the Project website is to serve as a central information hub. It is a primary line of information distribution and is referenced in all educational materials.
- The website contains general information on the Project and the partnership, as well as resources such as Project factsheets, FAQs, relevant news updates, as well as our recent virtual open house presentation and related materials.
- Links for supplier registration for Orsted and Eversource are included for those who are interested in participating in the supply chain.
- The site features a dedicated landing page for ongoing and upcoming field work. Included activities will range from survey work through construction and will contain the full scope of work and status of that activity.

- The site also features a section dedicated to public meetings and informational opportunities such as webinars or open houses, announcements for upcoming meetings, and an archive of previous materials and presentations including our recent virtual open house.
- A web portal also is included where visitors can contact the Revolution Wind team members directly at info@revolution-wind.com
- The website will continue to develop to meet the evolving needs of the Project, continually updated to adapt to each Project phase.

Educational Material

- A Project factsheet has been developed providing general details on Revolution Wind, including information on the Project, an overview of the partnership, benefits to be delivered and contact information for more information.
- Specific factsheets will also be developed throughout survey and construction phases to provide more detail on the current activity. These will be distributed to both municipal officials and abutting landowners and will include a timeline for the activity and contact information for the Project team.
- The Project Team will also develop factsheets to address specific issues of concern, which may include onshore cable routing construction and EMF, for example.
- Project factsheets will all be posted to the website, and will also be distributed through social media, email, newsletters, in-person and educational meetings and direct mail when appropriate.
- Examples of educational materials and outreach tools are available in Appendix B.

Public Open Houses & Webinars

- Two virtual open houses were conducted on November 18 and 19, 2020 at times scheduled to maximize stakeholder's participation and adapting to the health and safety concerns of the COVID-19 pandemic.
- Attendance and participation at each session was a success. November 18 had over 100 registrants and November 19 saw nearly 60 registered. During the Q&A session, participants were engaged in seeking answers to their questions from our Subject Matter Experts.
- The purpose of these open houses was to initiate and facilitate the open dialogue between the Project team and local community stakeholders. A general Project overview and introduction was given, highlighting the benefits, needs, and impacts that will be associated with the Project. Open house posters, outreach and media samples are in Appendix B.
- The open houses also served to further collect stakeholder feedback to be brought to the full Project team for review and consideration.
- The Project team will also lead webinars from time to time to further serve as educational resources for the Project while maintaining social distancing.

- The Project team also plans to collaborate with local civic and community organizations on other virtual opportunities to promote the Project. This will also serve to broaden the audience.

Stakeholder Hotline

- A toll-free hotline (401-251-2207) has been established for the Project and will be available for use in the first quarter of 2021.
- The hotline will allow individuals to contact the Revolution Wind team for more information or to have specific questions or concerns answered. This number will be provided on all materials developed to support field activities.
- All calls placed into the Project hotline will go to a recorded voicemail, as it is a non-manned number. Voicemails are then documented and logged by Project team members and forwarded to the appropriate team member or subject matter expert.
- The Project team will respond to all inquiries within 96 hours.

Periodic Project E-Update

- An informative periodic Project e-update will be developed and distributed to support outreach efforts and communication later in the Project's development.
- The content and distribution list of the e-update will be adapted to meet the informational needs and target audience at the time and will range from general Project highlights and milestones to detailed construction updates.
- The e-update will serve as a tool to keep municipal and agency officials informed of progress, educate elected officials, and engage with other community partners such as chambers and civic associations.
- The e-update will be distributed electronically through email, highlighted through Project social media, and posted to a dedicated page on the Project website. The website will also include a link for those who wish to be added to the distribution list.

Official Notifications

- In addition to the newsletter, which will provide general information and Project updates, the Revolution Wind team will also deliver a series of official notifications. These notifications will be provided to abutting neighbors and major stakeholders, intended to relay information on various activities and stages of the Project.
- Official notifications include, but are not limited to, alerting abutting neighbors of upcoming survey or construction work that has the potential to cause impact, the completion of a Project phase or other relevant milestones.
- Recipients of these notifications will be directed to the website, email and hotline for any additional information.
- Official notifications are typically delivered through the mail and in advance of any anticipated work, but may also be delivered through email, legal notice or press release.

Field Support

- Abutter Notifications: The Project team will provide notice to abutting residents and businesses of any upcoming survey or construction work that has the potential to cause impact.
- Notifications will be delivered to abutters 1-2 weeks in advance of the scheduled activity and are intended to inform the neighbors of the Project and outline the work that will be done as well as the timeline in which it will occur.
- A link to the Project website, email and dedicated hotline will be provided in all abutter notification for any additional information that is desired.
- Abutter notifications will typically be delivered through the mail. Additionally, the Project team may incorporate door-hangers and other means of communication such as legal ads or social media campaigns when appropriate.
- If COVID-19 related restrictions do not allow door-to-door notifications, the Project team may either enhance mail-delivered notifications or incorporate telephone distribution.

Onsite Support

- Additional field support resources will be provided when appropriate to ensure health, safety, and environmental standards are met, and to monitor field interactions with members of the public.
- This role will be filled by either a member of the Project team with a focus in community or stakeholder relations, project management or an expert on the activity.
- The Project team will also provide field support in the form of outreach contact cards, which can be distributed in public interactions to direct them to the Project website, hotline, email or social media for more information. A larger sign containing the same information will also be posted on vehicles and barriers for construction exclusion zones when appropriate.
- Staffing commitments will vary depending on the specific needs of a given activity.
- If COVID-19 related restrictions impact the number of non-essential employees that may be on-site, the Project team will increase efforts for contact-free information distribution, such as directing any interested individuals to a dedicated hotline and project website for more information, as well as increasing the number of posted signs around the site.

Media Relations Plan

- Today all forms of media dominate the lives of most of our stakeholders, making media including digital, print, television, radio, and social media an essential tool for educating the public about Revolution Wind. The Project will engage with the public through each form of media throughout the Project's lifecycle to communicate 1) the configuration of the Project, 2) the opportunities for public engagement, and 3) the status of the Project's development efforts, and 4) any other important updates of potential interest to the public
- Revolution Wind has designated points of contact to respond to informational inquiries from print, television, digital and radio media representatives. These points of contact

are available on an on-call basis to provide timely information to press for the community's awareness

- Similarly, Revolution Wind maintains a Project Twitter presence (@RevWind) that is used to disseminate information and interact with members of the public who are seeking more information about the Project.
- Key topics addressed on social media amongst other outlets may include: 1) Project design and configuration, 2) public engagement opportunities, 3) the status of Project development, and 4) the HSE precautions undertaken by the Project.
- Local and regional media outlets include television, print and radio outlets that the project frequently works with include the following:
  - Providence Journal
  - Providence Business News
  - WPRI-12
  - WJAR-10
  - ABC-6
  - Boston Globe – Rhode Island bureau
  - ecoRI
  - East Bay Newspapers
  - Hartford Courant
  - Hartford Business Journal
  - The Day
  - CT Mirror
  - WNPR-FM
  - NBC CT
  - North Kingstown Independent
  - Block Island Times
  - Patch North Kingstown

4.8 Revolution Wind Project Costs

4.8.1 Projected Operation and Maintenance Costs

Annual operation and maintenance activities for transmission lines typically include periodic ROW vegetation management and vault and route inspections. Annual operation and maintenance activities for the Project include routine inspections and functional testing and adjustment of the electrical equipment.

4.8.2 Estimated Project Costs

As part of the Request for Proposals process, and selection of Revolution Wind to receive its PPAs, the Project team developed estimates of the costs associated with the proposed Project. While ratepayer impact of the Project is fixed, Revolution Wind continues to track Project costs as design progresses and has provided the estimated cost of the Project components located within Rhode Island subject to EFSB jurisdiction. Because of the competitive nature of the OSW solicitations, these costs are sensitive in nature, and will be provided in Appendix C that Revolution Wind requests be kept confidential indefinitely, not be placed in the public docket, and be disclosed on to the Board. Revolution Wind will file a Motion for Protective Treatment of Confidential Information for such Project Costs. [19]

19 Revolution Wind requests such information be kept confidential indefinitely, not be placed in the public docket, and be disclosed on to the Board. Revolution Wind will file a Motion for Protective Treatment of Confidential Information for such Project Costs

4.8.3 Project Schedule

Revolution Wind has developed a preliminary schedule based on time duration estimates of Project permitting and licensing, detailed engineering, materials acquisition, and construction. It is assumed that construction will begin by as early as Q3 2022 with installation of the onshore components and initiation of seabed preparation activities. Construction durations (inclusive of commissioning) are summarized below.

- OnSS – approximately 12 months
- ICF – approximately 12 months
- Onshore Transmission Cable – approximately 12 months
- RWEC-RI – approximately 8 months

5

Alternatives to the Proposed Action

5.1 Introduction

This section describes the siting process and development of alternatives for the Project. Transmission and interconnection facilities are necessary to transfer electricity generated by the Project to the broader electrical grid. This specifically requires conveying electricity from the offshore wind farm to existing onshore electrical transmission facilities associated with the Project. The Project includes three transmission and interconnection components within EFSB jurisdiction: POI and RWEC-RI (Section 5.2), Onshore Transmission Cable (Section 5.3), and an OnSS (Section 5.4). Note that the siting of the RWEC-RI and Onshore Transmission Cable considered alternative landfall locations; the landfall locations considered are presented with the discussion of Onshore Transmission Cable routing alternatives in Section 5.3. Revolution Wind completed a routing and alternatives analysis for the onshore components of the Project (Burns & McDonnell, 2020).

5.2 Revolution Wind Point of Interconnection and Export Cable

5.2.1 Point of Interconnection and Routing Alternatives

In order to accept the maximum electricity produced by the Project, Revolution Wind evaluated substations with operating capacities of 115 kV or higher as potential grid POIs. Revolution Wind evaluated several potential POIs in southeastern Massachusetts, Rhode Island, and the eastern coast of Connecticut. POIs were identified based several factors:

- Existing infrastructure with sufficient capacity to accept the electricity produced by the Project with minimal infrastructure upgrades.
- Proximity to the coastline to minimize the onshore transmission routes.
- Available lands nearby to support OnSS construction.

The POIs that were identified and evaluated include:

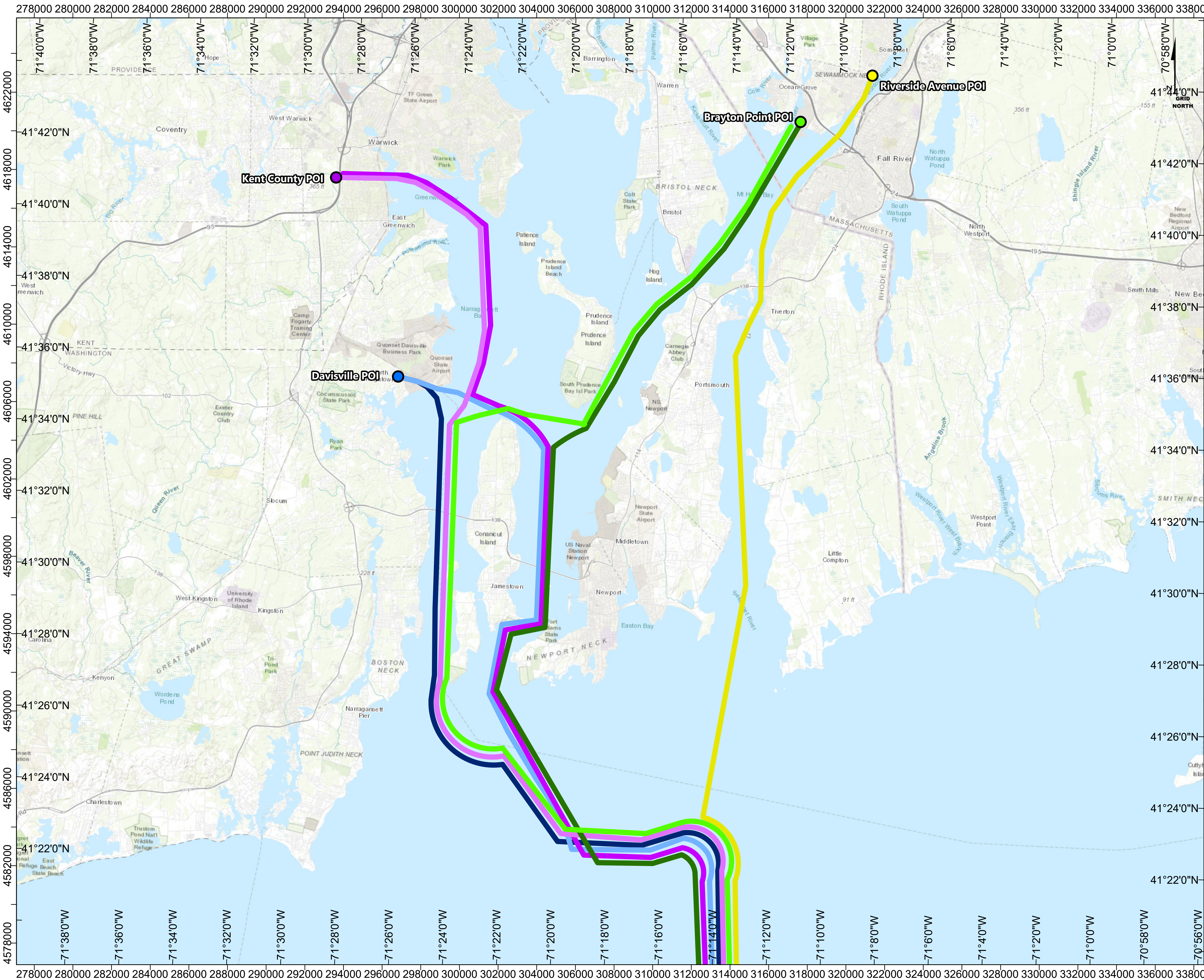
- Davisville Substation POI – landfall at Quonset Business Park in North Kingstown, Rhode Island
- Kent County POI – landfall in Warwick, Rhode Island
- Brayton Point POI – landfall in Somerset, Massachusetts
- Pottersville POI – landfall in Somerset, Massachusetts

To fully assess the feasibility of the POIs, export cable routes were identified and evaluated. Identification of a suitable export cable route for the RWEC-RI considered a variety of factors including:

- Suitable Landfall location, near to the POI, available real estate and minimal impacts
- Route between Lease Area and the Landfall location having:
  - Minimal conflicts with existing environmental and anthropogenic constraints and uses both onshore and offshore
  - Shortest distance between the Lease Area and the POI

Between the Lease Area and shore, Revolution Wind reviewed available data potentially affecting the route suitability such as seabed slope, geological hazards, tidal currents, aquaculture areas, subsea utilities, dumping grounds, shipwrecks and other seafloor obstructions, UXO and MEC, existing cable crossings, anchorage/mooring areas, Pilot boarding zones, navigational safety zones, and Department of Defense (“DoD”) military practice areas. Subsequently, two potentially viable routes between the Lease Area and the entrances to the East and West Passages of Narragansett Bay, and a third potentially viable route between the Lease Area and the Sakonnet River, were identified.

Figure 5-1 and Table 5-1 below details the interconnection points and export cable routes that were evaluated during the siting and alternatives analysis.



Revolution Wind

Figure 5-1
Export Cable Landfall Site Options
NORTH KINGSTOWN, RI

Legend

- Brayton Point POI
- Davisville POI
- Kent County POI
- Riverside Avenue POI
- Brayton Point Potenetial Route 1
- Brayton Point Potential Route 2
- Davisville Potnetial Route 1
- Davisville Potential Route 2
- Kent County Potential Route 1
- Kent County Potential Route 2
- Riverside Avenue Potential Route

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
World Topographic Map: Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS

Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 2000 4000 6000 Meters

0 6,000 12,000 18,000 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

Table 5-1 Interconnection Point and Corresponding Export Cable Routes Evaluated

Point of Interconnection Alternatives and Landfall Location		Potential RWEC Route	Constraints Identified
1	**Davisville Substation Point of Interconnection (Davisville POI)** Landfall at Quonset Business Park in North Kingstown, Rhode Island POI at a new onshore substation that would be located adjacent to the existing TNEC Davisville Substation	The lower West Passage between the Towns of Jamestown, Narragansett and North Kingstown	› Route segment advantageous based on existing bathymetry, favorable geology, lack/avoidance of use conflicts and environmental constraints › Advantageous due to short overland route, land availability and location within generally consistent land use for interconnection facilities; unfavorable due to challenging site conditions relative to contaminated soils (brownfields), floodplain, and potential underground utility conflicts (brownfields), floodplain, and potential underground utility conflicts
		The lower East Passage between the City of Newport and Town of Jamestown	› Route segment was not preferred due to water depths, bedrock, existing cable crossings, designation as primary commercial shipping channel to the Port of Providence and Quonset, and DoD use concerns
2	**Kent County POI** Landfall at private property identified as Brewer's Marina South in Warwick, Rhode Island POI at a new substation that would be located adjacent to the existing TNEC Kent County Substation	The lower West Passage between the Towns of Jamestown, Narragansett and North Kingstown	› Route segment advantageous based on existing bathymetry, favorable geology, lack/avoidance of use conflicts and environmental constraints
		The lower East Passage between the City of Newport and Town of Jamestown	› Route segment was not preferred due to water depths, bedrock, existing cable crossings, designation as primary commercial shipping channel to the Port of Providence and Quonset, and DoD use concerns
		The upper West Passage between Prudence Island (Town of Portsmouth), Town of North Kingstown and City of Warwick	› Route segment not preferred based on water existing cable crossings and designation as primary commercial shipping channel to Quonset
		Greenwich Bay which is bounded by the City of Warwick and Kent County overland route	› Route segment not preferred due to shallow water depths (<20 ft [6m]), significant submerged pre-contact archaeological resources, designated shellfish resources › Route segment not preferred due to longest overland route, private property ownership, shallow to bedrock, significant grade changes, narrow right of way, existing utility conflicts.

	Point of Interconnection Alternatives and Landfall Location	Potential RWEC Route	Constraints Identified
			› POI not preferred due to lack of reasonably available land for interconnection facilities
3	**Brayton Point POI** Landfall on the west side of Brayton Point in Somerset, Massachusetts POI at a new substation west of the former Brayton Point Power Generating Plant	The lower East Passage or West Passage, upper East Passage between Aquidneck Island and Prudence Island and Mount Hope Bay bounded by the Towns of Portsmouth, Tiverton and Bristol, Rhode Island, and the Towns of Swansea and Somerset and City of Fall River, Massachusetts	› Lower East Passage route segment was not preferred due to water depths, bedrock, existing cable crossings, designation as primary commercial shipping channel to the Port of Providence and Quonset, and DoD use concerns › Route segment not preferred due to existing cable crossings and designation as primary commercial shipping channel to the Port of Providence › Route segment not preferred due to longest submarine route, challenging site conditions relative to potential contaminated soils, and uncertainty regarding reasonably available land for interconnection facilities
4	**Pottersville POI** Landfall at the former Montaup Power Generating Plant in Somerset, Massachusetts POI adjacent to the new TNEC Pottersville substation west of Montaup	The Sakonnet River between the Towns of Little Compton and Tiverton, and Aquidneck Island, the Mount Hope Bay and the Taunton River	› Route segment not preferred due to geologic constraints, longest submarine route, designated shellfish resources, conflicting water use classification › Route segment not preferred due longest submarine routes, challenging site conditions relative to potential contaminated soils, uncertainty regarding reasonably available land for interconnection facilities

Of the POIs and routes evaluated, alternatives 2, 3 and 4 were ultimately excluded from further consideration as additional evaluation determined that these routes and POIs would result in greater seabed and/or terrestrial disturbance due to increased length of transmission route; and/or conflicts with existing anthropogenic constraints and uses.

The TNEC Davisville Substation, which is located within the Quonset Business Park in North Kingstown, Rhode Island was selected for the grid interconnection. The Davisville Substation operates at 115-kV and connects to the regional transmission grid via two 115-kV transmission tap lines. The existing substation is located within North Kingstown Assessor's Plat (AP) 179 Lot 005.

Consequently, Revolution Wind identified the preferred route for the RWEC-RI as entering Narragansett Bay via the West Passage and interconnecting at the Davisville Substation. This alternative accommodates the full generation capacity of the Project and results in minimal resource impacts due to the shortest overall transmission route offshore and onshore, existing bathymetry, favorable geology, avoidance of use conflicts and environmental constraints, available land for interconnection equipment, favorable zoning and beneficial reuse of contaminated properties.

5.2.2 RWEC Construction Alternatives

There are various options for installation of submarine cables. While direct placement on the seafloor may reduce initial environmental impacts, Revolution Wind will bury the cable to enable continued ocean uses like fishing, and to ensure cable reliability from anchor strikes and external damage. Burying the cable is a means of protecting it from potential damage caused by various external forces (e.g., fishing gear, anchors) and minimizing the potential for interference with other marine uses, including fishing gear conflict. Burying the cable also minimizes the need for maintenance and associated potential for seabed disturbance. The burial depths have been selected to balance the following design criteria: 1) physical conditions; 2) avoidance of physical damage from anchors, vessels, or other equipment that might penetrate the seabed; 3) avoidance and minimization of interference with other marine uses; and 4) to allow heat to flow away from the cable so that the temperature does not exceed the design basis of the cable.

Various installation methods for the RWEC were also considered, including hydraulic plow (i.e., jet-plow and controlled flow excavation) mechanical plow, and mechanical dredging (i.e., mechanical cutter and trailing suction hopper dredger). Due to the variability of surface and subsurface seabed conditions, Revolution Wind may use a combination of cable installation methods to install the cable at the target burial depth.

Revolution Wind completed a routing and alternatives analysis for potential OnSS sites, summarized in Section 5.3.

5.3 Onshore Substation Alternatives Analysis

Once the Davisville Substation was identified as the interconnection, Revolution Wind conducted an extensive evaluation of alternatives for the proposed OnSS.[20] The analysis consisted of the following steps:

- Real Estate Canvas: high level review of potentially available and suitable properties
- GIS Mapping and Analysis: detailed review of potentially available properties meeting the parameters reviewed in the Real Estate Canvas.

The results of these analyses are described in the following sections.

5.3.1 Real Estate Canvas

The approach included first completing an evaluation of parcels by completing a real estate canvas using the following criteria:

20 The ICF is an expansion of the existing Davisville Substation to incorporate the Project. The ICF will continue to be refined and the Project will be designed to balance environmental concerns, cost and reliability, while maintaining existing easements and property boundaries.

- Proximity to the preferred grid interconnection point (i.e., within one mile to the Davisville Substation);
- A parcel of adequate size (minimum 7-ac [2.8 ha] parcel and at least 250-ft wide [76.2 m]), suitable shape, ground conditions (e.g., no severe slopes or shallow groundwater) and appropriate zoning/land-use compatibility (e.g., avoidance of residential areas and/or other sensitive receptors [schools, hospitals, day care centers, open space and recreational areas]) for construction and operation of the OnSS; and
- Availability (property is either on the market or the owner is willing to sell)[21]Based on these parameters, Revolution Wind identified seven potential properties, which are discussed below (see Figure 5-2 below). All other properties within one mile of the Davisville Substation are residential and were therefore not considered.
  1. Parcel 17 is an approximate 10.6-acre property within the Quonset Business Park.
  2. Two conservation areas were identified. Conservation Area 1 is approximately 11.76 acres and Conservation Area 2 is approximately 36.82 acres.
  3. Parcel 47 is an approximate 10-acre parcel within the Quonset Business Park.
  4. The Davisville QDC substation property is undeveloped land that is partially cleared and is located adjacent to the existing TNEC Davisville Substation. It consists of two parcels identified as Lot 179-001 and Lot 179-030 and is owned by QDC. The combined parcels are located at 594 and 574 Camp Avenue, North Kingstown, RI.
  5. The Fujifilm substation property is identified on the AP 179, Lot 8 and is a quarter mile from the existing TNEC Davisville Substation on a parcel owned by Fujifilm Electronic Material USA. The parcel address is 40 Circuit Drive, North Kingstown, RI and contains two commercial buildings belonging to Fujifilm, as well as approximately 14 acres of undeveloped cleared space.
  6. The QDC Mainsail Drive substation property is identified on the AP 184, Lot 9 and is located approximately 1,000 feet from the existing TNEC Davisville Substation on a parcel owned by QDC. The parcel address is 215 Mainsail Drive, North Kingstown, RI and is a cleared space that is largely comprised of a fenced-in developed laydown area.

Properties 1 through 3 above were dismissed from additional evaluation due to lack of site control or costs and zoning or land use complications. Properties 4 through 6 were advanced through a more detailed analysis.

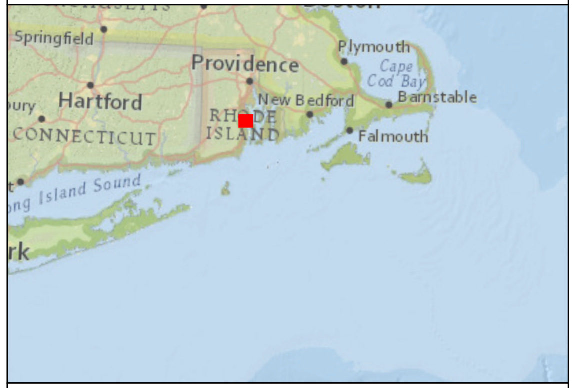
21 The Real Estate canvas identified potentially viable sites regardless of whether the parcels were actively on the market. Following favorable technical analysis, landowners were approached regarding potential sale.

Revolution Wind

Figure 5-2
Substation Sites
NORTH KINGSTOWN, RI

Legend
- TNEC Davisville Substation
- Parcel 47 & NKFD
- Conservation Parcel
- Substation Parcel
- 1 Mile Substation Buffer
- Parcel Boundary

Service Layer Credits: RIDEM/Tax_Parcels: RI State, 37 Towns
National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Rhode Island Aerial Photographs (Spring 2018; State Plane):



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 160 320 480 Meters

0 475 950 1,425 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

5.3.2 GIS Mapping and Analysis

Once the real estate canvas was complete, three properties were evaluated using GIS mapping and conducting additional analysis including size, topography, accessibility, soil conditions, contamination, sensitive natural resources (i.e., wetlands, streams, floodplains, vernal pools, rare species), vegetation clearing, land use and zoning, sensitive receptors, noise, visual impacts, real estate, and presence of existing utilities. The analysis for each property is discussed below.

5.3.2.1 Davisville QDC Substation Property

The Davisville QDC substation property is undeveloped land that is partially cleared and is located adjacent to the existing TNEC Davisville Substation. It consists of two parcels identified as Lot 179-001 and Lot 179-030 and is owned by QDC. The combined parcels are located at 594 and 574 Camp Avenue, North Kingstown, Rhode Island.

Size

The site is approximately 15.7 acres consisting of AP 179, Lots 1 and 30. The site is bounded by TNEC's electric transmission right-of-way and other undeveloped property owned by QDC to the north, residential and wooded area to the west, Camp Avenue to the south, and the existing TNEC Davisville Substation to the east. There is enough space for a gas insulated substation design, and it can also partially accommodate the expanded Davisville Switchyard that is required for interconnection.

Topography

The site has varying topography that ranges from 10 ft above the North American Vertical Datum of 1988 ("NAVD88") to 28 ft NAVD88 with multiple high points draining towards the perimeter of the properties. To best balance the amount of site work required, a base elevation of 18 feet NAVD88 will require over 16,000 cubic yards of cut and fill each. Moving this amount of soil will cause longer site preparation durations in the overall construction schedule and added costs for the scope of work.

Accessibility

The site has frontage on Camp Avenue and would require an approximate 520-foot-long access road be constructed from Camp Avenue to the OnSS. The proposed substation site is approximately 400 feet from the existing TNEC Davisville substation property with an interconnection length approximately 745 feet. Based on the onshore transmission cable routes, this site is the second longest overall (landfall length plus interconnection length) for all landfall options.

Soil Conditions

The Natural Resource Conservation Service ("NRCS") has mapped several soil types on the site. Soils in the developable upland areas are mostly sandy loam or previously disturbed with urban structures and have a Hydrologic Soil Group ("HSG") A rating. There is also a portion of the site with Quonset gravelly sandy loam and Windsor loamy sand, which are both soils with HSG A rating. HSG A soils consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission. The soil on-site is suitable for the construction of a substation; however, additional geotechnical testing is required for stormwater management, pavement and foundation design.

Contamination

The site is known as the Camp Avenue Dump Site and was a location used for the disposal of materials including construction debris (asphalt, asphalt shingles, wood, concrete, glass, brick, roofing tar, metal scraps), automobile debris (tires, battery casings), ship parts, unspecified industrial wastes, and remnants of small arms target practice. As a result, there is an Environmental Land Use Restriction ("ELUR") on this site which would require approval from RIDEM before any alterations may be made. A soil cap was placed over the disposal location with groundwater monitoring wells located around the perimeter. The last sampling of groundwater was in 2009, and four exceedances for vinyl chloride above RIDEM's GA and GB groundwater objectives were detected. Further groundwater sampling is required at this site under a long-term monitoring plan with RIDEM. Geotechnical investigations required at the site require an unexploded ordinance avoidance plan because of the potential presence of small arms remnants, UXOs and MECs.

Wetlands

Wetlands were investigated and field delineated by VHB in August and September 2019, following the Corps of Engineers wetlands delineation manual (USACE Waterways Experiment Station, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2) (USACE, 2012). Wetland flag locations were recorded in the field using a Trimble® Geo 7 hand-held GPS unit capable of sub-meter accuracy, post processed, and transferred and incorporated onto Project mapping. Wetlands characterized as forested swamp are present in the northern portion of the site and along the western property line with a larger area in the southwestern corner. Vegetation along wetland boundary includes a mixture of red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), sweet pepperbush (*Clethra alnifolia*), glossy buckthorn (*Frangula alnus*), Asiatic bittersweet (*Celastrus orbiculatus*), greenbrier (*Smilax* sp.) and poison ivy (*Toxicodendron radicans*). There is a State 50 ft Wetland Buffer associated with the wetlands in accordance with the RI CRMC Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast (650-RICR-20-00-02) (Freshwater Wetland Rules). Work in or around the buffer requires approval from RI CRMC. Any direct impacts to the wetlands will require wetland mitigation.

The wetlands drain to north and west of the parcel boundary to Mill Creek. Based on their linear form and deep channel incision, these streams were likely excavated to drain the freshwater wetland. The streams are all less than 10-ft wide and receive a 100-ft Riverbank Wetland in accordance with the RI CRMC Freshwater Wetland Rules.

Vernal pool surveys completed in April 2020 confirmed the presence of a vernal pool at the site including wood frog (chorusing and egg masses), spotted salamander egg masses, and fairy shrimp. This vernal pool is coincident with the northern wetland boundary and has no additional restrictions above the development restrictions for wetland impacts.

Design of the OnSS avoids direct impacts to wetlands; however, there would be approximately 16,500 square feet of permanent impacts to wetland buffer area which will require a permit from RI CRMC.

Floodplains

The site is located within the Federal Emergency Management Agency (FEMA) Zone AE 1% Annual Exceedance Probability ("AEP") floodplain, commonly referred to as the 100-year floodplain with an associated Base Flood Elevation (BFE) of 13 feet NAVD 88. Additionally, most of the site is located within the 0.2% AEP floodplain, commonly referred to as the 500-year floodplain. VHB performed a floodplain analysis that calculated the 500-year flood elevation to be 23 feet above NAVD88. Floodplain compensation is not required for development within the floodplain because the floodplain is influenced by coastal rather than riverine flooding.

Rare Species

The site does not lie within a RIDEM-mapped Natural Heritage and Endangered Species Area. Clusters of sickle-leaved golden aster (*Pityopsis falcata*), a plant species of state concern within Rhode Island, were observed by VHB in two areas totaling approximately 6,275 square feet. Sickle-leaved golden aster is a highly restricted endemic plant that is found only on sandy glacial deposits (Native Plant Trust, 2020). This plant is identifiable by its yellow tubular disk flowers in the center and yellow ray flowers around the center. The Rhode Island Natural Heritage Program (RINHP) has records of this species occurring within a mapped natural heritage polygon approximately 400 ft (120 m) west of the OnSS parcel boundary. In accordance with RINHP policy, the new species occurrences will be reported to the RINHP during the state permitting process and potential relocation or propagation of the plants with a local conservation group based out of URI will be utilized as a mitigation measure, if necessary.

The US Fish and Wildlife Service ("USFWS") Official Species List generated by Information for Planning and Consultation ("IPaC") on September 28, 2019, indicated that the federally threatened northern long-eared bat (*Myotis septentrionalis*; NLEB) has the potential to occur within the Property. Bat acoustic presence-absence surveys were conducted July 29-31, 2020, and concluded a probable absence of NLEB, which was reported to USFWS on October 28, 2020.

Vegetation Clearing

The site consists of wooded ridges and flat grassy to sparsely wooded wetlands. Approximately 4.4 acres of trees will need to be cleared to accommodate the OnSS.

Land Use and Zoning

The site lies within the Quonset Mixed-Use Development District ("QMUDD") and the Quonset Open Space and Conservation District ("QOSCD") according to the map titled "Land Use Districts, Figure 1" in the "Development Package: Quonset Business Park" dated November 2018. Lot 179-001 (southern lot along Camp Avenue) lies within the QMUDD district while Lot 179-030 (northern lot where the proposed substation yard is located) lies within the QOSCD district, the following regulations apply:

› **Permitted Land Uses:**
  - QMUDD: solar and wind energy systems (accessory use only).
  - QOSCD: conservation areas, buffers. Solar and wind energy systems are not allowed uses.

Use of Lot 179-030 will require relief from the QDC and Town of North Kingstown for construction of the OnSS, which will be addressed through the EFSB process.

Sensitive Receptors

There are no sensitive receptors abutting this site. The closest sensitive receptor is Fishing Cove Elementary School about 2,200 ft away to the southwest. The combined sites have four direct abutters touching the property boundary. Of the four direct abutters, two are residential involving townhomes/condominiums that total 137 rental units. There are also five residential abutters directly across Camp Avenue south of the site. The closest residence is within the townhome community approximately 280 feet west of the proposed substation fence line.

Noise Impacts

Based on a preliminary acoustic study performed by VHB, noise at the closest residences will be approximately 43.9 dBA, a change from 43 dBA, which is less than the regulatory requirement of 50 dBA by the town. Noise mitigation, therefore, will not be required.

Visual Impacts

The location of the substation on the site will allow for many of the existing wooded areas to remain, which will help to screen the substation from view at the property lines.

Real Estate

While only one factor in identifying viable options for an OnSS, site control for a property is weighted more heavily in determining whether to investigate a property further. Lot 179-001 and 179-030 both belong to the Rhode Island Commerce Corporation (a.k.a. QDC). There are various easement encumbrances on the property that still require an American Land Title Association ("ALTA") survey; however, the only clear easement is a 50ft right of way on Lot 179-001 to access 179-030 to the north (land locked). Since both are owned by the QDC, this easement should not impact substation development. Contact with the owner has resulted in site access to perform exploratory environmental and technical surveys, and the owner is amenable to lease option agreements if the Project should choose to utilize this property for the OnSS.

Utilities

There are no known utilities on this site.

Availability

The parcels have been identified as available to Revolution Wind for the Project development.

5.3.2.2 Fujifilm Substation Property

The Fujifilm substation property is identified on the AP 179, Lot 8 and is a quarter mile from the existing TNEC Davisville Substation on a parcel owned by Fujifilm Electronic Material USA. The parcel address is 40 Circuit Drive, North Kingstown, Rhode Island, and contains two commercial buildings belonging to Fujifilm, as well as approximately 14 acres of undeveloped cleared space.

Size

The site is approximately 26.0 acres with approximately 14.0 acres of undeveloped cleared space. It is bounded on the north by a small vacant TNEC parcel, and land owned by the QDC where a railroad easement exists. Circuit Drive bounds the site on the west, Burlingham Avenue on the east, and QDC/private property bounds the site to the south.

Topography

The site has relatively level topography with elevations varying from 12 feet NAVD88 to 22 feet NAVD88 with the majority of the site at approximately 19 feet NAVD88. This site would require minimal amounts of regrading.

Accessibility

The site has frontage on Burlingham Avenue and Circuit Drive, and access would likely be built from Circuit Drive to the substation with an access road of minimal length. The proposed substation site would require underground circuits that are approximately 2,130 feet in length to reach the existing TNEC Davisville substation. This site is the shortest overall (landfall length plus interconnection length) for all the landfall options.

Soil Conditions

The NRCS has mapped predominantly sandy and sandy loam soils at this parcel. Additional geotechnical testing should be performed for stormwater management, pavement and foundation design; however, this soil would be generally suitable for the construction of a substation and significant fill is not expected to be imported.

Contamination

Based on the review performed by VHB dated May 9, 2020, Fujifilm’s building is identified as an Emergency Planning and Community Right-to-Know Act (“EPCRA”) tier II Facility and has an ELUR within the area where the OnSS would be sited.

Wetlands

Based on the review performed by VHB dated May 9, 2020, the Property is not located within RI CRMC regulated Freshwater Wetlands in the Vicinity of the Coast nor the 200-foot Contiguous Area of a Coastal Feature. A review of the RIDEM Environmental Resource Mapper (“ERM”) Natural Heritage area coverage indicates that the Property is not within a Natural Heritage polygon.

Floodplains

Most of the site is located within the 0.2% AEP floodplain. The 500-year flood elevation is approximately 23 feet above NAVD88. Floodplain compensation is not required since the floodplain is influenced by coastal rather than riverine flooding.

Rare Species

There are no known rare species at this site.

Vegetation Clearing

The site is generally clear from any vegetation or trees; therefore, tree clearing would not be required.

Land Use and Zoning

This site is located within the Quonset Business Park District and is marked as Quonset Light Industrial District ("QLID"). Permitted uses in this area include wind and solar energy systems (accessory use). Variances are not expected to be required to build the OnSS.

Sensitive Receptors

There are no sensitive receptors as adjacent abutters to this location. The closest sensitive receptor is Fishing Cove Elementary School about 3,400 ft away to the west. The site has four direct abutters touching the property boundary. Of the four direct abutters, two are commercial properties and the other two are open fields; one of which used to carry a small distribution station for TNEC and the other as a right of way for the railway servicing the Quonset Business Park. There are six commercial property abutters directly across the street (Circuit Drive) to the west and two commercial property abutters directly across the street (Burlingham Avenue) to the east. None of the abutters are residential. The closest residential property is approximately 490 feet southwest of this site's property boundary.

Noise Impacts

An acoustic study has not been completed specific to this site but based on the results at the Davisville QDC Substation property, OnSS noise is anticipated to be approximately 55 dBA at the edge of the fence line. Due to the lack of tree cover between the site and residential receptors, some noise mitigation may be required to ensure the sound remains under the Town of North Kingstown's noise ordinance limits.

Visual Impacts

The Fujifilm site does not have any appreciable tree cover and is located within a highly travelled area, despite being in a light industrial zone. As such, visual mitigation, such as vegetative landscaping, may be required.

Utilities

There is a 24-inch stormwater drain that runs from north to south through the middle of the property towards the western edge of the eastern cleared parcel. This stormwater drain may need to be relocated to support substation design.

Availability

The parcels are not actively on the market, but due to favorable technical features, landowners were approached regarding sale.

5.3.2.3 QDC Mainsail Drive Substation Property

The QDC Mainsail Drive substation property is identified on the AP 184, Lot 9 and is located approximately 1,000 feet from the existing TNEC Davisville Substation on a parcel owned by QDC. The parcel address is 215 Mainsail Drive, North Kingstown, Rhode Island, and is a cleared area that is largely comprised of a fenced-in developed laydown area.

Size

The site is approximately 9.9 acres of cleared area that is largely comprised of a fenced-in paved area. The site is bounded by the North Kingstown Golf Course to the north and west. Mainsail Drive bounds the property to the east and Roger Williams Way to the south.

Topography

The site has relatively level topography with elevations varying from 14 feet NAVD88 to 18 feet NAVD88 sloped up from west to east. There is one small rise that has an elevation ranging from 18 feet to 28 feet NAVD88. This site would require minimal amounts of balanced cut/fill regrading and result in a rough site elevation of approximately 16 feet NAVD88.

Accessibility

The site has frontage on Roger Williams Way and Mainsail Drive, and access would likely be built from Mainsail Drive to the station with an access road of minimal length. The proposed substation site would require underground circuits that are approximately 3,510 feet in length to reach the existing TNEC Davisville substation. Between the all the potential onshore cable routes this site is the longest overall (landfall length plus interconnection length) for all the landfall options.

Soil Conditions

The NRCS has mapped predominantly sandy loam or imported soils at this site. Additional geotechnical testing should be performed for stormwater management, pavement and foundation design; however, this soil would be generally suitable for the construction of a substation and significant fill is not expected to be imported.

Contamination

Based on the review of the RIDEM ERM performed by VHB dated May 9, 2020, the property has not been identified in any regulated property databases.

Wetlands

Based on the review of the RIDEM ERM performed by VHB dated May 9, 2020, portions of the site contain state-regulated freshwater wetlands including a tributary to Mill Creek located along the northern property boundary and its associated 100-foot Riverbank

Wetland. A review of the ERM Natural Heritage area coverage indicates that there are no Natural Heritage polygons within the Property limits.

Floodplains

Based on the review of the RIDEM ERM performed by VHB dated May 9, 2020, the southeastern portion of the property is located within the 0.2 % AEP flood hazard areas associated with Narragansett Bay south of the property. Floodplain compensation is not required since the floodplain is influenced by coastal rather than riverine flooding.

Rare Species

There are no known rare species at this site.

Vegetation Clearing

The site is generally clear from any vegetation or trees; therefore, tree clearing would not be required.

Land Use and Zoning

This site is located within the Quonset Business Park District and is marked as Quonset General Industrial District ("QGID"). Permitted uses in this area include wind and solar energy systems (accessory use). Variances will not be required to build the OnSS.

Sensitive Receptors

There are no sensitive receptors as adjacent abutters to this location. The closest sensitive receptor is Fishing Cove Elementary School about 4,000 ft away to the southwest. The site has one direct abutter touching the property boundary which is the North Kingstown Golf Course. There is one abutter directly across the street (Roger Williams Way) to the south which is the right of way for the local railway and one industrial property abutter directly across the street (Mainsail Drive) to the east. None of the abutters are residential. The closest residential property line is approximately 1,190 feet from this site's property boundary.

Noise Impacts

An acoustic study has not been completed specific to this site but based on the results of the noise study at the Davisville QDC Substation property, noise is anticipated to be approximately 55 dBA at the edge of the fence line of the substation. The distance and moderate tree cover between the site and the residential receptors may help with noise mitigation; therefore, additional noise mitigation is not expected to be required to ensure the sound remains below the Town of North Kingstown's noise ordinance limits.

Visual Impacts

The QDC Mainsail Drive site does not have any appreciable tree cover and is located adjacent to a moderately trafficked road, Roger Williams Way. As such, some visual mitigation may be required.

Utilities

There is a 24-inch sanitary line and adjacent abandoned 30-inch sanitary line that both run from north to south through the western side of the property. These would likely have to be relocated for the installation of a substation.

Availability

The parcels are not actively on the market, but based on favorable technical criteria, discussions with parcel owner regarding sale were advanced.

5.3.3 Onshore Substation Evaluation Summary

Revolution Wind evaluated three sites for potential development for the OnSS using the parameters discussed in Section 5.3.2. The table below summarizes the analysis, ranking the criteria with a scale of 1 to 3, where 1 is favorable and 3 is unfavorable.

Table 5-2 Onshore Substation Alternatives Analysis Ranking Criteria

Site Alternative	QDC Davisville	Fujifilm	QDC Mainsail Drive
Space	1 Sufficient space for a substation.	1 Sufficient space for a substation.	1 Sufficient space for a substation.
Topography (Grading Required)	2 Grading required.	1 Minimal grading required.	1 Minimal grading required.
Distance to Davisville Substation	1 745 Feet. No subsurface utilities. Shortest overall option.	3 2130 Feet. Requires one splice vault. Second longest overall option.	3 3510 Feet. Requires one splice vault. Jack and bore under railroad. Longest overall option.
Soil Conditions	1 Suitable sandy loam	1 Suitable sandy loam	1 Suitable sandy loam
Contamination	3 Moderate	1 Low	1 Low
Wetland Impact	2 Yes, buffer impact only	1 No	1 No
Floodplain Mitigation (Elevated Equipment)	1 Low	1 Low	1 Low
Rare Species	1 Rare plant species	1 No known rare species	1 No known rare species

Site Alternative	QDC Davisville	Fujifilm	QDC Mainsail Drive
	identified that will be avoided		
Habitats and Tree Clearing	3 4.4 acres of tree clearing required	1 No tree clearing required	1 No tree clearing required
Land Use and Zoning	2 Zoning variance required. Residential abutters.	1 Light Industrial: no variance	1 General Industrial: no variance
Sensitive Receptors	2 Direct residential abutters	1 No residential abutters	1 No residential abutters
Noise Mitigation	1 Sound mitigation not expected	2 Noise mitigation expected	1 Sound mitigation not expected
Visual Mitigation	1 No Visual mitigation needed	2 Visual mitigation potentially needed	2 Visual mitigation potentially needed
Real Estate	1 Site control granted	3 No site control	3 No site control
Underground Utilities	1 No underground utilities	2 One underground utility	3 Two underground utilities
OVERALL RANKING SCORE	23	22	22

The QDC Davisville Substation Property is the preferred location due to the proximity to the existing TNEC Davisville Substation, acquisition of the property, and subsequent support from QDC and the Town of North Kingstown.

5.4 Landfall and Onshore Transmission Cable

5.4.1 Landfall and Routing Alternatives

Based on the preferred RWEC route (i.e., entering Narragansett Bay via West Passage) and interconnection location (i.e., the Davisville Substation), evaluation of potential Landfall and Onshore Transmission Cable routes began with identification and evaluation of specific landfall sites around Quonset Point in North Kingstown, Rhode Island. Four potential landfall sites were identified based on real estate, engineering, and environmental considerations, referred to as the Quonset Business Park Route Alternative, Blue Beach Alternative, Whitecap Drive Alternative, and Hayward West Alternative landfall locations (see Figure 5-3).

The assessment of potential Landfall and Onshore Transmission Cable routes was developed with input from various State and Federal agencies and on an evaluation property availability, of length of the underground cable (from suitable landfall to OnSS), installation infrastructure, reliability concerns, wetlands, contamination, rare species, vegetation clearing, route analysis, utilities, estimated construction schedules, and estimated construction costs. For the purposes of this analysis, it was assumed that the Davisville QDC Substation site described in Section 5.3 would be the OnSS.

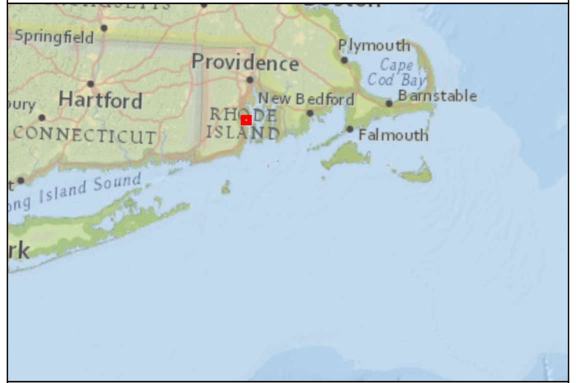
This page intentionally left blank.

Revolution Wind

Figure 5-3
Onshore Cable Route Alternatives
NORTH KINGSTOWN, RI

Legend
- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Landfall Area
- Onshore Cable Route
- Blue Beach Alternative
- Quonset Business Park Alternative
- Hayward West Alternative
- White Cap Drive Alternative
- Emissive Energy Route Variation
- Parcel Boundary

Service Layer Credits: RIDEM/Tax_Parcels: RI State, 37 Towns
National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
Rhode Island Aerial Photographs (Spring 2018; State Plane):



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 60 120 180 Meters

0 200 400 600 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

5.4.1.1 Blue Beach Landfall Route Alternative

At the Blue Beach landfall location, the RWEC and Onshore Transmission Cable would be jointed at TJBs located approximately 350 ft (106 m) inland from Blue Beach adjacent to a public pathway to the beach. The Onshore Cable route would follow Lot 22 north to Circuit Drive. The route would head west on Circuit Drive until it reaches a paved roadway where it turns west then south (bisecting road of Stanley-Bostitch and Bel Air Finishing Supply Corp), followed by a turn to the west on Camp Avenue. The route continues west on Camp Avenue until it reaches the proposed substation access road to the preferred substation site, which is located on the north side of Camp Avenue.

This landfall and route alternative was originally proposed based on the ability to acquire the property. However, based on feedback from States agencies on the amount of temporary direct wetland impacts and recreational use of the walkway, various additional landfall routes were reviewed and private property owners approached.

Property Review

As discussed above, the Blue Beach route alternative transverses multiple parcels of various ownerships with permits and/or easements being required for each parcel.

The Blue Beach Alternative also has 18 direct abutters along the proposed route. Of the 18, six are residential and the remaining are commercial/industrial owners. There are nine additional abutters within 300 ft (91 m) of the proposed cable route, all of which are residential.

Wetlands

This alternative would require temporary filling of freshwater wetlands and adjoining tidal salt marsh near the Blue Beach walkway to allow for the installation of cable infrastructure. Since the infrastructure will be placed underground and will mostly occur within the footprint of the existing walking path from Blue Beach to the parking area on Circuit Drive, all wetland fill during construction is expected to be temporary. Temporary fill includes the placement of swamp mats or similar structures to facilitate construction while causing minimal impact to the wetland and will be removed after construction is complete.

Contamination

Three contaminated sites were identified along this route. The Blue Beach Disposal Area is the former Quonset Naval Air Station that was formerly used as a salvage yard for the storage and disposal of vehicle parts, machinery, construction debris, drummed materials, practice bombs (ordnance), and miscellaneous waste. The USACE is performing ongoing investigations and remediation activities. Groundwater samples collected in early 2020 reveal groundwater contamination above RIDEM's GA groundwater objectives including benzo(a)pyrene, trichloroethylene, and vinyl chloride. The former Keifer Park Tank Farm has documented releases of jet fuel and aviation.

Rare Species

One State plant species of special concern, butterfly milkweed (*Asclepias tuberosa*), is adjacent to this alternative route. In addition, forested portions may provide potentially suitable summer habitat for the federally threatened NLEB. Bat acoustic surveys conducted in the summer of 202 resulted in a probable absence determination for NLEB.

Vegetation Clearing

Along Blue Beach walkway, a 30-foot clearing width would be required to provide enough working room for the offshore to onshore shore landing of the cables, as well as installation of the onshore cable system. This will result in tree clearing along the walkway. Tree clearing required near the Davisville substation would be minimal beyond what would be required to build the substation access road as the circuits would follow and be installed below this access road.

Habitat conversion will result from vegetation clearing and grading that will be required within the Blue Beach Landfall Work Area to allow for safe access for construction equipment and personnel and to establish construction staging areas. The impacted habitat types include portions of oak forest, Freshwater Wetland 1 (ruderal forested swamp), tidal salt marsh, and coastal beach/dune. When completed, the infrastructure at the Landfall Work Area will be placed underground. The impacted habitat types will be considered "converted" habitats that will initially revegetate as a grass/forb and herbaceous cover then will gradually transition to shrub and sapling cover. These two initial phases of regeneration will support different plant communities and wildlife relative to the existing baseline conditions.

Route Analysis

The proposed Blue Beach route would consist of approximately 0.77 miles of open-cut trenching, with no assumed trenchless crossings. Most of the route would be constructed in existing roadway. The off-roadway construction would be located near the start and end segments of the route, the Blue Beach pedestrian walkway, and the approach to the substation. This route's key aspects include:

- Shortest of the proposed onshore route alternatives
- Landfall location has limited impact on surrounding businesses
- Minimal distance on existing roadways, least potential disturbance to existing subsurface utilities

A summary of each segment of the route is below.

<u>Blue Beach Pedestrian Walkway</u>

A portion of the Blue Beach Alternative includes construction within a portion of and parallel to the existing Blue Beach gravel pedestrian walkway. Although this would require permitting and closure of the pedestrian walkway, it would reduce vehicle traffic control and potentially restoration costs. In addition, it is assumed that there are no subsurface utility crossings. However, there is limited space for construction and construction would require clearing vegetation up to 30 ft in width.

There is also a stream crossing and wetland encroachment in this segment. Considerations associated with the stream crossing include:

- Need for temporary and potentially permanent bridge upgrade to accommodate construction traffic and future access;

- Temporary mitigation of stream during construction – culvert or pumping methods may be required;
- Stream restoration post construction; and
- Potential trenchless crossing or bridge attachment may be required if open cut installation of the duct bank below the stream is not possible.

Circuit Drive

This segment will be installed within the road ROW and will require minimal vegetation clearing and no trenchless crossings. However, there are conflicts with existing subsurface utilities and utility relocations may be required for both duct bank and splice vault installation. In addition, there would be a reduction in Eversource's standard horizontal and vertical clearance requirements due to the existing subsurface utilities.

Camp Avenue

Although Camp Avenue has minimal existing subsurface utilities, it has possible residential disturbance associated with construction noise and access roads.

Off-Road Approach to Substation Termination

This off-roadway approach to the OnSS is assumed to be the same for all onshore cable routes. A permanent access road would be constructed, and the underground utility line would be installed via open trench. Some vegetation clearing would be required.

Splice Vaults

The feasibility of placing splice vaults outside of the current road easement were evaluated. It was determined that splice vaults would be placed approximately 1,600 linear feet apart in two locations, with two splice vaults at each location. The first location is within the Blue Beach walkway parking lot. There are no known utility conflicts and closure of the parking lot during construction would be required. The second location has potential utility conflicts and could require relocation of existing sewer, water, and natural gas lines if the splice vaults are installed within the roadway. If the splice vaults were installed off the roadway, a private easement would need to be obtained and there could potentially be an issue with overhead line clearance for construction equipment if it was placed too close to the roadway.

Utilities

Based on a preliminary evaluation, this route would require crossing approximately 36 existing utilities. In addition, there are several existing parallel utilities in the roadway that may require relocation or protection in place.

5.4.1.2 Hayward West Alternative

Starting from the shore landing location at Blue Beach, this route alternative begins at the TJB location, located approximately 350 ft inland in the area of open land in between the existing Blue Beach walkway and the Hayward Industries building. The route proceeds north in the wooded/overgrown land, paralleling the Blue Beach pedestrian walkway to reach the existing roadway, Circuit Drive. The route heads west on Circuit Drive until it reaches a paved roadway where it turns west then south (bisecting road of Stanley-Bostitch and Bel Air

Finishing Supply Corp), followed by a turn to the west on Camp Ave. The route continues west on Camp Ave. until it follows the proposed substation access road to the future substation termination, located in the land parcel on the north side of the Camp Ave.

This landing and route alternative was proposed to reduce the amount of temporary direct wetland impacts associated with the Blue Beach Route Alternative and shift the impacts to be within the wetland buffer zone. The Hayward West route will reduce the environmental impacts at the landfall in contrast to the Blue Beach Route Alternative, while enabling the walkway to remain open during construction as a public access point to Blue Beach for the community.

Property Review

The Hayward West route alternative transverses multiple land parcels containing various ownerships. With each differing parcel necessary permits and easements will be required.

The Hayward West route has 17 direct abutters along the proposed route. Of the 17 direct abutters, six are residential and the remaining are commercial / industrial owners. There are nine additional abutters within 300 ft of the proposed export cable route, all of which are residential.

Wetlands

The shift of this alternative from the Blue Beach pedestrian walkway onto Hayward Industries properties removes any direct temporary impacts wetlands associated with the Blue Beach Alternative. Minimal temporary impacts within the 50 ft wetland buffer will be involved. Permitting for temporary impacts to a wetland buffer is more favorable than temporary direct impacts to wetlands.

Contamination

The potentially hazardous sites discussed for the Blue Beach Alternative apply are the same for they Hayward West Alternative. Please refer to that discussion for information on contamination.

Rare Species

One State plant species of special concern, butterfly milkweed (*Asclepias tuberosa*), is adjacent to this alternative route. In addition, forested portions may provide potentially suitable summer habitat for the federally threatened NLEB. Bat acoustic surveys conducted in the summer of 202 resulted in a probable absence determination for NLEB.

Vegetation Clearing

An approximately 98 ft wide x 328 ft long construction area will be required to support the TJB installation. This will require tree clearing within this area along the Hayward Industries perimeter adjacent to the Blue Beach walkway.

Route Analysis

The proposed Hayward West route would consist of approximately 0.78 miles of open-cut trenching, with no assumed trenchless crossings. Most of the route would be constructed in existing roadway. The off-roadway construction would be located near the initial and end segments of the route, the portion running parallel to the Blue Beach Walkway in Hayward Industry property, and the approach to the OnSS. This route's key aspects include:

- Similar length to the shortest proposed onshore route alternatives (i.e., Blue Beach Alternative)
- Landfall location has limited impact on environmental and public areas
- Minimal distance on existing roadways, least potential disturbance to existing subsurface utilities

Utilities

Based on a preliminary evaluation, this route would require crossing approximately 36 existing utilities. In addition, there are several existing parallel utilities in the roadway that may require relocation or protection in place.

5.4.1.3 Whitecap Drive Alternative

Starting from the shore landing location, this route alternative begins at the Whitecap Drive landfall location, located in the Hayward Industry parking lot. From there the route begins on Whitecap Drive as it heads north until it reaches Circuit Drive, where it merges with the other alternative routes, and turns west. It follows Circuit Drive until it reaches a paved roadway where it turns west then south (bisecting road of Stanley-Bostitch and Bel Air Finishing Supply Corp), followed by a turn to the west on Camp Ave. The route continues west on Camp Avenue until it follows the proposed substation access road to the future substation termination, located in the land parcel on the north side of the Camp Avenue.

Property Review

The Whitecap Drive route alternative transverses multiple land parcels containing various ownerships. With each differing parcel necessary permits and easements will be required.

The Whitecap Drive route has 21 direct abutters along the cable route. Of the 21 direct abutters, six are residential and the remaining are commercial / industrial owners. There are nine additional abutters within 300 ft of the proposed export cable route, all of which are residential.

Wetlands

There are no wetlands or wetland buffers along this proposed route.

Contamination

The Blue Beach Disposal Area and Camp Avenue Dump discussed for the Blue Beach Alternative are also within this alternative's footprint. In addition to those two potentially hazardous sites, the Falvey Property is present just south of the southern terminus of the Whitecap Alternative. The property contains a USACE paved cap that covers a "deep fill area" that straddles a portion of the property between the Hayward (AP 179/Lot 28) and Falvey (AP 185/Lot 20) properties. The site has an ELUR that restricts access to the underlying soils. According to the USACE, the soils are contaminated with polychlorinated biphenyls and each property owner is responsible for maintenance of the cap.

Rare Species

The same rare species within the immediate vicinity of the Blue Beach Alternative are present along the Whitecap Alternative.

Vegetation Clearing

Minimal tree trimming and/or clearing would be required to construct this alternative. Habitat conversion is not a factor at this potential landfall alternative because the baseline habitat conditions of these areas are less complex than the Blue Beach landfall location and include developed areas such as mowed lawn, parking lots and roads. Potential indirect impacts include the spread of invasive species, reduction in habitat quality, and displacement of wildlife and resources.

Route Analysis

The proposed Whitecap Drive route would consist of approximately 0.81 miles of open-cut trenching, with no assumed trenchless crossings. The route would be constructed in existing roadway, apart from the end segments approach to the substation. This route's key items include:

- This is one of the shorter proposed onshore routes
- Landfall location is within a business parking lot

Utilities

Based on a preliminary evaluation, this route would require crossing approximately 51 existing utilities. In addition, there are several existing parallel utilities in the roadway that may require relocation or protection in place.

5.4.1.4 Quonset Business Park Alternative

Starting from the shore landing location, this route alternative begins at the Quonset Business Park landfall location, located in the Quonset Business Park yard. From there the route continues on Burlingham Avenue heading north until it reaches Circuit Drive where it turns west. It follows Circuit Drive until it reaches a paved roadway where it turns west then south (bisecting road of Stanley-Bostitch and Bel Air Finishing Supply Corp), followed by a turn to the west on Camp Ave. The route continues west on Camp Ave. until it follows the proposed substation access road to the future substation termination, located in the land parcel on the north side of the Camp Ave.

Property Review

The Quonset Business Park route alternative transverses multiple land parcels containing various ownerships. With each differing parcel, necessary permits and easements will be required.

The Quonset Business Park route has 21 direct abutters along the cable route. Of the 21 direct abutters, six are residential and the remaining are commercial / industrial owners. There are 10 additional abutters within 300 ft of the proposed export cable route. Nine are residential and one is a commercial; however, the commercial property belongs to the QDC.

Wetlands

There are no direct wetland or wetland buffer impacts associated with this alternative.

Contamination

The Property is not part of the former Blue Beach Disposal Area, Former Keifer Park Tank Farm, or in the location of the USACE Cap. Contamination in this area is unknown but suspected to have less issues as compared to the Whitecap Drive and Blue Beach options. Desktop review of RIDEM's files also indicates there are no ELURs on this property. Once site control is obtained, further environmental evaluations will be completed.

Rare Species

No rare species or suitable habitat is present at the Goodison landfall route.

Vegetation Clearing

There are no significant areas of vegetation within the previously developed Quonset Business Park landfall site.

Route Analysis

The proposed Quonset Business Park route would consist of approximately 0.95 miles of open-cut trenching, with no assumed trenchless crossings. The route would be constructed in existing roadway, apart from the end segments approach to the substation. This route's key items include:

- Relatively short length of the proposed onshore route alternatives
- Landfall location is within a more remote portion of the business park and does not have any impacts to public access points
- No direct wetland or wetland buffer impacts
- Majority of the route to be constructed within existing roadways

Utilities

Based on a preliminary evaluation, this route would require crossing approximately 58 existing utilities. In addition, there are several existing parallel utilities in the roadway that may require relocation or protection in place.

5.4.1.5 Emissive Energy Route Variation

The Emissive Energy alternative utilizes the Emissive Energy rear parking lot reducing route length while also bypassing a portion of the high utility congested Circuit Drive roadway. Four route alternatives; Blue Beach, Hayward West, Whitecap Drive, and Quonset Business Park can utilize this alternative.

Picking up at an approximate midpoint of Circuit Drive, the Emissive Energy Alternative heads northwest on a private drive into the Emissive Energy parking lot located on the south side of the building. From there the route continues northwest across the parking lot and existing landscaped area to reach Camp Avenue where it continues to the Davisville substation like the previously mentioned route alternatives.

This route would require installation in existing roadways and landscaped areas. It would have minimal conflicts with existing utilities and splice vaults would be installed within the parking lot. It would also require closing the Emissive Energy parking lot during construction and would require pavement of the entire parking lot post-construction. This route would also require clearing and grubbing and acquisition of a private easement. In addition, there are three additional abutters within 300 ft of the proposed cable route, all of which are residential.

The proposed alternative would reduce each route length by approximately 0.12 miles They key items to note for this alternative include:

- It would reduce traffic impact
- It would reduce construction cost (337 days) and duration
- There would be minimal distance on existing roadways and the least potential disturbance to existing subsurface utilities
- A private property easement would be required

5.4.2 Summary of Landfall and Onshore Cable Route Analysis

After coordination with agencies and property owners and consideration of environmental, cost and reliability factors, the Quonset Business Park Landfall and Routing alternatives was selected as the preferred landfall location with the potential to utilize the Emissive Energy Route Variation. The Quonset Business Park Landfall and Routing provides a balance of property availability, minimization of environmental concerns and constructability opportunities, while addressing the concerns vocalized by state agencies.

The onshore cable route is currently under review while engineering and environmental analysis are being completed. Revolution Wind anticipates that a decision will be made in the first quarter of 2021.

5.5 Preferred Alternative

Revolution Wind identified the Preferred Alternative for the Project based on the results of the alternative evaluations discussed above. To arrive at a Preferred Alternative for the entire Project, each of the separate Project component alternative evaluations were taken into consideration as a whole to create the entire Preferred Alternative. The Preferred Alternative, which comprises the Project components and which meets the established purpose of the Project, consists of the following:

- Landfall Location and Point of Interconnection Alternative 1, consisting of an RWEC route through the West Passage of Narragansett Bay to Quonset Point and connection to the existing Davisville Substation in North Kingstown, Rhode Island.
- Installation of submarine cables via hydraulic plow (i.e., jet-plow and controlled flow excavation) mechanical plow, mechanical dredging (i.e., mechanical cutter and trailing suction hopper dredger), or similar technology for displacing sediments to allow for cable burial.
- Installation of the RWEC at the landfall location.

- Landfall site at Quonset Business Park.
- Below-ground installation of the Onshore Transmission Cables between the preferred landfall and the preferred OnSS site.
- OnSS, located at Plat 179, Lots 001 and 030 and the ICF and Davisville Substation, located at Plat 179, Lot 005, are both adjacent to Camp Avenue.

5.6 Conclusion

Revolution Wind has evaluated multiple alternatives for both offshore and onshore components of the Project. Based on the analysis above, Revolution Wind has determined the routing of the RWEC through the West Passage of Narragansett Bay to Quonset Point, installing the Onshore Transmission Cables underground, and building a new OnSS on the QDC Davisville Substation site adjacent to and connecting to TNEC's existing Davisville Substation is superior to the alternatives considered. Construction of the Project as proposed will provide a clean, renewable energy source at reasonable cost and will not cause unacceptable harm to the environment.

This page intentionally left blank.

6

Description of Affected Natural Environment

This section of the ER describes the existing natural environment that may be affected by the proposed Project. As required by the EFSB Rules and Regulations, this section includes a detailed description of all environmental characteristics within and immediately surrounding the proposed Project. The following section describes the specific natural features that have been assessed for the evaluation of impacts and the preparation of a mitigation plan. Information pertaining to existing site conditions has been obtained through available published resource information, the Rhode Island Geographic Information System ("RIGIS") database, various state and local agencies, and field investigations of the Project Study Area.

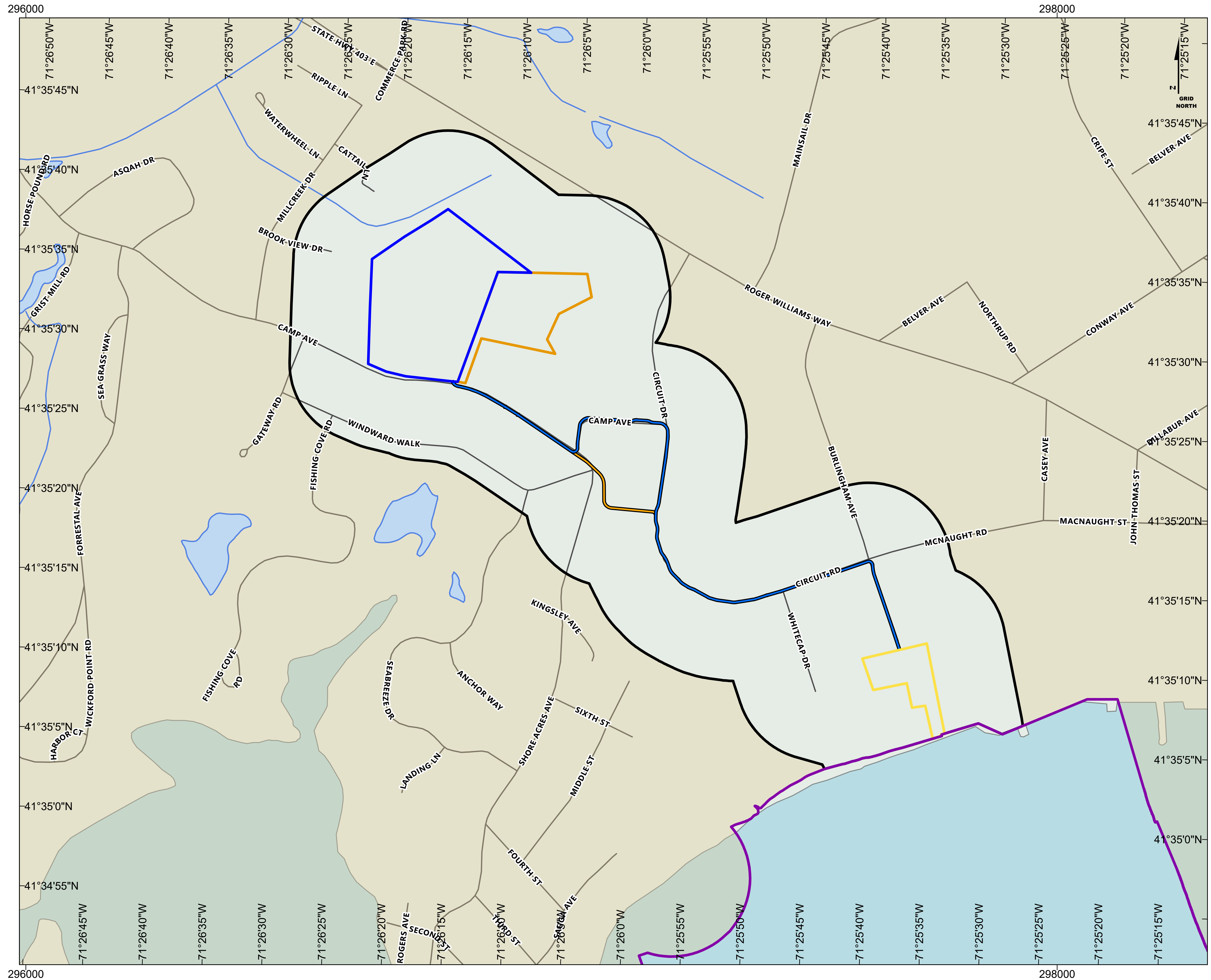
Physical, biological, cultural, visual, and socioeconomic resources were characterized based upon extensive desktop studies, targeted field studies, predictive modeling, and data analysis. These assessments provided a detailed background on the condition of these resources in the affected environment. Desktop studies included: literature reviews; examination of publicly available datasets; direct communication with academic and government science researchers; and consultation with state and federal government entities. The Rhode Island Ocean Special Area Management Plan ("OSAMP") (RI CRMC, 2010) and the Massachusetts Ocean Management Plan provided important insight on environmental conditions and existing human activities in and near the RWEC-RI. The resource characterizations also relied on the material published in recent BOEM NEPA documents, such as the Final Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf (BOEM, 2007).

6.1 Project Study Area

The Study Area for the Onshore Facilities is defined as a 500-foot radius from the Onshore Transmission Cable route, the Landfall Work Area, and the parcels for the proposed OnSS and ICF. The Study Area for the offshore components of the Project (i.e., the RWEC-RI Area) is variable, with it being approximately 10,500 linear feet at its widest point and 1,300 feet at its narrowest. See Figures 6-1A and 6-1B.

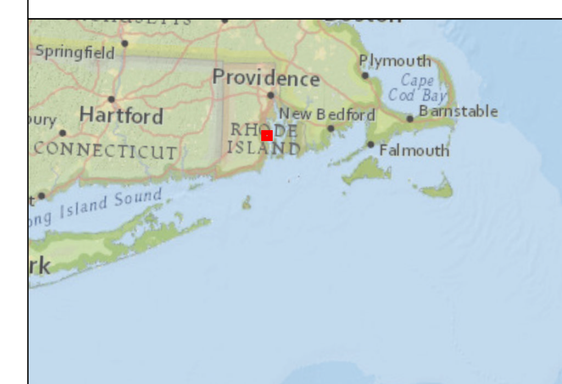
This page intentionally left blank.

Revolution Wind
Figure 6-1A
Onshore Study Area
NORTH KINGSTOWN, RI



Legend
- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Onshore Transmission Cable
- Alternative Cable Route Segment
- Landfall Area
- Limits of Study Area
- RWEC-RI Study Area
- Parcel Boundary

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 80 160 240 Meters

0 240 480 720 Feet

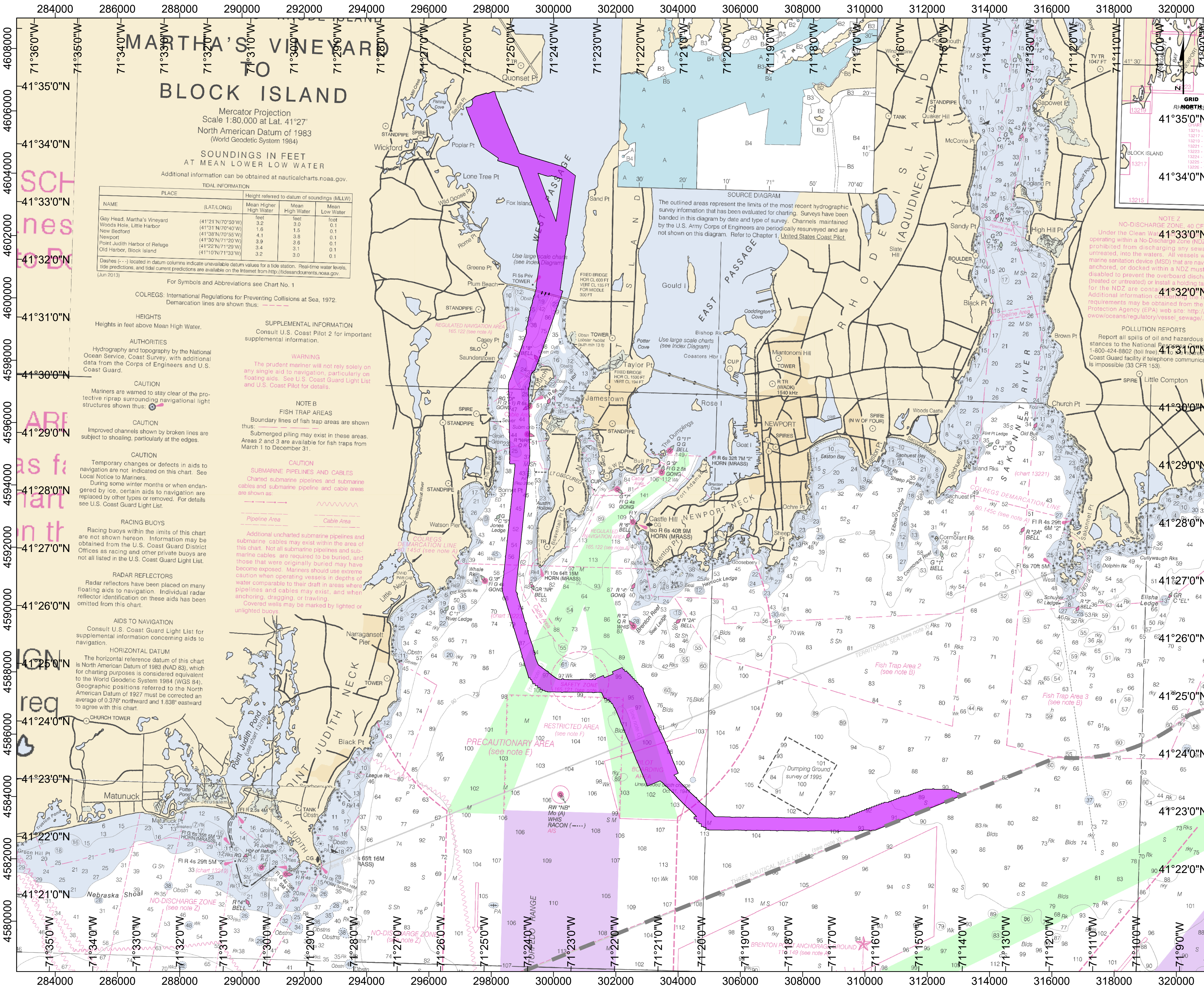
Date: 12/3/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind

Powered by Ørsted & Eversource

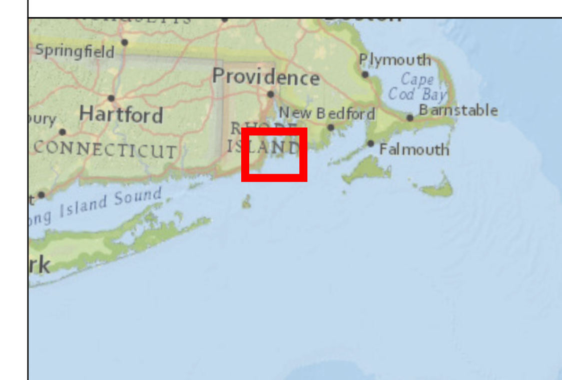
This page intentionally left blank.



Revolution Wind
Figure 6-1B
Offshore Study Area

Legend
- RWEC-RI Study Area
- 3-Nautical Mile State Water Boundary

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
NOAA Raster Nautical Charts (RNC): NOAA Office of Coast Survey



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 1000 2000 3000 Meters

0 4,000 8,000 12,000 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

6.2 Climate and Weather

Climate and weather are discussed generally for the state of Rhode Island. Rhode Island has a moist continental climate with four distinct seasons (Rhode Island Secretary of State, n.d.). Rhode Island's weather is tempered by sea winds, particularly in the Seaboard Lowland, which has a more moderate climate than the rest of New England. North Kingstown enjoys a moderate climate due to its close proximity to the Narragansett Bay which helps to minimize extreme temperatures. Although the Bay has a moderating effect, temperatures in Rhode Island tend to fluctuate by large ranges both daily and annually (National Climatic Data Center, 2011). The mean annual temperature of Rhode Island's coastal areas along Narragansett Bay, is 51 degrees Fahrenheit. Rhode Island is characterized by an even distribution of precipitation throughout the year with an annual average of 42 to 46 inches over most of the state, with approximately 20 inches of that total attributed to snowfall in the coastal Narragansett Bay regions (National Climatic Data Center, 2011). Due to its proximity to the belt of generally eastward air movement which interacts to produce storm systems, Rhode Island experiences a considerable diversity of weather over the short term and long-term scale (National Climatic Data Center, 2011). Rhode Island is geographically situated so that in winter, the contrast between cold air masses of the continental interior and the relatively warm Atlantic Ocean provides the energy for occasional intense Nor'easter storms (Runkle et al., 2017).

The effects of climate change in Rhode Island are measurable and will continue to impact Rhode Island. According to the State of the Narragansett Bay and its Watershed Technical Report, the average air temperature in Rhode Island has increased by more than 3 degrees Fahrenheit since the beginning of the century. (Narragansett Bay Estuary Program, 2017). Similarly, the surface temperature in Narragansett Bay has risen by nearly 3 degrees Fahrenheit since the 1960s with the most rapid warming occurring in the winter (Fulweiler et al. 2015). Climate projections suggest that average air temperature will increase approximately 5 to 10°F by 2100 depending on the greenhouse gas emission rate (Narragansett Bay Estuary Program, 2017).

Climate change has also resulted in a higher intensity of rainfall events that lead to flooding. Rhode Island's average annual precipitation has increased more than 10 inches since 1903 (Rhode Island Climate Resilience Action Strategy, 2018); the amount of annual precipitation falling during intense storms has increased 71 percent since 1965 (Narragansett Bay Estuary Program, 2017). It is projected that precipitation will be concentrated into fewer, more extreme events which may lead to more frequent extreme dry periods throughout the state. These drier periods of drought are expected to occur in the warmer summer months (Rhode Island Climate Resilience Action Strategy, 2018).

6.3 Geology

This section includes a general summary of geological conditions from various local researchers (e.g., King) for the Onshore and Offshore Study Areas as well as extensive G&G

surveys completed by Fugro in 2019/2020 (Fugro, 2020) to more precisely characterize geological conditions within the Offshore Study Area.[22]

6.3.1 Bedrock Geology

The geological framework of the southern Rhode Island region is characterized by a mix of Mesozoic aged metamorphic and plutonic igneous bedrock. In the Narragansett Basin, which includes the Onshore Facilities, Narragansett Bay and much of Rhode Island Sound, this basement crystalline rock is locally superimposed with deposits of softer, dark, carbon-rich sedimentary Pennsylvanian-age rock up to hundreds of feet thick. The east and west passage of Narragansett Bay and the Sakonnet River are drowned eroded valleys cut into this bedrock (McMaster and Ashraf 1973). The geology and shallow structure of Rhode Island Sound was studied using seismic reflection by O'Hara et al. (1980), Needell et al. (1983), McMullen et al. (2007a), McMullen et al. (2008), McMullen et al. (2011) and Poppe et al. (2014). McMaster (1984) and McMullen et al (2007b) completed similar work in Narragansett Bay.

This bedrock suite within the Narragansett Basin dips southward into Rhode Island Sound. The surfaces of this rock are cut by unconformities that are now drowned and filled valleys and ancient river channels that extend waterward from the coast. These features were formed by erosive forces during extended periods of sea level depression. Approximately 7.5 to 12.5 mi (12 to 20 km) south of the Rhode Island coastline, southward dipping bedrock contacts and then slips below a separate geologic unit associated with the submerged coastal plain and the continental shelf strata laid down in the late Cretaceous and early Tertiary Periods. The contact between the two contrasting bedrock types is abrupt and occurs along a strongly oscillating line where coastal plain sediment strata were severely eroded during the late Tertiary and early Pleistocene Periods. The eroded face of these coastal plain strata forms a steep north-facing escarpment or cuesta along the contact. This feature can be traced from western Long Island Sound north to Georges Bank (Weed et al. 1974). The coastal plain sediments are poorly studied with little information available concerning physical properties. Fugro (2020) describes the Coastal Plain Formation as consisting of unconsolidated to semi-consolidated sand, gravel, silt, and clay.

6.3.2 Surficial Geology

6.3.2.1 Revolution Wind Export Cable

The surficial geology within portions of the Narragansett Bay and Study Area has been previously described by J. King Consulting, LLC, prepared by analyzing published work by Needell et al. (1983), McMaster (1984), Oakley (2012), and by re-analyzing open file data from these surveys (McMullen et al. 2009). More recent data are also available from a multiyear seismic reflection survey conducted by the University of Rhode Island between 2004 and 2008. Finally, the entire RWEC-RI was evaluated by Fugro in their G&G survey report (Fugro, 2020). The site-specific data collected by Fugro during 2019/2020 surveys are

22 The site-specific geophysical and geotechnical surveys were completed in accordance with 30 CFR 585 and BOEM guidelines for the Construction and Operations Plan approval.

being used to identify potential geologic and anthropogenic hazards that could affect the design, installation, and operation of the RWEC- RI.

General Characterization of Surficial Geology in Narragansett Bay

King (Undated) defined an obstruction as outcropping or shallow bedrock (less than 16 ft (5 m) below the seafloor) or sediment containing boulders. The West Passage of Narragansett Bay includes several islands that are bedrock cored along with bouldery glacial till and moraine deposits. McMaster (1984) documented the presence of gas bearing silt-clay estuarine deposits in the Narragansett Bay that should be avoided. Entrapped gas is detected in seismic reflectivity surveys by abruptly extinguished return signals.

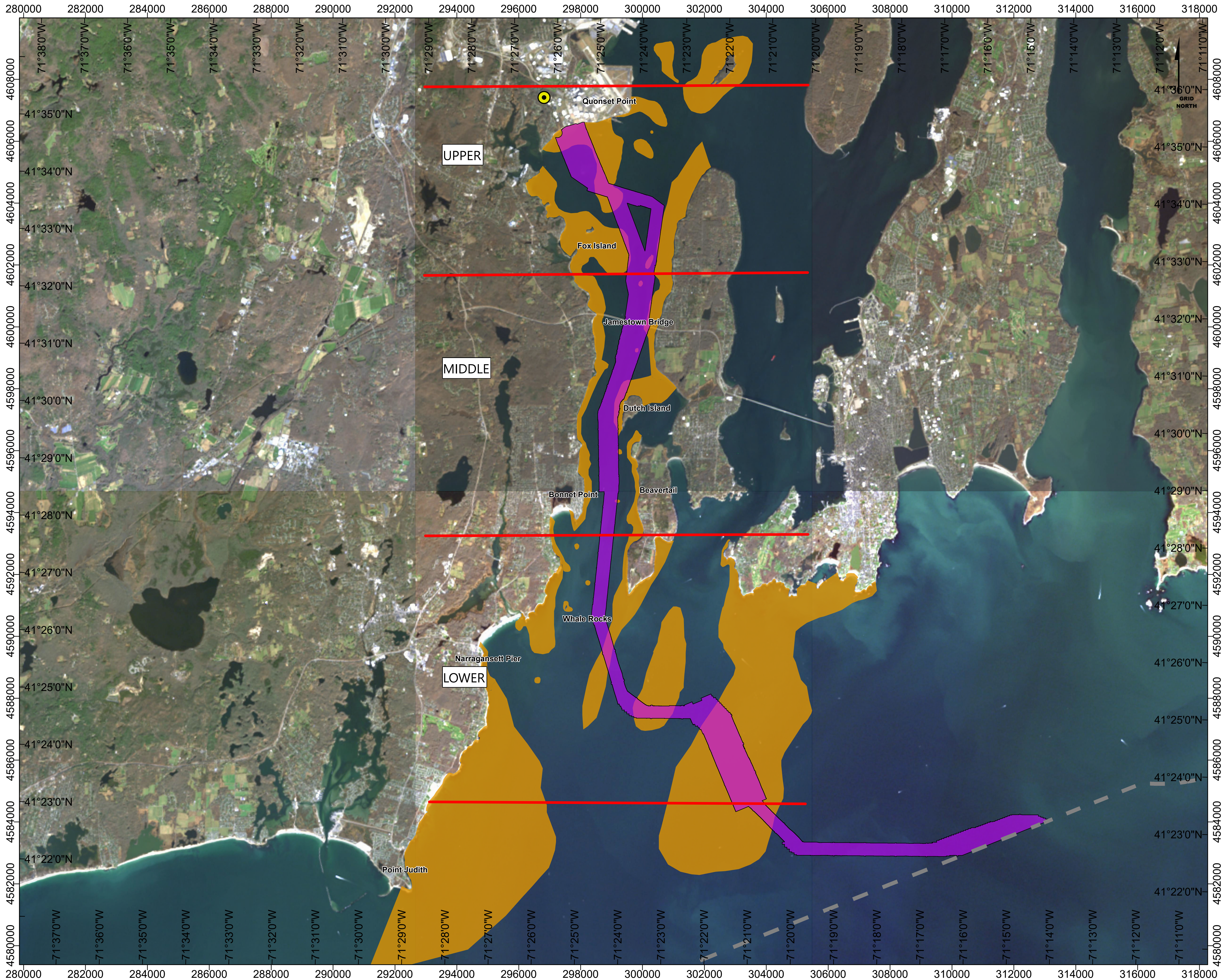
King (Undated) identified three sub-areas that are located along the RWEC–RI:

- Rhode Island Sound and Lower West Passage sub-area
- Middle West Passage sub-area
- Upper West Passage sub-area

These areas, as described by King (Undated), are characterized further in the following subsections. Figure 6-2 below shows the three sub-areas identified by King.

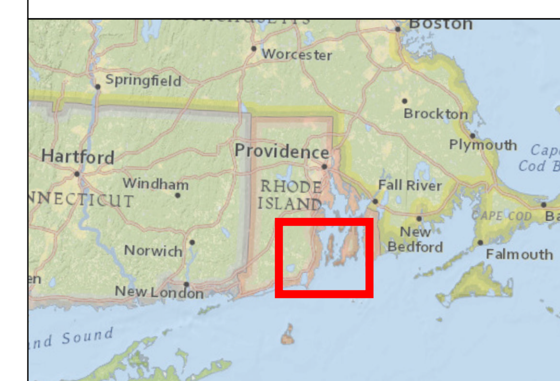
This page intentionally left blank.

Revolution Wind
Figure 6-2
RWEC-RI Geologic Hazards



Legend
- OnSS
- RWEC-RI State Waters
- Geological Obstructions (King)
- 3-Nautical Mile State Water Boundary

Service Layer Credits: Landsat 8 Imagery: Bathymetric with DRA: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
World_Ocean_Base: Esri, DeLorme, NaturalVue



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 1000 2000 3000 Meters

0 3,000 6,000 9,000 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind

Powered by Ørsted & Eversource

This page intentionally left blank.

Rhode Island Sound and Lower West Passage Sub-Area

This sub-area begins in Rhode Island Sound and continues north to Beavertail on Conanicut Island (Jamestown). Shallow bedrock was encountered in several areas in this sub-area including submerged continuations of Aquidneck and Conanicut Islands that extend several miles (km) south from their coastlines. This includes outcrops of bedrock near Brenton Reef.

King reports that this bedrock is the same suite associated with the islands, a late Paleozoic meta-sedimentary rock rich in carbon. Boulder fields and bedrock outcrops extend offshore from Point Judith to Narragansett Pier. Part of this boulder field is associated with the Point Judith and Buzzards Bay recessional moraines. King notes that seismic reflections from this boulder field end about 0.9 miles (1.5 km) from the shoreline, but NOAA charts indicate that this obstruction is continuous to the shore.

Other obstructions in this sub-area include named features such as Whale Rock, Jones Ledge and River Ledge. These all represent outcropping bedrock or rocky seafloor conditions.

Middle West Passage Sub-Area

This sub-area begins at Bonnet Point at the south and continues north to the Jamestown Verrazano Bridge (Jamestown Bridge). King used Compressed High Impact Radar Pulse ("CHIRP") seismic reflection data collected by the University of Rhode Island to evaluate obstructions. King describes this reach of the West Passage as mostly unobstructed. Shallow depths to bedrock are reported along the western coastline of Conanicut Island and the rocky shorelines of Narragansett, Saunderstown and North Kingstown. Borings completed in 1979 for the Jamestown Bridge indicated 16 ft (5 m) and 33 ft (10 m) of sediment over bedrock along the eastern third of the bridge approaching Jamestown. The area around Dutch Island, including Dutch Harbor contains bouldery till or shallow bedrock.

Oakley (2012) studied the stratigraphy of Glacial Lake Narragansett and identified two glacial deltaic deposits fed by subglacial flows emerging at the ice front in this area: The Dutch Island Delta west of Dutch Island and the Annaquatucket Delta near the Jamestown Bridge. King noted that these thick sand and gravel deposits are unlikely to contain obstructions but cautioned that the seismic reflection data collected was not sufficient to confirm the absence of obstructions.

Upper West Passage Sub-Area

This sub-area begins north of the Jamestown Bridge and continues north to the landfall location at Quonset Business Park in North Kingstown. The surveys in the sub-area revealed several potential obstructions including shallow bedrock and bouldery till. Seismic data in the vicinity of Fox Island showed the area to be very rocky and that these obstructions were continuous as it approached the mid-point of the west passage with only a narrow unobstructed corridor remaining. Prominent obstructions are also present on the seafloor south of Quonset Point. Approaching the landfall location, Fugro (2019) identified a line of boulder piles with an 820 ft (250 m) gap where the RWEC–RI will need to be routed.

Summary of Site-Specific Survey Data

Data collected by Fugro (2020) within the Study Area is more detailed but does not conflict with King's general characterization of surficial geology in the bay and is discussed below.

This site-specific study is being used in siting the RWEC-RI and identifying potential geological constraints.

Beginning near the shore, the surficial geology of the seafloor is predominantly comprised of fine-grained sediment in the upper 10 ft (3 m), with potential bedrock and/or glacial till exposed in localized areas. Bedrock/glacial till is exposed in the eastern portion of the Study Area and is interpreted to only be 33 ft (10 m) deep in the western portion.

<u>West Passage of Narragansett Bay</u>

Beginning at the landfall location, the RWEC-RI route crosses an area of limited sediment thickness as it proceeds south. A north-south trending feature described on nautical charts as “ledge” may represent shallow glacial till or rock. Before reaching the Jamestown-Verrazzano Bridge, a prominent flood shoal or bar feature comprised of 10 ft (3 m) of coarse-grained deposits is passed. This bar feature may shift during tidal currents or varying flow conditions in the river system. As the Jamestown-Verrazzano Bridge is approached, bouldery glacial till deposits are exposed in the eastern portion of the RWEC-RI and large amounts of debris from the demolition of the former Jamestown-Verrazzano Bridge were observed. The main part of the channel appears to be naturally deep in this area, which is indicative of strong tidal currents.

South of the bridge, the upper 10 ft (3 m) is comprised of very soft to firm fine-grained deposits. The main part of the channel is naturally deep and, based on hydrodynamic studies, is prone to strong ebb and flood tidal currents. Continuing south toward Dutch Island, the naturally deepened channel achieves depths of 33 ft (10 m) to 66 ft (20 m). A prominent bar deposit crosses the channel at a northwest-southeast orientation. This feature may be the result of high ebb and flood tidal currents and is an area with high potential seabed mobility conditions. Glacial till outcrops are present in localized areas along the eastern perimeter of the survey corridor. South of Dutch Island headed to the mouth of the West Passage glacial till deposits were interpreted to be present within 1 to 3 ft (0.3 to1 m) of the seafloor surface. Bedrock may also be present beneath the till surface.

<u>Rhode Island Sound</u>

Within the Rhode Island Sound, the typical stratigraphy consists of approximately 0.5 m thick layer of sand overlying soft to firm clay to Brenton Reef. At Brenton Reef, shallow bedrock is exposed or covered by sediment mantles of ranging from sand to clay texture. Crystalline bedrock outcrops are present that typically extend approximately 3.3 feet (1 m) to 6.5 feet (2 m), but a suitable cable route is available through the reef.

Along the RWEC-RI, potential mobile seabed areas were interpreted based on morphology and oceanographic/tidal conditions. Asymmetrical bedforms inferred to be current driven and mobile. One area of megaripples along the RWEC route between kilometer posts 35 and 36 and ripples (approximately 0.1 to 0.6 m tall) at various locations along the RWEC were assigned a moderate seabed mobility hazard to the megaripple area and low seabed mobility hazard to the current driven ripples that are 0.1 to 0.5 m tall.

6.3.2.2 Revolution Wind Onshore Facilities

The Study Area for Onshore Facilities is in an industrial district of Kiefer Park, at Quonset Business Park in North Kingstown, Rhode Island. This area is part of the large outwash plain that characterizes Quonset Point. Holocene deposits also present in this area include:

- Coastal Beach: Areas of unconsolidated, accreted, usually unvegetated sediments commonly subject to wave action, extending from mean low water landward to an upland rise or backed by a dune or marsh. The beaches within the Study Area range from sandy to cobbly or stony.
- Salt Marsh: Deposits of partially decomposed Holocene-age plant matter in areas typically inundated during higher portions of each tidal cycle.
- Freshwater Wetland: Areas outside of the limits of tidal influence which support hydrophytic vegetation and where organic materials accumulated under the influence of prolonged periods of inundation or saturated soil conditions.
- Human Transported Materials: Areas where the natural soil or surficial geological deposits have been altered, typically by grading, filling, or excavation. These actions obscure the structure of the original surficial deposits and soil forming processes. This unit includes areas where dredge spoils were disposed of on land.

6.3.3 Geological Hazards

Geological hazards, such as earthquakes or fault zones, could have negative impacts on transmission lines or substations. Rhode Island is in a region of the North American plate and falls within seismic zone 2A with 10-14 percent ground acceleration, which translates to a "moderate" seismic hazard (Petersen et al. 2008; US Seismic Zone Map). This means that people may experience moderate intensity shaking that can lead to slight damage during an earthquake event (FEMA Earthquake Hazard maps). There are no significant geologic fault lines in Rhode Island or New England, and the U.S. Geological Survey ("USGS") Earthquake Hazards Program identifies all of Rhode Island as occurring in a low seismic risk area (<2 percent peak ground acceleration). Earthquakes that occur in the northeast, which is considered an intraplate area, do not meet the assumptions of the plate tectonic theory since there is no obvious relationship between earthquake occurrence and fault lines in intraplate areas (Kafka, 2014).

A commonly accepted explanation for the occurrence of earthquakes in the northeast is that "ancient zones of weakness" are being reactivated by the present stress field (Kafka, 2014). This theory hypothesizes that pre-existing faults and other geologic features formed during ancient geological episodes persist today and that earthquakes occur when present-day stress is released along these zones of weakness (Kafka, 2014).

Seismic hazards are generally described by the Northeast States Emergency Consortium ("NESEC"). Data compiled by NESEC reports that 408 earthquakes strong enough to be felt were reported in Massachusetts over a period of 348 years, averaging slightly more than one per year. Only two of these earthquakes, one in 1727 with an estimated magnitude of 5.6 and one in 1755 with an estimated at a magnitude of 6.2 were considered "Damaging Earthquakes" (NESEC 2019). There were only 34 earthquakes reported in Rhode Island between 1766 and 2016 and none were classified as "Damaging Earthquakes". Based on these data, Rhode Island averages one earthquake every eight years.

6.4 Soils

Detailed information concerning the physical properties, classification, agricultural suitability, and erodibility of soils within the Study Area are presented in this section. Descriptions of soil types were obtained from the NRCS Web Soil Survey[23], the Soil Survey of Rhode Island (Rector, 1981), and from on-site investigations conducted by VHB. The Soil Survey delineates map units that may consist of one or more soil series and/or miscellaneous non-soil areas that are closely and continuously associated on the landscape. In addition to the named series, map units include specific phase information that describes the texture and stoniness of the soil surface and the slope class. A total of 11 named soil series have been mapped within the Study Area. Table 6-1 lists the characteristics of the 13 soil map units (lower taxonomic units than series) found within the Study Area.

Table 6-1 Soil Phases within the Study Area

Soil Map Unit Symbol	Soil Phase	Amount in Study Area (Acres)	Drainage Class	Percent Slope
Bax	Beaches, boulders	0.5	N/A	0 to 8
FtA	Fortress sand	5.5	N/A	0 to 3
MU	Merrimac-Urban land complex	69.3	swed	0 to 8
NP	Newport urban land complex	12.9	wd	1 to 15
QoA	Quonset gravelly sandy loam	2.4	ed	0 to 3
QoC	Quonset gravelly sandy loam, rolling	12.9	ed	3 to 15
Rc	Raypol silt loam	0.9	pd	N/A
SwA	Swansea muck	7.9	vpd	0 to 1
UD	Udorthents-Urban land complex	9.6	N/A	0 to 15
Ur	Urban land	36.2	N/A	N/A
UrS	Urban land, sandy substratum	15.6	N/A	0 to 5
Wa	Walpole sandy loam	16.4	pd	0 to 3
WgB	Windsor loam sand	5.6	ed	3 to 8

Source: USDA NRCS Web Soil Survey

Notes: ed – excessively drained; pd – poorly drained (hydric); wd – well drained; vpd – very poorly drained; swed – somewhat excessively drained; N/A – not available

23 Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

6.4.1 Soil Series

The soil series detailed in the following subsections have been identified within the Study Area for the Onshore Facilities. The classification follows the Soil Survey of Rhode Island (Rector, 1981). Beaches, Fortress, and Swansea soil series are not described within the Soil Survey of Rhode Island (1981).

6.4.1.1 Merrimac Series

The Merrimac series consists of sandy, mixed, mesic Typic Dystrochrepts. The soils are somewhat excessively drained and formed in outwash deposits derived from schist, gneiss, and phyllite. They are on outwash plains and terraces and are on the landscape with excessively drained Hinckley and Windsor soils, well drained Agawam and Enfield soils, moderately well drained Sudbury soils, and poorly drained Walpole soils.

6.4.1.2 Newport Series

The Newport series consists of coarse-loamy, mixed, mesic Typic Fragiochrepts. The soils are well drained and formed in compact glacial till derived from dark sandstone, conglomerate, argillite, and phyllite. They are on crests of drumlins and glacial till plains and are on the landscape with well drained Poquonock soils, moderately well drained Birchwood and Pittstown soils, poorly drained Stissing soils, and very poorly drained Mansfield soils.

6.4.1.3 Quonset Series

The Quonset series consists of sandy-skeletal, mixed, mesic Typic Udorthents. The soils are excessively drained and formed in glaciofluvial deposits derived from phyllite, shale, schist, and gneiss. They are on terraces and outwash plains and are on the landscape with excessively drained Hinckley and Windsor soils, somewhat excessively drained Merrimac soils, wells drained Agawam soils, and moderately well drained Sudbury soils. Quonset soils are darker than Hinckley or Windsor soils.

6.4.1.4 Raypol Series

The Raypol series consists of coarse-loamy over sandy or sandy-skeletal, mixed, acid, mesic Aeric-Haplquepts. These poorly drained soils formed in windblown or water-deposited silts derived mainly from schist, gneiss, and shale. They are in depressions mainly on terraces and outwash plains.

6.4.1.5 Udorthents Series

Udorthents are moderately well drained to excessively drained soils that have been cut, filled, or eroded, typically by anthropogenic processes. The areas have had more than two feet of the upper part of the original soil removed or have more than two feet of fill on top of the original soil. Udorthents are extremely variable in texture. They are on glacial till plains and gravelly outwash terraces.

6.4.1.6 Urban Land

Urban land consists mostly of sites for buildings, paved roads and parking lots. The areas are mostly rectangular and range from 5 to 100 acres. Soils included in this unit are small intermingled areas of Udorthents, somewhat excessively drained Merrimac soil, well drained Canton, Charlton, and Newport soils; moderately well drained Pittstown, Sudbury and Sutton soils.

6.4.1.7 Walpole Series

The Walpole series consists of sandy, mixed, mesic Aeric-Haplquepts. The soils are poorly drained and formed in glaciofluvial deposits derived from schist, gneiss, and granite. They are in depressions and drainageways and are on the landscape with excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well drained Agawam soils, moderately well drained Sudbury, Ninigret, and Deerfield soils, and very poorly drained Scarboro soils.

6.4.1.8 Windsor Series

The Windsor series consists of mixed, mesic Typic Udipsamments. The soils are excessively drained and formed in glaciofluvial deposits derived from schist, gneiss, and phyllite. They are on terraces, outwash plains, kames, and eskers and are on the landscape with excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well drained Agawam soils, and moderately well drained Deerfield and Sudbury soils.

6.4.2 Prime Farmland Soils

Prime Farmland, as defined by the United States Department of Agriculture ("USDA"), is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods.

Rhode Island recognizes 35 prime farmland soils (USDA, 2012). Prime farmland soils can be used for cropland, pastureland, rangeland, forestland, or other land.

There are no USDA Prime Farmland Soils within the Study Area for the Onshore Facilities.

6.4.3 Farmland Soils of Statewide Importance

Farmland of Statewide Importance is land that is designated by the Rhode Island Department of Administration Division of Planning to be of statewide importance for the production of food, feed, fiber, forage, and oilseed crops (USDA, 2012). Generally, farmlands of statewide importance include those lands that do not meet the requirements to be considered prime farmland, yet they economically produce high crop yields when treated and managed with modern farming methods. Some may produce as high a yield as prime farmland if conditions are favorable.

In order to extend the additional protection of state regulation to Prime Farmland, the State of Rhode Island has expanded its definition of Farmland of Statewide Importance to include all Prime Farmland areas. Therefore, in Rhode Island, all USDA designated Prime Farmland soils are also Farmland of Statewide Importance. The Study Area crosses five soil phases of Farmland of Statewide Importance (see Table 6-2 below). All of these soils are in previously and/or currently disturbed areas within the Study Area.

Table 6-2 Farmland Soils of Statewide Importance within the Study Area

Soil Map Unit Symbol	Name	Percent Slope	Amount in Study Area (Acres)
QoA	Quonset gravelly sandy loam	0 to 3	2.4
QoC	Quonset gravelly sandy loam, rolling	3 to 15	12.9
Rc	Raypol silt loam	N/A	0.9
Wa	Walpole sandy loam	0 to 3	16.4
WgB	Windsor sandy loam	0 to 3	5.6

Source: USDA NRCS Rhode Island https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ri/soils/?cid=nrcs144p2_016615

6.4.4 Potentially Erosive Soils

The erodibility of a soil is dependent upon the slope of the land occupied by the soil and the texture of the soil. NRCS has characterized soil map units as "highly erodible", "potentially highly erodible", or "not highly erodible" due to sheet and rill erosion (USDA, 1993). This determination is done by using the Universal Soil Loss Equation ("USLE"). The USLE relates the effects of rainfall, soil characteristics, and the length and steepness of slope to the soil's tolerable sheet and rill erosion rate.

Soils are given an erodibility factor (K), which is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values in Rhode Island range from 0.10 to 0.64, with the erodibility factor increasing as the K value increases and vary throughout the depth of the soil profile with changes in soil texture. Very poorly drained soils and certain floodplain soils usually occupy areas with little or no slope. Therefore, these soils are not subject to erosion under normal conditions and are not given an erodibility factor. Quonset gravelly sandy loam, rolling, 3 to 15 percent slopes (QoC) is the only soil map unit within the Study Area that is classified as a potentially erosive soil (see Table 6-3 and Figure 6-3).

Table 6-3 Soil Mapping Unit with Potential Steep Slopes within the Study Area

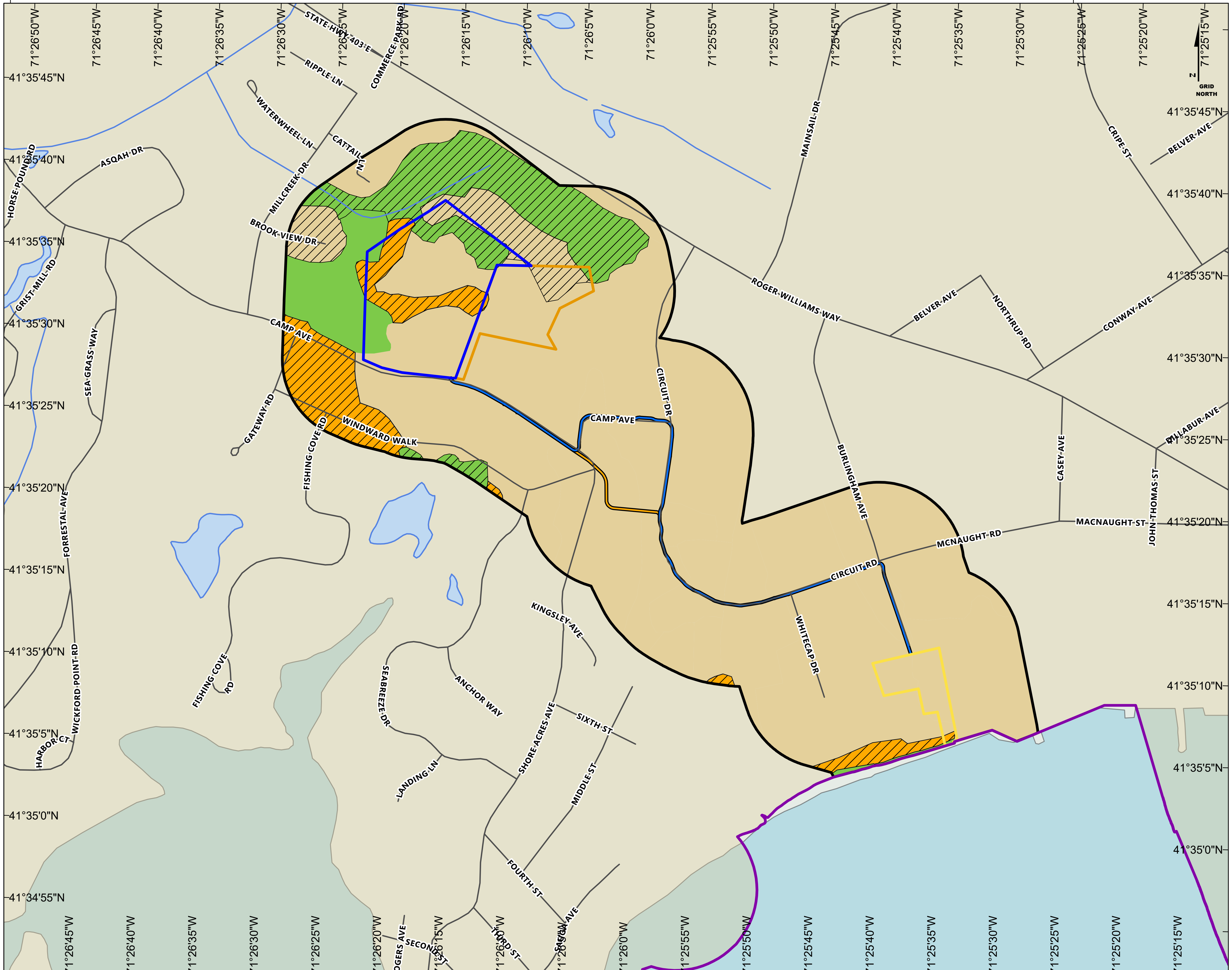
Soil Map Unit Symbol	Soil Phase	Percent Slope	Erodibility Hazard	Surface K Values
QoC	Quonset gravelly sandy loam, rolling	3 to 15	Phel	0.10

Source: Soil Survey of Rhode Island (Rector, 1981) and United States Department of Agriculture, Natural Resources Conservation Service, Highly Erodible Soil Map Units of Rhode Island, Revised January 1993.

Phel Potentially Highly Erodible

This page intentionally left blank.

Revolution Wind
Figure 6-3
Soil Map
NORTH KINGSTOWN, RI



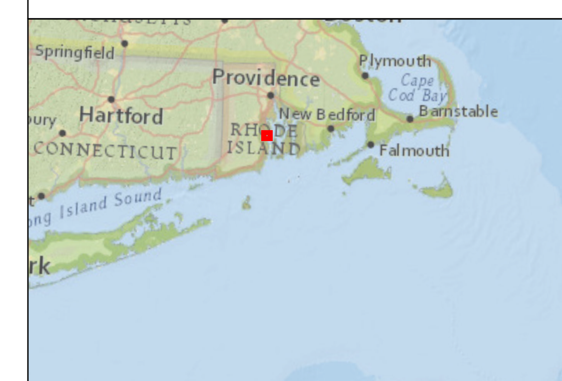
Legend

- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Onshore Transmission Cable
- Alternative Cable Route Segment
- Landfall Area
- Limits of Study Area
- RWEC-RI Study Area
- Parcel Boundary
- Farmland Soil of Statewide Important

Hydric Soils and Steep Sloped Soils

- Hydric Soil
- Potentially Highly Erodable
- Other Lands

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 80 160 240 Meters

0 240 480 720 Feet

Date: 12/29/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

6.5 Surface Water

6.5.1 Revolution Wind Export Cable

This section includes surface water quality for the RWEC-RI. Several parameters were evaluated, including dissolved oxygen ("DO"), chlorophyll *a*, nutrient content, turbidity, and anthropogenic activities that have in the past or currently impact water quality. The description of the affected environment and assessment of potential impacts for water quality were determined by reviewing public data sources and conducting project-specific studies including the following: Rhode Island OSAMP; Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Continental Shelf Offshore Rhode Island and Massachusetts, Revised Environmental Assessment (RI-MA WEA) (BOEM, 2013); National Coastal Condition Report IV ("NCCR") (US EPA, 2012); Narragansett Bay Commission ("NBC") Snapshot of Upper Narragansett Bay data; State of Narragansett Bay and Its Watershed Technical Report (NBWTR) (Narragansett Bay Estuary Program [NBEP], 2017) and Revolution Wind Integrated Geotechnical and Geophysical Site Characterization Study (Fugro, 2020). Available surface and quality data were also reviewed with available RIGIS data and the RIDEM Water Quality Regulations.[24] Most of the RWEC-RI is mapped as SA, which are waters designated for shellfish harvesting for direct human consumption, primary and secondary contact recreational activities, and fish and wildlife habitat. The landfall location is mapped as SB, which are waters designated for primary and secondary contact recreational activities, shellfish harvesting for controlled relay and depuration, and fish and wildlife habitat. Both SA and SB waters have good aesthetic value.

6.5.1.1 RWEC Rhode Island Sound

Dissolved Oxygen

DO refers to the concentration of oxygen present in water. The source of the DO may be the atmosphere and from photosynthesis from aquatic plants including phytoplankton. Low levels of oxygen (hypoxia) or no oxygen levels (anoxia) can occur when excess organic material, such as produced during large algal blooms are decomposed by microorganisms (LICAP, 2016). Water sampling conducted at four stations in Rhode Island Sound in 2002 by the USACE found that DO concentrations both at the surface and in bottom waters remained above established levels for the "highest quality marine waters" and suggests that hypoxic and anoxic conditions do not typically occur in those areas (RI CRMC, 2010).

Chlorophyll a

Chlorophyll *a* is measured as a surrogated to determine concentrations of phytoplankton, which can indicate overproduction of algae and degraded water quality (NCCR, US EPA 2012). For this reason, chlorophyll *a* is used as a metric of plant production, called "primary

24 State of Rhode Island and Providence Plantations Department of Environmental Management, Office of Water Resources. Water Quality Regulations. Last Amended May 2009. http://www.dem.ri.gov/pubs/regs/regs/water/h20q09.pdf

production" because of the ability of plants to capture energy from sunlight and is measured in units of grams of carbon per meter squared per day (g C m-2 day-1).

The RI CRMC OSAMP adapted a table (Table 6-4) from Hyde (2009) to compare the range of primary production throughout the year for OSAMP waters and nearby ecosystems. Primary production in the OSAMP area is comparable to other coastal systems and is just slightly lower than the value ranges presented for Narragansett Bay and New York Bight. Chlorophyll a sampling at four locations in Rhode Island Sound found concentrations ranging from six to nine µg 1-1 (USACE 2002), which is "consistent with oceanic systems and slightly lower than an average estimate of phytoplankton production on continental shelves (Mann 2000)," (RI CRMC 2010).

Table 6-4 Comparison of the Range of Primary Production (g C m-2day-1)

Ecosystem	Production (g C m^{-2} d^{-1})	Reference
OSAMP	143-204	Hyde, 2009
Narragansett Bay	160-619	Oviatt et al., 2002
Massachusetts Bay	160-570	Keller et al., 2001; Oviatt et al., 2007; Hyde et al., 2008
New York Bight	370-480	Malone and Chervin, 1979

Nutrients

Nutrients are chemical elements that all living organisms need to sustain life and for growth. Problems may arise when too much of a particular nutrient is introduced into the environment through human activities (i.e., eutrophication). In surface waters, excess nutrients fuel algal blooms which can lead to water quality degradation. Severe or harmful algal blooms can result in the depletion of oxygen in the water column and benthos that aquatic life needs for survival. Algal blooms also reduce water clarity, which reduces desirable plant growth, such as seagrasses, reduces the ability of aquatic life to find food, and clog fish gills. Freshwaters are more sensitive to excess phosphorus, while in coastal waters, nitrogen is the nutrient of highest concern. In some cases, both nutrients may interact and contribute to a water pollution problem (RIDEM, 2010).

Dissolved nutrients reach the RWEC from Narragansett Bay, Long Island Sound, and Buzzards Bay. Table 6-5 below was taken from the RI CRMC OSAMP (2010), which published the Oviatt and Pastore 1980 nutrient sample results for the Rhode Island Sound. Research on Block Island Sound water quality suggests that nutrient concentrations (measured in micromoles, µM) have seasonal variation, with peaks in the autumn, and nearly undetectable levels in the late spring and early summer months (Staker and Bruno, 1977). Although additional sampling is required, the data suggest that nutrient availability may be a limiting factor, resulting in lower primary production.

Table 6-5 Nutrient Concentrations Measured in the Rhode Island Sound (Oviatt and Pastore, 1980)

	Concentration (µM)		
Nutrient	Station 16 (mouth of Narragansett Bay)	Station 17 (just outside mouth of Narragansett Bay)	Time
Ammonia (NH_3)	-	0	Jan-May
	1	1.5-2	Jun-Aug
	3-4	2-2.5	Nov-Dec
Nitrite + Nitrate (NO_2 + NO_3)	6	6	Jan
	1-2	5	Feb
	0.5	0.5	Mar
	5	4	Apr
	0	1-2	May-Aug
	6	6	Nov
	12	10	Dec
Orthophosphate (PO_4)	1-2	1-1.5	Jan-Aug
	1.5	1.5-2	Nov-Dec

Pathogens

There is little information on the algal and bacteria dynamics in Rhode Island Sound. According to RI CRMC (2010), there were no documented reports of harmful algal blooms or waterborne pathogen outbreaks Rhode Island Sound as of 2010.

Contamination

Data on water-column contaminant levels in Rhode Island Sound are limited. Organic contaminants (polychlorinated biphenyls [PCBs] and pesticides) measured in 2001 and 2002 were generally below method detection limits for these analytes (USACE, 2004). For example, total PCB concentrations were less than 46 nanograms per liter (ng/L), and total dichlorodiphenyltrichloroethanes were less than 4 ng/L. Water-column dissolved metals concentrations in Rhode Island Sound were also low, with concentrations generally less than 1 microgram per liter (µg/L). Dissolved metal concentrations appeared similar throughout the year and throughout Rhode Island Sound. Metals, PCBs, and organic and inorganic pollutant concentrations measured in the water column within the OSAMP area in 2002 were well below ambient RI DEM water quality criteria (RI CRMC, 2010).

Turbidity

Turbidity is the measure of cloudiness or haziness (opacity) of water caused by suspended solids (e.g., sediments or algae). Ocean waters beyond 3 mi (4.8 km) offshore typically have very low concentrations of suspended particles and low turbidity. Turbidity in Rhode Island Sound from five studies cited by the USACE (2004) ranged from 0.1 to 7.4 milligrams per liter (mg/L) of total suspended solids. Bottom currents may re-suspend silt and fine-grained sands, causing higher suspended particle levels in benthic waters. Storm events, particularly frequent intense wintertime storms, may also cause a short-term increase in suspended sediment levels. (BOEM, 2013)

Anthropogenic Activities

Current anthropogenic activities that are sources of water quality degradation include point source pollution and nonpoint source pollution. Point source pollutants, which enter waterways at well-defined locations, such as pipe or sewer outflows, are common sources of water pollution. There are no direct municipal wastewater or industrial point sources of pollution into or within the Study Area. Vessels may release discharges that have the potential to impact water quality.

6.5.1.2 RWEC Narragansett Bay

Dissolved Oxygen

The Narragansett Bay Fixed Site Monitoring Network ("NBFSMN") is a multi-agency collaborative that continuously collects data, including DO, at 13 fixed stations throughout the Narragansett Bay. The data collected at the fixed stations shows that the majority of the stations experience or are vulnerable to periodic episodes of hypoxia and occasional anoxia (RIDEM, [ND]). In addition, although the NCCR (EPA, 2012) states that the overall condition of DO in the Northeast Coast region is fair, more extensive data collection, such as that by NBFSMN and Brown University, have shown that the Narragansett Bay has a higher incidence of hypoxia.

DO within the Bay was also evaluated by the NBEP, which used a Hypoxia Index. The Hypoxia Index evaluated data from the NBFSMN to identify sample areas that experience hypoxia and combined the duration that this condition persisted. The Hypoxia Index "measures of the amount or magnitude that bottom water DO concentrations fell below a fixed threshold, and how long they stayed below the threshold" (NBEP, 2017). NBEP used a threshold of 2.9 mg/L and the Hypoxia Index to identify acute hypoxia, which evaluated each individual site/year as the sum of all deficit-durations from mid-May through mid-October (NBEP, 2017). The occurrences of hypoxia at given sites varied from year to year, with precipitation playing a factor. Wetter years experienced greater incidents of hypoxia. NBEP also found that periods of hypoxia have a higher chance of occurrence during the summer months, when the warm waters support high productivity and respiration rates and the Bay is thermally stratified with poor exchange between strata (NBEP, 2017). The proposed RWEC-RI will make landfall at Quonset Business Park within North Kingstown and pass within a portion of the Upper West Passage that is prone to sporadic hypoxic events (NBEP, 2017).

Chlorophyll a

A Chlorophyll Bloom Index ("CBI") was developed to quantify phytoplankton blooms based on a time series of chlorophyll measurements and data from ten NBSFMN sites that were analyzed (NBEP, 2017). The CBI measured the surplus-duration of an event, which is both the intensity and time period of the event. Since the State of Rhode Island has not established water quality criteria for chlorophyll *a* concentrations, the federal threshold of 20 µg/L was used. Although long-term trends could not be readily identified, the CBI indicated that spikes in chlorophyll a levels in Narragansett Bay are most frequent in the summer and show a spatial gradient decrease when moving north to south throughout the Bay with the Upper West Passage having values ranging from five to nine µg/L (NBEP, 2017). This is likely the result of nutrient inputs from rivers and wastewater treatment facilities ("WWTF") (i.e., riverine loading) (NBEP 2017).

The NBC also monitored chlorophyll *a* in the Providence and Seekonk River estuaries within the upper Narraganset Bay. Table 6-6 below was adapted from available 2019 NBC data from the two buoys (Bullock Reach Buoy and Conimicut Point Buoy) maintained proximate to the southern terminus of the Providence River at Upper Narragansett Bay. Samples were taken 1.6 to 3.3 ft (0.5-1 m) below the surface. As shown in Table 6-6, the chlorophyll *a* levels exceeded the federal threshold (20 µg/L) on June 19, 2019 at the Bullock Reach Buoy and on August 15, 2019 at both the Bullock Reach Buoy and the Conimicut Point Buoy.

Table 6-6 2019 Chlorophyll a Levels from NBC Data Collected at Bullock Reach Buoy and Conimicut Point Buoy

Collection Date	Station	Chl a (µg/L)	Station	Chl a (µg/L)
1/3/2019	Bullock Reach Buoy Surface	2.2302	Conimicut Point Surface	0.36123
3/13/2019	Bullock Reach Buoy Surface	0.8307	Conimicut Point Surface	7.13
3/27/2019	Bullock Reach Buoy Surface	3.5457	Conimicut Point Surface	2.7547
4/10/2019	Bullock Reach Buoy Surface	7.0368	Conimicut Point Surface	7.7439
4/24/2019	Bullock Reach Buoy Surface	7.9713	Conimicut Point Surface	19.647
5/8/2019	Bullock Reach Buoy Surface	1.7406	Conimicut Point Surface	1.7828
5/21/2019	Bullock Reach Buoy Surface	3.3849	Conimicut Point Surface	4.1268
6/5/2019	Bullock Reach Buoy Surface	3.1776	Conimicut Point Surface	2.709
6/19/2019	Bullock Reach Buoy Surface	30.393	Conimicut Point Surface	14.577
7/3/2019	Bullock Reach Buoy Surface	9.3984	Conimicut Point Surface	5.1741

Collection Date	Station	Chl a (µg/L)	Station	Chl a (µg/L)
7/17/2019	Bullock Reach Buoy Surface	10.909	Conimicut Point Surface	9.3837
7/31/2019	Bullock Reach Buoy Surface	1.8061	Conimicut Point Surface	2.1052
8/15/2019	Bullock Reach Buoy Surface	33.026	Conimicut Point Surface	48.981

Nutrients

There is limited data available for nutrient levels within Narragansett Bay. However, NBEP monitors nitrogen and phosphorus levels with a focus on WWTFs and riverine discharges. Data suggests that nutrient levels have dropped within a 15-year period since Rhode Island enacted a statute to reduce summer nutrient loading into the Bay from WWTFs (NBEP, 2017). Table 6-7 below was adapted from the NBWTR (NBEP, 2017) and summarizes a comparison of WWTF nitrogen loading levels from 2000-2004, 2007-2010, and 2013-2015. The data indicates a decrease in total nitrogen discharging from WWTFs in the Coastal Narragansett Bay Basin.

Table 6-7 NBEP Data for Nitrogen Loading Levels from Wastewater Treatment Facilities

	WWTF Total Nitrogen Loading (x10^3 lbs/year)		
	Nixon et al (2008)	Krumholz (2012)	NBEP Study
Coastal Narraganset Bay Basin	2000-2004	2007-2010	2013-2015
Narraganset Bay	5,253	4,420	2,777
Ten Mile River	379	328	170
Woonasquatucket River	134	45	52

Total phosphorus was similarly analyzed for discharges from WWTFs and it was found that WWTFs that directly discharge to "Narragansett Bay account for 74 percent of total phosphorus loading" (NBEP, 2017). Table 6-8 below was adapted from the NBWTR (NBEP, 2017) and summarizes a comparison of phosphorus loading levels from 2000-2004, 2007-2010, and 2013-2015.

Table 6-8 NBEP Data for Phosphorus Loading from Wastewater Treatment Facilities

	WWTF Total Nitrogen Loading (x10^3 lbs/year)		
	Nixon et al (2008)	Krumholz (2012)	NBEP Study
Coastal Narraganset Bay Basin	2000-2004	2007-2010	2013-2015
Narraganset Bay	551	618	526
Ten Mile River	26	3	3
Woonasquatucket River	21	1	1

Pathogens

The NBEP monitors Narragansett Bay for pathogens to monitor potential health concerns regarding recreation (e.g., swimming and boating) and shellfishing by testing for Escherichia coli, general fecal coliform, and Enterococci bacteria (NBEP, 2017). Sources of these pathogens include WWTFs, stormwater runoff, septic systems, and wildlife. It was found that 20 percent of streams and rivers and 97 percent of lakes and ponds in the Coastal Narragansett Bay area were acceptable for recreational use (NBEP, 2017). For shellfishing, 63 percent of Narragansett Bay was classified as approved, 13 percent was classified as conditionally approved, and 24 percent was classified as prohibited in 2015. However, the sampling locations at the Mouth of the Bay and the West Passage, where the Project will occur, each have 90 percent classified as approved for shellfishing, indicating good water quality regarding pathogens.

Contamination

NBEP monitors both of what it considers legacy and emerging contaminants in Narragansett Bay. Legacy contaminants are those such as heavy metals that have been present and regulated for many years and may persist in the environment (NBEP, 2017). Research conducted during the 1980s and 1990s on legacy contaminants found that there was a north-south gradient in the Bay, with the northern reaches having the highest concentrations of legacy contaminants. NBEP also evaluated legacy contaminants by analyzing dated sediment cores and blue mussel (*Mytilus edulis*) tissue (NBEP, 2017). The sediment cores were evaluated for levels of copper, lead, cadmium and chromium and the effects range median (ERM – threshold where detected levels of a contaminant above the ERM likely or always result in observed effects) were compared to levels of the contaminants in the 1770s. The analysis showed that the levels for all contaminants spiked during the Industrial Revolution and then dramatically reduced with the introduction of environmental regulations (i.e., Clean Water Act and Clean Air Act). Additional analysis showed that all analyzed contaminants within the sediment cores dropped below the ERM after 1990. Similarly, data on metals and PCBs from tissue from blue mussels showed a trend in declining levels of contaminants from 1976 to 2012 (NBEP, 2017).

Emerging contaminants, or "chemical contaminants of emerging concern (CECs) refers to chemicals with unknown ecological effects and no associated regulatory standards" (NBEP, 2017). Sources of CECs include pharmaceuticals, personal care products, and industrial chemicals, and information on them within the Bay is limited (NBEP, 2017). Due to the lack of sufficient data, the extent and magnitude of CECs within the Bay are not available.

Turbidity

There are limited data available on turbidity within Narragansett Bay. The NBC measures turbidity using a Secchi disk. A Secchi disk measures water clarity by lowering a black and white disk into the water column until it is no longer visible; the depth at which the disk is last visible is then recorded. Table 6-9 below was adapted from available data from NBC for Bullock Reach and Conimicut Point, which are the two monitoring locations that are closest to the mouth of Narragansett Bay. Several readings were taken every month and the data below represents the annual average for depth visibility. All depths are in meters (NBC, 2019).

Table 6-9 2017-2019 Water Clarity Depths Measured by NBC at Bullock Reach and Conimicut Point Monitoring Stations using a Secchi Disk

Sample Location and Year	Greatest Depth (m) (Date)	Shallowest Depth (m) (Date)	Annual Average Depth of Visibility (m)
Bullock's Reach – 2017	3.9 (11/29/2017)	0.8 (8/23/2017)	1.7
Bullock's Reach – 2018	3.9 (10/17/2018)	1.3 (5/24/2018, 7/25/2018, 8/1/2018, 8/8/2018)	2.1
Bullock's Reach – 2019	3.9 (3/13/2019)	0.9 (5/30/2019	1.7
Conimicut Point – 2017	4.2 (10/18/2017)	1.1 (7/6/2017)	1.8
Conimicut Point – 2018	5.4 (3/28/2018)	1.3 (8/8/2018)	1.7
Conimicut Point – 2019	3.6 (1/3/2019)	0.9 (5/30/2019)	2.3

Anthropogenic Activities

The watersheds of Narragansett Bay have experienced development and population growth since the 1700s and continued residential, commercial, and industrial development. These factors have shaped the area and introduced nutrients, pathogens and pollutants into streams, rivers and the Bay. Both point and non-point sources of pollution are present, and the effects of those sources as well as others are discussed above.

6.5.2 Onshore Facilities

The Study Area for the Onshore Facilities lies within the Narragansett Bay drainage basin of Rhode Island and the Lower West Passage watershed. A drainage basin is the area of land that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), and is synonymous with watershed. Narragansett Bay extends approximately 45 kilometers (km) from north to south and 18 km at its widest point from west to east (Chinman and Nixon, 1985). The Narragansett Bay watershed is composed of nine subwatersheds and those that are located within the Study Area are the Upper East Passage, Lower East Passage, and the Sakonnet River subwatersheds (Raposa and Schwartz, 2009). The Narragansett Bay Basin flows south into Rhode Island and Block Island Sounds, and ultimately the Atlantic Ocean.

The waters of the State of Rhode Island (meaning all surface water and groundwater of the State) are assigned a Use Class which is defined by the most sensitive uses which it is intended to protect. Waters are classified according to specific physical, chemical, and biological criteria which establish parameters of minimum water quality necessary to support the water Use Classification. A tributary to Mill Creek is located within the northwestern end of the Study Area. According to the online RIDEM ERM, this tributary is classified as Class B, which are waters designated for fish and wildlife habitat and primary and secondary recreational activities. No other surface waters are present within the Study Area. Wetlands are discussed in Section 6.8.

6.5.3 Floodplain

Special Flood Hazard Areas are areas that are subject to inundation by the one percent AEP flood. Available studies and backup data provided by FEMA for Washington County, Rhode Island were reviewed, including Flood Insurance Rate Map (“FIRM”) Panels 44009C0104J and 44009C0108J effective October 16, 2013. Based on available FIRM Panel 44009C0108J, a portion of the Study Area is in a coastal Zone AE with a base flood elevation of 12 feet, the nearshore portion of the Study Area is in a coastal Zone VE with a base flood elevation of 21 feet, and the more inland portion of the Study Area is located within a coastal Zone AE with a base flood elevation of 13 feet. Portions of the Study Area are also located within areas mapped as Zone X or unmapped areas.

6.5.4 Surface Water Protection Areas

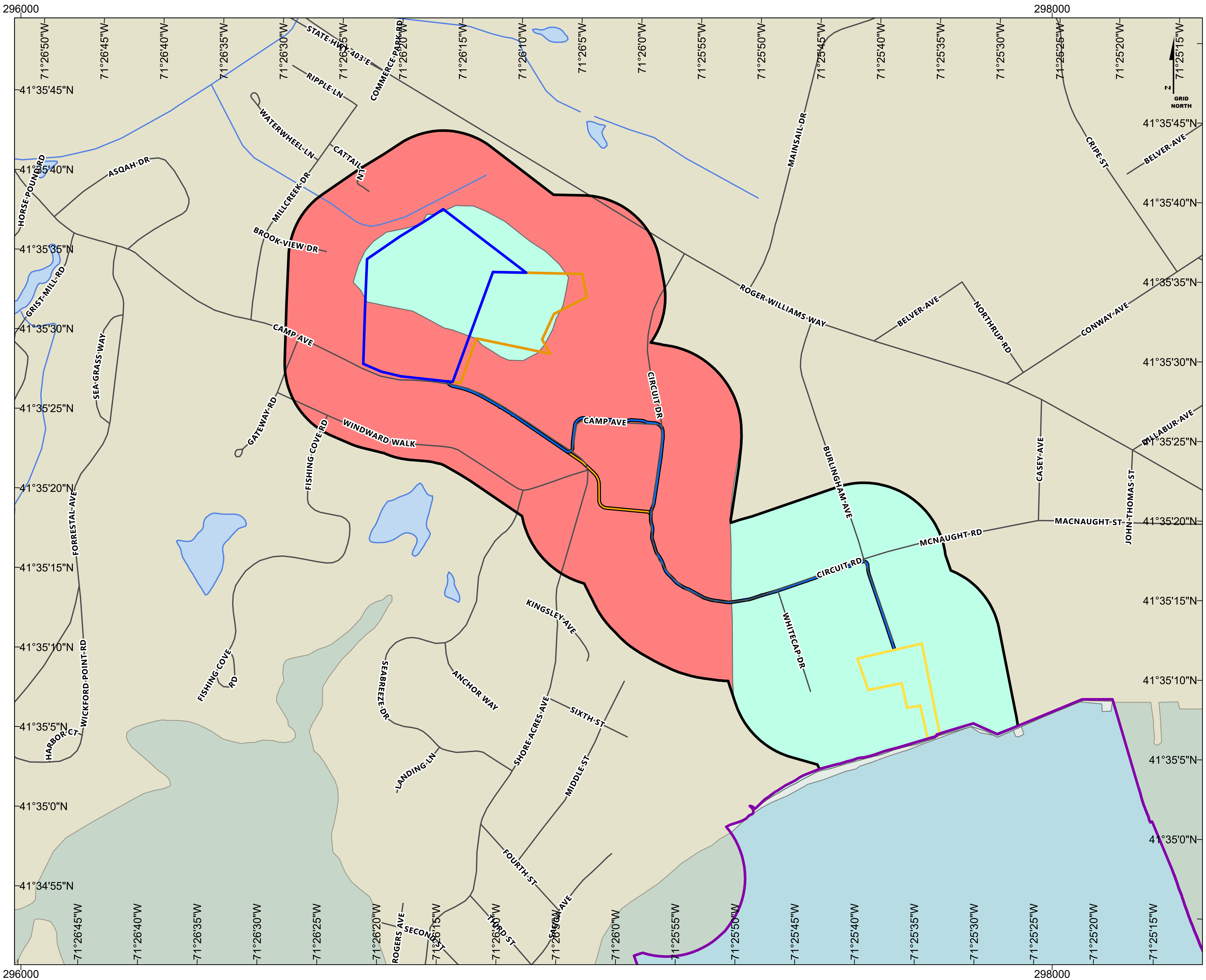
Surface water protection areas are drainage areas that contribute to drinking water supply reservoirs that serve public water systems in Rhode Island. There are no surface water protection areas within the Study Area.

6.6 Groundwater

The Study Area for the Onshore Facilities are not within a community wellhead protection area, groundwater recharge area, or sole source aquifer (RI DEM ERM, accessed 10/8/2020).

RI DEM established groundwater quality standards and preventative action limits by classes to protect public health. The Study Area is mapped as both Class GA and Class GB for groundwater classification. Class GA waters are presumed to be suitable for drinking without treatment and Class GB may not be suitable for drinking without treatment and are serviced by public water systems. See Figures 6-4A and 6-4B.

This page intentionally left blank.



Revolution Wind

Figure 6-4A

Surface and Groundwater Resources Map

NORTH KINGSTOWN, RI

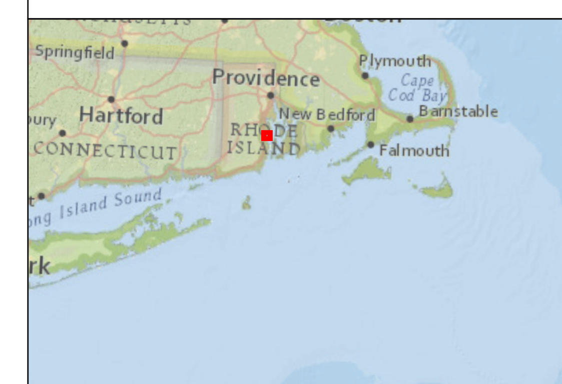
Legend

- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Onshore Transmission Cable
- Alternative Cable Route Segment
- Landfall Area
- Limits of Study Area
- RWEC-RI Study Area
- Parcel Boundary

Groundwater Types

- GA
- GB

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 80 160 240 Meters

0 240 480 720 Feet

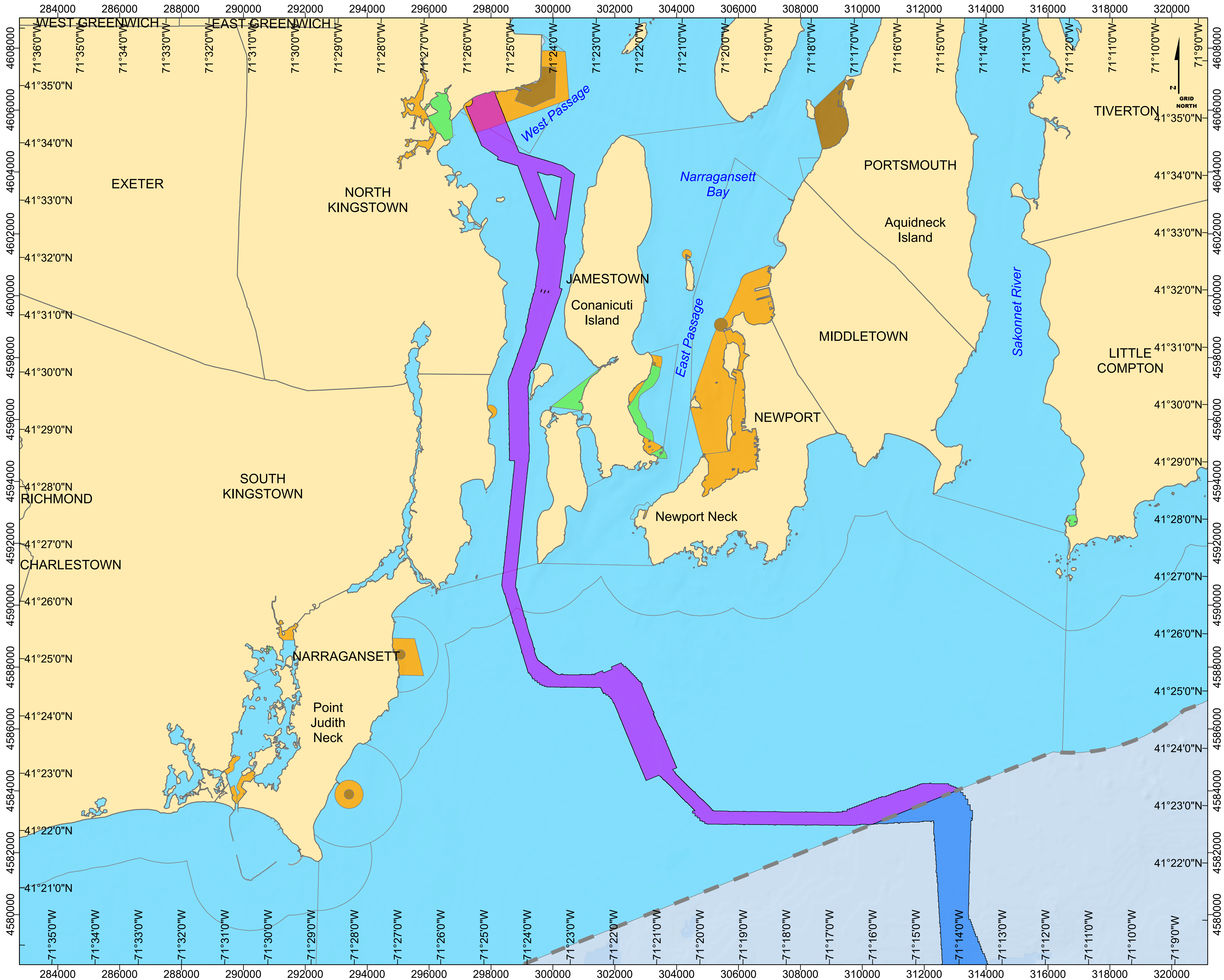
Date: 12/29/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind

Powered by Ørsted & Eversource

This page intentionally left blank.



Revolution Wind

Figure 6-4B
Surface and Groundwater Resources Map

Legend
- RWEC-OCS Envelope
- RWEC-RI Study Area
- 3-Nautical Mile State Water Boundary

Estuarine Water Quality Standard
- SA
- SA{b}
- SB
- SB1

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.
World Ocean Base: Esri, DeLorme, NaturalVue

Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 1000 2000 3000 Meters

0 4,000 8,000 12,000 Feet

Date: 05/19/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

6.7 Vegetation

This section only discusses vegetation and mapped key habitat types for the Study Area. Vegetated areas within the Study Area were documented in the field and were compared to the Key Habitat Profiles provided within the RI Wildlife Action Plan ("RI WAP") (RIDEM et al. 2015) to assign the appropriate Key Habitats. Tidal habitats were identified in accordance with the Coastal Resources Management Plan ("CRMP"; 650-RICR-20-00-1) classifications. Upland vegetation habitat types are listed in Table 6-10 and are discussed below except for manmade shoreline. Wetland and tidal habitat types are discussed within Section 6.8.

Table 6-10 Upland Habitat Types within the Study Area

Habitat Type	Amount in Study Area (SF/Ac)
Coastal Beach	1149890/2.64
Manmade Shoreline	1,155/0.03
Managed Lawn	22,247/0.51
Oak Forest	6,999/0.16
Ruderal Grassland/Shrubland	249,712/27.02
Mixed Oak/White Pine Forest	866,824/19.90
Ruderal Pitch Pine Barren	249,712/5.73
Landfill	114,990/2.6

Source: VHB

6.7.1 Coastal Beach

Coastal beach communities are developed by persistent winds, salt spray, and storm surge that are characteristic conditions at shorelines exposed to wave buildup over expanses of tidal waters. The open beach habitat consists of sand and the dune vegetation is made up of American beach grass (*Ammophila breviligulata*), seaside goldenrod (*Solidago sempervirens*), rough cocklebur (*Xanthium strumarium*), prickly lettuce (*Lactuca serriola*), switch grass (*Panicum virgatum*), spotted knapweed (*Centaurea stoebe*), orangegrass (*Hypericum gentianoides*), common evening-primrose (*Oenothera biennis*), and spearscale orache (*Atriplex patula*).

6.7.2 Managed Lawn

Portions of the Study Area are within areas that are managed/maintained lawn. Although managed lawn is not considered a Key Habitat by the RI WAP, it provides limited utility to some species of wildlife, such as passerines and rodents, in an otherwise heavily developed industrial and commercial area.

6.7.3 Oak Forest

According to the RI WAP, deciduous forest dominated by oaks is the most widely distributed habitat type in Rhode Island. While this type of habitat can support a wide range of species, its benefit is tied largely to the size of the forested tract and its connectivity to similarly supportive habitat covers. Although the oak forest borders on ruderal forested wetland and therefore likely provides some habitat utility for wildlife, in the wider landscape it is an example of forest fragmentation due to the large-scale industrial development to the east and north and residential development to the west.

6.7.4 Ruderal Grassland/Shrubland

Between the rip rap revetment and the Quonset Business Park Landfall, the RWEC-RI traverses ruderal grassland/shrubland and consists of herbaceous species. Ruderal grassland/shrubland is also present on the ICF parcel and consists of a mix of herbaceous and woody species. Ruderal grasslands and shrublands constitute early successional habitats, defined by Anderson, et. Al. (1976) as uplands where the potential natural vegetation is predominantly grasses, grass-like plants, forbs or shrubs. Such habitats are typically anthropogenically created or maintained due to management strategies. The vegetation within the ruderal shrubland area includes eastern red cedar (*Juniperus virginiana*), pitch pine (*Pinus rigida*), *Yucca* sp., Virginia creeper (*Parthenocissus quinquefolia*), spotted knapweed, common milkweed (*Asclepias syriaca*), prickly lettuce (*Lactuca serriola*), American pokeweed (*Phytolacca americana*), garlic mustard (*Alliaria petiolata*), raspberry (*Rubus* sp.)and northern bayberry (*Myrica pensylvanica*).

6.7.5 Mixed Oak/White Pine Forest

The upland area where the OnSS and ICF are proposed is a mixed oak/white pine forest. Dominant species within the canopy include red oak, black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea)* and eastern white pine (*Pinus strobus*). Other canopy species include red maple (*Acer rubrum*), black cherry (*Prunus serotina*, eastern cottonwood (*Populus deltoides*), eastern red cedar (*Juniperus virginiana*), sassafras (*Sassafras albidum*), Norway maple (*Acer platanoides*) and black birch (*Betula lenta*). Understory vegetation includes Morrow's honeysuckle (*Lonicera morrowii*), common greenbrier (*Smilax rotundifolia*), Virginia creeper, and spotted wintergreen (*Chimaphila maculata*).

6.7.6 Ruderal Pitch Pine Barren

The southeast corner the OnSS site is an apparent former gravel excavation pit that sits at a lower elevation than the surrounding grade and has transitioned to a sand barren over time. This habitat classification of pitch pine barren includes the modifier of "ruderal" because it was likely created by anthropogenic activities. Pitch pine is scattered throughout open patches of bare sand. A stunted shrub layer is composed of autumn olive, scrub oak, eastern white pine, and gray birch (*Betula populifolia*) and the herbaceous layer is composed of orangegrass, narrow-leaved goldenrod (*Euthamia caroliniana*), lady's thumbprint (*Persicaria maculosa*), boneset (*Eupatorium perfoliatum*), patridgepea (*Chamaecrista fasciculata*), redshank (*Persicaria maculosa*), perforate St. John's-wort (*Hypericum perforatum*), and sickle-leaved golden aster, which is state species of concern within Rhode Island. In accordance with RINHP policy, the new species occurrences of sickle-leaved golden aster within the pitch pine barren will be reported to the RINHP during the state permitting process.

6.7.7 Landfill

Although not a designated Key Habitat within the RI WAP, it is worth noting that there is an approximate 2.6-acre portion of the former Camp Avenue Dump within the OnSS parcel and a portion of the ICF parcel that is mounded with an herbaceous covering. Vegetation within the mounded landfill area includes bird's foot trefoil (*Lotus corniculatus*), Virginia creeper, poison ivy, sensitive fern (*Onoclea sensibilis*), fox grape (*Vitis labrusca*), multiflora rose, black swallowwort (*Cynanchum louiseae*) and common greenbrier.

6.7.8 Submerged Aquatic Vegetation

INSPIRE conducted a Sediment Profile and Plan View Imaging ("SPI/PV") survey to collect images for a benthic assessment (INSPIRE, 2020), as well as a towed video survey to document SAV presence. During the video survey, a total of 52 transect lines of a variety of distances and orientations were mapped using a towed video camera. The spatial focus of the video survey was nearshore regions around the landfall where SAV was expected at a higher probability, as well as potential HDD exit pit locations and the open cut route.

Broadly, the habitats along the RWEC-RI were low in environmental complexity, consisting mainly of sand sheet macrohabitat type. However, stations within Narragansett Bay were more variable and also included macrohabitats within the mid-Bay that were characterized as mollusk beds on mud (including *Crepidula* sp. And *Mytilis edulis*) and patchy cobbles on sand. No sensitive taxa or species of concern were observed along the RWEC-RI. However, small, isolated patches of macroalgae were observed at five stations sampled along the RWEC-RI within Narragansett Bay during the SPI/PV benthic survey.

During the towed video survey, SAV, specifically eelgrass (*Zostera marina*), was observed at two locations within the area identified as potential material storage near the landfall. An eelgrass bed was also observed along the shoreline approximately 492 feet (150 m) east of the potential material storage area near landfall. In addition, based on GIS analysis of available eelgrass mapping for Narragansett Bay (RIGIS, 2017), a small section of eelgrass is present on the western side of Dutch Island, approximately 679 feet (207 m) from the proposed RWEC cable centerline. The next closest area of mapped eelgrass is on the western side of Conanicut Island, approximately 1,411 feet (430 m) from the RWEC cable centerline.

6.8 Wetlands

Wetlands have been identified as resources potentially providing ecological functions and societal values. Wetlands are characterized by three criteria including the (i) presence of undrained hydric soils, (ii) a prevalence (>50 percent) of hydrophytic vegetation, and (iii) wetland hydrology, soils that are saturated near the surface or flooded by shallow water during at least a portion of the growing season.

6.8.1 Freshwater Wetlands and Waterbodies

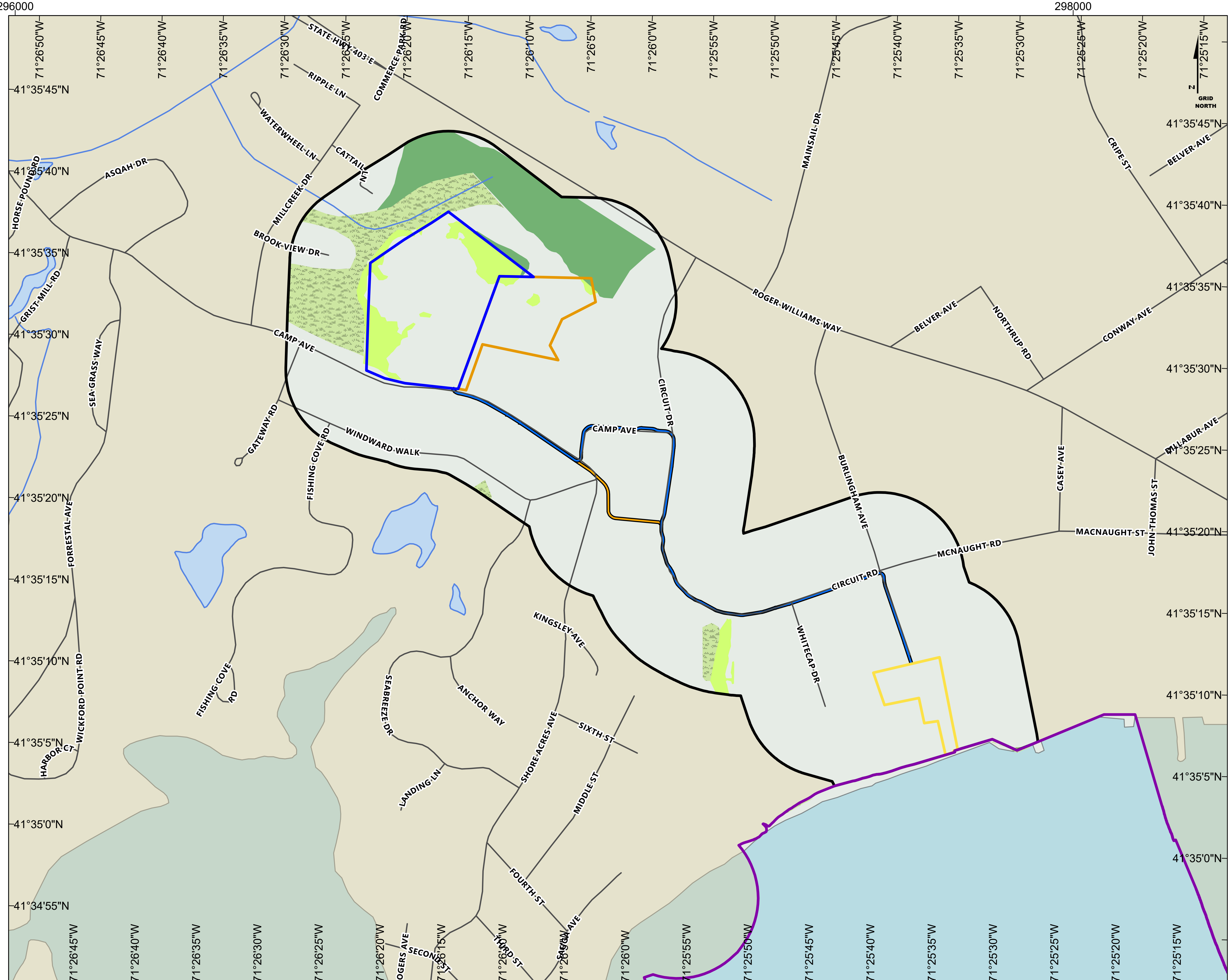
State-regulated freshwater wetlands, coastal/tidal wetlands, and streams were identified and delineated throughout the proposed limit of work for the Onshore Facilities. Wetland resource areas outside of the proposed limit of work and within the Study Area were mapped using the wetlands shapefile[25] from the RIGIS website. Figure 6-5 depicts both the field delineated and GIS mapped wetlands within the Study Area and Table 6-11 details the delineated and approximated wetlands using aerial photography and available GIS data from the RIGIS website.

Table 6-11 Freshwater Wetlands within the Study Area

Wetland Type	Area of Wetlands within Study Area (SF/Ac)
Delineated Wetland	219,291/5.03
Approximated Wetland	1,010,906/23.21
Total	1,230,197/28.24

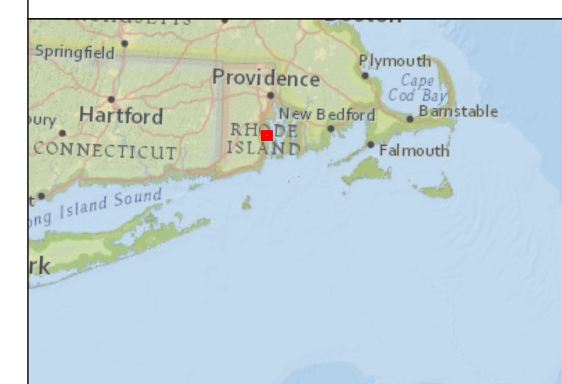
25 University of Rhode Island Environmental Data Center. 1993. Wetlands Shapefile as interpreted from 1988 aerial photography; Cowardin 16 classification scheme.

Revolution Wind
Figure 6-5
Wetlands Map
NORTH KINGSTOWN, RI



Legend
- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Onshore Transmission Cable
- Alternative Cable Route Segment
- Landfall Area
- Limits of Study Area
- RWEC-RI Study Area
- Parcel Boundary
- Delineated Wetland Resources
- Interpolated Wetland
- Wetland (NWI)

Service Layer Credits: National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 80 160 240 Meters
0 240 480 720 Feet

Date: 12/29/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind
Powered by Ørsted & Eversource

This page intentionally left blank.

Field methodology for the delineation of State-regulated resource areas was based upon vegetative composition, presence of hydric soils, and evidence of wetland hydrology. Based on the Rhode Island Freshwater Wetlands Act and the RI CRMC Freshwater Wetland Rules, State-regulated freshwater wetlands include swamps, marshes, bogs, forested or shrub wetlands, emergent plant communities and other areas dominated by wetland vegetation with evidence of wetland hydrology. Swamps are defined as wetlands dominated by woody species and are three acres in size, or greater. Marshes are wetlands dominated by emergent species and are one acre or greater in size. Emergent wetlands communities are areas similar to marshes in vegetation composition; however, they are less than one acre in size. Forested and shrub wetlands are also dominated by woody species, similar to swamps, but do not meet the three-acre size criteria.

The upland area within 50 feet of the edge of a swamp, marsh, or bog is regulated as the Wetland Buffer under the Freshwater Wetland Rules. Emergent wetland communities, forested wetlands, and shrub wetlands do not merit a 50-foot Wetland Buffer.

In addition to these vegetated wetland communities, Rhode Island also regulates activities in and around streams and open water bodies, which include Rivers, Ponds, and ASSF. A River is any perennial stream indicated as a blue line on a USGS 7.5-minute series topographic map. If the River or stream is less than 10 feet wide, the area within 100 feet of each bank is regulated as 100-foot Riverbank Wetland. If the River or stream is greater than 10 feet wide, the area within 200 feet of each bank is regulated as 200-foot Riverbank Wetland. A Pond is an area of open standing or slow-moving water present for six or more months during the year and at least one-quarter acre in size. Ponds have a 50-foot Wetland Buffer associated with the boundary. An ASSF is defined as any "body of flowing water" defined by a scoured channel or change in vegetative composition or density that conveys storm runoff into or out of a wetland.

Project wetland vegetation community types as described in the RI WAP and their dominant plant species located within the Study Area are listed in Table 6-12 and are described below.

Table 6-12 Wetland Habitat Types within the Study Area

Habitat Type	Amount within Study Area (SF/Ac)
Ruderal Forested Swamp	1,176,785/27.02
Ruderal Shrub Marsh	89,113/2.05
Floodplain[1]	24,060/0.55
Area Subject to Storm Flowage	145 linear feet

Source: VHB

1 The area of floodplain is within the Project Footprint only

6.8.1.1 Ruderal Forested Swamp

The dominant canopy species within the ruderal forested swamp is red maple (*Acer rubrum*) with scattered patches of black gum (*Nyssa sylvatica*), swamp white oak (*Quercus bicolor*), red oak and eastern white pine. The understory contains scattered sapling recruitment from the canopy layer, and shrub thickets of sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), and alder (*Alnus* sp.). Poison ivy (*Toxicodendron radicans*), green briar (*Smilax rotundifolia*), sensitive fern (*Onoclea sensibilis*), and skunk cabbage (*Symplocarpus foetidus*) are common in the herbaceous stratum.

6.8.1.2 Ruderal Shrub Marsh

The ruderal shrub marsh has species similar to the ruderal forested swamp; however, the overall vegetative composition is dominated by shrubs.

6.8.1.3 Stream/Intermittent Stream

Tributaries to Mill Creek flow through the northwestern portion of the Study Area. Based on their linear form and deep channel incision, these streams were likely excavated as a means to drain a freshwater wetland. The streams are all less than 10-ft (3 m) wide and receive a 100-ft Riverbank Wetland in accordance with the Freshwater Wetland Rules.

6.8.1.4 Shrub/Forested Wetland

Wetlands that are not Swamps or Marshes and are dominated by woody vegetation are classified as either Shrub Wetlands or Forested Wetlands. In the Study Area, vegetation includes red maple, American elm, and black gum in the overstory. The shrub layer is dominated by highbush blueberry, sweet pepper bush, arrowwood, multiflora rose, winterberry, and elderberry (*Sambucus canadensis*). Associated herbaceous species may include skunk cabbage, cinnamon fern, and jewelweed (*Impatiens capensis*).

6.8.1.5 Floodplain

A floodplain is the land area adjacent to a river or stream or other body of flowing water that is, on the average, likely to be covered with flood waters resulting from a one percent annual chance flooding event. These regulated floodplain areas include areas mapped by FEMA, as well as unmapped floodplain. See the discussion in Section 6.5.1 for a description of the floodplains within the Study Area.

6.8.1.6 Area Subject to Storm Flowage

ASSF are channel areas and water courses which carry storm, surface, groundwater discharge or drainage waters out of, into, and/or connect freshwater wetlands or coastal wetlands. ASSFs are recognized by evidence of scouring and/or a marked change in vegetative density and/or composition. The small isolated wetland on the ICF parcel is connected to the larger wetland via a manmade ditch that is regulated as an ASSF. The ditch was unvegetated and dry during the site investigation conducted by LEC on behalf of TNEC and was delineated as a centerline, so an area is not provided in Table 6-12 above.

6.8.2 Coastal Wetlands and Waterbodies

The RI CRMC regulates freshwater wetlands through the CRMP and Freshwater Wetland Rules (650-RICR-20-00-2). Definitions of the wetlands and waterways under RI CRMC jurisdiction fall into two categories: regulated shoreline features as defined in in § 1.2.2 (A) through 1.2.2 (G) in the CRMP and freshwater wetlands as defined in §2.4 of Freshwater Wetland Rules. Freshwater wetlands are discussed within Section 6.8.1. Regulated shoreline features include coastal beaches; barrier islands and spits; coastal wetlands; headlands, bluffs, and cliffs (banks); rocky shorelines; manmade shorelines; and coastal dunes.

The RI CRMC classifies the seawall and riprap located along the shoreline at the Quonset Business Park Landfall as "manmade shoreline," which is a regulated coastal feature. Spotted knapweed is a weedy invasive species that occurs along the top of the seawall.

6.9 Wildlife

The wildlife species present within the Study Area vary according to the habitat resources present. The Rhode Island RI WAP (RIDEM et al. 2015) defines habitat as a place where an animal normally lives, often characterized by a dominant plant form or physical characteristic (e.g., a stream or a deciduous forest). In addition to the type of vegetative cover, habitat also includes the resources, such as food and water, and conditions present in an area that produces occupancy – including survival and reproduction – by a given organism (Hall et al., 1997). A species may utilize one or several resource areas or vegetation cover types for its habitat. Rhode Island's varied bedrock and surficial geology, soils, topography, and hydrology support a range of plant communities that supports a complex ecological framework for Rhode Island's fish and wildlife diversity (RIDEM et al., 2015). Tables in Appendix D1 provide a list of birds, reptiles and amphibians, and mammals that were observed during field investigations or that have the potential to occur based on habitat preferences. Note that these species tables are not exhaustive. Species that are listed under the 2015 RI WAP as species of greatest conservation need ("SGCN") have been indicated in the tables in bold

6.10 Fishery Resources

The Study Area for the RWEC-RI was evaluated for finfish and Essential Fish Habitat. Although a tributary to Mill Creek is located within the northwestern end of the Onshore Study Area, fishery resources were not evaluated for the Onshore Facilities. The Study Area for the Onshore Facilities was not evaluated given its location on land and lack of water bodies (e.g., streams, rivers, lakes, etc.). Finfish evaluated include pelagic, demersal, and anadromous fish that inhabit the region. Essential Fish Habitat ("EFH") is defined in the Magnuson-Stevens Fishery Conservation and Management Act as those waters (e.g., aquatic areas and their associated physical, chemical, and biological properties used by fish) and substrate (e.g., sediment, hard bottom, underlying structures, and associated biological communities) necessary for the spawning, feeding, or growth to maturity of managed fish species. See Appendix D2 for a list of finfish species known to occur in the area.

The description of the affected environment and assessment of potential impacts for finfish and EFH was evaluated by reviewing current public data sources related to finfish and EFH, including state and federal agency-published papers and databases, published journal articles, online data portals and mapping databases, and correspondence and consultation with federal and state agencies.

The regional waters off the coast of Rhode Island and Massachusetts are transitional waters that separate Narragansett Bay and Long Island Sound from the OCS (BOEM, 2013). These waters straddle the Mid-Atlantic and New England regions and serve as the northern boundary for some Mid-Atlantic species and the southern boundary for some New England species. The species that may be found in the RWEC-RI reflect the transitional nature of this regional area.

Several factors directly affect spatial and temporal patterns of fish species, including habitat. The coastal waters of New England have diverse habitats that are defined by their temperature, salinity, pH, nutrient concentrations, physical structure, biotic structure, depth, and currents. The unique combination of habitat characteristics shapes the community of fish and invertebrate species that inhabit the area. Habitat characteristics influence species composition, distribution, and predator/prey dynamics. Benthic communities have experienced increased water temperatures in the region in the past several decades, and average pH is expected to continue to decline as seawater becomes more saturated with carbon dioxide (Saba et al., 2016). Acidification of seawater poses a threat to the health and survival of organisms with calcareous shells (such as the Atlantic scallop, blue clam, and hard clam), but less is known about direct effects of acidification on cartilaginous and bony fishes.

The distributional ranges of several groundfish species in New England waters have shifted northward and into deeper waters in response to increasing water temperatures (Pinsky et al., 2013; Nye et al., 2009) and more species are predicted to follow (Selden et al., 2018; Kleisner et al., 2017). The black sea bass, identified as particularly sensitive to habitat alteration (Guida et al., 2017), has been increasing in abundance over the past several years, and is expected to continue its expansion in southern New England as water temperatures increase (Kuffner, 2018; McBride et al., 2018). Several pelagic forage species have been increasing in the region, including butterfish, scup, squid (Collie et al., 2008) and Atlantic mackerel (McManus et al., 2018). Distributions of other species are reported to be shifting southward, including spiny dogfish, little skate, and silver hake (Walsh et al., 2015). It has been suggested that the spiny dogfish may replace the Atlantic cod as a major predator in southern New England as the cod is driven north by warm waters that the spiny dogfish tolerates well (Selden et al., 2018).

Further temperature increases in southern New England are expected to exceed the global ocean average by at least a factor of two, and ocean circulation patterns are projected to change (Saba et al., 2016). Distributional shifts are occurring in both demersal and pelagic species, perhaps mediated by changes in spawning locations and dates (Walsh et al., 2015). Southern species, including some highly migratory species such as mahi mahi that prefer warmer waters, are expected to follow the warming trend and become more abundant in the area (Walsh et al., 2015; South Atlantic Fishery Management Council, 2003). Climate change may also influence the migration behavior of anadromous fish in the region. The herrings, shad, and sturgeon were identified as having high biological sensitivity to adverse effects of climate change (Hare et al., 2016). In addition to physiological effects of temperature and pH, anadromous fishes face a physical risk caused by flooding in their spawning rivers.

As summarized in BOEM's Revised Environmental Assessment (BOEM, 2013), finfish off the coast of Rhode Island include demersal, pelagic, and shark finfish assemblages. In addition, there are important shellfish and migratory pelagic finfish throughout the region. Demersal species including groundfish such as cod and haddock, as well as other commercially important species such as monkfish and winter skate spend at least part of their adult life stage on or close to the ocean bottom. Many of these demersal fish species are considered to be high-value fish and are sought by both commercial and recreational anglers. Pelagic fishes are generally schooling and occupy the mid- to upper water column as juveniles and adults and are distributed from the nearshore to the continental slope and beyond. Some species are highly migratory and are reported to be present in the near-coastal and shelf surface waters of Southern New England waters in the summer, taking advantage of the abundant prey in the warm surface waters. Coastal migratory pelagics include fast-swimming schooling fishes that range from shore to the continental shelf edge and are sought by both recreational and commercial anglers. These fish use the highly productive coastal waters of the more expansive Mid-Atlantic Bight during the summer months and migrate to deeper and/or distant waters during the remainder of the year (BOEM, 2013). Several shark species also occupy this region.

6.11 Marine Mammals and Sea Turtles

Marine mammals inhabit all the world’s oceans, and can be found in coastal, estuarine, shelf, and pelagic habitats including the Study Area (Hayes et al., 2020). Thirty-six species of marine mammals inhabit the regional waters of the western North Atlantic OCS and may occur in the Study Area, including six mysticetes (baleen whales), 25 odontocetes (toothed whales, dolphins, and porpoise), four pinnipeds (earless or true seals), and one species of sirenian (manatees). All 36 species are protected under the Marine Mammal Protection Act (“MMPA”); six species are also protected under the federal Endangered Species Act (“ESA”).

Table 6-13 summarizes the marine mammal species potentially present within the RWEC-RI Study Area, including the relative occurrences for each species. The table also includes each species’ conservation status, including the designation as a strategic or non-strategic stock, as defined by the MMPA. A strategic stock meets one or more of the following criteria: the population experiences a level of human-caused mortality that exceeds the potential biological removal level; the population is declining and is likely to be listed as a threatened species under the ESA, based on the best available information; or the population is listed as a threatened marine mammal species under the ESA or is designated as depleted under the MMPA. A non-strategic stock is defined as any marine mammal stock that does not meet the strategic stock criteria.

Table 6-13 Marine Mammal Potential Present within the RWEC-RI Study Area

Common Name	Scientific Name	Stock	Current Population Status	Relative Occurrence in the RWEC-RI	Best Abundance Estimate[1]
Order Cetacea					
Suborder Mysticeti (baleen whales)					
Fin whale	*Balaenoptera physalus*	Western North Atlantic	ESA Endangered MMPA Depleted and Strategic RI State Endangered	Common	7,418
Sei whale	*Balaenoptera borealis*	Nova Scotia	ESA Endangered MMPA Depleted and Strategic	Uncommon	6,292
Blue whale	*Balaenoptera musculus*	Western North Atlantic	ESA Endangered MMPA Depleted and Strategic	Not Expected	402
North Atlantic right whale	*Eubalaena glacialis*	Western North Atlantic	ESA Endangered MMPA Depleted and Strategic RI State Endangered	Common	428
Minke whale	*Balaenoptera acutorostrata*	Canadian East Coast	MMPA Non-strategic	Common	24,202
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	MMPA Non-strategic RI State Endangered	Common	1,396
Suborder Odontoceti (toothed wales, dolphins, and porpoises					
Sperm whale	*Physeter macrocephalus*	North Atlantic	ESA Endangered MMPA Depleted and Strategic	Regular	4,349
Pygmy sperm whale	*Kogia breviceps*	Western North Atlantic	MMPA Non-strategic	Rare	7,750
Dwarf sperm whale	*Kogia sima*	Western North Atlantic	MMPA Non-strategic	Rare	7,750
Northern bottlenose whale	*Hyperoodon ampullatus*	Western North Atlantic	MMPA Non-strategic	Not Expected	Unknown
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic	MMPA Non-strategic	Rare	21,818
Mesoplodont beaked whales	*Mesoplodon* spp.	Western North Atlantic	MMPA Depleted	Rare	21,818
Killer whale	*Orcinus orca*	Western North Atlantic	MMPA Non-strategic	Rare	Unknown
False killer whale	*Pseudorca crassidens*	Western North Atlantic	MMPA Strategic	Rare	1,791

Common Name	Scientific Name	Stock	Current Population Status	Relative Occurrence in the RWEC-RI	Best Abundance Estimate[1]
Pygmy killer whale	*Feresa attenuata*	Western North Atlantic	MMPA Non-strategic	Not Expected	Unknown
Short-finned pilot whale	*Globicephala macrorhynchus*	Western North Atlantic	MMPA Strategic	Rare	28,924
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	MMPA Strategic	Uncommon	39,215
Melon-headed whale	*Peponocephala electra*	Western North Atlantic	MMPA Non-strategic	Not Expected	Unknown
Risso's dolphin	*Grampus griseus*	Western North Atlantic	MMPA Non-strategic	Uncommon	35,493
Common dolphin	*Delphinus delphis*	Western North Atlantic	MMPA Non-strategic	Common	172,825
Fraser's dolphin	*Lagenodelphis hosei*	Western North Atlantic	MMPA Non-strategic	Rare	Unknown
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic	MMPA Non-strategic	Common	93,233
White-beaked dolphin	*Lagenorhynchus albirostris*	Western North Atlantic	MMPA Non-strategic	Rare	536,016
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic	MMPA Non-strategic	Rare	6,593
Clymene dolphin	*Stenella clymene*	Western North Atlantic	MMPA Non-strategic	Not Expected	Unknown
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic	MMPA Non-strategic	Rare	67,036
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic	MMPA Non-strategic	Uncommon	39,921
Spinner dolphin	*Stenella longirostris*	Western North Atlantic	MMPA Non-strategic	Rare	4,102
Rough toothed dolphin	*Steno bredanensis*	Western North Atlantic	MMPA Non-strategic	Rare	136
Common bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic, offshore	MMPA Non-strategic	Common	62,851
		Western North Atlantic, Northern migratory coastal	MMPA Depleted and Strategic	Rare	6,639
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	MMPA Non-strategic RI State SGCN	Common	95,543

Common Name	Scientific Name	Stock	Current Population Status	Relative Occurrence in the RWEC-RI	Best Abundance Estimate[1]
Order Carnovora					
Suborder Pinnipedia					
Harbor seal	*Phoca vitulina*	Western North Atlantic	MMPA Non-strategic RI State SGCN	Regular	75,834
Gray seal	*Halichoerus grypus*	Western North Atlantic	MMPA Non-strategic	Regular	27,131
Harp seal	*Pagophilus groenlandica*	Western North Atlantic	MMPA Non-strategic	Rare	Unknown
Hooded seal	*Cystophora cristata*	Western North Atlantic	MMPA Non-strategic	Rare	Unknown
Order Sirenia					
Florida manatee[2]	*Trichechus manatus latirostris*	-	ESA Threatened MMPA Depleted and Strategic	Rare	Unknown

1 Best abundance estimate from the Draft 2019 Marine Mammal Stock Assessment Report, published by National Marine Fisheries Service (NMFS) on the Federal Register on 27 November 2019 (84 FR 65353).

2 Under management jurisdiction of United States Fish and Wildlife Service rather than National Marine Fisheries Service (USFWS, 2019).

Definitions:

- Common – Occurring consistently in moderate to large numbers;
- Regular – Occurring in low to moderate numbers on a regular basis or seasonally;
- Uncommon – Occurring in low numbers or on an irregular basis;
- Rare – Records for some years but limited; and
- Not expected – Range includes the Study Area but due to habitat preferences and distribution information species are not expected to occur in the Study Area although records may exist for adjacent waters.

The Northeastern United States coast, including waters off Rhode Island, contains a variety of marine habitats that are suitable for these sea turtles, such as the shallow enclosed waters of the Peconic Bay and other bays in Long Island, the deeper waters of Long Island Sound and the Atlantic Ocean (Burke et al., 1993). With Rhode Island State Waters being located within three miles of shore, more suitable habitat for adult sea turtles would be available compared to areas farther offshore.

There are four sea turtle species commonly found throughout the western North Atlantic which may occur within the Study Area. Consequently, these four species are considered *potentially affected species*. These species include the green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*). A fifth species, hawksbill sea turtle (*Eretmochelys imbricata*), may potentially occur within the region, but was not considered further in the impact assessment due to its use of tropical waters and coral reef habitats. Since this habitat is not present within the North Atlantic region, the presence of the hawksbill sea turtle would be extremely rare (NOAA Greater Atlantic Region Fisheries Office ["GARFO"], 2017). The four turtle species discussed in this section are listed as Endangered or Threatened under the ESA and are also listed as Endangered by the state of Rhode Island (RIDEM, 2020). USFWS and NMFS share the responsibility for sea turtle recovery under the authority of the ESA.

6.12 Rare, Threatened and Endangered Species

To assess whether any federal or state listed RTE species or SGCN were present within the Project Study Area, VHB evaluated information from the USFWS IPaC tool and the RIDEM ERM. Additionally, special attention was made during the biological reconnaissance and wetland delineation field visits on the OnSS parcel to identify occurrences of rare plants. General wildlife records are based on observations made during site investigations in July, August, and September 2019, the review of the RI WAP for species tied to specific Key Habitats within the Study Area, and other pertinent literature, including New England Wildlife (DeGraaf and Yamasaki 2001).

6.12.1 USFWS IPaC Consultation

VHB generated an Official Species List from the USFWS using the IPaC tool on December 28, 2020 regarding the proposed work limits for the Landfall, the Onshore Transmission Cable routes, the OnSS, the Interconnection ROW, the TNEC ROW, and the ICF.

The Official Species List generated by IPaC on September 28, 2019 and updated on December 28, 2020 indicated that the federally NLEB has the potential to occur within the Study Area. A Final 4(d) Rule specific to "take" prohibitions of the NLEB was published in the Federal Register on January 14, 2016 (USFWS, 2016). Take is defined by the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any species listed under the ESA. The IPaC list also indicated that there are no Critical Habitats within the Study Area.

There are several fragmented forested areas within the Study Area that provide potentially suitable summer habitat for NLEB. While habitat preference for the NLEB is broad, their occurrence in Rhode Island has not been studied extensively enough to indicate occurrences of summer roosting locations. According to the RIDEM's lead bat biologist, hibernating NLEB have been identified on Jamestown, but no surveys have been conducted to identify maternity roosting trees. Occurrences of NLEB within Rhode Island are tracked by the RIDEM and no new occurrences were recorded in 2019.

Bat acoustic surveys for NLEB were conducted in summer 2020. Acoustic monitors were deployed for two consecutive nights at five sampling stations within the Study Area for the Onshore Facilities. Call data were auto classified with Bat Call Identification East, Version 2.8b (BCID), which resulted the detection of the following species: big brown bat (*Eptesicus fuscus;* n=540 calls), eastern red bat (*Lasiurus borealis;* n=891 calls), Hoary bat (*Lasiurus cinereus*; n=23 calls) and silver-haired bat (*Lasionycteris noctivagans*; n=130 calls). Qualitative analysis of unknown and species of concern calls confirmed 11 big brown bat calls and 135 eastern red bat calls. The acoustic surveys did not identify any individuals for NLEB within the Study Area. The results of the acoustic survey were submitted to USFWS who confirmed the absence determination for NLEB.

6.12.2 Natural Heritage Area Review

VHB reviewed the Natural Heritage Area overlays within the RIDEM ERM and determined that there are no records of State-listed species within the Study Area. However, one Natural

Heritage Area is mapped within the northwestern edge of the Study Area. VHB contacted RIDEM on August 16, 2019 to inquire about the species listing for this area. RIDEM responded on August 19, 2019, stating that sickle-leaved golden aster (*Pityopsis falcata*), a plant species of state concern within Rhode Island, is mapped within that area. Sickle-leaved golden aster is a highly restricted endemic plant that is found only on sandy glacial deposits (Native Plant Trust). This plant is identifiable by its yellow tubular disk flowers in the center and yellow ray flowers around the center.

Due to its proximity to the Project, VHB completed a survey on the OnSS for this species. Clusters of sickle-leaved golden aster were observed within the pitch pine barren on the OnSS property. In accordance with RINHP policy, the new species occurrences within the pitch pine barren will be reported to the RINHP during the state permitting process.[26]

6.13 Air Quality

Tech Environmental (Tech, 2020) completed an evaluation of construction and O&M air emissions associated with the Project. The affected environment for air quality includes the RWEC–RI and the Onshore Facilities. The discussion of air quality related to Project activity for the RWEC-RI in Rhode Island applies to the Rhode Island territorial waters. Although air quality data are not available specifically for Rhode Island State waters, the RIDEM, in conjunction with the Rhode Island Department of Health, operates a network of eight air monitoring stations throughout the state that measure ambient concentrations of criteria pollutants; hazardous air pollutants ("HAPs"); and ozone precursors, which are substances that react in the atmosphere to form ground-level ozone. The discussion of baseline air quality conditions specific to Onshore Facilities applies to the onshore segment of the RWEC, the Landfall Work Area, the Onshore Transmission Cable, and OnSS. The Onshore Facilities are in the Quonset Business Park in North Kingstown, Rhode Island (Washington County).

The National Ambient Air Quality Standards ("NAAQS") were established by the Federal Clean Air Act Amendments and are designed to protect both public health and welfare ("EPA NAAQS"). The NAAQS, provided in parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter ($\mu g/m^3$), are presented in Table 6-14. The six criteria pollutants that comprise the NAAQS include carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), and particulate matter (PM). PM is a mixture of solid particles and liquid droplets found in the air and includes particles of varying sizes, categorized in the NAAQS as being smaller than 10 micrometers in diameter (PM_{10}) or smaller than 2.5 micrometers in diameter ($PM_{2.5}$) (40 CFR § 50). The standards are based on the total concentration of a criteria pollutant in ambient air that is accessible to the public. In an effort to achieve and maintain the standards, each state is required to monitor the ambient air to determine whether the state or area is in compliance. Therefore, baseline air quality conditions are typically evaluated by comparing the ambient concentration of a criteria pollutant, as measured at the nearest air monitoring station, to the NAAQS to determine whether the ambient concentration is in exceedance of any of the criteria pollutant standards.

26 Field surveys will be updated during the appropriate season in 2021.

Table 6-14 Criteria Pollutants National Ambient Air Quality Standards

Criteria Pollutant	Primary/Secondary	Averaging Time	Standards	
			Concentrations	Form
CO	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead	Primary and Secondary	Rolling 3-month average	0.15 μg/m^3	Not to be exceeded
NO_2	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and Secondary	1 year	53 ppb	Annual mean
Ozone	Primary and Secondary	8 hours	0.070 ppm	Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years
$PM_{2.5}$	Primary	1 year	12 μg/m^3	Annual mean, averaged over 3 years
	Secondary	1 year	15 μg/m^3	
	Primary and Secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years
PM_{10}	Primary and Secondary	24 hours	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
SO_2	Primary	1 hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

According to EPA's Green Book[27] (current as of March 31, 2020), which provides the NAAQS attainment status for each state and/or county in the country, all of Rhode Island is an attainment area (i.e., meets or exceeds primary standards) for all NAAQS criteria pollutants. Air quality analyses for projects that may impact motor vehicular traffic are required to evaluate their impact on ozone (O_3) and carbon monoxide ("CO").

In addition to the criteria pollutants discussed above, air pollutants can be categorized as toxic or hazardous air pollutants ("HAPs") or greenhouse gases ("GHGs"). There are no ambient air quality standards for HAPs or GHGs; however, emissions are regulated through national manufacturing standards and permit requirements. HAPs are those pollutants known, or suspected, to cause cancer or other serious health impacts, such as reproductive impacts or birth defects, or adverse environmental impacts. Examples of HAPs include benzene; dioxin; asbestos; toluene; and metals, such as cadmium, mercury, chromium, and

27 Nonattainment Areas for Criteria Pollutants (Green Brook), March 31, 2020. Accessed April 28, 2020. https://www.epa.gov/green-book

lead. GHGs are gases that trap heat in the atmosphere and include carbon dioxide ("CO_2"), methane ("CH_4"), nitrous oxide ("N_2O"), and fluorinated gases such as SF_6. GHGs are regulated under through national manufacturing standards and permit requirements federal Prevention of Significant Deterioration and Title V air quality regulations. They are also covered under RIDEM's Air Pollution Control Regulation No. 46 CO_2 Budget Trading Program.

Many criteria pollutant monitoring stations also measure HAPs, which are then reported to EPA on a yearly basis to produce the Monitor Values Report ("MVP"). In the case of GHGs, EPA regulates total GHGs expressed as carbon dioxide equivalent ("CO_2e"). 40 CFR § Part 98 requires GHG emitters, fossil fuel suppliers, industrial gas suppliers, and facilities that inject CO_2 underground for sequestration or other reasons to report their GHG emissions so that individual states can produce an annual GHG emissions inventory.

Although the MVP presents data on many different HAPs, only those that are associated with fuel oil combustion and are routinely measured were evaluated for the purposes of establishing a baseline for the affected environment. These include acetaldehyde, benzene, and formaldehyde. Although HAPs are monitored at most monitoring stations, many do not measure for every HAP; therefore, the ambient concentration of fuel oil HAPs were evaluated for the entire state of Rhode Island. Similar to HAPs, GHG data is not available for specific counties; therefore, the annual production of GHGs were also evaluated for the entire state of Rhode Island.

Per EPA's MVP, concentrations of diesel HAPs in Rhode Island have been generally decreasing over the last ten years. The ten-year concentrations of acetaldehyde, benzene, and formaldehyde were generally at their highest in 2009 and their lowest in 2013 to 2014. The reported concentrations since 2014 have been slightly higher but are generally steady.

Per the 2016 Rhode Island Greenhouse Gas Emissions Reduction Plan, emissions of GHGs in Rhode Island have been estimated at 11.3 million metric tons of CO_2e in 2015 (RIEC4, 2016). This is on target to meet the 2020 limit of 11.23 million metric tons of CO2e in accordance with the 2014 Resilient Rhode Island Act, which outlines programs and policies the state could undertake to meet its commitment to reduce annual GHG emissions to at least 10 percent less than 1990 levels by 2020, and up to 80 percent less than 1990 levels by 2050 (RIEC4, 2016).

7

Description of Affected Social Environment

The EFSB Rules require a detailed description of all social and environmental characteristics of the proposed site including the land uses within and proximate to the Project, visual resources in the vicinity of the Project, and the public roadway systems in the area. A 25-mile segment of the RWEC for the proposed Project is located in Rhode Island State Territorial waters (the REWC-RI). The RWEC-RI will make landfall in North Kingstown, Rhode Island, at Quonset Business Park. The proposed Project is located within Rhode Island State waters, existing roadway ROWs, on public and private property, and on properties owned by the QDC in the Town of North Kingstown. Additionally, the Project may utilize ports within Rhode Island during construction and O&M, including in the City of Providence (Port of Providence), the Town of North Kingstown (Port of Davisville – Quonset Business Park), and the Town of Narragansett (Port of Galilee).[28] No improvements at these ports are considered part of the Project.

Per Sections 45-22.2-2 *et seq.* of the R.I.G.L., the Rhode Island Comprehensive Planning and Land Use Act, all cities and towns are required to adopt and periodically update Local Comprehensive Land Use Plans. In compliance with these requirements, North Kingstown adopted its Comprehensive Plan Re-Write in 2019.

7.1 Population Trends

The total population within the Host Community has increased by approximately 2 percent between 2000 and 2017. As shown in Table 7-1, the Host Community accounted for approximately 2.5 percent of the total state population in 2000, 2010, and 2017.

28 The Project may also make use of the following existing ports outside of Rhode Island: Port of Montauk (Suffolk County, New York), Port Jefferson (Suffolk County, New York), Port of New London (New London County, Connecticut), Paulsboro Marine Terminal (Gloucester County, New Jersey), New Bedford Marine Commerce Terminal (Bristol County, Massachusetts), Port of Norfolk (Norfolk City, Virginia), and Sparrow's Point (Baltimore County, Maryland).

Table 7-1 Population Characteristics, 2000-2017

Entity	Decennial Census Population Count (2000)	Decennial Census Population Count (2010)	ACS Population Estimate (2017)	Population Density (2017)	Population Change (2000-2017)	ACS Median Age (2017)
State of Rhode Island	1,048,319	1,052,567	1,056,138	1,021	1%	40
Town of North Kingstown	26,326	26,486	26,178	609	2%	45
Host Community Percent of State Population	2.5%	2.5%	2.5%	-	-	-

ACS = American Community Survey
Source: U.S. Census Bureau. 2000, 2010, 2017a, 2018

According to the Rhode Island Division of Statewide Planning population projections, the population of the Host Community is anticipated to increase by 11.1 percent between 2010 and 2040. The Host Community is expected to account for approximately 2.8 percent of the total state population in 2040 (Table 7-2) (Rhode Island Division of Planning, 2013).

Table 7-2 Population Projections, 2010-2040

Area	2010	2020	2030	2040	2020-2040 Absolute	2020-2040 Percent
State of Rhode Island	1,052,567	1,049,177	1,070,677	1,070,104	20,927	2%
Town of North Kingstown	26,486	27,608	28,968	29,435	1,827	7%
Host Community Percent of State Population	2.5%	2.6%	2.7%	2.8%	-	-

Source: Rhode Island Division of Planning, Rhode Island Statewide Planning Program. Rhode Island Population Projections 2010-2040. http://www.planning.ri.gov/documents/census/tp162.pdf, accessed September 24, 2020.

7.2 Economy and Employment

Recent population growth, urbanization, and a substantial commuter-based population have produced greater demands for and a wider selection of trades and services. According to the Rhode Island Commerce Corporation ("RICC"), Rhode Island has enormous growth potential in the health and life science industry due to the emerging biotechnology companies. The financial services sector is extremely important to Rhode Island, employing over 25,000 individuals in 2019. Many manufacturers that invest in technologies and workforce training to compete in the global market have corporate or divisional headquarters in Rhode Island. Labor force and employment trends for the State and the Host Community are shown in Table 7-3. Average employment by industry is shown in Table 7-4.

Table 7-3 Labor Force and Employment Estimates, 1990-May 2020

	State of Rhode Island	Town of North Kingstown
2020 (May)		
Labor Force	518,556	13,425
Resident Employment	435,646	11,652
Resident Unemployment	82,910	1,773
Unemployment Rate	16.0%	13.2%
2010 (Annual Average)		
Labor Force	566,704	14,950
Resident Employment	503,216	13,532
Resident Unemployment	63,488	1,418
Unemployment Rate	11.2%	9.5%
2000 (Annual Average)		
Labor Force	543,561	14,963
Resident Employment	521,313	14,469
Resident Unemployment	22,248	494
Unemployment Rate	4.1%	3.3%
1990 (Annual Average)		
Labor Force	525,361	13,086
Resident Employment	492,002	12,448
Resident Unemployment	33,359	638
Unemployment Rate	6.3%	4.9%
Total Employment Changes 1990-May 2020	**-6,805**	**339**

Source: Rhode Island Department of Labor and Training, Labor Force Statistics, Not Seasonally Adjusted, 1976-October 2020. https://dlt.ri.gov/lmi/datacenter/laus.php
Rhode Island Department of Labor and Training, North Kingstown Labor Force Statistics, Not Seasonally Adjusted, 1990-May 2020. http://www.dlt.ri.gov/lmi/laus/town/nkingstown.htm

The largest employment sector in the Host Community is manufacturing, which has grown by 50.5 percent between 2010 and 2019 (Table 7-4). Other large employment sectors in North Kingstown include retail trade, health care and social services, and government.

Table 7-4 Average Employment by Industry, 2010 and 2019

	Town of North Kingstown	
	2010	2019
Agricultural, Forestry, Fishing and Hunting	31	88
Mining	*	*
Utilities	*	*
Construction	480	521
Manufacturing	4,392	6,610
Wholesale Trade	427	676
Retail Trade	1,931	2,016
Transportation and Warehousing	431	449
Information	243	191
Finance and Insurance	202	348
Real Estate, Rental, and Leasing	63	83
Professional and Technical Services	426	411
Management of Companies & Enterprises	612	821
Administrative Support & Waste Mgmt.	425	559
Educational Services	129	133
Health care & social services	1,500	1,642
Arts, entertainment, & recreation	247	298
Accommodation & Food Services	875	927
Other services (except public administration)	424	422
Unclassified Establishments	*	*
Government	1,480	1,359
Total	14,428	17,605

* Some data not available to avoid revealing data of a specific employer
Source: Rhode Island Department of Labor and Training: City and Town Census of Employment and Wages Data Tables for 2010 – NAICS. https://dlt.ri.gov/documents/pdf/lmi/town10ann.pdf
Rhode Island Department of Labor and Training: City and Town Quarterly Census of Employment and Wages Data Tables for 2019 – NAICS. https://dlt.ri.gov/lmi/datacenter/qcew.php

7.2.1 Gross Domestic Product

Gross Domestic Product ("GDP") represents the market value of goods and services produced by the labor and property located within a geography. It is influenced to a large degree by size (geographic area). GDP serves as a relative indicator of the size of the economies within the region, particularly when viewed as a percentage of the overall national economy. Since GDP is typically reported at a regional level, state and county data is included in Table 7-5 below. GDP in these geographies decreased between 2007 and 2008 and then increased almost every year since 2008. In 2018, Washington County accounted for11.6 percent of the state's GDP.

Table 7-5 State and County GDP (billions of dollars)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
State of Rhode Island	$47.85	$47.11	$47.90	$49.57	$50.18	$51.64	$53.21	$54.43	$56.76	$57.69	$58.51	$60.59
Washington County	$5.15	$4.98	$4.98	$5.20	$5.31	$5.51	$5.74	$5.86	$6.36	$6.40	$6.55	$7.04

Source: Bureau of Economic Analysis (BEA). 2019. Gross domestic product (GDP) by county and metropolitan area. Accessed September 24, 2020 from https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1

7.3 Land Use

This section characterizes existing land uses and land use controls within the vicinity of the Onshore Facilities based on publicly available land use and zoning data. As depicted in Figure 7-1, the Revolution Wind Study Area established for this discussion covers parcels within 500 feet of the Onshore Facilities, including the onshore segment of the RWEC-RI, Landfall Work Area, Onshore Transmission Cable, OnSS, Interconnection ROW, ICF, and TNEC ROW.

7.3.1 Study Area Land Use

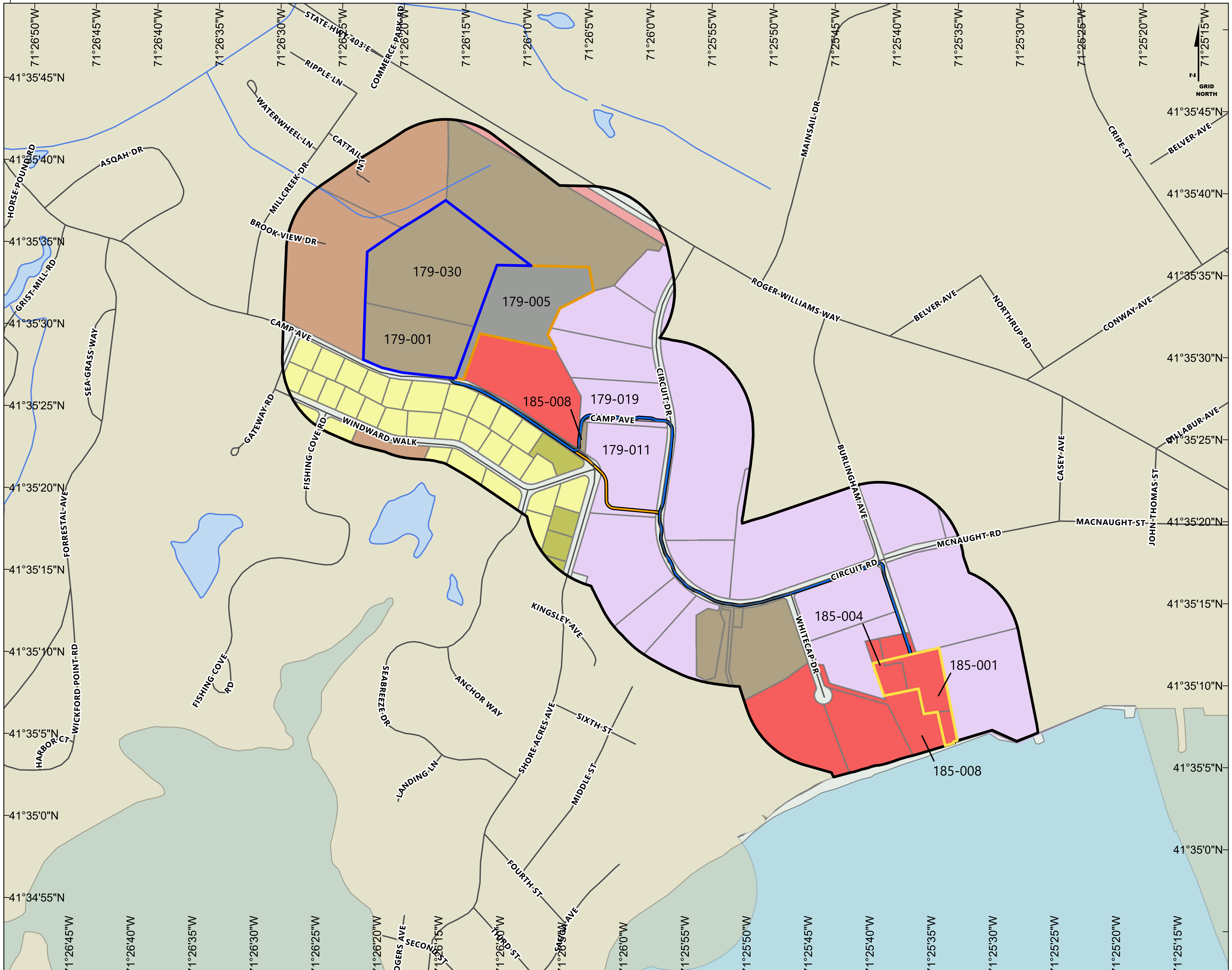
The proposed landing site for the RWEC-RI is within the Landfall Work Area, which is south of Burlingham Avenue and east of White Cap Drive. The route for the RWEC-RI and the Onshore Transmission Cable runs north from the MHWL to Burlingham Avenue to Circuit Drive, and then follows Circuit Drive in a northerly direction until it reaches Camp Avenue. The proposed route follows Camp Avenue in a westerly direction before turning north to the OnSS. An alternative route cuts across an industrial property along Circuit Drive (135 Circuit Drive) prior to the intersection of Circuit Drive and Camp Avenue to reach Camp Avenue. Similar to the proposed route, the alternative route follows Camp Avenue in a westerly direction before turning north to the OnSS.

Based on the Town of North Kingstown's Assessors' Data (2019), and as shown in Figure 7-1, the Onshore Facilities are within an area that is predominantly industrial but also includes some large business commercial, low-medium residential (including single family and two-family residences), and undeveloped land uses. The OnSS is sited on vacant parcels (Parcel ID: 179-001 and Parcel ID: 179-030) that are abutted by low-medium residential, medium-high density residential (including apartments), utility (i.e., the existing TNEC Davisville Substation), and undeveloped land uses. The Interconnection ROW will be on the OnSS site and the parcel containing the existing TNEC Davisville Substation. Abutting land uses to the TNEC Davisville Substation include industrial, large business commercial, low-medium residential, utility (existing transmission lines) and undeveloped land uses. The ICF and TNEC ROW will be sited on the same parcel as the existing TNEC Davisville Substation.

Most of the Onshore Facilities, and the entirety of the Landfall Work Area, are within the Quonset Business Park that is managed by the QDC. The Quonset Business Park is generally defined by industrial development, commercial/services development, waterfront development, open space and conservation development, and public and recreation development. The Quonset Business Park also includes the Quonset State Airport at its eastern edge. The Onshore Facilities are specifically within the Kiefer Park District of the Quonset Business Park, which consists predominantly of commercial services and light industrial uses. The Kiefer Park District is largely developed, including the site of the ICF and TNEC ROW that is the location of the existing TNEC Davisville Substation (Parcel ID: 179-005). However, the parcels that would host the OnSS and part of the Interconnection ROW are undeveloped. Only a short portion of the Onshore Transmission Cable is outside of the boundaries of the Quonset Business Park, falling within the Camp Avenue ROW belonging to the Town of North Kingstown.

Based on the Town of North Kingstown's Zoning Ordinance (2018), with the exception of the portion of the Onshore Transmission Cable that runs within the ROW belonging to the Town of North Kingstown, the Onshore Facilities fall entirely within the Quonset Business Park District ("QBPD"). The QDC has developed the Quonset Business Park Development Package, inclusive of the Development Regulations, to establish review processes and standards for development proposals that fall within its jurisdiction. According to the Development Regulations, with exception to the OnSS, all Onshore Facilities fall within the QDC's QLID. The OnSS sits within the QMUDD (Parcel ID: 179-001) and the QOSCD (Parcel ID: 179-030). Zoning adjacent to the portion of the Onshore Transmission Cable that runs within the ROW belonging to the Town of North Kingstown is Institutional/Office (I/O); this includes a single parcel (Parcel ID: 179-003). See Figure 7-1.

Revolution Wind
Figure 7-1
Land Use Map
NORTH KINGSTOWN, RI

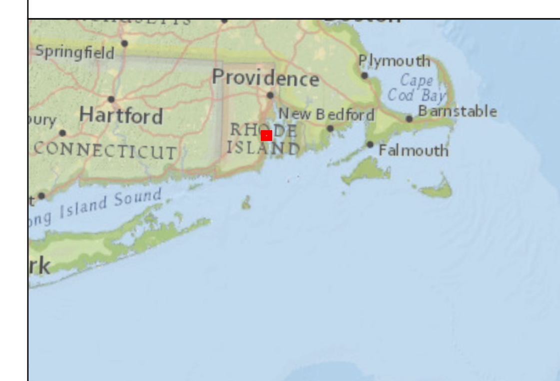


Legend
- Parcel ID 179-030 & 179-001
- Parcel ID 179-005
- Onshore Transmission Cable
- Alternative Cable Route Segment
- Landfall Area
- Limits of Study Area
- Parcel Boundary

Surrounding Land Use
- Industrial
- Commercial
- Residential - Single Family
- Residential - Two Family
- Residential - Apartment
- Vacant
- Utility
- Transportation

XXX-XXX - Parcel ID

Service Layer Credits: RIDEM/Tax_Parcels: RI State, 37 Towns
National Geographic World Map: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 80 160 240 Meters

0 240 480 720 Feet

Date: 12/3/2020
Document no:

Created by: S. PELLETIER
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

7.3.2 Contaminated Properties

The Study Area is predominately situated within the former Davisville Naval Air Station, which operated at Quonset Business Park between the 1940s and the 1970s. During the Naval occupation, land usage and disposal of contaminates and contaminated material was unregulated by any state or federal laws. Consequently, the Study Area experienced a period of land management that resulted in the discharge of numerous now-known contaminants to the environment.

As part of its due diligence, Revolution Wind performed a Phase I Environmental Site Assessment (“Phase I ESA”) in general accordance with the American Society for Testing and Materials (“ASTM”) Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (“ASTM Designation: E1527-13”), All Appropriate Inquiry (“AAI”). The Phase I ESA identified the following sites within the Onshore Study Area as having the potential to contain contaminated materials on or below the ground surface:

- Camp Avenue Dump
- Blue Beach Disposal Area
- Kiefer Park Tank Farm
- Small Arms Range and Burial Area
- Falvey Realty, LLC
- Davisville Substation
- Vantage Properties, LLC
- Goldline Properties, LLC
- Blue Beach Walking Path/ Red Maple Swamp

Most of these sites are controlled by an ELUR, executed with RIDEM and recorded in the municipal Land Evidence Records, which limits public exposure to identified contaminants. Some of the properties have not reached this controlled status due to ongoing monitoring or inability to execute an ELUR with RIDEM. Table 7-6 provides a summary of property data obtained during as RIDEM file review conducted as part of the Phase I ESA.

Table 7-6 Summary of Contaminated Properties within Onshore Study Area

Property	Property ID	ASTM Regulatory Status	Contaminants of Concerns
Camp Avenue Dump	AP 179 Lots 1 and 30; a portion of AP 179 Lot 5	Controlled Recognized Environmental Condition (“CREC”)	› Solid waste › UXO/MEC › Metals › polynuclear aromatic hydrocarbons (“PAHs”) › polychlorinated biphenyls (“PCBs”) › volatile organic compounds (“VOCs”) › pesticides

Property	Property ID	ASTM Regulatory Status	Contaminants of Concerns
Blue Beach Disposal Area	AP 185/Lot 20 and AP 179/Lot 28 and Lot 25	Recognized Environmental Condition ("REC")	› petroleum constituents present as dissolved constituents in the groundwater and as Light Non-Aqueous Phase Liquid ("LNAPL") › VOCs › Pesticides › PCBs › metals
Kiefer Park Tank Farm	AP 179, Lot 25 and a portion of the current AP 185, Lot 9	CREC	› LNAPL
Small Arms Range and Burial Area	Associated with Keifer Park and the vicinity of Whitecap Drive	REC	› UXO/MEC
Falvey Realty, LLC	AP 185, Lot 20	CREC	› LNAPL › Arsenic › benzo(a)pyrene › naphthalene › lead › selenium › cadmium
TNEC Davisville Substation	AP 179, Lot 5	REC	› PCBs › association with the former Camp Avenue Dump › Releases of non-PCB MODF
Vantage Properties, LLC	AP 185 Lots 8 and 21	CREC	› Potential LNAPL › Total Petroleum Hydrocarbons › VOCs
Goldline Properties, LLC	AP 179 / Lots 28, 29 AP 179 / Lots 25, 26, 27	CREC	› PCBs
Blue Beach Walking Path/ Red Maple Swamp	AP 179 Lots 22 and 24	CREC	› dissolved-phase petroleum compounds › VOCs

7.3.3 Open Space and Recreation

The Onshore Facilities do not intersect or otherwise occupy open space and recreation resources. As depicted within the Quonset Business Park Development Package, Parcel ID:

179-030 is within the QDC's QOSCD; Parcel ID: 179-001 falls outside of this district. However, in the more recent *Quonset Business Park Master Land Use and Development Plan*, Parcel ID: 179-030 is shown to be in the QLID. This is consistent with that plan's recommendation to re-zone this parcel "from Open Space to Light Industrial, consistent with the zoning in Kiefer Park, but recognizing that only development with low traffic volumes would be appropriate in this location" (Quonset Development Corporation, 2019). While Parcel 179-030 is presently designated as open space, QDC has not developed any recreational facilities or parking areas at this location, and existing use is passive recreation only.

Areas of open space and recreation proximate to the Onshore Facilities include Blue Beach, to the west of the proposed Landfall Work Area, the wetland to the north, and Compass Rose Beach to the east. The North Kingstown Municipal Golf Course sits farther to the north across Roger Williams Way.

7.3.4 Future Land Use Planning

The QDC adopted the latest *Quonset Business Park Master Land Use and Development Plan* in 2019. The purpose of this plan is to guide the continuing development of the Quonset Business Park for economic development purposes. With respect to the Kiefer Park District, the land use concept put forth by the *Quonset Business Park Master Land Use and Development Plan* largely calls for the continuation of existing uses. It does recommend, however, the rezoning of Parcel ID: 179-001 from mixed-use to light industrial, and as previously mentioned, Parcel ID: 179-030 from open space to light industrial (Quonset Development Corporation, 2019). As of December 15, 2020, the Quonset Business Park Development Regulations have not yet been updated to reflect these recommendations (Quonset Development Corporation, 2011).

According to the Town of North Kingstown's *Comprehensive Plan Re-Write*, in the area of the Onshore Facilities, the Town envisions moving away from a mix of industrial and commercial toward all light industrial. The parcel adjacent to the portion of the Onshore Transmission Cable within the ROW belonging to the Town of North Kingstown (Parcel ID: 179-003) is expected to transition from commercial to institutional (consistent with existing zoning). The parcel containing the OnSS and the parcel to the north of the OnSS are expected to remain undeveloped and the surrounding low-medium density residential areas are expected to transition to high density residential (Town of North Kingstown, 2019).

7.4 Visual Resources

EDR completed a Visual Resources Assessment ("VRA") (EDR, 2020) for above-ground components of the Onshore Facilities, inclusive of both the OnSS and ICF. See Appendix E. This section will discuss existing visual resources within the VSA. In order to define the maximum area of potential visual effect associated with the Project, EDR defined the VSA as all areas within 3 miles of the Project's limit of disturbance. The VSA includes approximately 30.5 square miles within the Town of North Kingstown and small portions of Warwick and East Greenwich, Rhode Island. In addition, the VSA includes a portion of Narragansett Bay. The VSA was used to characterize the landscape, assess potential Project visibility, and identify visually sensitive resources of national, regional, and statewide significance.

7.4.1 Existing Landscape Types

Specific landscape types ("LT") within a viewshed area can be used as a framework for the potential visibility of a facility. Seven LTs were identified within the VSA and are discussed below.

Open water is the most prevalent LT within the VSA due to the presence of Narragansett Bay. Narragansett Bay makes up approximately 35 percent of the VSA and includes portions of West Passage, Mill Creek, Fishing Cove, Wickford Harbor, and Bissel Cove. The Open Water LT is generally defined by broad expanses of open water including coves, harbors, and river estuaries prevalent along this portion of the bay. Both Prudence and Conanicut Islands define the West Passage and land is typically visible in all directions from any given point on the bay. Views over the water are generally longer distance than in other LTs within the VSA due to the lack of foreground screening features.

Developed Land comprises the second largest proportion of the VSA, making up approximately 30 percent of the total area. This LT is primarily comprised of industrial land associated with the Quonset Business Park, Quonset Point Naval Air Station, the Quonset Davisville Business Park, and other commercial and industrial areas within the Town of North Kingstown. Developed areas also include dense suburban residential developments located north and west of the business parks along the State Route 403, US Route 1, and Davisville Road corridors within the VSA. Open views within this LT are generally limited by the presence of foreground buildings and vegetation.

The Forest LT occurs in small pockets around and including the Project site (OnSS and ICF), but collectively makes up almost 26 percent of the VSA. Larger contiguous areas of forest land occur in the southern and western portions of the VSA and are associated with Cocumcussoc State Park, Black Swamp, and Calf Pasture Beach. Forest land also occurs between suburban residential developments in the northern portion of the VSA and include several wetlands unsuitable for residential development. Views within the Forest LT are generally restricted by the dense forest canopy and understory vegetation.

Open Space occurs throughout approximately 8 percent of the VSA and includes areas that are developed for the purpose of recreation, stormwater management, or managed vacant land. The largest representative example in this VSA is the North Kingstown Golf Course, located adjacent to and north of the Project site. Open space areas have a greater potential for outward, long-distance views than other terrestrial LTs within the VSA.

The remaining LTs, wetlands, beach, and agricultural land, collectively make up approximately 1.6 percent of the entire VSA and are scattered throughout in non-contiguous areas, thus making them a minor and inconsequential constituent of the VSA.

7.4.2 Existing Visually Sensitive Resources

EDR's VSA included researching and identifying VSR that have been identified by national, state, or local governments, organizations, and/or Native American Tribes. These important sites are given some level of protection or recognition and avoiding or minimizing impacts to these sites is an important consideration during project planning and design. Table 7-7 below identifies the visually sensitive resources identified by EDR. In addition to the VSRs identified below, approximately 10 residences are within 150 feet from the OnSS and ICF properties and were therefore informally considered.

Table 7-7 Visually Sensitive Resources Identified within the VSA

Type of Resource	Number of Resources within the VSA
Historic Resources (State or National Register of Historic Places)	17
Rhode Island Historical Cemeteries	63
State Parks	1
Rhode Island State Scenic Areas	4
State Nature Preserve	1
Public Boat Launch and Fishing Access	5
State Lands	2
Ferry Ports	1
Major Waterbodies	1
Total	95

Source: Visual Resource Assessment Revolution Wind Onshore Facilities (EDR, 2020)

7.5 Noise

Sound is the rapid fluctuations of air pressure above and below ambient pressure levels. Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, communication, or recreation. Sound is described based on its loudness or intensity (sound level), the frequencies of sound, and the variation of sound over time. Sound levels are most often measured on a logarithmic scale of decibels relative to 20 micro-Pascals in air and relative to 1 micro-Pascal in water. Since airborne and underwater sound levels are based on different reference levels, they should not be directly compared.

Airborne sound can have a range of effects on humans including speech interference, sleep interference, annoyance, and physiological effects such as anxiety or tinnitus and at high amplitudes could result in pain or hearing loss.

How people perceive sound depends on several measurable physical characteristics, including:

- Sound Level: Sound level is based on the amplitude change in pressure and is related to the loudness or intensity. Research indicates the general relationships between sound level and human perception are as follows:
  - A 3-dB increase is a doubling of acoustic energy and is approximately the smallest difference in sound level that can be perceived in most environments.
  - A 10-dB increase is a tenfold increase in acoustic energy and is generally perceived as a doubling in loudness to the average person.

- Frequency: Sounds are comprised of acoustic energy distributed over a range of frequencies.
- Sound levels reported in octave or one-third-octave frequency bands are often used to describe the frequency content of different sounds. Some sources of sound can generate "pure tones," which is when there is a concentration of sound within a narrow frequency range such as a whistle. Humans can hear pure tones very well, and such conditions can be a cause of increased annoyance.

Table 7-8 presents a list of common outdoor and indoor sound levels. The duration characteristics of sound account for the time varying nature of sound sources.

Table 7-8 Typical Sound Pressure Levels Associated with Common Noise Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 ft	
130	Threshold of pain	Jet aircraft takeoff at 300 ft	
120	Threshold of feeling	Elevated train	Rock band concert
110	Extremely Loud	Jet flyover at 1000 ft	Inside propeller plane
100	Very Loud	Motorcycle at 25 ft, auto horn at 10 ft, crowd noise at football game	
90	Very Loud	Propeller plane flyover at 1000 ft, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately Loud	Diesel truck (40 mph) at 50 ft	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner, electric typewriter
60	Moderate	Air-conditioner condenser at 15 ft, near highway traffic	General office
50	Quiet		Private office
40	Quiet	Farm field with light breeze, birdcalls	Bedroom, average residence (without television and stereo)
30	Very quiet	Quiet residential neighborhood	
20	Very Quiet	Rustling leaves	Quiet theater, whisper
10	Just audible	-	Human breathing
0	Threshold of hearing	-	-

Source: Adapted from Architectural Acoustics, M. David Egan, 1988 and Architectural Graphic Standards, Ramsey and Sleeper, 1994.

7.5.1 Airborne Sound Assessment

VHB completed an onshore airborne sound assessment for the Project. The sound assessment included: presentation of background information on airborne sound level concepts; methodologies for analyzing operational and construction airborne sound; characterizing existing ambient sound conditions in the study area; an assessment of the potential effects of operational and construction sound from the Project; and an evaluation of the need for practicable operational and/or construction-period BMPs to minimize potential airborne noise effects. The sound assessment also considered applicable federal, state, and local laws and regulations. The airborne sound assessment assumed conservative design assumptions for the Project. For example, the sound evaluation of the OnSS uses sound emissions for transformers based on National Electrical Manufacturers Association ("NEMA") ratings. The NEMA rating is generally considered to be an upper bound of the sound generated by a transformer. Manufacturers will often provide equipment with guaranteed equipment with sound levels lower than the NEMA rating based on actual measured sound level of the equipment. The equipment is typically below the guaranteed level.

7.5.2 Regulatory Context

7.5.2.1 Federal

The Noise Control Act of 1972 authorized federal agencies to adequately control noise that may endanger the health and welfare of the nation's population. In 1974, the U.S. EPA conducted a study on noise impacts relative to public health and safety (EPA, 1974). This EPA study provides guidance on the potential effects of noise that can be considered by federal, state, and local agencies; however, it does not constitute a standard or regulation.

As shown in Table 7-9, the EPA study concluded that a day-night average sound level of 55 dBA (Ldn[29]) or less for outdoor residential areas, or 55 dBA (Leq[24][30]) or less for outdoor areas where people spend limited amounts of time, such as schools and playgrounds, would protect public health and welfare with regard to potential interference with outdoor activity and annoyance. The study also concluded that a sound level of 45 dBA (Ldn) or (Leq[24]) or less for indoor residential uses and schools, respectively, would protect public health and welfare in regard to potential interference and annoyance. Buildings will reduce noise to the interior spaces by approximately 20 dBA or more with the windows closed and by approximately 10 dBA with the windows open. Since the exterior criteria are more stringent, noise from the proposed Project was evaluated according to the outdoor criteria.

The EPA noise guidelines are based on the evaluation of pervasive long-term noise, and therefore are applied to future operational noise conditions and are not typically applied to short-term construction-period activities.

29 Day-night average sound level

30 Energy average sound level

Table 7-9 EPA Noise Levels Identified to Protect Public Health and Welfare

Effect	Level	Area
Outdoor Activity Interference	LDN [55 dBA]	Outdoors in residential areas and farms, other outdoor areas where people spend widely varying amounts of time, and other places in which quiet is a basis for use
	LEQ(24) [55 dBA]	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, parks, etc.
Indoor Activity Interference and Annoyance	LDN [45 dBA]	Indoor residential areas
	LEQ(24) [45 dBA]	Other areas with human activities, such as schools

Source: EPA, 1974

7.5.2.2 State of Rhode Island

The State of Rhode Island general laws include a noise policy (Chapter 11-45.1 Unreasonable Noise Levels), which prohibits unreasonable, excessive and annoying noise levels from all sources subject to its police power. There are no state-wide quantitative noise criteria for operations or construction of the Project. The State of Rhode Island relies on individual communities to establish noise regulations through community by-laws.

7.5.2.3 Local

The Town of North Kingstown, Rhode Island, noise ordinance (Chapter 8, Article VI) establishes standards for the control of noise pollution by setting maximum permissible sound levels at or within the real property boundary of a receiving land use, to protect the public health, safety and welfare. The sound level limits, shown in Table 7-10 are applicable to the operation of the OnSS and the ICF. Operational sound levels at residential property lines are limited to 50 dBA at night (between 10:00 PM and 7:00 AM) and 60 dBA during the day (between 8:00 AM and 10:00 PM). The Airborne Sound Assessment conservatively assumed that the lower nighttime noise limit (50 dBA) also applies between 7:00 AM and 8:00 AM. At industrial business property lines, operational sound levels are limited to 70 dBA at all times of day.

Sound from construction activities, drilling or demolition work are exempt from these specific sound level limits when it occurs between the hours of 7:00 AM and 9:00 PM (Town of North Kingston Noise Ordinance Section 8-85); however, construction activities must not create a "noise disturbance" between the hours of 6:00 PM and 7:00 AM (Town of North Kingston Noise Ordinance Section 8-93).

The thresholds for a "noise disturbance" are that sound must not injure humans or property, endanger safety of humans or property, or annoy or disturb a person of normal sensitivities. The sound level that would constitute a "noise disturbance" is generally a level of about 85 dBA sustained for 8 hours or longer based on the United States Occupational Safety and Health Administration ("OSHA") thresholds for increasing the risk of noise-induced hearing loss. Construction noise has the potential to cause a "noise disturbance" at lower levels if it causes annoyance.

Table 7-10 Town of Kingstown, Rhode Island Noise Ordinance

Municipality	Location of Receiving Land Use	Time	Sound Level Limit, dBA
Town of Kingstown, RI	Residential, and open space	8 AM – 10 PM	60
		10 PM – 7 AM	50
	Business (neighborhood, waterfront and	At all times	65
	Business (heavy, planned and industrial)	At all times	70
	Noise sensitive area	At all times	60

Source: North Kingstown, Rhode Island Town Code Chapter 8, Article VI, Noise, April 9, 2019

7.5.3 Airborne Sound Analysis

The Study Area for onshore airborne sound includes the RWEC-RI proximate to the shore, the Landfall Work Area, the Onshore Transmission Cable route, and the ICF including the OnSS and the interconnection bus. Noise sensitive receptors ("NSRs") were identified near the proposed landing site, transmission cable routes, and the ICF by reviewing the North Kingston land use data base and making field observations. NSRs include single-family residences on the south side of Camp Avenue, multi-family residences on Millcreek Drive, industrial properties on Circuit Drive and White Cap Drive, and Blue Beach including a walkway from Circuit Drive.

7.5.4 Existing Sound Levels

Ambient sound measurements were conducted at three sites near the OnSS and the Landfall Work Area from August 27 to August 31, 2019 (see Figure 7-2). The ambient sound measurement data were evaluated, and observations were made to determine that there was significant sound from insects present during the nighttime period. Sound from the insects caused nighttime sound levels to be up to 6 dBA to be higher than they would be without insects. Since insect noise is a seasonal occurrence and is not always present, they have been filtered out of the sound measurement results to provide results which are representative of the periods throughout the year when insect noise is not as prevalent. Sound levels with insect noise filtered out are denoted as "dBA-i". By filtering insect noise, the ambient sound measurement results are more conservative in that they represent the ambient sound levels during quieter periods of the year where there is greater potential for increases in noise due to the Project. The process to filter out insect noise is to identify the frequencies of sound that the insects generate (typically between 2,000 and 10,000 Hz) and to replace the sound energy in these frequencies with sound levels that do not include the insect generated tones.

This page intentionally left blank.

Revolution Wind

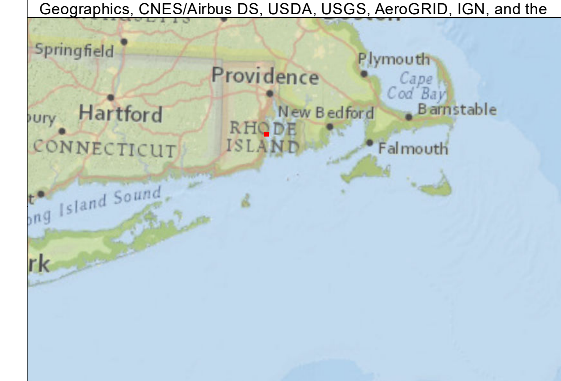
Figure 7-2

Ambient Sound Measurement Locations
NORTH KINGSTOWN, RI

Measurement Location

Onshore Substation Project Site

Anchorage, Environmental: Fugro
Shellgish Areas: MDMR
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 60 120 180 Meters
0 250 500 Feet

Date: 05/19/2020
Document no:

Created by: D. WHITE
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

Table 7-11 presents the results of the daytime and nighttime ambient sound level results at sites M1, M2, and M3.

Table 7-11 Ambient Sound Measurement Results

Measurement Site	Location	Measurement Period	Overall (dBA-i)	Octave-Band Sound Pressure Level (L_{eq}, dBA)								
				31.5	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
M1	Blue Beach	Night	43.9	16.2	27.5	32.8	34.1	37.6	38.1	37.2	30.7	29.1
		Day	49.1	20.2	32.0	36.3	38.4	41.8	42.1	42.2	41.5	38.1
M2	OnSS (Southern Portion of Project Site)	Night	45.4	15.7	27.3	31.0	33.1	39.3	40.3	37.6	36.1	30.6
		Day	50.5	19.5	31.6	36.0	38.0	42.9	44.7	44.1	42.4	39.0
M3	OnSS (Western Portion of Project Site)	Night	45.0	15.4	26.0	29.1	33.8	38.5	39.6	37.2	35.8	33.6
		Day	50.0	19.2	29.4	34.4	37.6	41.7	43.0	43.8	43.2	39.8

Source: VHB, 2019
Day is between 7:00 AM and 10:00 PM
Night is between 10:00 PM and 7:00 AM

7.6 Cultural Resources

BOEM is responsible for the regulation of renewable energy projects on the OCS per the Outer Continental Shelf Lands Act (43 U.S.C. 1337) and the Energy Policy Act of 2005 (PL 109-58). The issuance to Revolution Wind of an OCS lease under these regulations (titled Commercial Lease of Submerged Lands for Renewable Energy Development of the Outer Continental Shelf, Number OCS-A 0486) constitutes a federal undertaking subject to Section 106 of the National Historic Preservation Act ("NHPA"). The Section 106 implementing regulations (36 CFR Part 800) define an undertaking as a "project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license or approval" (36 CFR 800.16[y]). The Section 106 process "requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the [Advisory Council on Historic Preservation] a reasonable opportunity to comment on such undertakings" (36 CFR 800.1[a]).Through the Section 106 process, BOEM will consult with relevant stakeholders including State Historic Preservation Officers ("SHPOs") and Native American Tribes.

Additionally, Rhode Island state agency permits and authorizations will be required for the Project and the Antiquities Act of Rhode Island (Antiquities Act, RIGL 42-45 *et seq.*) requires all state agencies, departments, institutions, commissions, and all Rhode Island municipalities to cooperate with the RIHPHC in the preservation, protection, excavation, and evaluation of specimens and sites. RIHPHC has promulgated regulations implementing the Antiquities Act, which, in part, establish an advisory process to review state supported undertakings for potential effects to archaeological or cultural resources (530-RICR-10-00-1). Undertakings that are subject to compliance with Section 106 of the NHPA, such as the Project, satisfy the requirements the Antiquities Act by adhering to the federal 36 CFR 800 regulations (530-RICR-10-00-1.14I).

Revolution Wind has submitted to BOEM technical studies that evaluate potential impacts to terrestrial and marine archaeological and historic resources to support BOEM's Section 106 consultations.

7.6.1 Terrestrial Archaeological Resource Surveys

Revolution Wind has and continues to conduct surveys to identify buried archaeological sites in areas of potential ground disturbance. Terrestrial archaeological investigations of the Onshore Facilities are being conducted by Public Archaeology Laboratory, Inc. ("PAL") in accordance with the Rhode Island Historical Preservation and Heritage Commission's Performance Guidelines and Standards for Archaeology in Rhode Island (RIHPHC, 2015). These guidelines establish a phased approach to identification and evaluation of archaeological resources. Revolution Wind is consulting with RIHPHC and Native American Tribes to determine an appropriate approach to the identification and protection of deeply-buried archaeological or other cultural resources that may be present within the APE, consistent with the RIHPHC guidelines.

7.6.2 Marine Archaeological Resource Surveys

Consistent with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585 (BOEM, 2017), a Marine Archaeological Resources Assessment was completed for the Project by SEARCH, Inc. (SEARCH), who is serving as the Qualified Marine Archaeologists for Revolution Wind. Archaeologists reviewed extant public and proprietary databases containing information on shipwrecks, downed aircraft, or other potentially significant marine archaeological resources within the Project and surrounding areas. Ecological, geological, and cultural contexts were also developed to assist in the identification of potential submerged pre-contact Native American cultural resources. Finally, SEARCH reviewed gradiometer, side-scan sonar, sub-bottom profiler, and multibeam echosounder datasets collected during the 2019/2020 survey campaign to assess the presence or absence of potential submerged cultural resources within the APE offshore. SEARCH developed a paleolandscape reconstruction, based upon background research, regional geology, and the results of the high-resolution geophysical survey and geotechnical campaigns, which includes analysis of vibracores targeting potential submerged landforms.

7.6.3 Historic Resources Visual Effects Assessment

Also consistent with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585 (BOEM, 2017), potential impacts on above-ground historic resources are being assessed, ranging from physical alteration, disturbance, or destruction of a historic property caused by construction activities to changes such as the introduction of new and incompatible visual elements or auditory effects that diminish the historically significant characteristics of a historic property. The Federal Regulations entitled

"Protection of Historic Resources" (36 CFR 800) define potential impacts (adverse effects) on historic resources as follows:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative (36 CFR 800.5[2]).

Additional considerations may be required when a federal undertaking affects a National Historic Landmark. Section 110 (f) of the NHPA states:

> (f) Prior to the approval of any Federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible Federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking (CFR, 2004).

EDR completed an assessment of potential visual, auditory and atmospheric effects of the Project to above-ground historic properties. The assessment included the compilation of inventoried historic resources and State and National Register of Historic Places listed properties within a 40-mile radius of the proposed wind farm turbines and within 3 miles of the proposed OnSS facility in Davisville, Rhode Island. Detailed viewshed modeling of the largest proposed wind turbine generators was completed to identify all onshore areas with potential views of the offshore facilities. Viewshed modeling was also completed for the planned onshore facilities to refine the visual APE. Historic properties located within the viewsheds were grouped by thematic type and analyzed to determine the extent to which maritime settings and views of the open ocean contribute each property's historic significance.

EDR selected Key Observation Points ("KOPs") for photosimulations of the Project facilities. KOPs were chosen to provide representative views that can characterize numerous settings within the viewshed and allow for detailed assessments of the visual changes that would be caused by the Project. Field assessments were conducted of candidate KOPs to verify the GIS-generated viewshed model. Field assessments also provided additional information regarding the visual context of candidate KOPs used to refine the selection of specific viewpoints for photosimulations of the Project. Field photography was completed under a variety of lighting and atmospheric conditions to better characterize the range of conditions that may affect Project visibility. Daytime photosimulations were completed from a total of 28 unique viewpoint locations. In addition, five sunset simulations, and four nighttime simulations of the Project were prepared (for a total of 37 simulations from 28 unique viewpoints). Analysis of the simulations by architectural historians was then completed to identify Project-related visual changes that may exceed the federal adverse effect threshold.

The analysis included consideration of each potentially affected property's qualifying characteristics and the extent to which maritime settings contribute to those characteristics.

7.7 Transportation

The Project assessed existing transportation infrastructure within the Study Area, both onshore and offshore. A summary of existing conditions is presented below.

7.7.1 Vehicular Traffic

The transportation needs of the area proximate to the Onshore Facilities in the Town of North Kingstown are served by a network of state and local roads. Roger Williams Way is the major roadway, becoming State Route 403 just north of Circuit Drive. State Route 403 connects to Davisville Road, US Route 1, and US Route 4, which ultimately connects to Interstate 95. Roger Williams Way west of Circuit Drive is owned and operated by the Rhode Island Department of Transportation ("RIDOT").

Circuit Drive, Burlingham Avenue, and John Thomas Street provide north-south connections to Roger Williams Way and are served by smaller roads: Whitecap Drive and McNaught Street, along with smaller driveways and access roads. Southwest of Camp Avenue are residential streets that connect to it and the wider roadway network via Seabreeze Drive, Windward Walk, and Shore Access Avenue. North of Roger Williams Way are industrial roads that connect to it and the wider roadway network.

Quonset Business Park is served by public bus transportation operated by the RIPTA. Route QX is an express route connecting Quonset Business Park with metropolitan Providence, offering weekday service limited to two outbound trips (AM) and two inbound trips (PM) per day. Route QX Outbound begins in Pawtucket, Rhode Island, enters Quonset via Roger Williams Way, follows Circuit Drive with a stop on Circuit Drive near the intersection with Whitecap Drive, then turns north onto Burlingham Avenue before rejoining Roger Williams Way and serving other stops within the Business Park. The Inbound route generally complete the reverse route each weekday afternoon.

7.7.2 Marine Traffic

During the construction of the RWEC-RI, including the landfall, Project construction vessels and support craft will transit to the construction site from nearby ports and be stationed along the RWEC-RI corridor carrying out construction activities during the 12-month anticipated construction duration. A detailed NSRA prepared for the Project assessed existing vessel operational data including Automatic Identification System data, Vessel Monitoring System data, USCG data and ongoing dialogue with recreational and fishing industry organizations, pilot organizations, commercial maritime industry representatives, port authorities, state advisory groups and the USCG. The NSRA concluded that given the nature and frequency of marine traffic in the RWEC-RI area, navigation safety will not be adversely impacted.

Additionally, the Project met with the USCG, U.S. Navy Undersea Warfare Center Newport, and the RI Pilot Commission to discuss the planned RWEC-RI and identify any issues of concern, especially as they may relate to the respective agency's mission. All three indicated that RWEC-RI would not adversely impact their mission and had no objection to the project.

7.7.3 Quonset State Airport

Portions of the Project including the ICF, the OnSS, Onshore Transmission Cable and Landfall Work Area are proximate to Quonset Airport in North Kingstown, Rhode Island. These Project components were evaluated in terms of the applicability of Title 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, Part 77.9 Construction or alteration requiring notice. The Reporting Requirements for FAA Form 7460-1 (Notice of Proposed Construction or Alteration) were also reviewed. Part 77 allows the "FAA to identify potential aeronautical hazards in advance thus preventing or minimizing the adverse impacts to the safe and efficient use of navigable airspace." Due to the proximity of the Project to the Airport, an FAA notice using FAA Form 7460-1 would need to be completed at least 45 days prior to construction of any structures that either exceed 200 feet above ground level ("AGL") at the site, or that exceed a sloped imaginary surface extending outward and upward from a public use airport out to a horizontal distance of 20,000 feet.

The FAA has developed a web-based screening tool called the Notice Criteria Tool, which assists in determining whether there could be Part 77 impacts and informs the user whether or not a FAA Form 7460-1, Notice of Proposed Construction or Alteration should be filed with the FAA. The Notice Criteria Tool also considers other criteria, in addition to the Part 77 surfaces, such as instrument approach areas and proximity to navigational aids. The ICF, the OnSS, Onshore Transmission Cable and Landfall Area were evaluated in the FAA Notice Criteria Tool and a filing for the Project was requested.

Revolution Wind will submit a Form 7460-1 for FAA review for the applicable Project components. The FAA will conduct an aeronautical study to determine if there would be any hazards to air navigation and what mitigation measures might be necessary. However, it is anticipated that the onshore Project components would likely receive a no objection or conditional determination from the FAA. Finally, if advised by the FAA and per the requirements of any FAA-provided determination, Revolution Wind will notify the FAA prior to the start of construction and upon completing construction of each transmission structure via FAA Form 7460-2.

7.8 Electric and Magnetic Fields

Exponent assessed EMF associated with the operation of offshore and onshore components of the Revolution Wind Project (Exponent, 2020). EMF is a term used to describe electric and magnetic fields that are created by voltage (electric field) and electric current (magnetic field). All North American electric utilities supply electricity at a frequency of 60 Hertz (Hz). Therefore, the electric utility system and the equipment connected to it, produce 60-Hz (power-frequency) EMF. These fields can be measured using instruments and can be calculated using analytical or numerical models.

Power frequency EMFs are present wherever electricity is generated, distributed or used. Sources of these fields include utility transmission lines, distribution lines, substations, building wiring in homes, offices, and schools, and the appliances and machinery used in these locations.

Electric fields are produced by the voltage on a wire and are not related to the magnitude of the current flow. The strength of the electric field is a function of the configuration and operating voltage of the line and decreases with the distance from the source (i.e., the transmission line). Electric fields are shielded (i.e., the strength is reduced) by conducting materials. For overhead lines, trees, fences, walls, buildings, and most types of structures provide good shielding. For underground or submarine transmission cables the electric field from the voltage on conductors within is blocked by cable insulation and metal sheathing around the cables.

Magnetic fields are produced by current flows in a conductor and do not depend on the voltage of the conductor. The magnetic field strength around a transmission line is a function of both the current flow on the conductor and the configuration of the transmission line. The strength of these fields also decreases with distance from the source. However, unlike electric fields, most common materials have little shielding effect on magnetic fields. Magnetic fields are measured in units called Gauss. However, for the low levels normally encountered during daily activities, the field strength is expressed in a much smaller unit, the milliGauss (mG), which is one thousandth of a Gauss. Magnetic fields also induce very weak electric fields in seawater that can be detected by some marine species.

The federal government has not enacted any limits for electric fields or magnetic fields from land- or marine-based transmission cables or other sources of 60 Hz fields. Similarly, the State of Rhode Island also has not established any limits or guidelines for exposure. While land-based exposure to EMF from transmission cables is relatively common, marine-based submarine cables provide only a limited opportunity for persons to approach them, although limited exposure is possible for those who may be scuba diving at the seabed directly over the cables.

Two international organizations provide guidance on human exposure to magnetic fields. This guidance is the result of extensive review and evaluation of relevant research of health and safety issues, and the limits they propose are designed to protect health and safety of persons in an occupational setting and for the general public. The ICES, which operates "under the rules and oversight of the IEEE Standards Association Board," developed an exposure reference level limit to 60-Hz electric and magnetic fields of 5.0 kV/m and 9,040 mG, respectively for the general public (ICES, 2019). ICNIRP, an independent organization that provides scientific advice and guidance on the health and environmental effects of non-ionizing radiation, determined a reference level limit of 4.2 kV/m and 2,000 mG for whole-body exposure to 60-Hz electric and magnetic fields (ICNIRP, 2010).

8

Impact Analysis

This chapter presents an analysis of the potential impacts of the Project on existing environmental and socioeconomic resources within the Project Area (i.e., the Project's limit of work). As with any construction project, potential adverse impacts can be associated with the construction, operations or maintenance. These impacts have been minimized by the careful siting of the RWEC-RI and Onshore Facilities and by the adoption of numerous avoidance, minimization, and mitigation practices.

The Project will be constructed in a manner that minimizes the potential for adverse environmental impacts. Design and construction avoidance, minimization, and mitigation measures (see Section 9) will ensure that Project-related impacts are minimized. Revolution Wind will also develop a monitoring program to be implemented during construction of the Project to ensure that it is constructed in compliance with all relevant licenses and permits and applicable federal, state, and local laws and regulations. The following sections discuss potential impacts associated with the construction and O&M of the Project within various environmental and socioeconomic resources. Certain resources do not apply to all Project components and are therefore not discussed (e.g., fishery resources only apply to the RWEC-RI, so the Onshore Facilities are not discussed).

Table 8-1 summarizes the potential for impacts to environmental, societal, and economic resources from the construction, operation, and maintenance of the various Project components.

Table 8-1 Potential Impacts from Project Components

	Project Component						
	Onshore Substation	Interconnection ROW	Interconnection Facility	TNEC ROW	Onshore Transmission Cable	Landfall Work Area	Export Cable
Natural Resources							
Geology	X	X	X	X	X	X	X
Soils	X	X	X	X	X	X	-
Surface Water	-	-	-	-	-	-	X
Groundwater	-	-	-	-	-	-	-
Vegetation	X	X	X	X	X	X	-
Wetlands	X	X	X	X	-	-	-
Wildlife	X	X	X	X	X	X	-
Fishery Resources	-	-	-	-	-	-	X
Marine Mammals and Sea Turtles	-	-	-	-	-	-	X
Rare, Threatened, and Endangered Species	-	-	-	-	-	-	-
Air Quality	X	X	X	X	X	X	X
Socioeconomic, Cultural, and Visual Resources							
Social and Economic	X	X	X	X	X	X	X
Land Use	X	X	-	-	X	X	-
Visual Resources	X	-	X	-	-	-	-
Noise	X	-	X	-	X	X	X
Transportation	-	-	-	-	-	-	-
Cultural Resources[1]	X	X	X	X	X	X	X
Safety and Public Health	X	-	X	-	X	-	-
Electric and Magnetic Fields	-	-	-	-	-	-	-

1. Cultural resource impacts are subject to the Section 106 review being led by BOEM.

8.1 Geology

The RWEC-RI and the Onshore Facilities were designed to minimize impacts to geological resources. Initial RWEC-RI siting efforts incorporated the research and analysis completed by King (Undated) and are being refined with site-specific geotechnical and geophysical data collected by Fugro (2020). The Onshore Facilities are sited within previously and currently developed areas to minimize impacts. The sections below discuss potential impacts for both the RWEC-RI and the Onshore Facilities.

8.1.1 Revolution Wind Export Cable–Rhode Island

The RWEC-RI design will continue to be refined to address existing geologic resources and minimize direct and indirect impacts to the seafloor, as well as minimize land disturbance and sediment suspension and deposition. The RWEC-RI installation will require a temporary disturbance corridor of approximately 131 feet (40 m) for 23 miles for each cable, which is a total disturbance corridor of approximately 730 acres (295 ha). Impacts to geological resources will be limited to the area of the seafloor disturbed during preparation for and installation of the two export cables, which includes boulder clearance, sandwave leveling (leveling), cable installation, and installation of secondary cable protection.

It is estimated that boulder clearance will be required along approximately 70 percent of each cable corridor (511.3 ac [206.9 ha]) and is a discreet action with limited disturbance to the seafloor. Sandwaves are formed and maintained by ocean currents and leveling of these features is a temporary impact. It is estimated that sandwave leveling will be required along approximately 7 percent of each cable corridor (51.1 ac [20.7 ha]).[31] In addition, it is estimated that approximately 22 acres (8.9 ha) of secondary cable protection will be required (approximately 10% for each cable route), which will result in direct, long-term impacts to geological resources.

The RWEC-RI will be installed to a target burial depth of approximately 4 to 6 feet (1.2 to 1.8 m) below the seabed.[32] It will mostly affect surficial geology, but not to such an extent that there would be a perceptible change in overall regional geological resources. It will be installed to avoid shallow hazards using equipment such as a mechanical cutter, mechanical plow, or jet plow to the extent practicable. These installation techniques are not expected to result in any permanent seabed impacts because the trench naturally backfills with the temporarily suspended sediment. As described in Section 4.4.2.2, the use of a trailing suction hopper dredger and/or CFE may be required in certain locations. In addition, DP vessels will be used to the extent possible during installation of the RWEC-RI. DP vessels do not require anchors to maintain their position and therefore avoid additional geological impacts. If DP vessels cannot be used in certain locations, vessels that require anchoring will be used, which will result in short-term seafloor disturbance. These impacts cannot be quantified at this

31 The disturbance estimates presented herein are not additive as disturbance of boulder clearance and sandwave leveling may overlap and all impacts are within the disturbance corridor.

32 The target burial depth for the cables will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.

time, but anchoring will be limited to within the RWEC-RI's 1,312-ft (400-m) ROW. "No anchorage areas" will also be identified prior to construction to avoid any documented sensitive resources.

As the RWEC-RI approaches landfall, the cables will be installed using either open cut or HDD. If open cut is used, the cables will be installed approximately 10 feet (3 m) below the seabed and the trenches would temporarily disturb 4.6 acres (1.9 ha). If the HDD option is used, the target burial depth is approximately 49 feet (15 m).[33] In addition, a temporary offshore work area will be required for HDD installation, which may include two cofferdams (one per cable) that would measure approximately 164 feet by 30 feet, which would temporarily disturb approximately 0.2 acres (0.1 ha). Sheet piles would be installed during HDD installation at the offshore to onshore transition into the landfall and would be removed after the cable was installed except for a very small section of sheeting under the cable where the seawall currently is. This section would remain in place because removal could potentially damage the cable during the removal process. Installation of the sheet pile walls would result in direct, short-term impacts to geological resources.

Once the RWEC–RI is installed, there are no further impacts to geological resources anticipated with operation of the Project. The RWEC-RI has no maintenance requirements unless a fault or failure occurs or the cable becomes exposed. Repair or replacement of cables or cable protection are considered non-routine maintenance activities and will potentially result in the same or lesser impacts as construction.

Based on the analysis discussed in this section, impacts to geological resources resulting from seafloor preparation and installation of the RWEC–RI are primarily temporary and limited to the immediately surrounding area. Once buried, the area above the cable, except for the limited impacts associated with the secondary cable burial protection, will recover as part of ongoing processes associated with dynamic marine sediments.

8.1.2 Onshore Facilities

The Onshore Facilities were designed to minimize impacts to geology and were sited within previously disturbed and developed areas to the extent practicable. The Onshore Facilities include several different components, including the Landfall Work Area, Onshore Transmission Cable, OnSS, Interconnection ROW, TNEC ROW, and the ICF.

The Landfall Work Area will temporarily disturb up to 3.1 acres (1.3 ha) for the onshore portion of the RWEC-RI, the TJBs, and a portion of the Onshore Transmission Cable, and was sited in a currently developed area to avoid and minimize impacts. If open cut is used as the installation method, it will require an approximate 8,000 square foot trench that will be excavated to a depth of up to approximately 14 feet (4.2 m). Each TJB (one per cable for the RWEC-RI) will be up to 67 by 10 feet (20 by 3 m), for a total of approximately 1,320 square feet (122.6 m) of impacts and will be installed down to a depth of 10 feet. If HDD is used as the installation method, a temporary sheet pile anchor wall may be required to stabilize the drilling rig. This sheet pile wall would be approximately 30 feet long and would be driven to

33 The final target burial depth for the cables will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.

a depth of approximately 20 feet. Other sheet piles that have not yet been identified may also be required around the work area to stabilize the soil in the excavated area and/or anchor the rig.

The Onshore Transmission Cable will require a 25-foot-wide (7.6 m) disturbance area for the approximate one-mile (1.6 km) length of the cable for a disturbance corridor of approximately 3.1 acres (1.3 ha). An approximate eight-foot-wide trench will be excavated within existing paved roads to a depth of approximately 3 to 6 feet (0.9 to 1.8 m) with a maximum disturbance depth of 13 feet (4 m) to install the Onshore Transmission Cable beneath existing roads. This excavation will result in the mixing of soil materials during backfill, destroying any natural soil development that may be present. The Onshore Transmission Cable will also require two splice vaults approximately halfway to the OnSS. The two splice vaults will require a larger area of disturbance, with each requiring a 30- by 75-foot (9 by 22.9 m) area and will require excavation down to approximately 15 feet (4.6 m). The installation of the Onshore Transmission Cable and the splice vaults will have very limited impacts to geological resources due to the highly disturbed setting of Quonset Point.

The OnSS will require temporary disturbance of up to 7.1 ac (2.9 ha) to facilitate construction which includes an operational footprint of 3.8 ac (1.5 ha). Limited grading will occur; however, little to no impacts to geological resources are expected from construction and operation of the OnSS. A portion of the Interconnection ROW will also be constructed on the OnSS and will require the same excavation depth (i.e., 3 to 6 feet) and disturbance corridor (i.e., 25 feet) as the Onshore Transmission Cable.

The ICF will require temporary disturbance of up to 4.0 ac (1.6 ha) to facilitate construction with an operational footprint of 1.4 ac (0.6 ha). The temporary disturbances will be associated with temporary work areas, grading, filling, vegetation clearing, and staging/laydown areas. New structures will be also be installed within the TNEC ROW to reconfigure the existing overhead transmission line on the ICF parcel to connect the ICF to TNEC's Davisville Substation. The structures will be installed down to a depth of approximately 40 feet with an assumed diameter of 10 feet, which will result in minimal impacts to surficial geology.

Overall, construction activities for the Onshore Facilities will have little to no impacts to surficial geology because the majority of construction will occur in developed areas where geology is already disturbed (e.g., roadways, parking lot, landfill, etc.). In addition, all earth disturbances will be conducted in compliance with the RIPDES General Permit, which will include a site-specific SESC Plan and weekly monitoring until soils are stabilized after construction. Impacts to geological resources associated with sediment transport will be indirect and short-term.

Little to no impacts to geological resources are also anticipated during the O&M phase of the onshore segment of the RWEC-RI and Onshore Transmission Cable. Similar to the offshore segment of the RWEC-RI, onshore cable systems may suffer faults and/or failures potentially requiring the cables to be excavated and exposed for repair or replacement. These types of repairs would be considered non-routine maintenance and would have less impacts than construction. Routine maintenance activities will have no impact on geological resources.

8.2 Soils

This section only discusses potential impacts to soils associated with the Onshore Facilities. For details regarding disturbance corridors, areas of impact, and excavation depth for the Onshore Facilities, please refer to Section 8.1. The Project includes limited grading activities, principally associated with the construction of the new OnSS and ICF. Minor grading will be necessary to construct new access roads, stormwater management features, and prepare the Project footprint for construction. New structures to support existing overhead transmission lines will be necessary to support the TNEC ROW. All structures will be installed in uplands. Excess soil from excavation at pole structures in uplands will be spread around the poles and stabilized to prevent erosion and migration to adjacent wetland areas. Topsoil will then be spread over the excess excavated subsoil material in uplands and seeded and mulched to promote rapid revegetation and stabilization.

Industry standard construction techniques and BMPs such as the installation of compost filter socks, straw bales and siltation fencing, re-establishment of vegetation, and dust control measures will be employed to minimize any short- or long-term effects due to construction activities. These devices will be inspected by an environmental monitor frequently during construction and supplemented, repaired, or replaced when needed. Revolution Wind will develop and implement an SESC Plan that will detail BMPs and inspection protocols.

As discussed within Section 6.2 and as shown in Table 8-2 below, Quonset gravelly sandy loam (QoC), Walpole sandy loam (Wa), and Windsor sandy loam (WgB) are Farmland of Statewide Importance soils and are mapped within the Landfall Work Area, OnSS, and ICF. All of these areas within the Project footprint are previously developed, will be disturbed during Project construction and will be utilized during Project operation. QoC is also considered a potentially highly erodible soil, however, as mentioned above, standard BMPs will be employed which will prevent the erosion and sedimentation of sediment during construction and all disturbed areas will be stabilized with vegetation after construction. In addition, any slopes greater than eight percent that are above wetland and other sensitive areas that will be disturbed during construction will be stabilized with straw or chipped brush mulch to prevent the migration of sediments. In summary, with the implementation of the SESC plan and industry standard BMPs, no adverse impacts to soils are anticipated.

Table 8-2 Farmland Soils of Statewide Importance within the Project Footprint

Soil Map Unit Symbol	Name	Percent Slope	Project Component (Acres)
QoC	Quonset gravelly sandy loam, rolling	3 to 15	Landfall Area (0.03), OnSS (1.3), ICF (0.1)
Wa	Walpole sandy loam	0 to 3	OnSS (0.3)
WgB	Windsor sandy loam	0 to 3	ICF (0.5)

Source: USDA NRCS. Prime and Other Important Farmlands. State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties. November 2012. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ri/soils/?cid=nrcs144p2_016661

8.3 Surface Water

There are no surface waters (e.g. streams, rivers, lakes, etc.) within the Onshore Facilities footprint. One stream is located approximately 192 feet (17.8 m) to the west of the OnSS limit of work; however, it will not be impacted by the Project. Construction activities temporarily increase risks for erosion and sedimentation that may temporarily degrade existing surface water quality; however, appropriate BMPs will be implemented and maintained to effectively control sediment. The RWEC-RI will be installed within Narragansett Bay and Rhode Island Sound. The following sections discuss potential Project impacts to surface water quality for the RWEC-RI and Onshore Facilities, and hydrology and floodplains for the Onshore Facilities only.

8.3.1 Surface Water Quality

8.3.1.1 Revolution Wind Export Cable–Rhode Island

The primary concern to surface water quality is sediment suspension and deposition during installation of the RWEC-RI. To assess these impacts, Revolution Wind is completing a sediment transport modeling analysis to support permitting with RIDEM for the Water Quality Certificate ("WQC") pursuant to the Water Quality Regulations (250-Rhode Island Code of Regulations [RICR]-150-05-1.1 *et seq*.), RI CRMC for a Category B Assent Permit pursuant to the RI CRMC Management Procedures (the "Red Book") (650-RICR-20-00-1.1 *et seq*.), and RIDEM and RI CRMC for a dredge permit pursuant to the Rules and Regulations for Dredging and the Management of Dredged Materials (250-RICR-150-05-2.1 *et seq*.).

If HDD is used as the installation method, a drilling fluid that consists of water and bentonite, a natural clay mineral, will be used to stabilize the hole, prevent collapse and return the cuttings to the drill rig where they will be separated from the drilling fluid. A barge or jack-up vessel may also be used to assist the drilling process, handle the pipe for pull in, and help transport the drilling fluids and mud for treatment, disposal and/or reuse. To minimize the potential risks for an inadvertent drilling fluid release, an HDD Contingency Plan will be developed and BMPs will be implemented during construction and if any inadvertent release occurs, it is expected to result in direct, short-term impacts to water quality.

Vessels will be used during construction of the RWEC-RI and will comply with regulatory requirements for management of onboard fluids and fuels, including prevention and control of discharges and accidental spills. Revolution Wind will meet applicable regulations and standards, as set by the IMO MARPOL, the USCG, and the State of Rhode Island, for treatment and disposal of solid and liquid wastes generated during all phases of the Project. Revolution Wind will also implement an ERP/OSRP. Overall, installation of the RWEC-RI is expected to result in direct, short-term impacts to water quality from sediment suspension and deposition and is not expected to impact DO, chlorophyll *a*, or nutrient balance in the region. Due to proper handling and disposal of solid and liquid waste generated by the vessels, no impacts to surface water quality are expected from vessels. In addition, the sediment in the RWEC-RI landfall segment will be tested for contaminants and if analytical results an exceedance of RIDEM criteria, reuse or disposal of the excavated material will be subject to further negotiation with RIDEM.

8.3.1.2 Onshore Facilities

There are no waterbodies (e.g., streams, lakes, etc.) within the Project footprint and therefore there are no anticipated direct impacts to surface waters associated with the Onshore Facilities. Equipment used for the construction of the Onshore Facilities will be properly maintained and operated to reduce the chances of spill occurrences of petroleum products. Refueling of equipment will be conducted in upland areas and refueling equipment will be required to carry spill containment and prevention devices (i.e., absorbent pads, clean up rags, five-gallon containers, absorbent material, etc.) will be required at all times. In addition, maintenance equipment and replacement parts for construction equipment will be on hand to repair failures and stop a spill in the event of equipment malfunction. All construction activities will also be conducted in compliance with the RIPDES General Permit for the Discharge of Stormwater Associated with Construction Activities and an approved SESC Plan.

8.3.2 Hydrology

Some temporary impacts to surface drainage can be expected during construction of the Onshore Facilities. These impacts will be associated with installation of the underground Onshore Transmission Cable and construction of the OnSS, the Interconnection ROW, the TNEC ROW, and the ICF. A slightly higher rate of storm water runoff may result from the clearing of vegetation that would otherwise function to absorb some of the precipitation and slow the rate of runoff. However, the Project has been designed to mitigate increases in peak runoff rates and provide for water quality treatment consistent with the RISDISM, the SESC Plan, and the Project BMPs.

8.3.3 Floodplain

Based on available FEMA mapping, portions of the Onshore Facilities are within Zone A and Zone VE SFHAs. Construction of the Landfall Work Area, the ICF, the Interconnection ROW, or the TNEC ROW will not result in any temporary or permanent fill to floodplain. Construction of the OnSS will impact 25,375 square feet (0.58 acre) of floodplain from grading and construction of the control house and Substation equipment. Of this fill, 17,434 square feet (0.40 ac) is permanent and 8,257 square feet (0.20 ac) is temporary. All floodplains within the Revolution Wind Project footprint are coastal floodplains and compensation for loss of flood storage is not required under state or federal regulations.

8.4 Groundwater

This section only discusses potential impacts to groundwater within the footprint of the Onshore Facilities. For a discussion of equipment maintenance and spill containment, see Section 8.3.1.2. In addition to equipment associated spills, secondary containment for transformers will be provided in accordance with EPA SPCC (Title 40 CFR Part 112) and state requirements. Containment of 110 percent of a transformer’s fluid volume will be provided. In addition, the proposed transformers will be supported on concrete foundations and any potential leak will be trapped in the crushed stone surface.

Revolution Wind will perform regular inspections and maintenance of its substation equipment. In addition to regular inspections and secondary containment, the transformers at the new OnSS will be monitored for low coolant level, loss of internal pressure and electrical faults. In the event of these conditions occurring, an alarm would be transmitted to a 24-hour trouble center to dispatch a crew to address the problem.

The new OnSS, control house, and ICF will not involve storage of hazardous materials but will require installation of batteries to provide power in the event of an emergency. The acid contained in the batteries is toxic and corrosive and is classified as a hazardous material. Leaks from substation batteries are an infrequent event. In the unlikely event of a leak, the liquid will be contained behind the berm within the control enclosure until cleanup is performed. Hydrogen gas from a leaking battery will be detected by sensors. If a hydrogen gas condition is detected, an alarm is transmitted to a Control Center and fans are automatically activated to purge gas from the substation control building. These engineering controls, coupled with a regular inspection and maintenance program, make it unlikely that the battery acid would pose a hazard to the public or the environment.

As a result of these protective measures, no impacts to groundwater are anticipated during construction or operation and maintenance of the Onshore Facilities from spills or releases.

If dewatering is required during excavation, one of the dewatering methods discussed in Section 4.5.3 will be used and the SESC Plan and Eversource BMPs will be implemented to avoid adverse impacts to groundwater.

8.5 Vegetation

Potential direct impacts for Onshore Facilities include land disturbance and vegetation clearing and potential indirect impacts include spread of invasive species. Potential direct impacts to SAV might occur within a potential material storage area for the RWEC-RI and potential indirect impacts might occur from sediment deposition. In addition to the SPI/PV survey that INSPIRE completed, a preconstruction survey will be conducted to identify whether additional SAV beds have established within the Project’s limit of work. If SAV beds are identified, mitigation measures will be implemented to either avoid or transplant the individuals; mitigation measures will be coordinated with the applicable agencies.

8.5.1 Vegetation Clearing

Vegetation clearing will occur to facilitate construction of the Onshore Facilities. For the Onshore Transmission Cable, minor disturbance of lawn areas may be required for installation; however, that has not yet been determined. In addition, if the Emissive Energy Alternative Route is implemented, it will require removal of a limited number of trees within a hedgerow that runs parallel to Shore Acres Avenue as well as very minor temporary disturbance of maintained lawn. Because these impacts are not anticipated, they have not been quantified and are therefore not in Table 8-3 below.

The RWEC-RI will make landfall at a developed parcel and will disturb approximately 3,760 square feet (0.094 ac) of herbaceous vegetation within the Landfall Work Area; the temporary clearing for installation of the onshore portion of the RWEC-RI is immediately adjacent to the sea wall and will not result in any habitat conversion or long-term impacts. Once constructed, the area will be restored with a native herbaceous seed mix. The OnSS will require clearing approximately 3.3 acres (1.3 ha), which includes the construction footprint for the OnSS, the access road, stormwater management, grading, and the portion of the Interconnection ROW that is on the OnSS parcel. The ICF will require clearing approximately 2.8 acres (1.1 ha) of vegetation during construction, which includes the construction footprint for the ICF, stormwater management, access roads, grading, the portion of the Interconnection ROW that is on the ICF parcel and the TNEC ROW. Similar to the Landfall Work Area, all temporarily disturbed areas will be restored with a native seed mix once construction is complete. Table 8-3 below details vegetation clearing within mapped key habitats.

Table 8-3 Vegetation Clearing within Mapped Habitat Types for the Project Footprint

Habitat Type	Landfall Work Area (SF/Ac)	Onshore Substation Parcel (SF/Ac)[1]	Interconnection Facility Parcel (SF/Ac)[2]
Ruderal Grassland/Shrubland	3,760/0.09	0	606/0.01
Ruderal Forested Swamp	0	0	3,800/0.1
Ruderal Shrub Marsh	0	0	800/0.02
Mixed Oak/White Pine Forest	0	139,339/3.2	118,794/2.7
Pitch Pine Barren	0	4,964/0.1	0
Landfill	0	2,750/0.06	0
Total	3,760/0.09	147,053/3.4	124,000/2.8

Source: VHB

1. Includes the construction footprint for the OnSS, the access road, stormwater management, and grading, and the portion of the Interconnection ROW that is on the OnSS parcel.
2. Includes the construction footprint of the ICF including stormwater management, access roads, grading, the portion of the Interconnection ROW on the ICF parcel, and the TNEC ROW.

8.5.2 Vegetation Management

Vegetation management will occur on the OnSS and the ICF parcels. The Landfall Work Area and Onshore Transmission Cable will not require vegetative management and will be fully restored once construction is complete. The OnSS will have a 30-foot-wide perimeter around the fence line that will be maintained, the Interconnection ROW will have a 40-foot maintained ROW, the ICF will have a 10-foot wide perimeter around the fence line that will be maintained, and the TNEC ROW will have 120-foot-wide maintained ROW.

Per Eversource's Specifications for Rights-of-Way Vegetation Management, vegetation management on the OnSS and Interconnection ROW will be managed to promote a low-growing plant community dominated by grasses, flowers, ferns, and herbaceous plants. All woody vegetation including trees and shrubs will be removed and discouraged from becoming established by on-going IVM maintenance, including manual cutting, mowing and the prescriptive use of herbicides plus the use of environmental controls. The method of control is determined following inspections of the site scheduled for maintenance. The current maintenance cycle for vegetation control utilizing IVM practices is three or four years depending on the vegetation composition, facilities and site conditions. The cycle is based on the average growth rates of targeted species following maintenance. If vegetation is so thick or tall that they interfere with testing or maintenance, a narrow path directly over the conduit can be mowed. The allowed mature plant height may be modified, up to 15 ft (4.6 m) in height at maturity by species, to accommodate established herbaceous or woody plant communities that not only protect the electric facility and reduce long-term maintenance, but also enhance wildlife habitat, forest ecology and aesthetic values.

Per TNEC vegetation management requirements, vegetation control of the ICF and the TNEC ROW will be managed through integrated procedures combining removal of danger trees, hand cutting, targeted herbicide use, mowing, selective trimming, and side trimming. These procedures involve the cyclical management of vegetation along the active transmission line ROW The vegetation maintenance cycle follows a five-year timeline and encourages the growth of low-growing shrubs and other vegetation which provide a degree of natural vegetation control. This vegetation management is necessary to allowing for the proper clearance between vegetation and electrical conductors.

Methods for tree removal involve the use of manual climbing crews, skidder bucket equipment, aerial saws and tree harvesting machines. The location of the work, type of work and the degree or amount of work dictates the type of crew and equipment to be employed.

8.6 Wetlands

This section only discusses potential wetland impacts for the Onshore Facilities. Construction of the Landfall Work Area and Onshore Transmission Cable will not result in any permanent or temporary impacts to wetlands or Wetland Buffers. Construction of the OnSS will impact approximately 21,127 square feet (0.5 ac) of Wetland Buffer from grading, access road construction, stormwater management, and substation equipment. Of this, approximately 8,197 square feet (0.2 ac) is permanent and 12,930 square feet (0.3 ac) is temporary. Construction of the ICF and TNEC ROW will temporarily impact approximately 3,800 square feet (0.09 ac) of an isolated wetland, 800 square feet (0.02 ac) of a forested wetland, and 8,600 square feet (0.2 ac) of Wetland Buffer. In addition, the new access road on the ICF parcel for the TNEC ROW will cross the drainage channel that is regulated by the RI CRMC as an ASSF. The ASSF will be culverted to maintain drainage under the roadway, which will result in approximately 40 linear feet (12.2 m) of impacts.

8.6.1 Vegetation Clearing and Management

Vegetation clearing and mowing will occur within the isolated wetland and a portion of the forested wetland on the ICF parcel as well as Wetland Buffer areas to facilitate construction and maintenance of the proposed OnSS and ICF. Construction of the OnSS will require 21,127 square feet (0.5 ac) of vegetation clearing within Wetland Buffer. As mentioned in Section 8.6 above, all wetland impacts associated with the ICF are clearing impacts (i.e., there are no direct wetland or Wetland Buffer impacts) for the ICF and the TNEC ROW.

Appropriate erosion and sediment control measures will minimize impacts to wetlands from adjacent disturbed areas. All temporary wetland and Wetland Buffer impacts from vegetation clearing will be managed as described in Section 8.5.2 and will be a conversion of forested to a maintained herbaceous and low shrub growing communities.

8.6.2 Access Roads

Following delineation of wetlands on the OnSS parcel, the layout of the OnSS, including the access road, was chosen to avoid wetlands completely and only impact the outer periphery of the Wetland Buffer that is located along the northern boundary of the OnSS parcel. No access roads will be constructed within wetlands or Wetland Buffer to facilitate construction of the Interconnection ROW and the TNEC ROW. No access roads will be constructed within wetlands or Wetland Buffer to facilitate construction of the ICF. However, as mentioned above, the ASSF that is regulated by RI CRMC will be culverted to maintain drainage under the roadway, which will result in approximately 40 linear feet (12.2 m) of impacts.

8.6.3 Structures

The only new structures for overhead transmission lines are associated with the TNEC ROW, which will connect the ICF to TNEC's Davisville Substation. Under the current design of the proposed TNEC ROW, no structures will be placed within regulated wetlands.

8.6.4 Stormwater Management

No stormwater management features will be constructed within wetlands or Wetland Buffer on the OnSS, the ICF or along the Onshore Transmission Cable route.

8.7 Wildlife

This section only discusses potential impacts to wildlife associated with the Onshore Facilities. Fishery Resources impacts associated with the RWEC-RI are discussed in Section 8.8. The Project will result in temporary and permanent impacts to local wildlife during construction and O&M from land disturbance, habitat alteration, noise, traffic, and lighting. Habitat alteration is any physical change to areas necessary for breeding and survival of plant and animal species whether terrestrial, aquatic or airborne.

8.7.1 Landfall Work Area

Potential direct impacts resulting from land disturbance and habitat alteration generated from construction of the Landfall Work Area will be limited due to the developed nature of the area but include direct mortality or injury of wildlife during construction. Mobile individuals will be able to temporarily vacate this area of disturbance and are therefore less susceptible to mortality or injury compared to less mobile species such as insects and life-stages such as eggs. However, there is very limited suitable habitat for ground egg laying species (e.g., ducks and Canada geese) and no trees for aerial or cavity nesting species within the Landfall Work Area, which minimizes the potential for impacts. Habitat conversion is not a factor within the Landfall Work Area because the baseline habitat conditions of this area includes developed areas such as mowed lawn, parking lots, buildings, and roads and the small area of ruderal grassland that will be disturbed during construction will be restored upon completion of the Project. Therefore, impacts associated with land disturbance are anticipated to be direct and short-term.

Land disturbance within the Landfall Work Area can also generate temporary sediment suspension from open cut activities at the landfall location of the RWEC-RI within the Landfall Work Area. This sediment suspension may temporarily impact birds that forage in the nearshore area by disrupting and/or obscuring their prey base (e.g. invertebrate foraged by shore birds and ducks). For foraging birds, this could cause direct effects in reduced visibility and inhibiting pre-detection in the immediate vicinity of construction activities. In addition, sediment suspension could locally displace prey. However, as discussed throughout this section, BMPs and erosion controls will be installed in accordance with the SESC plan, which should minimize potential impacts. Therefore, impacts associated with land disturbance are anticipated to be direct and short-term. If the HDD option was implemented, it would have fewer impacts from land disturbance.

Accidental discharges, releases, and trash disposal could cause habitat degradation that would negatively impact the use of habitat by wildlife (e.g., ingestion of toxins which could reduce fitness or becoming entangled by debris). However, as discussed within Section 8.3.1.2, construction equipment will be properly maintained to reduce the chance of leaks and will contain spill containment kits, and good housekeeping (i.e., proper trash disposal) will be implemented, which greatly reduces these potential indirect, short-term impacts to wildlife.

Construction- and traffic-generated noise from construction of the Landfall Work Area can impact wildlife, such as avian and bat species, and how they behave within their affected habitats. Potential direct impacts on avian species and other wildlife from traffic generated during construction include collisions with construction equipment. Indirect impacts on avian species from traffic and traffic-generated noise during construction may include temporary avoidance of construction areas or disruption of normal behavior in the vicinity of the construction. However, both the direct and indirect occurrences are expected to be rare and are therefore considered direct and short-term.

Lighting can influence how wildlife interacts within their habitats. Lighting is not expected to result in injury or mortality or result in the alteration of habitat. Potential indirect impacts on wildlife resulting from lighting generated by construction at the Landfall Work Area include temporary displacement of wildlife individuals or disruption of normal wildlife behavior (e.g. foraging, breeding). Because most construction activities will occur during the day over the 12-month construction period, the indirect impacts from lighting on wildlife will be short-term.

8.7.2 Onshore Transmission Cable

The Onshore Transmission Cable route will pass through existing paved road and parking lots and will not involve significant removal of mature vegetation. The alternative access route will require removal of a limited number of trees and some trimming of trees along the route may be necessary to maintain safe clearance to equipment. Some disturbance of lawned areas along the route may occur during the construction of the cable and will be restored upon completion. These limited impacts are not anticipated to have an adverse effect to wildlife. Wildlife impacts associated with land disturbance; discharges, releases, trash, and debris; noise and traffic; and lighting will be similar to those described in Section 8.7.1 for the Landfall Work Area.

8.7.3 Onshore Substation and Interconnection Facility

Wildlife impacts associated with discharges and releases, trash and debris, noise and traffic, and lighting will be similar to those described in Section 8.7.1 for the Landfall Work Area. Potential impacts associated with land disturbance and habitat alteration are discussed below.

Impacts from habitat alteration and land disturbance from construction of the OnSS and the ICF (ICF is inclusive of the portion of the Interconnection ROW that is on the ICF parcel and the TNEC ROW) are similar to impacts resulting from the construction of the Landfall Work Area except there will be habitat conversion, which will occur when the forested areas within the parcels are cleared and graded for construction. In addition, the isolated wetland on the ICF parcel exhibits characteristics of a special aquatic site that could potentially support amphibian breeding (i.e., potential vernal pool). The impacted habitat types include portions of mixed oak/pine forest, pitch pine barren, and capped landfill. The impacted habitat types will be considered “converted” habitats that will initially revegetate as a grass/forb and herbaceous cover then will gradually transition to shrub and sapling cover. These two initial phases of regeneration will support different plant communities and wildlife relative to the existing baseline conditions.

The construction of the OnSS and ICF will not only result in habitat conversion but will also result in habitat loss. Habitat loss occurs when an area supporting wildlife is converted to non-habitat that lacks the natural resources to support occupancy for any species, e.g. paved areas. The operational footprint of the OnSS and ICF will result in habitat loss when forested uplands are cleared and replaced with hard structures with crushed gravel yards that are not capable of supporting plants or wildlife. The impacts associated with habitat loss are expected to be both direct and indirect and long-term, but minimal.

Land disturbance and habitat alteration from the construction of the OnSS and ICF also has the potential to create the indirect impact of habitat degradation through the spread of invasive species and wildlife displacement. Invasive plant growth is present on both the OnSS and ICF parcels. This indicates that invasive species are likely to become further established in disturbed areas if proper management techniques are not followed. Further surveys for invasive species are planned for 2021. Invasive species management will be implemented as required in permits from applicable agencies.

8.8 Fishery Resources

This section only discusses potential impacts to fishery resources associated with construction and operation of the RWEC-RI. Impacts to marine species are expected to be short-term and will primarily occur during construction. Seafloor disturbance during O&M that could potentially impact marine species would only occur if non-routine maintenance required uncovering and reburying the cable.

Installation activities associated with the RWEC-RI are generally expected to have short-term, localized impacts on access to fishing grounds due to safety measures on entering the area. In Rhode Island State Waters fishing activity primarily uses pots and traps, followed by fixed nets, and the top species landed are scup, channeled whelk and summer flounder. Vessel intensity for the Atlantic herring, pelagic species (herring, mackerel, squid), monkfish, and squid fisheries are medium-high to very high along portions of the RWEC-RI route; therefore these fisheries are most likely to be affected during installation of the RWEC-RI. During O&M, commercial and recreational fisheries are expected to experience none to limited effects from the presence of the RWEC-RI because it will be buried beneath the seabed. The USCG's stated policy is that "in the United States vessels will have the freedom to navigate through [wind farms], including export cable routes." (See Coast Guard Navigation and Vessel Inspection Circular 01-19 dated 1 August 2019.) Therefore, commercial fishermen will have the ability to continue to fish along the RWEC-RI corridor. Impacts to commercial and recreational fisheries and any mitigation will be fully addressed through the RI CRMC review process.

8.8.1 Essential Fish Habitat

Project-related impacts on EFH would vary for different species based on several factors including their behavior and distribution in the water column diet, habitat preferences, the amount of suitable habitat present in the area, and their life stage. Most of the potential impacts on EFH will be temporary and reversible as natural processes are expected to return the disturbed areas to pre-construction conditions apart from secondary cable protection. In addition, the spatial extent of anticipated habitat that is anticipated to be impacted is small relative to the amount of similar habitat in the region.

Species with a completely pelagic lifestyle are generally expected to be less negatively affected than demersal or benthic species from construction related impacts. Based on the results of a number of studies on benthic recovery (e.g., AKRF, Inc. et al., 2012; Germano et al., 1994; Hirsch et al., 1978; Kenny and Rees, 1994), the affected benthic communities in the disturbed area are expected to re-establish within 1 to 3 years as native assemblages recolonize the affected area or a new community develops as a result of immigration of organisms from nearby areas or from larval settlement. However, there are no expected population-level effects on EFH species due to the limited scale and intensity of the Project activities and the availability of similar habitat in the surrounding area. Therefore, construction related impacts to EFH species with benthic/demersal life stages are expected to be both direct and indirect, and long-term.

Similarly, EFH species with benthic/demersal early and/or late life stages are the most likely to experience impacts as a result of and O&M of the RWEC-RI. The species and associated life stages most likely to experience some level of short-term or long-term, direct or indirect impact are listed in Table 8-4 below.

Cable protection associated with the RWEC-RI also has the potential to have beneficial effects on species with life stages with a preference for hard-bottom habitats (e.g., gravel, rock, boulders, artificial reefs), depending on the quality of the newly-created hard-bottom habitat, and the composition of the benthic community that colonizes that habitat. These species and life stages that may experience a long-term, beneficial effect are listed in Table 8-5.

Note that some species could experience both negative and beneficial impacts at different phases of the Project. Thus, the same species and life stages may appear in both Table 8-4 and Table 8-5.

Table 8-4 EFH Species Most Likely to Experience Negative Impacts

Species	Egg	Larvae	Neonate	Juvenile	Adult
New England Finfish					
Atlantic cod (*Gadus morhua*)				●	●
Haddock (*Melanogrammus aeglefinus*)				●	
Monkfish (*Lophius americanus*)				●	●
Ocean pout (*Zoarces americanus*)	●			●	●
Red hake (*Urophycis chuss*)				●	●
Silver hake (*Merluccius bilinearis*)				●	●
White hake (*Urophycis tenuis*)				●	
Windowpane flounder (*Scophthalmus aquosus*)				●	●
Winter flounder (*Pseudopleuronectes americanus*)	●	●			●
Yellowtail flounder (*Limanda ferruginea*)				●	●
Mid-Atlantic Finfish					
Black sea bass (*Centropristis striata*)				●	●
Scup (*Stenotomus chrysops*)				●	●
Summer flounder (*Paralichthys dentatus*)				●	●
Invertebrates					
Atlantic sea scallop (*Placopecten magellanicus*)	●	●		●	●
Atlantic surfclam (*Spisula solidissima*)				●	●
Longfin inshore squid (*Doryteuthis pealeii*)	●				
Ocean quahog (*Arctica islandica*)				●	●
Skates					
Little skate (*Leucoraja erinacea*)				●	●
Winter skate (*Leucoraja ocellata*)				●	●
Sharks					
Spiny dogfish (*Squalus acanthias*)				● [1]	●

1 Includes sub-adult males and sub-adult females

Table 8-5 EFH Species That May Experience Beneficial Effects

Species	Egg	Larvae	Neonate	Juvenile	Adult
New England Finfish					
Atlantic cod (*Gadus morhua*)				●	●
Haddock (*Melanogrammus aeglefinus*)				●	
Monkfish (*Lophius americanus*)				●	●
Ocean pout (*Zoarces americanus*)	●			●	●
Pollock (*Pollachius virens*)				●	
Red hake (*Urophycis chuss*)				●	●
Silver hake (*Merluccius bilinearis*)					●
Winter flounder (*Pseudopleuronectes americanus*)				●	●
Yellowtail flounder (*Limanda ferruginea*)					●
Mid-Atlantic Finfish					
Black sea bass (*Centropristis striata*)				●	●
Scup (*Stenotomus chrysops*)					●
Invertebrates					
Atlantic sea scallop (*Placopecten magellanicus*)	●	●		●	●
Longfin inshore squid (*Doryteuthis pealeii*)	●				
Skates					
Little skate (*Leucoraja erinacea*)				●	●
Winter skate (*Leucoraja ocellata*)				●	●

8.8.2 Benthic Resources and Shellfish

During construction and O&M of the RWEC-RI, benthic resources and shellfish are expected to experience impacts. Long-term impacts are expected as a result of habitat alteration, as benthic habitat recovery and benthic infaunal and epifaunal species abundances may take up to 1 to 3 years to recover to pre-impact levels in disturbed areas (e.g., AKRF, Inc. et al., 2012; Germano et al., 1994; Hirsch et al., 1978; Kenny and Rees, 1994). Benthic species may experience localized, long-term impacts caused by the conversion of soft-bottom habitat to hard-bottom habitat associated with cable protection along portions of the RWEC-RI route. None of the impacts are expected to result in population-level effects on benthic species, due to the limited scale and intensity of the RWEC-RI activities, and the availability of similar habitat in the surrounding area.

8.9 Marine Mammals and Sea Turtles

Construction of the RWEC-RI may result in both direct and indirect, short-term impacts to marine mammals and sea turtles. During RWEC-RI construction, short-term impacts on marine mammals and sea turtles are expected from seafloor disturbance, habitat alteration, sediment suspension/deposition, discharges and releases, trash and debris, lighting, noise, and vessel traffic.

Seafloor disturbances associated with installation of the RWEC-RI may impact marine mammals and sea turtles by disrupting potential benthic prey species in the immediate area around the cable route. Marine mammals and sea turtles occurring in the area would likely be transiting in search of prey species, which may occasionally be benthic species. During installation of the RWEC-RI, trenching of the cable route will temporarily alter the existing habitat and may temporarily displace benthic organisms. As discussed within Section 8.8.2, benthic species are expected to recover within 1 to 3 years, resulting in direct and indirect, long-term impacts to marine mammals and sea turtles.

Underwater noise generated by impact pile driving for installation of a cofferdam is considered the predominant impact that could result in potential physiological and behavioral impacts on marine mammals and sea turtles due to the relatively high source levels produced by impact pile driving and the large distances over which the noise is predicted to propagate. However, some marine mammal species show a preference for deeper waters and are less likely to occur in shallower state waters of the RWEC–RI, which may reduce the risk for potential impacts from nearshore vibratory pile driving that would occur during installation of a cofferdam. Additionally, the relatively low sound levels produced during vibratory pile driving make it likely this noise will be masked by other non-project-related sounds in the region, diminishing the likelihood that marine mammals would be exposed solely to vibratory hammer noises resulting in physiological or behavioral impacts. For those few individuals that may perceive the non-impulsive noise from the vibratory pile driving, they might experience short-term disruption of communication or echolocation from auditory masking; behavior disruptions; or limited, localized, and temporary displacement from ensonified areas around the cofferdam. Therefore, these impacts are expected to be direct and short-term.

Seasonal increases in marine mammal presence within offshore areas may increase the risk of exposure to above-threshold noise, and for those very few individuals that may perceive the non-impulsive noise from Project dynamic positioning vessels, impacts may be considered consequential if behavioral disruptions, short-term disruptions in communication, or temporary displacement from the ensonified area were to occur as this could result in the interruption of biologically significant behaviors during construction and would therefore result in direct, short-term impacts.

Pinnipeds that may be present along the RWEC–RI could also be susceptible to in-air noise disturbance at haul out sites or pupping grounds, and in-air thresholds have been established by NMFS. However, above water noise impacts to pinnipeds are not expected to occur because the nearest known haul site for seals is approximately 3 km (1.86 mi) from the proposed location of the Onshore Facilities, and activities at this location are anticipated to produce relatively low levels of in-air noise compared to activities such as impact pile driving underwater.

Vessel strikes are another potential impact to marine mammals and sea turtles. Vessel strikes happen when either the animal or the vessel fails to detect one another in time to avoid the collision. Variables that contribute to the likelihood of a collision include vessel speed, vessel size and type, barriers to vessel detection by an animal (e.g. acoustic masking, heavy traffic, biologically focused activity) and in some cases mitigation measures. Most reports of collisions involve large whales, but collisions with smaller species have been reported (Evans et al., 2011; Van Waerebeek et al., 2007). Construction vessel traffic will result in a relatively localized impact which will occur sporadically throughout the approximate 8-month construction period, temporarily increasing the volume and movement of vessels. In the unlikely event that a strike resulting in injury or mortality were to occur, impacts could result in removal of those individuals from the population. The impacts resulting from the removal of an individual from a population that is listed as Endangered is countered by their overall resilience to population-level impacts. Due to comparatively low species densities, and the implementation of avoidance measures, there is a low risk of impacts to occur. However, increased vessel traffic poses a strike risk for marine mammals over the course of RWEC construction and impacts are considered direct and short-term due to the relatively short duration of installation activities.

Artificial lighting during installation and removal of the RWEC-RI will be associated with navigational and deck lighting on vessels from dusk to dawn. Only a limited area would be associated with the artificial lighting used on Project vessels relative to the surrounding unlit areas and the linear installation of the RWEC-RI will cause the lit area to constantly move along the cable route. Because of the relatively short duration of installation activities, impacts are considered direct and short-term for marine mammals.

8.10 Rare, Threatened, and Endangered Species

As discussed in Section 6.11, NLEB has the potential to occur within the Project Area and suitable summer roosting habitat is present within the fragmented forested areas. However, an acoustic survey was completed, which did not identify any individuals for NLEB. The IPaC did not identify any other federally protected species or critical habitats.

In addition to federally protected species, clusters of sickle-leaved golden aster, a plant species of special concern, were identified on the OnSS parcel. The OnSS, including access roads, will continue to be refined and the Project will be designed to avoid this species and during construction, the clusters will be protected during construction.

Due to the adherence to the time TOYR for NLEB and the protective measures incorporated for sickle-leaved golden aster, the Project will not have any adverse effects to rare, threatened, or endangered species.

8.11 Air Quality

The primary causes of potential air quality impacts from the RWEC-RI and the Onshore Facilities include air emissions from vessels, vehicles, helicopters, and stationary engines associated with construction, and O&M. A significant portion of the construction and O&M air emissions from the RWEC-RI (emissions occurring within 25 miles of the RWF) is subject to an OSC Permit; therefore, additional refinement to the RWEC-RI emissions estimates is likely as a result of the permitting process. Emissions have been estimated separately for each phase of the Project.

Project-related aircraft, vessel, vehicle, and equipment usage will generate emissions offshore and onshore, predominantly during the approximate one-year construction phase.

Table 8-6 provides details on the Study Area that is intended to help the reader understand the Project segment activities and impacted areas, which are used to determine the emissions presented in this section, and to which regulatory program the emissions are allocated. Note that a portion of the RWEC-RI emissions are subject to the OCS Permit and have not been included in these emissions estimates.

Table 8-6 Air Quality Study Area and Emissions Allocation

Project Segment	Segment Description	Project Activity	State	Applicable Regulatory Program
RWEC–RI	Area outside of OCS Permit Area in which the RWEC-RI is expected to be laid.	Marine vessels	Rhode Island	NEPA[1]
Onshore Facilities	The onshore segment of the RWEC-RI, the Landfall Work Area, the Onshore Transmission Cable, and OnSS	Marine Vessels Non-road equipment On-road vehicles Generators	Rhode Island	NEPA[1] and RIDEM[2]

1 Attainment areas are not subject to General Conformity; therefore, emissions that occur within 25 miles from shore (General Conformity Area) but are nearest to an onshore attainment area are only subject to NEPA.

2 Stationary sources, such as emergency generators may need to be registered or permitted through RIDEM, which is outside of the OCS permitting process.

The BOEM Offshore Wind Energy Facilities Emission Estimating Tool ("BOEM Wind Tool") was developed to provide consistent sets of air quality emission factors for proponents preparing OCS air emissions inventories. The BOEM Offshore Wind Energy Facilities Emission Estimating Tool Technical Documentation (ERG, 2017) provides a summary of the emission factors, and emission estimating methods, which were used in the independently developed air emissions estimations presented herein.

The following pollutants were included in the air emissions inventory for the Project:

- NO_X
- VOCs
- CO
- PM_{10}
- $PM_{2.5}$, a subset of PM_{10}
- SO_2
- Pb

- Black Carbon (BC)
- GHG emissions (including N_2O, CH_4, CO_2, SF_6 and total greenhouse gases expressed as CO_2e)

8.11.1 Revolution Wind Export Cable Emissions

8.11.1.1 Construction

Air emission sources during RWEC-RI construction will include the vessels that will perform, or support, installation of the RWEC-RI. Vessels supporting RWEC-RI construction will transit from existing port facilities and most, or all, of these vessels will utilize diesel engines burning low-sulfur fuel. Over the approximate 12-month construction period, RWEC-RI air emissions from vessels could have direct, short-term impacts to air quality. The majority of RWEC-RI emissions will occur over relatively short spans of time, and occur offshore, so impacts to air quality near populated areas will be limited in duration. For the purposes of estimating maximum annual emissions, it was conservatively assumed that construction would be completed in one year.

Estimated air emissions from the proposed construction activities for RWEC-RI outside of the OCS Permit area are summarized in Table 8-7. Typically, these emissions would be categorized as General Conformity emissions; however, because Rhode Island is in attainment, or unclassifiable, with all criteria pollutants the General Conformity Rule does not apply and these emissions are only subject to National Environmental Policy Act ("NEPA") review. Potential impacts to air quality from RWEC-RI installation air emissions occurring outside (or landward) of the OCS Permit area are considered direct and short-term.

Table 8-7 Estimated General Conformity Area Emissions from the RWEC-RI (Tons)

Project Component	CO_2	CH_4	N_2O	CO_2e	BC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	Pb
RWEC-RI	3,573	0.0	0.2	3,619	1.3	13.1	54.2	1.8	1.8	0.2	1.0	0.0

8.11.1.2 Operations and Maintenance

During the 20- to 35-year estimated O&M phase, the RWEC-RI will generate few emissions from infrequent use of equipment engines, vessels, and vehicles. O&M activities will produce relatively little emissions compared to those produced during construction. Furthermore, the O&M emissions will be more than offset by the hundreds of tons of avoided NO_X and SO_2 emissions and the millions of tons of avoided CO_2 emissions due to the renewable energy created by the Project.

8.11.2 Onshore Facilities

8.11.2.1 Construction

Over the approximate 12-month construction period, Onshore Facilities air emissions could have direct, short-term impacts to air quality. Estimated conformity air emissions from the proposed construction activities for the Onshore Facilities are summarized in Table 8-8.

Potential impacts to air quality from air emissions during the construction and installation of Onshore Facilities occurring outside of the OCS Permit Area are considered direct and short-term.

Table 8-8 Estimated General Conformity Area Emissions from the Onshore Facilities (Tons)

Project Component	CO_2	CH_4	N_2O	CO_2e	BC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	Pb
OnSS	285,962	6.6	0.4	286,240	0.0	555.5	990.6	44.1	42.4	2.3	67.7	0.0
Onshore Transmission Cable	7,338	0.1	0.0	7,342	0.0	8.9	37.2	1.8	1.8	0.1	2.4	0.0
Landfall – HDD	3,269	0.0	0.0	3,271	0.0	4.3	14.3	0.7	0.7	0.0	1.0	0.0
Landfall – Open Cut	1,936	0.0	0.0	1,936	0.0	1.1	3.0	0.2	0.2	0.0	0.3	0.0
Total	298,505	6.8	0.4	298,789	0.0	569.8	1,045.2	46.9	45.1	2.4	71.4	0.0

8.11.2.2 Operations and Maintenance

Estimated air emissions from the proposed O&M activities from Onshore Facilities are expected to have limited direct impacts to regional air quality and would be expected to be smaller compared to the impacts anticipated during construction activities. The Project will not change traffic and emissions parameters, nor affect the travel characteristics of the vehicles traveling in North Kingstown, Rhode Island. Therefore, the mobile source emissions will not be changed due to the proposed Project. The only air emissions anticipated during O&M would result from maintenance of an emergency generator and an occasional maintenance vehicle, and these would not be expected to result in a decrease of air quality within the surrounding area of the Onshore Facilities.

Estimated air emissions from the proposed O&M activities for Onshore Facilities are summarized in Table 8-9. As with construction, these emissions nearest to Rhode Island are not subject to General Conformity and would occur within 28.8 miles (46.3 km) from shore. Potential impacts to air quality from O&M of Onshore Facilities are also considered direct and long-term.

Table 8-9 Estimated Emissions from Onshore Facilities Operations and Maintenance (Tons/Year)

Project Phase	CO_2	CH_4	N_2O	CO_2e	BC	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	Pb
O&M	22	0.0	0.0	22	0.0	0.6	0.2	0.0	0.0	0.0	0.0	0.0

8.11.3 Beneficial Impacts to Air Quality

It is important to acknowledge the use of wind to generate electricity reduces the need for electricity generation from traditional fossil fuel powered plants in New England that produce greenhouse gas emissions. Table 8-10 presents the estimated annual avoided emissions from the operation of Revolution Wind. Avoided emissions were based on New England's annual non-baseload emission rates (Abt Associates, 2020). The estimated annual emissions were calculated based on a maximum 2,991,014 MW-hours generated per year, and a minimum 2,392,812 MW-hours generated per year. The estimated lifetime emissions were calculated by applying the maximum and minimum generated MW-hours per year to the maximum and minimum project life of 20 and 35 years, respectively. The Project is expected to annually displace CO_2, CH_4, N_2O, NO_X, and SO_2 produced by the New England electric grid and decrease the creation of GHG in the atmosphere from these sources.

Table 8-10 Annual and Lifetime Avoided Emissions for the Operation of the RWF (tons)

Term	Power Generated (MWh)	CO_2	CH_4	N_2O	CO_2e	NO_X	SO_2
Maximum Annual Avoided Emissions	2,991,014	1,392,275	128.6	16.5	1,400,236	749.2	397.8
Minimum Annual Avoided Emissions	2,392,812	1,113,820	102.9	13.2	1,120,189	599.4	318.2
Maximum Lifetime (35-year) Avoided Emissions	104,685,504	48,729,637	4,105.5	575.8	49,008,257	26,223.7	13,923.2
Minimum Lifetime (20-year) Avoided Emissions	47,856,230	22,276,405	2,075.8	263.2	22,403,775	11,988.0	6,364.9

8.12 Social and Economic Impacts

This section discusses the social and economic impacts of the Project, including its potential to increase local populations and its estimated direct, indirect, and secondary impacts. As detailed in the Project's purpose and need, the Project will provide clean, reliable offshore wind energy that will increase significantly the volume of renewable energy delivered to consumers in Rhode Island as well as Connecticut.

8.12.1 Population

Population impacts (e.g., resident shifts, growth, losses) to the Host Community could result from the influx of local and non-local construction personnel. Such direct impacts would be short-term, only occurring during the construction period. Due to the short duration of construction activities, it is unlikely that non-local workers will relocate families to the area. Local and non-local personnel would be required for the operation of the Project. Due to the long-term nature of this employment, it is likely that non-local workers will relocate families to the area; however, related population increases are expected to be small relative to the size of the local workforce under existing conditions. The Project would not require, nor will it lead to, residential displacements.

Temporary construction noise and traffic impacts, related to the operation of construction vehicles and equipment, are expected to be localized and short term. Except as needed for specific activities, construction will not exceed parameters set by local ordinances and most construction is anticipated to occur Monday through Friday between the hours of 7:00 am to 6:00 pm to minimize noise disturbance. Traffic impacts may include construction detours and increased vehicular traffic (e.g., delivery trucks carrying construction equipment and supplies, construction and export cable-laying equipment such as an excavator, and automobiles used for daily commuting to various work sites). The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

To minimize the direct short-term impacts to population expected to occur during the construction period, Revolution Wind will design the construction schedule to minimize and mitigate population-related impacts to the local community. Additionally, Revolution Wind will coordinate with local authorities during construction to minimize local traffic impacts and will construct in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion).

8.12.2 Employment and Economic Impacts

Guidehouse evaluated the direct[34], indirect[35], and induced jobs [36]; labor earnings[37]; gross output[38]; and economic value added[39] expected from the Project (inclusive of the RWF, RWEC, and Onshore Facilities). Based on this evaluation, the Project would have beneficial effects for the national economy across both phases – construction and operations – with an expected gross output (i.e., the sum value of all goods and services at all stages of production resulting from the Project) of roughly $1,360.3 million and value add (the best indicator of economic development benefits to the local economy) of roughly $737.9 million. As summarized in Table 8-11, for Rhode Island, the expected gross output and value add are $726.8 million and $390.6 million, respectively. This includes the generation of 3,059 direct, indirect, and induced jobs during the construction phase, and 233 direct, indirect, and induced annual jobs during the operations phase (Guidehouse, 2020).

Table 8-11 Summary of Jobs and Investment Impacts for Rhode Island

Project Phase	Impact Categories	Jobs	Earnings (Millions USD)	Gross Output (Millions USD)	Value Added (Millions USD)
Construction	Direct	1,020	$79.1	$88.5	$81.8
	Indirect	1,412	$103.2	$445.9	$177.1
	Induced	627	$39.0	$106.6	$61.7
	Total	**3,059**	**$221.4**	**$641.1**	**$320.6**

34 Direct jobs are on-site labor and professional services. On-site labor is given in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Construction jobs are given as FTE job-years since they are spread over a multi-year construction period. Some construction jobs will last only a portion of a year while others may last the entire expected construction period of three years. Operations jobs are given as annual FTE jobs over the entire operating period.

35 Indirect jobs are driven by the increase in demand for goods and services from direct on-site spending from the Project.

36 Induced jobs are driven by the local expenditures of those receiving payments within the first two job categories or increased household spending by workers.

37 Labor earnings are the additional earnings (wages and employer paid benefits) associated with the additional local jobs.

38 Gross output is the sum value of all goods and services at all stages of production resulting from the Project.

39 Value added is the best indicator of economic development benefits to the local economy. The sum total of value added of all enterprises and self-employed in a given state comprises that state's GDP. These values are the sum of earnings from capital and labor or the difference between total gross output and the cost of intermediate inputs. It is comprised of payments made to workers, proprietary income, other property type income, indirect business taxes, and taxes on production and imports less subsidies.

Operations (Annual)	Direct	58	$4.9	$4.9	$4.9
	Indirect	18	$1.5	$51.4	$47.5
	Induced	156	$10.8	$29.3	$17.6
	Total	**233**	**$17.2**	**$85.7**	**$70.0**

Notes: Earnings, Output and Value Added figures are in millions of 2020 dollars. Construction job figures are in job years, which are full-time equivalent (FTE) jobs multiplied by the number of construction years. Operations jobs are FTEs for a period of one year. The analysis does not include impacts associated with spending of wind farm profits. Totals may not add up due to independent rounding

Source: Guidehouse. (2020a). ***Advisory Opinion on the Economic Development Benefits of the Proposed Project***. October 2020.

The Project would not require, nor will it lead to, the displacement of businesses or industry. Temporary construction noise and traffic impacts, related to the operation of construction vehicles and equipment, are expected. Except as needed for specific activities, construction will not exceed parameters set by local ordinances and construction is anticipated to occur Monday through Friday between the hours of 7:00 am to 6:00 pm to minimize noise disturbance. Traffic impacts may include construction detours and increased vehicular traffic (e.g., delivery trucks carrying construction equipment and supplies, construction and export cable-laying equipment such as an excavator, and automobiles used for daily commuting to various work sites). The scale of these impacts will depend on the overall construction schedule and any TOYR that are imposed upon the Project.

Installation activities associated with the RWEC-RI are generally expected to have short-term, localized impacts on access to fishing grounds due to safety measures on entering the area. See Section 8.8 for additional information on fisheries.

8.13 Land Use

This section discusses the compatibility of the Project with the various land uses and land use controls within the vicinity of the various Onshore Facilities. As discussed in Section 7.3, the Study Area established for this discussion includes parcels within 500 feet of the Onshore Facilities, including the onshore segment of the RWEC-RI, Landfall Work Area, Onshore Transmission Cable, OnSS, Interconnection ROW, ICF, and TNEC ROW.

8.13.1 Study Area Land Use

Most of the Onshore Facilities, including all the Landfall Work Area, are entirely within the Quonset Business Park that is managed by the Quonset Development Corporation. Only a portion of the Onshore Transmission Cable is outside of the boundaries of the Quonset Business Park, falling within right-of-way belonging to the Town of North Kingstown along Camp Avenue leading to the OnSS. Of note, the alternative route for the Onshore Transmission Cable cuts across an industrial property along Circuit Drive (135 Circuit Drive) prior to the intersection of Circuit Drive and Camp Avenue to reach Camp Avenue; this parcel is within the Quonset Business Park. As previously noted, the Project will not displace any residences or businesses.

The Onshore Facilities, except for the OnSS, ICF, and TNEC ROW, will be buried underground. The landfall cable, TJBs, and onshore cable will be located on commercial properties under private ownership (Parcel ID: 185-008 and Parcel ID: 185-001), requiring the acquisition of permanent easements (i.e., a landfall cable easement and an onshore cable easement). The alternative route for the Onshore Transmission Cable runs through Parcel ID: 179-011, primarily along a private roadway, and therefore, will also require a permanent easement. All easements are expected to be granted by the property owners to Revolution Wind.

Construction of landfall cable, TJBs, and onshore cable, as well as the alternative route for the Onshore Transmission Cable, are expected to have short-term land use impacts to the selected commercial and industrial properties, as well as to Parcel ID: 185-004 that will be used for construction purposes. Existing land uses and related activities are expected to fully resume following construction. Revolution Wind is expected to obtain temporary construction easements from the private property landowners, and will coordinate with these owners and tenants, as applicable, on the intended construction plan and schedule.

The remainder of the buried portions of the Onshore Facilities will be located within rights-of-way owned by either the Quonset Development Corporation or the Town of North Kingstown. These underground portions of the Onshore Facilities also are expected to have short-term land use impacts that will occur during the construction phase of the Project, with existing land uses and related activities allowed to fully resume following construction. Revolution Wind will provide notification of the intended construction plan and schedule to affected abutters so that the effect of any temporary disruptions may be minimized. The buried portions of the Onshore Facilities are not expected to result in long-term impacts, as they will not permanently change land uses or induce land use changes.

The OnSS and part of the Interconnection ROW will be sited on currently undeveloped Parcel ID: 179-001 and Parcel ID: 179-030, while the remainder of the Interconnection ROW, ICF, and TNEC ROW will be sited on the same parcel as the existing TNEC Davisville Substation (Parcel ID: 179-005) (see Figure 7-1). The Interconnection ROW will be buried. The ICF and TNEC ROW are compatible with existing uses as they represent a modification of an existing use. The ICF includes the addition of a 115kV six-breaker ring bus to enable a more reliable connection between the Project (two 115kV underground duct bank connections) and the existing TNEC Davisville Substation, and the electrical grid beyond. The TNEC ROW is a reconfiguration of existing overhead lines.

As noted in Section 7.3, Parcel ID: 179-001 is within the QMUDD and Parcel ID: 179-030 is within the QOSCD. A substation and related infrastructure is not an allowed use within the QOSCD. Typically, proposals that include a land use that is not allowed in a land use district obtain a "Major Variance," and review and approval by the Quonset Development Corporation and the Town of North Kingstown Planning Commission. Per the EFSA (R.I.G.L. § 42-98-1 et seq.), however, the EFSB's permitting authority supersedes local jurisdiction, with exception to delegated authority of federal law. Therefore, Revolution Wind would not have to file for a Major Variance with the Quonset Development Corporation for the construction and operation of the OnSS and Interconnection ROW.

As part of its proceedings, the EFSB will request an advisory opinion from the Quonset Development Corporation. According to the *Quonset Business Park Master Land Use and Development Plan*, the Quonset Development Corporation seeks to include both Parcel ID: 179-001 and Parcel ID: 179-030 in its QLID, in which the OnSS and Interconnection ROW would be allowed (Quonset Development Corporation, 2019). As of September 30, 2020, the Quonset Business Park Development Regulations have not yet been updated to reflect this intent (Quonset Development Corporation, 2011).

As discussed in Section 7.3.2, the Onshore Facilities do not intersect or otherwise occupy open space and recreation resources. Therefore, they are not expected to result in an impact to such resources. The construction and operation of the OnSS and Interconnection ROW would preclude public access from Parcel ID: 179-001 and Parcel ID: 179-030, preventing the use of these properties for unofficial recreational activities.

The OnSS, Interconnection ROW, ICF, and TNEC ROW are not expected to induce land use changes. Due to their proximity to the existing TNEC Davisville Substation and other industrial uses within the Quonset Business Park, the conversion of the residential land uses to the south of Camp Avenue is not anticipated. Similarly, the high-density residential build-out of the parcels to the west of the OnSS and Interconnection ROW, as envisioned by the Town of North Kingstown's *Comprehensive Plan Re-Write*, are not expected to be limited by the construction and operation of these Project components. In many cases, existing vegetation will continue to provide visual screening of the proposed facility from nearby residences.

8.13.2 Consistency with Local Planning

The land use concept put forth by the *Quonset Business Park Master Land Use and Development Plan* largely calls for the continuation of existing uses in the Kiefer Park District. However, as noted in the previous section, this plan recommends the rezoning of Parcel ID: 179-001 from mixed-use to light industrial and Parcel ID: 179-030 from open space to light industrial (Quonset Development Corporation, 2019). As the Onshore Facilities represent allowable uses within the QLID, they are considered consistent with the *Quonset Business Park Master Land Use and Development Plan*.

8.13.3 Contaminated Properties

Revolution Wind has performed preliminary consultation with RIDEM regarding specific due diligence and geotechnical activities within contaminated properties in the Project Area, and more general discussion about an appropriate approach to managing and disposing of contaminated materials during construction. Early due diligence and geotech activities conducted to date in the Project Area were approved through the RIDEM Office of Land Revitalization and Sustainable Materials Management and were carried out in accordance with the ELURs and Soil Management Plans ("SMPs") specific to each of the properties investigated, and the Guidelines for the Management of Investigation Derived Wastes (RIDEM Policy Memo 95-01). Future due diligence and geotech activities will be conducted in the same manner.

It is anticipated that RIDEM will require the Project to develop a Project-specific SMP which will describe management, treatment and disposal of contaminated soil and groundwater, and solid waste generated during construction onshore.

8.14 Visual Resources

This section addresses the visibility and potential visual impact associated with the Onshore Facilities. The Visual Resource Assessment conducted by EDR in November 2020 illustrated that being within the Onshore Facilities viewshed does not necessarily indicate that the Onshore Facilities will result in visual impacts to the VSR present within the VSA. In fact, for the majority of these resources, Onshore Facilities Visibility will only include the upper portions of a few proposed transmission structures. As the line of sight cross sections indicate from Wickford Historic District and Wickford Harbor/Wickford Village State Scenic Area, Narragansett Bay and the Quonset Point Naval Air Station, the Onshore Facilities will be barely perceptible amongst the buildings and vegetation present in the Quonset Business Park. This is particularly the case for viewpoints and viewers located greater than 1 mile from the Onshore Facilities.

The Onshore Facilities may be potentially visible from approximately 15% of the entire VSA and five of the 95 (5%) identified VSRs within the VSA. However, field review suggested that Onshore Facilities visibility would likely be significantly less than suggested by the viewshed analysis due to the presence of landscape vegetation present along roadways, which was not considered in the viewshed analysis.

Where visible at near foreground distances, the proposed Onshore Facilities would introduce new industrial/utility structures into the landscape. At a maximum height of 80 feet, the proposed Onshore Facilities will not be out of scale or character with the existing types of development currently present in the vicinity, such as the existing Davisville Substation, or the structures at nearby Quonset Business Park. As such, it is anticipated that the Onshore Facilities will result in visual impacts to the public resources present in the VSA. Some Camp Avenue residences are likely to experience limited visual impacts as a result of the vegetative clearing associated with the ICF, OnSS and associated driveways, access road and transmission line ROWs. While these impacts are expected to alter the existing views experienced by the residents directly adjacent to the Onshore Facilities, they are generally localized and can be minimized through the use of mitigation, such as visual screening.

8.15 Noise

8.15.1 Construction Sound Impact Assessment

8.15.1.1 Landfall Construction

Landfall construction will either use HDD or open cut trenching to install the cable. Both methodologies were evaluated for potential noise impacts during construction and are discussed below.

If HDD is used there are three components that would be considered for noise: cofferdam installation; site preparation activities; and construction operations. A temporary offshore work area within the RWEC-RI corridor will be required. Within this work area, HDD exit pits (one per HDD) measuring approximately 164 ft x 33 ft x 10 ft (50 m x 10 m x 3 m) will be excavated or temporary cofferdams will be installed, which can include driving sheet piles using a vibratory hammer. Other site preparation activities include pile driving and installing a sheet pile anchor wall. Once the work areas are prepared, the cable is installed underneath the seabed and intertidal area using a drill rig located within the Landfall Work Area. See Section 4.4.2.1.1 for additional construction details.

Table 8-12 below shows onshore airborne construction sound levels from cofferdam construction, site preparation activities, and construction operations (i.e., installing the cable). Results are presented for the Landfall Work Area assuming that activities occur at the Quonset Business Park. Construction sound levels from cofferdam construction would be up to 51 dBA (Leq(8h)) at the nearest beach location. At the nearest residential receptors on Middle Street and Sauga Avenue, cofferdam construction sound levels would typically range from 38 to 49 dBA (Leq(8h)). Cofferdam construction would occur during daytime hours and would be within applicable state and local noise standards. Construction sound levels from HDD site preparation activities would be up to 57 dBA (Leq(8h)) at the closest beach location. At residential receptors on Middle Street and Sauga Avenue, construction sound levels would be 40 to 54 dBA (Leq(8h)). Site preparation construction would occur during daytime hours and would be within applicable state and local noise standards. Onshore airborne construction sound levels from HDD operations would be up to 43 dBA (Leq(8h)) at the beach. At the nearest residential receptors, HDD operations, which may occur during the daytime and nighttime, would generate sound from 22 to 36 dBA (Leq(8h)). HDD operations during the daytime would be within all applicable state and local noise standards.

Table 8-12 HDD Construction Noise

Receptor	Address	Cofferdam Construction Sound Level (dBA, $L_{eq(8h)}$)	HDD Site Preparation Construction Sound Level (dBA, $L_{eq(8h)}$)	HDD Construction Operations Sound Level (dBA, $L_{eq(8h)}$)
R13	133 Middle St.	41.2	53.8	35.5
R14	125 Middle St.	47.2	49.0	28.9
R15	119 Middle St.	47.2	45.4	24.5
R16	111 Middle St.	41.6	44.1	23.3
R17	91 Middle St.	47.6	43.7	22.2
R18	41 Middle St.	47.6	45.3	23.9
R19	216 Sauga Ave.	38.4	43.7	27.6
R20	221 Sauga Ave.	49.3	42.1	30.7
R21	159 Sauga Ave.	48.3	43.4	29.4
R22	89 Sauga Ave.	46.4	40.1	26.4
--	Blue Beach	51.1	56.5	42.8

Source: VHB, 2020

As described in Section 7.5, ambient sound measurements at M1 near Blue Beach were 49 dBA (Leq) during the day and 44 dBA (Leq) during the night. Therefore, HDD operations would generate sound below ambient conditions during both the daytime and nighttime ambient conditions and would not be expected to cause significant adverse noise impacts.

Open cut installation would be completed using traditional excavation methods for onshore construction, including equipment such as a bulldozer, front end loader, small crane, and trencher, and similar equipment on a shallow draught barge for the offshore portion. See Section 4.4.2.1 for additional construction details. As shown in Table 8-13, onshore airborne construction sound levels from open cut activities would be up to 53 dBA (Leq(8h)) at the beach within a distance of 50 feet from construction activities. At the nearest residential receptors, open-cut construction would generate sound from 27 to 45 dBA (Leq(8h)).

Table 8-13 Open Cut Construction Noise

Receptor	Address	Open-Cut Construction Sound Level (dBA, $L_{eq(8h)}$)
R13	133 Middle St.	30.8
R14	125 Middle St.	27.2
R15	119 Middle St.	27.5
R16	111 Middle St.	28.7
R17	91 Middle St.	31.2
R18	41 Middle St.	40.5
R19	216 Sauga Ave.	44.5
R20	221 Sauga Ave.	45.2
R21	159 Sauga Ave.	38.6
R22	89 Sauga Ave.	40.2
--	Blue Beach	53.0

Source: VHB, 2020

Construction sound levels at the nearest residences would be approximately 5 to 10 dBA quieter using HDD during cable installation rather than open-cut construction methods. However, the HDD site would require a period of increased sound levels associated with the site preparation. Additionally, HDD operations may require construction during the night when there is a greater potential for noise impact. See Figure 8-1 below for the sensitive receptors evaluated for the landfall location and portions of the Onshore Transmission Cable.

Revolution Wind

Figure 8-1

Landfall Noise Receptor Locations
NORTH KINGSTOWN, RI

Receptor Location

Cable Route

Route (Alternative)

Onshore Substation Site

Anchorage, Environmental: Fugro
Shellgish Areas: MDMR
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the

Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 90 180 270 Meters

0 250 500 Feet

Date: 05/19/2020
Document no:

Created by: D. WHITE
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind

Powered by Ørsted & Eversource

This page intentionally left blank.

8.15.1.2 Onshore Transmission Cable Construction

Construction activities associated with the Onshore Transmission Cable installation include clearing the route, saw-cutting the pavement, excavating and shoring the trench, installing the duct, and backfilling. The construction would typically occur in the roadway right-of-way except for an alternative route that would transition from Circuit Drive to Camp Avenue between 101 and 135 Circuit Drive. As shown in Table 8-14, construction sound levels would range from 84 to 89 dBA (Leq(8h)) at a distance of 50 feet for all construction phases. At 100 and 200 feet from the transmission cable construction, construction sound would be approximately 6 and 12 dBA lower, respectively.

It is anticipated that construction of the Onshore Transmission Cable will take approximately 12 months. Since construction progresses along the cable route during this period, the exposure to construction noise is of a substantially shorter duration at any particular location along the route. All potential cable routes would go along residences on Camp Avenue which are generally setback about 50 feet from the route. Onshore Transmission Cable construction would generally occur during daytime hours and would be within all applicable state and local noise standards.

Table 8-14 Onshore Transmission Cable Construction Noise

Distance from Cable Route (feet)	Construction Sound Level (dBA, $L_{eq(8h)}$)				
	Route Clearance	Excavation	Shoring/ Trenching	Duct Installation	Backfilling
50	89.2	88.0	83.9	85.2	89.0
100	83.2	82.0	77.9	79.2	83.0
200	77.2	76.0	71.9	73.2	77.0

Source: VHB, 2020

8.15.1.3 Onshore Substation and ICF Construction

Construction activities associated with the OnSS and ICF typically include clearing the site of vegetation, grading the site, installing erosion controls, installing the foundations and erecting buildings, and restoring any disturbed areas. As show in Table 8-15, construction sound would approximately 54 to 64 dBA at the nearest residential receptors on Cattail Lane, Brook View Drive, and Camp Avenue. The existing ambient sound levels at these receptors is 50 to 51 dBA-i during the daytime and 45 dBA-i during the night. Construction sound during the day would generally be 10 to 15 dBA above ambient conditions. Construction of the OnSS and ICF would occur during daytime hour and would be within all applicable state and local noise standards.

Table 8-15 Onshore Substation and ICF Construction Noise

Receptor	Address	Existing Sound Level (dBA, L_{eq}) Daytime	Nighttime	Substation Construction Sound Level (dBA, L_{eq})
R1	129 Cattail Lane	50.0	45.0	57.3
R2	140 Brook View Drive	50.0	45.0	55.8
R3	10 Gateway Road	50.5	45.4	54.4
R4	511 Camp Avenue	50.5	45.4	55.6
R5	525 Camp Avenue	50.5	45.4	55.8
R6	541 Camp Avenue	50.5	45.4	55.7
R7	553 Camp Avenue	50.5	45.4	55.9
R8	571 Camp Avenue	50.5	45.4	56.6
R9	595 Camp Avenue	50.5	45.4	57.7
R10	613 Camp Avenue	50.5	45.4	60.4
R11	629 Camp Avenue	50.5	45.4	57.2
R12	643 Camp Avenue	50.5	45.4	59.6

Source: VHB, 2020

8.15.2 Operational Sound Impact Assessment

Once constructed, the only components of the Project that will emit sound will be the OnSS and two line traps associated with the ICF 115kV ring bus. Table 8-16 presents the overall A-weighted sound emissions from the operations of the OnSS and ICF at nearby receptor locations. Figure 8-2 presents the sound level contours from the proposed OnSS and ICF. This figure shows the contours of equal sound levels between 35 and 55 dBA. The highest sound level at an NSR is 43.9 dBA at 129 Cattail Lane. This sound level is below the EPA guideline of 48.6 dBA (Leq), which is equivalent to a day-night average sound level of 55 dBA (Ldn), and therefore complies with the EPA guidance for exterior noise. Operational sound from the OnSS and ICF would also be below 50 dBA at the nearest residential property lines and below 70 dBA at the nearest commercial/industrial property lines which is below the Town of North Kingston, RI Noise Ordinance limits.

Revolution Wind

Figure 8-2

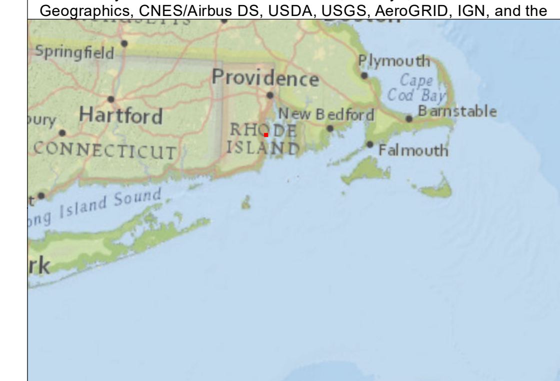
Onshore Substation Operations

NORTH KINGSTOWN, RI

Sound Level Contours

- 35 dBA
- 40 dBA
- 45 dBA
- 50 dBA
- 55 dBA
- Receptor Location
- Substation Equipment Area
- Interconnection Facility

Anchorage, Environmental: Fugro
Shellfish Areas: MDMR
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the



Reference system: NAD83 (2011)
Projection: UTM Zone 19N

0 25 50 75 Meters

0 250 500 Feet

Date: 05/19/2020
Document no:

Created by: D. WHITE
Checked by: S. MOBERG
Approved by: STEPW

Revolution Wind | Powered by Ørsted & Eversource

This page intentionally left blank.

Future sound levels at nearest NSR, which include existing ambient sources and the proposed OnSS and ICF, would experience an overall increase in sound of 0.9 dBA during the day and 2.5 dBA during the night at this location, which is nearly imperceptible (50.9 dBA and 47.5 dBA respectively). Since there are not existing ambient pure tone conditions and sound from the Project equipment would be lower than existing conditions, tonal conditions would not be anticipated. At NSRs east of the OnSS and ICF, which are commercial/industrial, sound would be 40.7 dBA (Leq) or quieter and future sound levels would increase by less than 3 dBA. An increase in sound level of 3 dBA or less is typically considered to be the threshold of perceptible change in sound. Therefore, the operation of the proposed OnSS and ICF would comply with relevant federal, state, and local noise limits.

Since most buildings with windows closed provide 20 dB or more, and buildings with windows open provide 10 dB of outdoor-to-indoor sound attenuation, interior noise conditions would be substantially quieter.

Table 8-16 Onshore Substation and ICF Operational Noise

Receptor	Address	Existing Sound Level (dBA-i, L_{eq})		Substation Sound Level (dBA, L_{eq})	Future Sound Level (dBA, L_{eq})		Increase (dBA)	
		Daytime	Nighttime		Daytime	Nighttime	Daytime	Nighttime
R1	129 Cattail Lane	50.0	45.0	43.9	50.9	47.5	0.9	2.5
R2	140 Brook View Drive	50.0	45.0	40.8	50.5	46.4	0.5	1.4
R3	10 Gateway Road	50.5	45.4	38.3	50.8	46.2	0.3	0.8
R4	511 Camp Avenue	50.5	45.4	38.8	50.8	46.3	0.3	0.9
R5	525 Camp Avenue	50.5	45.4	40.7	50.9	46.7	0.4	1.3
R6	541 Camp Avenue	50.5	45.4	39.3	50.8	46.4	0.3	1.0
R7	553 Camp Avenue	50.5	45.4	39.3	50.8	46.3	0.3	0.9
R8	571 Camp Avenue	50.5	45.4	39.9	50.9	46.5	0.4	1.1
R9	595 Camp Avenue	50.5	45.4	39.9	50.9	46.5	0.4	1.1
R10	613 Camp Avenue	50.5	45.4	41.0	51.0	46.7	0.5	1.3
R11	629 Camp Avenue	50.5	45.4	40.2	50.9	46.5	0.4	1.1
R12	643 Camp Avenue	50.5	45.4	43.0	51.2	47.4	0.7	2.0

Source: VHB, 2020

8.16 Transportation

Construction-related traffic, including commuting of the construction workforce, will add to the local traffic volume on public roads. The scale of these impacts will depend on the overall construction schedule and whether construction is timed to avoid traffic associated with summer tourism. The addition of this traffic is not expected to result in any additional congestion or change in level of service along any of the roadways within or surrounding the Project. This traffic will be intermittent, temporary, and will cease once construction of the

Project is completed. Implementation of environmental protection measures influences the size of the non-local construction workforce relative to existing conditions, construction detours, and increased vehicular traffic (e.g., delivery trucks carrying construction equipment and supplies, construction and export cable-laying equipment such as an excavator, and automobiles used for daily commuting to various work sites).

Project operations are not expected to significantly increase local traffic volume on public roads, or otherwise affect traffic congestion or change the level of service along any of the local roadways. The size of the operations workforce is expected to be small relative to the existing population. Further, there are no anticipated maintenance needs. If any unforeseen maintenance is required, impacts to traffic will be direct and short-term resulting from potential traffic detours and a slight increase in traffic from maintenance workers.

Revolution Wind's contractor will coordinate closely with the municipality to develop acceptable traffic management plans for work within public rights-of-way. At all locations where access intersects a public way, the contractor will follow a pre-approved work zone traffic control plan and where appropriate, police details. Vehicles entering and exiting the work areas will do so safely and with minimal disruption to traffic along the public way. Revolution Wind's contractor will coordinate with RIPTA regarding Project construction activities that may affect the express bus Route QX and require temporary route detours.

Potential Project impacts of vessel traffic on marine navigation were evaluated in a detailed NSRA prepared for the Project. Primary conclusions of the NSRA included that vessel traffic near the project area is light and recreational/pleasure vessels represent the greatest proportion of vessel tracks in the study area. Project-related vessels will be navigated by trained, licensed vessel operators who will adhere to navigational rules and regulations. USCG-approved navigation lighting is required for all vessels during construction and O&M of the RWEC. All vessels operating between dusk and dawn are required to turn on navigation lights. Project construction activities will be carried out in close coordination with the Coast Guard.

The Project evaluated potential impacts to aeronautical facilities including Quonset Airport. Preliminary consultation with the FAA suggests that construction activities have the potential to effect airport operations. Revolution Wind will submit a Form 7460-1 for FAA review for the applicable Project components. The FAA will conduct an aeronautical study to determine if there would be any hazards to air navigation and what mitigation measures might be necessary. However, it is anticipated that the onshore Project components would likely receive a no objection or conditional determination from the FAA. Finally, if advised by the FAA and per the requirements of any FAA-provided determination, Revolution Wind will notify the FAA prior to the start of construction and upon completing construction of each transmission structure via FAA Form 7460-2.

8.17 Cultural Resources

Consistent with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585, potential impacts on cultural resources are being assessed, ranging from physical alteration, disturbance, or destruction of a historic property caused by construction activities to changes such as the introduction of new and incompatible visual elements or auditory effects that diminish the historically significant characteristics of a historic property. As noted in Section 7.6, Revolution Wind has submitted technical studies to BOEM for evaluation of potential impacts to terrestrial and marine archaeological and historic resources to support BOEM's Section 106 consultations.

8.18 Safety and Public Health

The proposed facilities will be designed, built, and maintained in accordance with the standards and codes as described in Section 4.4. Accordingly, public safety and health will be protected. Following construction of the facilities, clear markings with warning signs to alert the public to potential hazards if climbed or entered will be applied where appropriate.

The OnSS and ICF will be locked and enclosed with chain link fence topped with barbed wire to prevent unauthorized entry. Transformers at the OnSS, which are internally insulated and cooled using MODF, are provided with secondary containment systems to prevent the spread of the MODF in the unlikely event of a leak. Transformers are continuously monitored and alarmed to notify Eversource's Control Center of abnormal operating conditions. The Control Center is manned 24 hours a day, seven days a week.

The OnSS and the ICF will use SF_6 gas as an insulator in the 115 kV circuit breakers. SF_6 is commonly used in lieu of insulating oil. When gas insulated equipment is used outdoors, as proposed at the OnSS and ICF, any release concentration would be insignificant when exposed to the atmosphere. Although SF_6 is defined as hazardous by USDOT, there is no risk of general public exposure because the switches are located inside the fenced substation yard. The breakers are installed and maintained by trained technical staff and they are checked for integrity during inspections. In addition, SF_6 levels are monitored, and any release would result in an alarm.

The construction of the Project may result in direct short-term impacts to public services, including public safety services. Access for emergency vehicles will be continually maintained, but there may be a short-term increase in construction vehicle and equipment traffic on routes used for construction, as well as from the construction workforce. This increase may impact public services relative to emergency response (e.g., police, fire, and emergency medical services ["EMS"]). In addition, local police will likely control traffic through detours and road closures and be present during construction activities. These impacts, however, are not anticipated to significantly affect safety or public health, as there is sufficient police capacity in the area and Revolution Wind will design and coordinate with local authorities on the construction schedule to minimize and mitigate impacts to the local community. Further, Revolution Wind will construct the Project in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). A traffic management plan will be developed prior to construction to ensure that emergency service access is continually maintained.

A discussion of the current status of the health research relevant to exposure to EMF is attached as Appendix F. This report was prepared by Exponent, Inc.

8.19 Electric and Magnetic Fields

8.19.1 Offshore Export Cable

8.19.1.1 Calculated Magnetic and Electric Fields Induced in Seawater

Exponent modeled the electric and magnetic field (EMF) levels associated with the RWEC and RWEC Landfall Cables that bring electricity generated by the offshore wind turbines to land (Exponent, 2020a). EMF levels were calculated with the COMSOL MultiPhysics Version 5.5, a 3-dimensional ("3D") finite element analysis solver and simulation software suite. The inputs to the calculations were the conductor geometry (e.g., cable diameter, conductor spacing, and pitch of the helical conductor twist) and burial depth of the cable. Magnetic-field levels were reported as the root mean square value of the resultant field in accordance with IEEE Standard C95.3.1-2010 and IEEE Standard 644-2019.[40,41]

The effects of cable materials surrounding the copper conductor, including ferromagnetic shielding effects and eddy currents, on magnetic field levels were not modeled. Further, it was assumed there would be no attenuation of magnetic fields by any surrounding materials (e.g., ductbank, seabed, earth, grout, mattresses, rock berms). These modeling assumptions were made to conservatively overestimate the calculated field levels at any specified loading and burial depth. In addition, the modeling assumed that there were no unbalanced currents flowing along the outer sheaths of the cables. The offshore cable models account for helically-twisting three-phase conductors.

Exponent evaluated three offshore configurations corresponding to the RWECs and the RWEC Landfall Cables. The three configurations were 1) RWEC buried 3.3 ft (1 m) below the seabed, 2) the RWEC on top of the seabed under a protective cover, and 3) the RWEC Landfall Cables installed via HDD.

The magnetic field is strongest at the surface of the cables and will decrease rapidly with distance. The magnetic-field levels in seawater were calculated to be well below limits published by the International Committee on Electromagnetic Safety and the International Commission on Non-Ionizing Radiation Protection intended to protect the health and safety of the general public. Calculated magnetic-field levels also were found to be below reported thresholds for effects on the behavior of magnetosensitive marine organisms and calculated induced electric-field levels were found to be below reported detection thresholds of local electrosensitive marine organisms (Exponent, 2020b).

The electric field created by the voltage applied by the conductors inside the cable is entirely shielded from the marine environment by grounded metallic sheaths and steel armoring (Snyder et al., 2019). The magnetic field, however, will induce a weak electric field in the

40 The resultant magnetic field is the Euclidian norm (square root of the sum of the squares) of the component magnetic-field vectors calculated along vertical, transverse, and longitudinal axes.

41 Institute of Electrical and Electronics Engineers (IEEE). IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 Hz to 100 kHz (IEEE Std. C95.3.1-2010)." New York: IEEE, 2010; Institute of Electrical and Electronics Engineers (IEEE). Approved Draft Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines (ANSI/IEEE Std. 644-2019). New York: IEEE, 2019.

seawater around the cable and in nearby marine species. Similar to the magnetic field, the induced electric field will decrease rapidly with distance.

The magnetic fields and induced electric fields around the conductors will vary depending on electric current—expressed in units of amperes (A). Since the electric current on the conductors will vary with varying power generation (dependent upon the speed of the wind and operational status), measurements or calculations of these fields represent only a snapshot of conditions at one moment in time. On a given day, throughout a week, or over the course of months or years, the magnetic- and induced electric-field levels will also vary. To account for this variability, calculations are performed for annual average loading and peak loading (corresponding to the maximum output capacity of the RWF) on the cables of the RWF, which will provide the average and peak field levels expected for the proposed Project.

The calculated magnetic-field levels above the RWEC and RWEC Landfall for a 3.3-foot (1 m) burial depth and average loading are plotted in Figures 8-3 and Figure 8-4 below (Exponent 2020a. The figures illustrate levels both at the seabed and at a height of 3.3 feet (1 m) above seabed. The calculated levels are highest directly above the buried cables (RWEC and RWEC Landfall) and decrease rapidly with distance. All calculated field levels are well below the ICNIRP reference level of 2,000 mG and the ICES exposure reference level of 9,040 mG for exposure of the general public.

Figure 8-3 Calculated magnetic field levels in seawater above the RWEC for a 3.3-foot (1m) burial depth and average loading (Exponent, 2020Calculated magnetic field levels in seawater above the RWEC for a 3.3-foot (1m) burial depth and average loading (Exponent, 2020a)

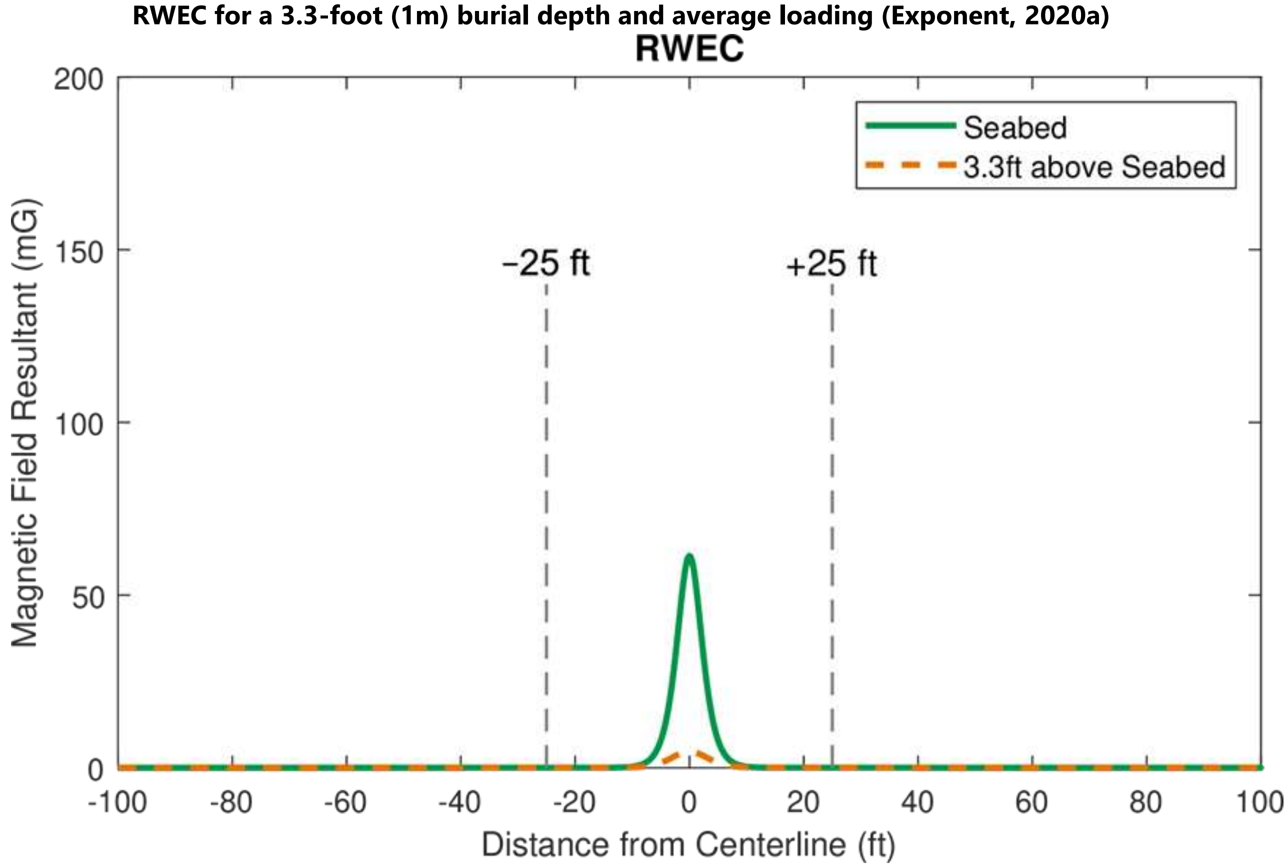
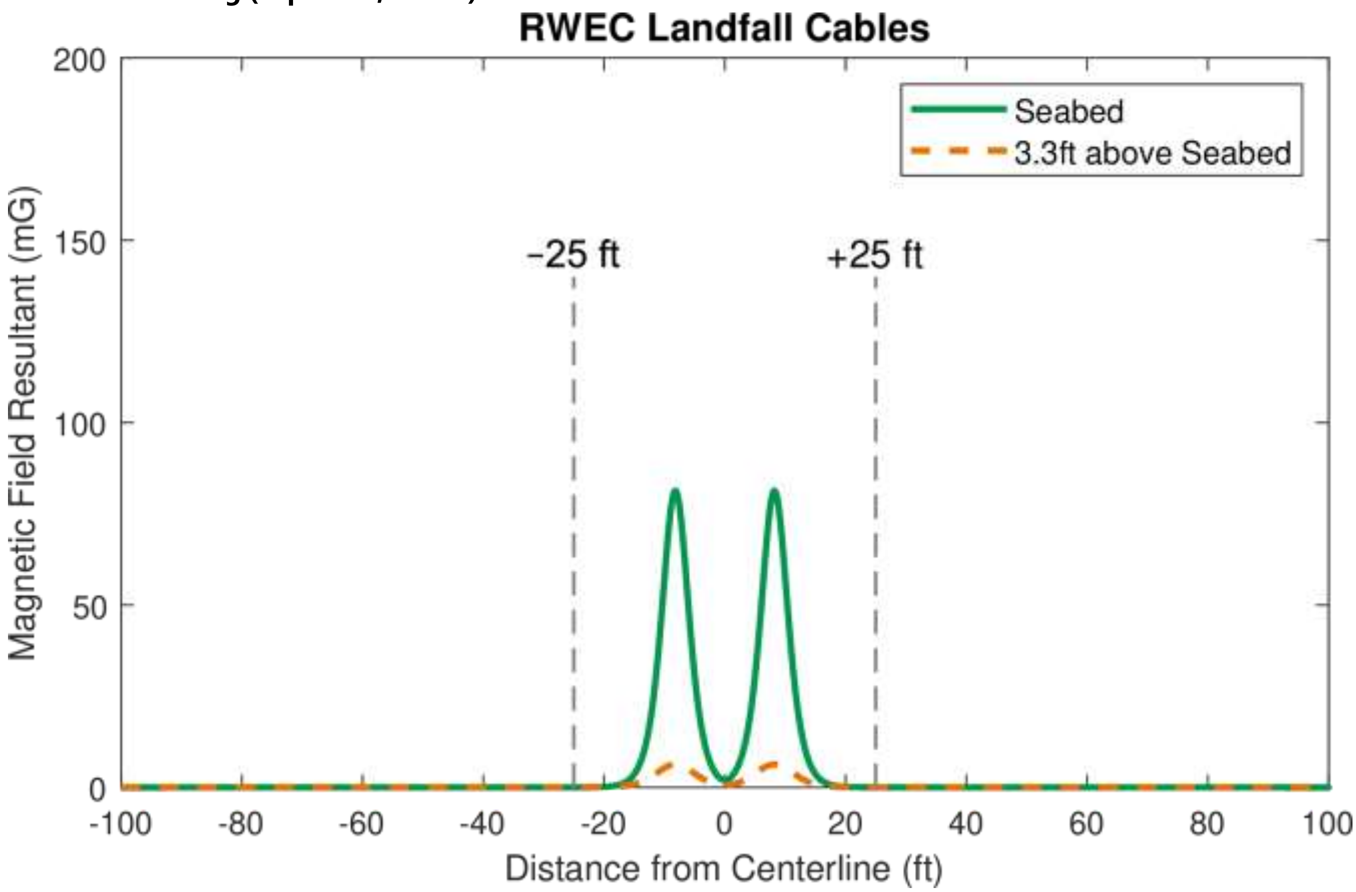


Figure 8-4 Calculated magnetic field levels in seawater above the two RWEC Landfall Cables for a 3.3 foot (1m) burial depth and average loading (Exponent, 2020Calculated magnetic field levels in seawater above the two RWEC Landfall Cables for a 3.3 foot (1m) burial depth and average loading (Exponent, 2020a)



A summary of calculated magnetic-field levels at 3.3 feet (1m) above the seabed is shown in Table 8-17 for each of the cable configurations at a 3.3-foot burial depth and average loading. Where the cables may potentially be laid on the seabed for short distances and covered by protective concrete mattresses or rock berms, the field levels would be higher, but will decrease very rapidly with distance. For horizontal distances beyond 25 feet from the buried cables, the magnetic-field levels for either buried or mattress-covered configurations are calculated to be less than 0.1 mG for average and peak loading.

Table 8-17 Calculated Magnetic Field Levels (mG) at 3.3 feet (1m) above the Seabed for a 3.3 foot (1m) burial depth and average loading of submarine cables

Configuration	Horizontal Distance from Centerline			
	Max	±5 feet	±10 feet	±25 feet
RWECs	4.7	1.5	0.1	< 0.1
RWEC Landfall Cables	6.3	2.0	0.2	< 0.1

Source: Exponent, 2020a)

8.19.1.2 Calculated Electric Field Levels Induced in Marine Organisms

The calculated magnetic-field and induced electric-field levels for the Project cables are not expected to affect populations of marine organisms in the area (Exponent, 2020b). This conclusion is based on comparisons of the reported EMF sensitivity of select, local marine species to the levels of EMF produced by the submarine cables. As part of the evaluation process, Exponent calculated the magnetic-field levels and induced electric-field levels associated with the Project cables. These calculations show that for the buried RWECs and RWEC Landfall Cables the highest magnetic field at 3.3 feet (1 m) above the seabed will be 6.3 mG or less at average loading for the RWECs and RWEC Landfall and less than 8.4 mG at peak loading. These maximum calculated field levels were then compared to magnetic-field levels reported in the scientific literature as causing behavioral responses in species groups expected to inhabit the Project Area, including fish, elasmobranchs, and marine invertebrates. This conservative evaluation resulted in the following conclusions (Exponent, 2020b), which are consistent with those of a 2019 BOEM report (Snyder et al., 2019):

- Data from field surveys conducted at 60-Hz AC submarine cable sites demonstrate that behavior and distribution of large crustaceans are unaffected by these magnetic fields.
- Observations of cephalopod distributions at the same 60-Hz AC cable sites also indicated that these species are not affected by the presence of AC EMF.
- Magnetic-field levels calculated for cables are below thresholds at which laboratory and field studies reported behavioral changes in magnetosensitive fish species.
- Elasmobranchs are not expected to detect the magnetic fields generated by the 60-Hz AC submarine cables.
- Calculated electric fields associated with Project cables are below the published detection thresholds of electrosensitive fish and elasmobranchs.

In conclusion, the 60-Hz magnetic- and induced electric-field levels calculated from conservative models of the Project's cables during operation will be below the detection thresholds of magnetosensitive and electrosensitive marine organisms in the Project Area. Therefore, the behaviors and populations of marine species are not expected to be impacted by EMF from the Project's submarine cables. This conclusion also is supported by years of biological surveys conducted at sites of existing offshore windfarms and submarine cables that indicate no long-term or large-scale changes to populations of marine organisms residing at these sites. Moreover, these findings are corroborated by a review of the ecological effects of Marine Renewable Energy ("MRE") projects; the authors reported that "there has been no evidence to show that EMFs at the levels expected from MRE [Marine

Renewable Energy] devices will cause an effect (whether negative or positive) on any species" (Copping et al., 2016). The lack of evidence for any substantive effects of EMF on marine species is also noted in the latest MRE State of Science report (Copping and Hemery, 2020). Moreover, a BOEM report that assessed the potential for AC EMF from offshore wind facilities to affect marine populations concluded that no negative effects on populations of key commercial and recreational fish species for the southern New England area are expected, (Snyder 2019).

8.19.2 Onshore Cables

8.19.2.1 Measurements of Magnetic Fields from Existing Sources

Existing electrical infrastructure, including underground and overhead distribution lines, as well service drops providing electricity to residences and businesses, are sources of magnetic fields. Existing magnetic-field levels were measured along the proposed paths of the underground cables from the TJBs to the OnSS to characterize the magnetic fields produced by existing sources, prior to the operation of the Project. Measured magnetic-field levels vary with the distance to these sources and ranged from < 0.1 mG to approximately 3.6 mG along various portions of the route alternatives. The existing magnetic-field levels measured around the neighborhoods located closest to the perimeter of the Combined Facilities also were all less than 4.0 mG.

8.19.2.2 Calculated Magnetic Fields for Onshore Transmission Cables

Exponent calculated the 60-Hz magnetic fields from the proposed Onshore Transmission Cables with COMSOL MultiPhysics Version 5.5, which is a 3D finite element analysis, solver, and simulation software suite. Field levels were calculated at a height of 3.3 ft (1 m) above ground and are reported as the root mean square value of the field in accordance with IEEE Std. C95.3.1-2010 and IEEE Std. 644-2019. Additionally, the models include the effect of a ground continuity conductor and assume that the load on the phase conductors is balanced, that there is no attenuation of magnetic fields from any surrounding material, and that there are no unbalanced currents flowing along the outer sheaths of the cables.

The voltage applied to the conductors within the cable creates an electric field but will not be a direct source of any electric field above ground due to the cable construction, duct bank, and burial underground, so above ground electric-field levels are not discussed further.

The phasing of the cables within the duct bank has been optimized to minimize magnetic fields. Calculations were performed both for a loading level corresponding to the maximum output capacity of the RWF as well as for an average loading corresponding to an expected operational capacity factor. If a lower capacity option is constructed, field levels would be lower.

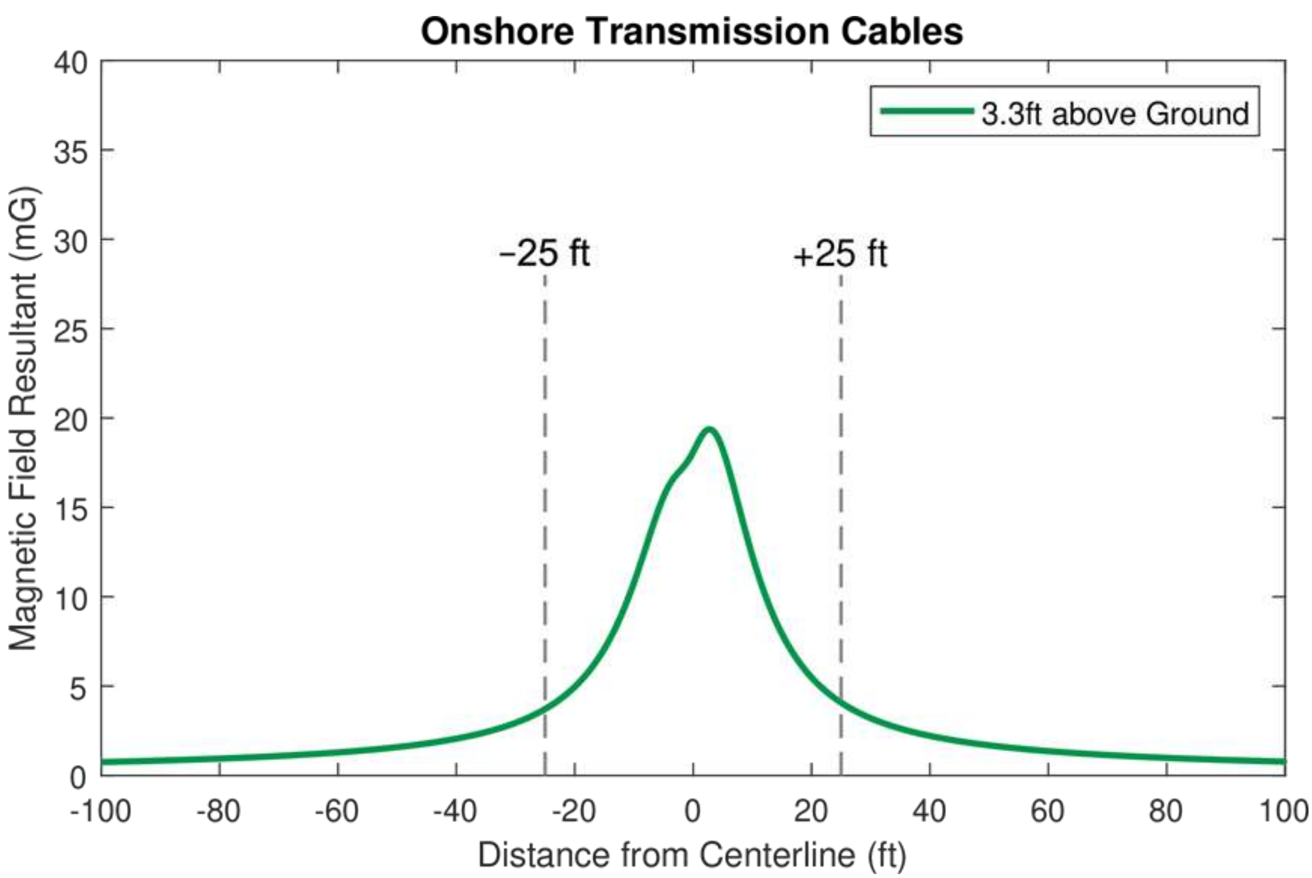
As shown in Table 8-18 and Figure 8-5, the magnetic-field level from the underground Onshore Transmission Cables were calculated to decrease very rapidly with distance from the centerline. For the underground Onshore Transmission Cables installed under roadways, the calculated magnetic-field level directly above the underground duct bank at average loading is 19 mG decreasing to 4.1 mG or less at a distance of 25 feet from the Onshore Transmission Cables' centerline. At peak load on this underground line, magnetic-field levels would be higher somewhat higher but at ± 25 ft, the peak magnetic field would be 5.4 mG, similar to average magnetic-field levels.

Table 8-18 Magnetic Field Level (mG) Calculated at 3.28 ft (1 m) Above Ground for Average Loading

	Horizontal Distance from Centerline			
Configuration	**Max**	**±5 feet**	**±10 feet**	**±25 feet**
Onshore Transmission Cables	19	18	12	4.1

Source: Exponent (2020a).

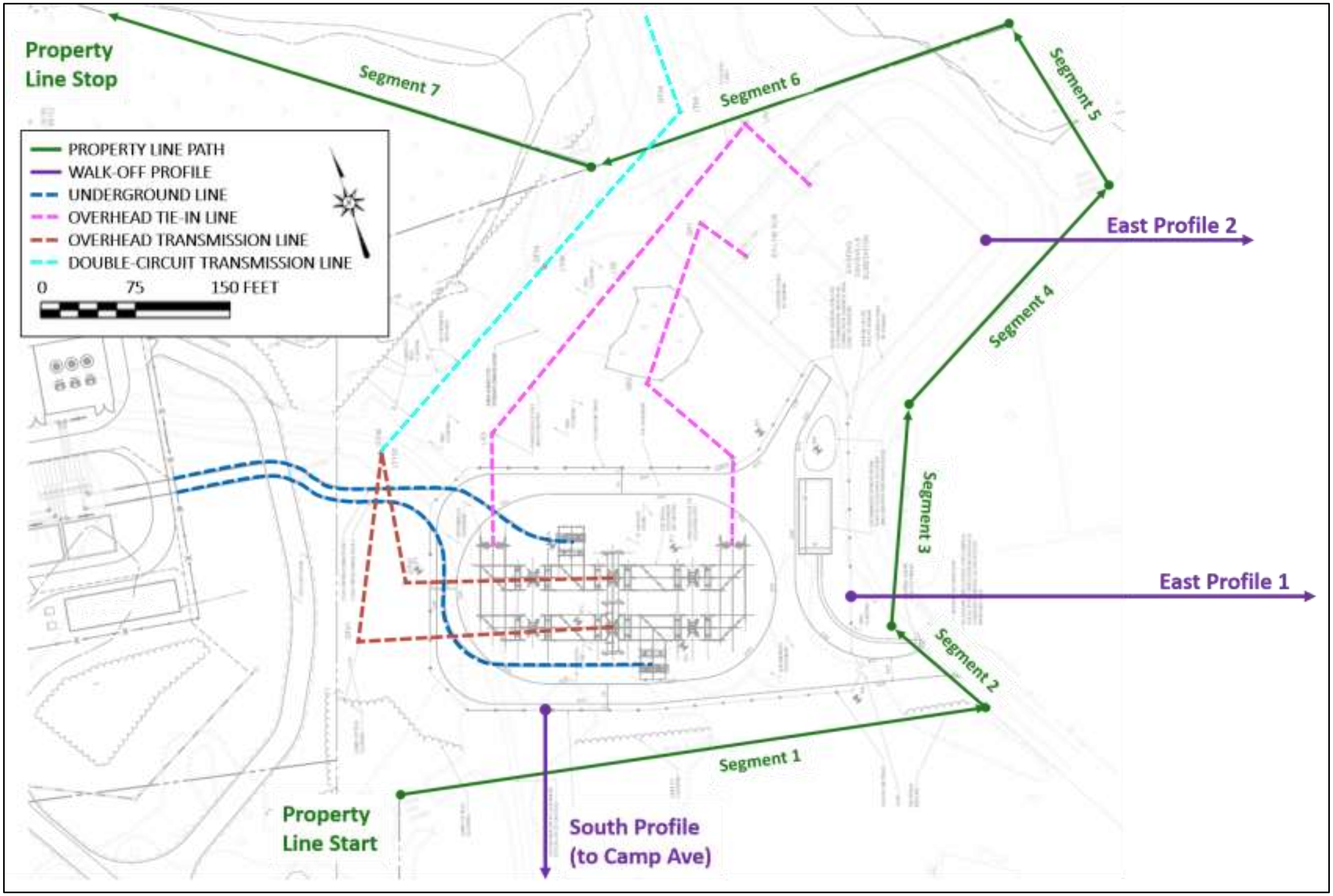
Figure 8-5 Calculated magnetic-field levels 3.3 feet (1 m) above ground for the 275-kV Onshore Transmission Cables at average loadingCalculated magnetic-field levels 3.3 feet (1 m) above ground for the 275-kV Onshore Transmission Cables at average loading (Exponent 2020a).



8.19.2.3 Calculation of Magnetic Fields Around Proposed Onshore Facilities

The magnetic-field levels associated with the proposed configuration of the underground Interconnection Cables between the OnSS and the ICF and overhead transmission lines within the ICF were calculated with the software program SUBCALC which was developed by the Electric Power Research Institute ("EPRI") and is licensed as part of the Enertech EMF Workbench Suite. The software accounts for the 3-D arrangement of all 115-kV transmission line conductors (including sag and transition spans) between the OnSS, the ICF, the Davisville Substation, and the parcel boundary of the Combined Facilities. The SUBCALC model included all portions of the 115-kV transmission lines between the OnSS, the ICF, and the Davisville Substation, as well as the TNEC G185S and L190 transmission lines (Figure 8-6).

Figure 8-6 Plan view of the Combined Facilities showing the location of modeled transmission lines (dashed lines) as well as the property line (solid green line) and the location of perpendicular profiles (solid purple lines).



Magnetic-field levels were calculated along the property line perimeter as well as three profiles perpendicular to the facility fence (Profiles 1 – 3), extending out towards adjoining properties. All calculations were performed at 3.3 ft (1 m) above ground as the root-mean-square value of the field in accordance with IEEE Standard C95.3.1-2010 and IEEE Standard 644-2019. Calculated magnetic-field levels are reported as resultant quantities in units of mG.

At the OnSS the voltage of the electricity carried on the 275-kV Onshore Transmission cables is stepped down to 115 kV for transmission to the Project's Interconnection Facility (ICF) over the Interconnection Cables, which will be installed underground on the Project's property. As shown in Figure 8.8 the calculated magnetic field from the Interconnection Cables at the boundary of the Combined Facilities along Segment 1 is 17 mG or less for average loading. At locations of closest residences, approximately 400 ft distant on the other side of Camp Ave, the magnetic field is calculated to be less than 1 mG. At peak loading of the Project, the calculated magnetic fields are slightly higher as depicted in Figure 8.8.

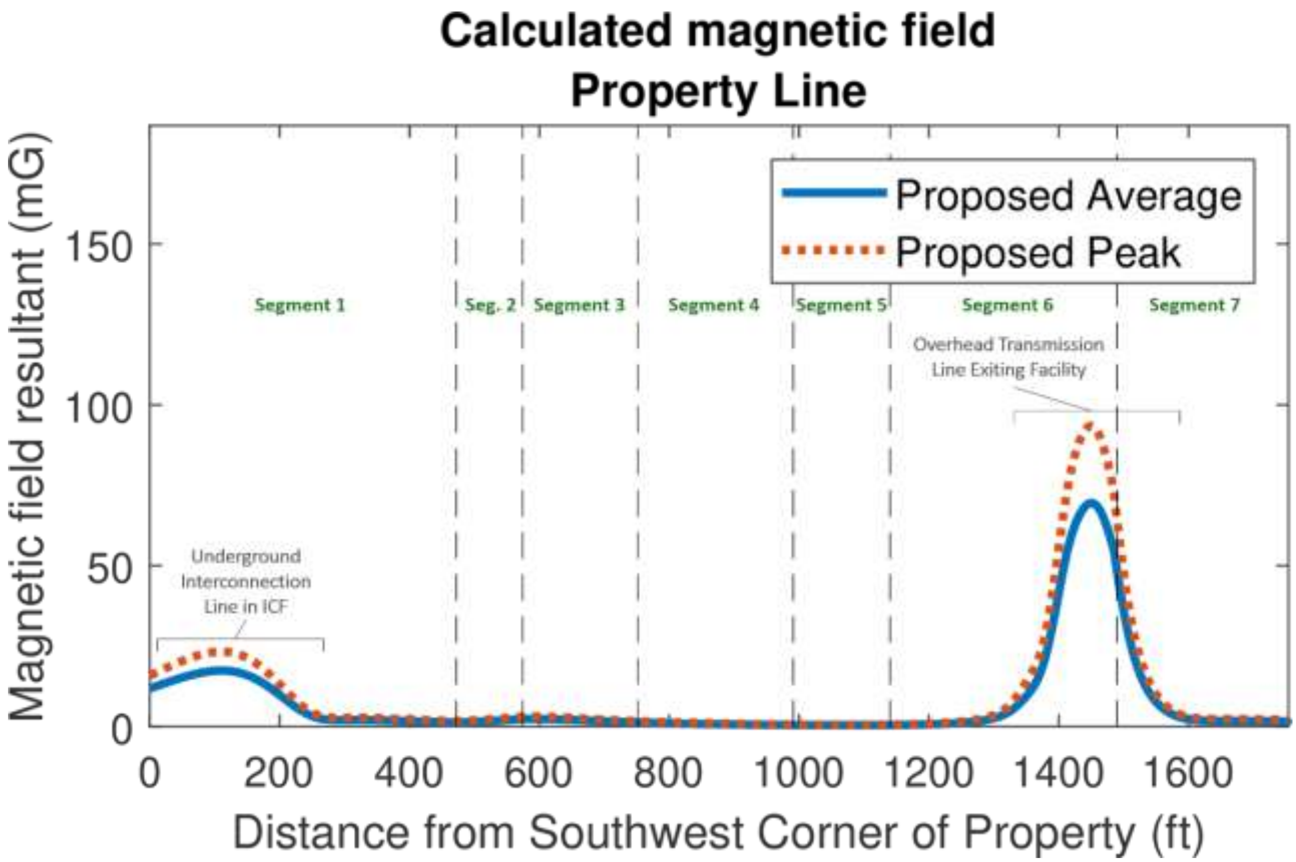
The highest magnetic-field level at the property boundary of the Combined Facilities will be under the overhead double-circuit G185S and L190 transmission lines that exit the property to the north (Figure 8-7, Segment 6). Magnetic field levels are expected to be highest where the power lines enter and exit the station as per IEEE Standard 1127 (IEEE, 2013), which notes:

In a substation, the strongest fields near the perimeter fence come from the transmission and distribution lines entering and leaving the substation. The strength of fields from equipment inside the fence decreases rapidly with distance, reaching very low levels at relatively short distances beyond substation fences.[42,43]

42 This modeling includes only transmission lines inside the facility. Other elements such as transformers, buswork, breakers, switchgear, etc., are also sources of magnetic fields but per IEEE Standard 1127, these elements are not expected to be significant magnetic-field sources at the property line and beyond.

43 Institute of Electrical and Electronic Engineers (IEEE). IEEE Guide for the Design, Construction, and Operation of Electric Power Substations for Community Acceptance and Environmental Compatibility (IEEE Std. 1127-2013). New York: IEEE, 2013. P. 26

Figure 8-7 Magnetic-field levels around the perimeter of the ICF. Modeling results are presented starting from the southwest corner and moving counter-clockwise. Vertical dashed lines show different segments of the perimeterMagnetic-field levels around the perimeter of the ICF. Modeling results are presented starting from the southwest corner and moving counter-clockwise. Vertical dashed lines show different segments of the perimeter (Exponent 2020a).



This page intentionally left blank.

9

Avoidance, Minimization, and Mitigation Measures

Avoidance, minimization, and mitigation measures will effectively minimize Project impacts on the natural and social environment and have been designed for each phase of construction. The scopes of the resource characterizations and impact assessments presented in Sections 6, 7, and 8 were based upon the requirements set forth in and in compliance with the requirements of Rule 1.6 of the EFSB Rules of Practice and Procedure (445-RICR-00-00-1) and were also guided by input from federal and state agencies and other public and private stakeholders in the region.

The Project was sited, planned, and designed to avoid and minimize impacts. To the extent there are potential adverse impacts to affected physical, biological, cultural, visual and socioeconomic resources that cannot be avoided, these will be mitigated. Potential impacts to resources from the RWEC-RI and Onshore Facilities are expected to be limited temporally and/or spatially. Post-construction environmental monitoring of various resources will take place and will include, at a minimum, coordination and data sharing with regional monitoring efforts. Monitoring plans will be developed in coordination with the relevant agencies prior to construction. Tables 9-1 and 9-2 outline the protective measures and modifications that have been incorporated into the Project to avoid or minimize impacts to environmental and social resources.

This page intentionally left blank.

Table 9-1 Avoidance, Minimization, and Mitigation Measures for Natural Resources

Project Component	Avoidance, Minimization, and Mitigation Measures: Natural Resources
Design Phase	
RWEC-RI[1]	› To the extent feasible, the RWEC will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment. › The RWEC will be sited to avoid and minimize impacts to sensitive habitats (e.g., hard bottom habitats) to the extent practicable. › Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › A preconstruction SAV survey will be completed to identify any new or expanded SAV beds. The Project design will be refined to avoid impacts to SAV to the greatest extent practicable.
Onshore Facilities	› Onshore Facilities will be sited within previously disturbed and developed areas to the extent practicable. › In accordance with Section 2.9(B)(1)(d) of the Freshwater Wetland Rules, the Onshore Facilities will be designed to avoid and minimize impacts to freshwater wetlands to the maximum extent practicable. Any wetlands that will be impacted as a result of the Project will be mitigated via the federal and state permitting process in accordance with Section 404 of the CWA and the Freshwater Wetland Rules.
Construction Phase	
RWEC-RI	› To the extent feasible, installation of the RWEC will occur using equipment such as mechanical cutter, mechanical plow, or jet plow. › Construction and operational lighting will be limited to the minimum necessary to ensure safety and to comply with applicable regulations. › Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › RWEC-RI will avoid identified shallow hazards to the extent practicable. › Exclusion and monitoring zones for marine mammals and sea turtles will be established for impact and vibratory pile driving activities. › Revolution Wind will comply with FAA and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimizes impacts on avian species. › A ramp-up or soft-start will be used at the beginning of each pile segment during impact pile driving and/or vibratory pile driving to provide additional protection to mobile species in the vicinity by allowing them to vacate the area prior to the commencement of pile-driving activities. › Environmental protection measures will be implemented for impact and vibratory pile driving activities. These measures will include seasonal restrictions, soft-start measures, shut-down procedures, marine mammal and sea turtle monitoring protocols, the use of qualified and NOAA-approved protected species observers, and noise attenuation systems such as bubble curtains, as appropriate. › Vessels: • Vessels will follow NOAA and BOEM guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions. • All personnel working offshore will receive training on marine mammal and sea turtle awareness and marine debris awareness. • Vessels providing construction or maintenance services will use low sulfur fuel, where possible. • Vessel engines will meet the appropriate EPA air emission standards for NO_X emissions when operating within Emission Controls Areas. • Marine engines with a model year of 2007 or later and non-road engines complying with the Tier 3 standards (in 40 CFR 89 or 1039) or better will be used to satisfy Best Available Control Technology or Lowest Achievable Emission Rate. • Revolution Wind will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials offshore will be managed through the Oil Spill Response Plan. • DP vessels will be used for installation of the RWEC to the extent possible. • A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources. • All vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with BOEM lease stipulations that require adherence to NTL 2015-G03, which instructs operators to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process.

Project Component	Avoidance, Minimization, and Mitigation Measures: Natural Resources
	• Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during construction and post-construction and provide an annual report to BOEM and USFWS. › Landfall Location: • If HDD is utilized at the landfall location, drilling fluids will be managed within a contained system to be collected for reuse as necessary. An HDD Contingency Plan will be prepared and implemented to minimize the potential risks associated with release of drilling fluids. • If open cut is utilized at the landfall location, soil will be managed in accordance with state and federal regulations. In order to minimize the potential risks associated with open cut, an SESC Plan will be prepared which will outline appropriate BMPs for handling and stockpiling of soils, and a Soil Management Plan ("SMP") will describe management, treatment and disposal of contaminated soil and groundwater, and solid waste onshore. For in water activities, a project-specific plan for excavating, storing and disposing of dredged material will be developed as required by state and federal permitting authorities.
Onshore Facilities	› General environmental protective measures that apply to all Onshore Facility components (i.e., Landfall Work Area, Onshore Transmission Cable, OnSS, ICF, Interconnection ROW, and TNEC ROW): • Compliance with the RIPDES General Permit for Stormwater Discharges associated with Construction Activities which requires the implementation of an SESC Plan and spill prevention and control measures. • A SESC Plan, including erosion and sedimentation control measures, will be implemented to minimize potential water quality impacts during construction and operation of the Onshore Facilities. • The operator must implement the site-specific SESC Plan and maintain it during the entire construction process until the entire worksite is permanently stabilized by vegetation or other means. The measures employed in the SESC Plan use BMPs to minimize the opportunity for turbid discharges leaving a construction work area. • Accidental spill or release of oils or other hazardous materials will be managed through the Oil Spill Response Plan. • The spill prevention and control measures mandate that the operator identify all areas where spills can occur and their accompanying drainage points. The operator must also establish spill prevention and control measures to reduce the chance of spills, stop the source of spills, contain and clean-up spills, and dispose of materials contaminated by spills. Spill prevention and control training will be provided for relevant personnel. • Construction and operational lighting will be limited to the minimum necessary to ensure safety and to comply with applicable regulations. • Onshore Facilities equipment and fuel suppliers will provide equipment and fuels that comply with the applicable EPA or equivalent emission standards. • To the extent feasible, tree and shrub removal for Onshore Facilities will occur outside the avian nesting and bat roosting period; May 1 through August 15. If tree and shrub removal cannot avoid this season, Revolution Wind will coordinate with appropriate agencies to determine appropriate course of action. › The Onshore Transmission Cables will be buried; therefore, avoiding the risk to avian and bat species associated with overhead lines. › The documented sickle-leaved golden aster population on the OnSS parcel will be protected during construction.
Post-Construction Phase	
RWEC-RI	› Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › Revolution Wind is developing an Avian Post-Construction Monitoring Plan for the Project that will summarize the approach to monitoring; describe overarching monitoring goals and objectives; identify the key avian species, priority questions, and data gaps unique to the region and Project Area that will be addressed through monitoring; and describe methods and time frames for data collection, analysis, and reporting. Post-construction monitoring will assess impacts of the Project with the purpose of filling select information gaps and supporting validation of the Project's Avian Risk Assessment. Focus may be placed on improving knowledge of ESA-listed species occurrence and movements offshore, avian collision risk, species/species-group displacement, or similar topics. Where possible, monitoring conducted by Revolution Wind will build on and align with post-construction monitoring conducted by the other Orsted/Eversource offshore wind projects in the Northeast region. Revolution Wind will engage with federal and state agencies and environmental groups (eNGOs) to identify appropriate monitoring options and technologies, and to facilitate acceptance of the final plan. › Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during construction and post-construction and provide an annual report to BOEM and USFWS.
› Onshore Facilities	› The perimeter surrounding Onshore Facilities will be managed to encourage the growth of native grasses, ferns, and low growing shrubs. The management strategy will include the removal of invasive plants in compliance with state and federal regulations (e.g. herbicide use will not be permitted within regulated wetlands). › Construction and operational lighting will be limited to the minimum necessary to ensure safety and to comply with applicable regulations.

Note: Onshore Facilities includes the Landfall Work Area and Onshore Transmission Cable, Onshore Substation, and Interconnection Facility and Interconnection Transmission Right-of-Way.

Table 9-2 Summary of Protection Measures for the Socioeconomic, Cultural, and Visual Resources

Project Component	Avoidance, Minimization, and Mitigation Measures
Design Phase	
RWEC-RI	› The RWEC will be sited to avoid or minimize impacts to potential submerged cultural sites and paleolandforms, to the extent practicable. › Native American Tribal representatives were involved, and will continue to be involved, in marine survey protocol design, execution of the surveys, and interpretation of the results. › RWEC was sited to avoid conflicts with DoD use areas and navigational areas identified by the USCG, as applicable. › Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communication Plan.
Onshore Facilities[1]	› Onshore Facilities will be sited within previously disturbed and developed areas to the extent possible. › Onshore Facilities will be sited to avoid or minimize impacts to potential terrestrial archeological resources, to the extent practicable. › Native American Tribal representatives were involved, and will continue to be involved, in terrestrial survey protocol design, execution of the surveys, and interpretation of the results.
Construction Phase	
RWEC-RI	› Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communication Plan. › Where possible, local workers will be hired to meet labor needs for Project construction and O&M. › A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources. › Revolution Wind will consult with USCG, the Northeast Marine Pilots Association and regional ferry service operators to avoid or reduce use conflicts. › Project construction and O&M activities will be coordinated with appropriate contacts at USCG and DoD command headquarters. › A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG). › As appropriate and feasible, BMPs will be implemented to minimize impacts on fisheries, as described in the Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585 (BOEM, 2015).
Onshore Facilities	› Revolution Wind will use Aircraft Detection Lighting System ("ADLS") (or a similar system), pursuant to approval by the FAA and commercial and technical feasibility at the time of FDR/FIR approval. › Where possible, local workers will be hired to meet labor needs for Project construction and O&M. › The Onshore Facilities construction schedule will be designed to minimize impacts to the local community during the summer tourist season, generally between Memorial Day and Labor Day. › Revolution Wind will coordinate with local authorities during construction of Onshore Facilities to minimize local traffic impacts; further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). In addition, traffic will be temporary and will not impact long term property values. › The Onshore Transmission Cables will be buried; therefore, minimizing potential impacts to adjacent properties. › Investigation and remediation of contaminated soil and groundwater must be carried out in accordance with RIDEM regulations and policies regarding Environmental Justice Focus Areas including enhanced stakeholder outreach. › An Unanticipated Discovery Plan ("UDP") will be implemented that will include stop-work and notification procedures to be followed if a potentially significant archaeological resource is encountered during construction. › An UDP will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation.

Project Component	Avoidance, Minimization, and Mitigation Measures
Post-Construction Phase	
RWEC-RI	› Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region. › Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communication Plan. › Where possible, local workers will be hired to meet labor needs for Project construction and O&M. › Project construction and O&M activities will be coordinated with appropriate contacts at USCG and DoD command headquarters.
Onshore Facilities	› Where possible, local workers will be hired to meet labor needs for Project construction and O&M. › Screening will be implemented at the OnSS to the extent feasible, to reduce potential visibility and noise.

Note: Onshore Facilities includes the Landfall Work Area and Onshore Transmission Cable, Onshore Substation, and Interconnection Facility and Interconnection Transmission Right-of-Way.

9.1 Design Phase

As outlined in Tables 9-1 and 9-2 above, Revolution Wind has incorporated design measures to reduce the impacts associated with the construction and operation of the Project. These measures include alignment, design, pole structure locations, and use of existing roads where possible, which have resulted in the avoidance and minimization of residential and wetland impacts, and soil disturbance.

The following sections detail the various measures that were implemented in the design phase of the Project to reduce impacts to the natural and social environment.

9.1.1 Avoidance and Mitigation of Natural Resource Impacts – Design Phase

9.1.1.1 Revolution Wind Export Cable

Design considerations to avoid impacts to natural resources included installing the RWEC-RI down to a depth of 4 to 6 ft (1.2 to 1.8 m) below seabed to avoid and minimize impacts to geological resources, commercial and recreational fisheries, essential fish habitat, benthic and shellfish, and marine mammals and sea turtles.

9.1.1.2 Landfall Work Area and Onshore Transmission Cable

The siting and design of both the Landfall Work Area and Onshore Transmission Cable have been designed to avoid impacts to natural resources. The Landfall Work Area is on a commercially developed property and the Onshore Transmission Cable will be constructed under existing roads.

9.1.1.3 Onshore Substation

The new OnSS, including the new access road and stormwater management features, was sited to avoid impacts to wetlands and documented sickle-leaved golden aster locations, minimize impacts to 50-Foot Wetland Buffer and coastal floodplain, maintain required safety clearances between substation equipment and transmission lines, and maintain reasonable vegetated buffers between the substation and residential abutters to the south. Consequently, unavoidable Wetland Buffer impacts have been limited to approximately 8,197 square feet (0.2 ac) of permanent impacts and 12,930 square feet (0.3) of temporary impacts. This design will continue to be refined and the Project will be designed to minimize impacts to the maximum extent practicable.

9.1.1.4 Interconnection ROW

The Interconnection ROW was sited underground, which minimizes the amount of ROW width that is required to be maintained and avoids permanent impacts to wildlife.

9.1.1.5 Interconnection Facility and TNEC ROW

The ICF will continue to be refined and the Project will be designed to avoid impacts to wetlands, Wetland Buffers, and floodplains, and will maintain reasonable vegetated buffers between residential abutters to the south. The design of the TNEC ROW will continue to be refined and will be designed to reduce wetland and Wetland Buffer impacts through avoidance, minimization, and restoration. Consequently, unavoidable wetland and Wetland Buffer impacts associated with vegetation clearing for construction of pole structure GR2 and for the required ROW clearance for the Project have been limited to approximately 3,800 square feet of vegetation clearing of an isolated wetland that is also a potential vernal pool and approximately 800 square feet of vegetation clearing within a forested wetland. In addition, the TNEC ROW will require clearing approximately 8,600 square feet of vegetation within a Wetland Buffer for construction and maintaining the required 120-foot-wide ROW. Mitigation for these alterations of wetland must be provided in order to comply with federal wetland regulations.

9.1.2 Avoidance, Minimization, and Mitigation of Socioeconomic Impacts

9.1.2.1 Population and Economy

Revolution Wind Export Cable

Design phases of the preferred RWEC-RI route is not expected to result in an adverse impact to local populations or economic resources in Rhode Island, including State waters.

Landfall Work Area and Onshore Transmission Cable

The Landfall Work Area and Onshore Transmission Cable will be on properties under private ownership within the Quonset Business Park and within public ROW belonging to the QDC and the Town of North Kingstown. Project infrastructure within the Landfall Work Area (including the TJBs) along with the Onshore Transmission Cable are designed to be buried, minimizing long-term impacts to the community – including potential impacts to local populations or economic resources. The Onshore Transmission Cable is sited primarily within public ROW, as well as on parcels where permanent easements are expected to be acquired, avoiding the displacement of residences or businesses on privately-owned properties.

Onshore Substation

The design of the OnSS is not expected to result in an adverse impact to local populations or economic resources in Rhode Island. This facility is sited in close proximity to TNEC's Davisville Substation to minimize impacts to the community and on vacant parcels to prevent the direct displacement of residences or businesses.

Interconnection ROW

The design of the Interconnection ROW is not expected to result in an adverse impact to local populations or economic resources in Rhode Island. This Project component is sited in the area to be occupied by the OnSS, which is currently vacant, and the parcel occupied by TNEC's Davisville Substation. Further, this Project component will be buried underground. No displacement of residences or business would result.

Interconnection Facility and TNEC ROW

The design of the ICF and TNEC ROW is not expected to result in an adverse impact to local populations or economic resources in Rhode Island. These Project components are sited on the parcel occupied by TNEC's Davisville Substation. No displacement of residences or business would result.

9.1.2.2 Land Use

Revolution Wind Export Cable

The design of the preferred RWEC-RI route is not expected to result in an adverse impact to land uses in Rhode Island.

Landfall Work Area and Onshore Transmission Cable

The Landfall Work Area and Onshore Transmission Cable will be on properties under private ownership within the Quonset Business Park, requiring the acquisition of permanent easements, and within public ROW belonging to the QDC and the Town of North Kingstown. Revolution Wind sited these Project components on the selected privately-owned properties knowing that the required easements could be obtained from the property owners. Further, the siting of these Project components on these properties were designed to prevent a permanent impact to their existing operations, avoiding a land use change.

The Onshore Transmission Cable is sited primarily within public ROW, as well as on parcels where permanent easements are expected to be acquired, avoiding the need for property acquisitions along with potential land use changes and the displacement of residences or business.

Onshore Substation

The design of the OnSS is not expected to result in an adverse impact to land uses in Rhode Island. This facility is sited on vacant parcels to prevent the direct displacement of residences or businesses. A proposed change in land use is consistent with surrounding land uses including TNEC's Davisville Substation.

Interconnection ROW

The design of the Interconnection is not expected to result in an adverse impact to land uses in Rhode Island. This Project component will be compatible with existing and surrounding land uses and will be adjacent to TNEC's Davisville Substation.

The ICF is sited in the area to be occupied by the OnSS, which is currently vacant, and the parcel occupied by TNEC's Davisville Substation. Further, this Project component will be buried underground. No displacement of residences or business would result.

Interconnection Facility and TNEC ROW

The design of the ICF and TNEC ROW is not expected to result in an adverse impact to land uses in Rhode Island. These Project components will be compatible with existing and surrounding land uses, as they will be adjacent to TNEC's Davisville Substation.

The ICF and TNEC ROW are sited on the parcel occupied by TNEC's Davisville Substation. Therefore, no displacement of residences or business would result.

9.1.2.3 Electric and Magnetic Fields

Revolution Wind Export Cable

The underground transmission cables will not be a direct source of any electric field above ground due to the design of cable construction, use of the duct bank, and burial underground.

Landfall Work Area and Onshore Transmission Cable

None expected during the design phase.

Onshore Substation

None expected during the design phase.

Interconnection ROW

None expected during the design phase.

Interconnection Facility and TNEC ROW

None expected during the design phase.

9.1.2.4 Transportation

The design of the preferred RWEC-RI route and onshore facilities is not expected to result in an adverse impact to transportation in Rhode Island.

9.1.2.5 Visual Resources

Revolution Wind Export Cable

The RWEC-RI export cable is designed to be buried underground, minimizing potential impacts to surrounding areas. There are no expected impacts to the visual resources of Rhode Island.

Landfall Work Area and Onshore Transmission Cable

The Landfall Work Area and Onshore Transmission Cable are sited primarily within public ROW in a commercial area. There are no expected impacts to the visual resources of Rhode Island.

Onshore Substation

Locating the OnSS near an existing substation will limit perceived changes in land use and scenic quality. Given that the OnSS has been proposed in an area intended for industrial development, the Project is in keeping with this intended use. Additionally, the Project layout has been designed to accommodate various setbacks from roads, residences, private properties, wetlands and cultural resources.

Interconnection ROW

The Interconnection ROW is designed to be buried underground, minimizing potential impacts to surrounding areas. There are no expected impacts to the visual resources of Rhode Island.

Interconnection Facility and TNEC ROW

Screening will be implemented at the ICF to the extent feasible to reduce visibility along portions of Camp Avenue. Additionally, the Project access road will benefit from a landscape treatment that is consistent with residential landscape vegetation and materials. This type of treatment is recommended to make the facility entrance appear similar to existing residential driveways in the area.

9.1.2.6 Noise

Revolution Wind Export Cable

The design of the preferred RWEC-RI route is not expected to result in an adverse impact to noise levels in the area.

Landfall Work Area and Onshore Transmission Cable

The design of the preferred Landfall Work Area and Onshore Transmission Cable is not expected to result in an adverse impact to noise levels in the area.

Onshore Substation

Onshore Facilities will be sited within previously disturbed and developed areas to the extent possible.

Interconnection ROW

The design of the Interconnection ROW is not expected to result in an adverse impact to noise levels in the area.

Interconnection Facility and TNEC ROW

Onshore Facilities will be sited within previously disturbed and developed areas to the extent possible.

9.1.2.7 Cultural Resources

In accordance with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585, avoidance and mitigation actions for cultural resources will be developed through Section 106 consultation with BOEM as the lead federal agency, the RIHPHC and Native American Tribes.

9.2 Construction Phase

As outlined in Tables 9-1 and 9-2, Revolution Wind will implement several measures during construction that will minimize impacts to the natural and social resources. The following section details various avoidance and mitigation measures that will be implemented to minimize construction related impacts.

9.2.1 Avoidance, Minimization, and Mitigation of Natural Resource Impacts

Table 9-1 details the proposed environmental protection measures to avoid and minimize environmental impacts to the greatest extent practicable. A discussion of avoidance and mitigation measures follows. Several avoidance and mitigation measures for the Onshore Facilities will be implemented for all onshore components. These measures include the following:

- Erosion controls in accordance with the SESC Plan
- Restoring all temporarily disturbed areas with vegetation
- Dewatering methods
- To the extent feasible, tree and shrub removal for Onshore Facilities will occur outside the avian nesting and bat roosting period; May 1 through August 15. If tree and shrub removal cannot be avoided during this timeframe, Revolution Wind will coordinate with appropriate agencies to determine appropriate course of action.
- Environmental monitoring

9.2.1.1 Revolution Wind Export Cable–Rhode Island

The RWEC-RI will incorporate several measures to protect the environment. During installation of the cable, equipment such as mechanical cutters, mechanical plows, and/or jet plows will be used. As described in Section 4.4.2.2, these methods allow the trench that will be excavated to install the cable naturally backfill, creating only transient disturbance to the seafloor. Because the sediment will exit suspension and the trench will be backfilled, these methods also minimize short-term impacts to geology, water quality, fisheries, marine mammals, and sea turtles and eliminate long-term impacts. In conjunction with cable installation methodology, the cable depth will also minimize short-term and eliminate long-term impacts to these resources.

Installation of the RWEC-RI will also require the use of vessels. To reduce air quality impacts, vessels will use low sulfur engine fuel where possible and will meet appropriate EPA air emission standards for NO_x when operating within Emission Control Areas. To control and track trash and waste, vessels will comply with USCG and EPA regulations that require operators to develop waste management plans, post informational placards, manifest trash sent to shore, and use special precautions such as covering outside trash bins to prevent accidental loss of solid materials. Vessels will also comply with regulatory requirements to prevent and control spills and discharges and an Oil Spill Response Plan will be developed prior to construction. DP vessels will also be used wherever practicable. DP vessels do not require anchoring, which minimizes impacts to geological resources and water quality.

Regarding marine life, vessels will follow NOAA and BOEM guidelines for marine mammal and sea turtle strike avoidance measures and all personnel working offshore will receive training on marine mammal and sea turtle awareness. A ramp-up or soft-start will also be used at the beginning of each pile segment to give mobile species in the area time to vacate the area prior to the commencement of pile-driving activities. Other protective measures include seasonal restrictions, shut-down procedures, marine mammal and sea turtle monitoring protocols, the use of qualified and NOAA-approved protected species observers, and noise attenuation systems such as bubble curtains, as appropriate. Vessels will also follow NOAA and BOEM guidelines for marine mammal and sea turtle strike avoidance measures, including vessel speed restrictions. In addition to marine life, Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during construction and post-construction and provide an annual report to BOEM and USFWS.

Revolution Wind will also comply with FAA and USCG requirements for lighting while using lighting technology (e.g., low-intensity strobe lights) that minimizes impacts on avian species. Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels during construction and O&M and will provide an annual report to BOEM and United States Fish and Wildlife Service USFWS.

At the landfall location, a specific plan for excavating, storing, and disposing of dredged material will be developed. Dredged material will be tested for contaminants and if analytical results contain an exceedance of RIDEM criteria, reuse or disposal of the excavated material will be subject to further negotiations with RIDEM. If the HDD variation is used, an HDD Contingency Plan will be developed.

9.2.1.2 Landfall Work Area and Onshore Transmission Cable

Construction of both the Landfall Work Area and Onshore Transmission Cable will require excavation for the onshore portion of the RWEC-RI, the TJBs, and the Onshore Transmission Cable. Prior to any ground disturbance, erosion controls will be installed in locations where sediment can migrate downgradient into wetland resources. Erosion controls will be inspected on a regular basis during construction by the environmental monitor and will be maintained or replaced as necessary.

Dewatering might also be required during excavation for the TJBs and trench to install the Onshore Transmission Cable. If dewatering is required during excavation, one of the methods discussed in Section 4.5.3 will be used and the SESC Plan and Eversource’s BMPs will be implemented to avoid adverse impacts to surface and groundwater. If contaminated groundwater is encountered during dewatering, it will be managed in accordance with the RIDEM Remediation General Permit.

There is very minimal vegetation clearing associated with the Landfall Work Area, all of which is herbaceous, and no vegetation clearing anticipated for construction of the Onshore Transmission Cable. Following construction of the Landfall Work Area, the area that was cleared of herbaceous vegetation will be seeded with a native herbaceous seed mix and will be covered with either mulch or straw, if necessary.

Throughout the entire construction process, the services of an environmental monitor will be retained. The primary responsibility of the monitor will be to oversee construction activities including the installation and maintenance of erosion and sedimentation controls, on a routine basis to ensure compliance with federal and state permit requirements, Revolution Wind policies and other commitments. The environmental monitor will be a trained environmental scientist responsible for supervising construction activities relative to environmental issues. The environmental monitor will be experienced in the erosion control techniques described in this ER and will have an understanding of wetland resources that require protection.

During periods of prolonged precipitation, the monitor will inspect all locations to confirm that the environmental controls are functioning properly. In addition to retaining the services of an environmental monitor, the contractor will be required to designate an individual to be responsible for the daily inspection and upkeep of environmental controls. This person will also be responsible for providing direction to the other members of the construction crew regarding matters of wetland access and appropriate work methods. Additionally, all construction personnel will be briefed on Project environmental compliance issues and obligations prior to the start of construction. Regular construction progress meetings will provide the opportunity to reinforce the contractor's awareness of these issues.

9.2.1.3 Onshore Substation

The erosion controls, dewatering methods, vegetation restoration, and environmental inspections will be the same as discussed within Section 9.2.1.2. Clearing and vegetation management operations will be confined to the limits of work. To the extent feasible, tree and shrub removal for Onshore Facilities will occur outside the avian nesting and bat roosting period; May 1 through August 15. If tree and shrub removal cannot avoid this season, Revolution Wind will coordinate with appropriate agencies to determine appropriate course of action. Protective measures for sickle-leaved golden aster will be incorporated to avoid adverse effects to this species.

During construction, excavated soils will be stockpiled outside of wetland resources and if they will be in place for more than 10 days, will be covered with plastic and will be circled with erosion controls.

9.2.1.4 Interconnection ROW

The erosion controls, dewatering methods, vegetation clearing and restoration, and environmental inspections will be the same as discussed within Section 9.2.1.2 and 9.2.1.3.

9.2.1.5 Interconnection Facility and TNEC ROW

Except for sickle-leaved golden aster, the avoidance and mitigation measures for the ICF and TNEC ROW are the same as those described in Sections 9.2.1.2 and 9.2.1.3.

9.2.2 Avoidance, Minimization, and Mitigation of Socioeconomic Impacts

9.2.2.1 Population and Economy

Revolution Wind Export Cable

Construction of the preferred RWEC-RI route is not expected to result in adverse impacts to local populations or economic resources in Rhode Island, including state waters. Where possible, local workers will be hired to meet construction labor needs associated with the RWEC-RI.

Installation of the RWEC-RI will have transient impacts on commercial and recreational fishing due to constrained access to certain areas during construction. These impacts and their mitigation will be addressed during the RI CRMC review process.

Landfall Work Area and Onshore Transmission Cable

Construction activities associated with the Landfall Work Area and Onshore Transmission Cable will result in temporary traffic and noise impacts to properties intersecting and proximate to the Project infrastructure within the Landfall Work Area (including the TJBs) along with the Onshore Transmission Cable. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate population- and business-related impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns. Where possible, local workers will be hired to meet construction labor needs associated with the infrastructure sited within the Landfall Work Area as well as the Onshore Transmission Cable.

Onshore Substation

Construction activities associated with the OnSS will result in temporary traffic and noise impacts to properties proximate to this Project component. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate population- and business-related impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, this Project component will be constructed in compliance with applicable regulations related to environmental and community concerns. Where possible, local workers will be hired to meet construction labor needs associated with the OnSS.

Interconnection ROW

Construction activities associated with the Interconnection ROW will result in temporary traffic and noise impacts to properties proximate to this Project component. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate population- and business-related impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, the Interconnection ROW will be constructed in compliance with applicable regulations related to environmental and community concerns. Where possible, local workers will be hired to meet construction labor needs associated with this Project component.

Interconnection Facility and TNEC ROW

Construction activities associated with the ICF and TNEC ROW will result in temporary traffic and noise impacts to properties proximate to these Project components. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate population- and business-related impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, the ICF and TNEC ROW will be constructed in compliance with applicable regulations related to environmental and community concerns. Where possible, local workers will be hired to meet construction labor needs associated with these Project components.

9.2.2.2 Land Use

Revolution Wind Export Cable

Construction of the preferred RWEC-RI route is not expected to result in adverse impacts to land uses in Rhode Island. Accordingly, Revolution Wind is not proposing mitigation under the construction phase for this component of the Project.

Landfall Work Area and Onshore Transmission Cable

Construction activities associated with the Landfall Work Area and Onshore Transmission Cable will result in temporary traffic and noise impacts to properties intersecting and proximate to the Project infrastructure within the Landfall Work Area (including the TJBs) along with the Onshore Transmission Cable. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate land use impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns. A Soil Erosion and Sediment Control Plan and a Spill Prevention, Control, and Countermeasures Plan will minimize potential impacts to adjacent lands uses during construction of the infrastructure sited within the Landfall Work Area as well as the Onshore Transmission Cable.

Onshore Substation

Construction activities associated with the OnSS will result in temporary traffic and noise impacts to properties proximate to this Project component. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate land use impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, this Project component will be constructed in compliance with applicable regulations related to environmental and community concerns (e.g., traffic and erosion). A Soil Erosion and Sediment Control Plan and a Spill Prevention, Control, and Countermeasures Plan will minimize potential impacts to adjacent lands uses during construction of the Onshore Facilities

Interconnection ROW

Construction activities associated with the Interconnection ROW will result in temporary traffic and noise impacts to properties proximate to this Project component. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate land use impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, this Project component will be constructed in compliance with applicable regulations related to environmental and community concerns. A Soil Erosion and Sediment Control Plan and a Spill Prevention, Control, and Countermeasures Plan will minimize potential impacts to adjacent lands uses during construction of the Interconnection ROW.

Interconnection Facility and TNEC ROW

Construction activities associated with the ICF and TNEC ROW will result in temporary traffic and noise impacts to properties proximate to these Project components. The scale of these impacts will depend on the overall construction schedule and any time of year restrictions that are imposed upon the Project.

Revolution Wind will design the construction schedule to minimize and mitigate land use impacts to the local community, as well as coordinate with local authorities and abutters during construction to minimize local traffic impacts. Further, these Project components will be constructed in compliance with applicable regulations related to environmental and community concerns. A Soil Erosion and Sediment Control Plan and a Spill Prevention, Control, and Countermeasures Plan will minimize potential impacts to adjacent lands uses during construction of the ICF and TNEC ROW.

9.2.2.3 Electric and Magnetic Fields

There will be no EMF produced during construction of the RWEC-RI or Onshore Facilities.

9.2.2.4 Transportation

Public buses and other vehicular traffic that use the roadway network at the Quonset Business Park may be delayed during construction hours.

If advised by the FAA and per the requirements of any FAA-provided determination, Revolution Wind will notify the FAA prior to the start of construction and upon completing construction of each transmission structure and the applicable construction vessels via FAA Form 7460-2.

9.2.3 Avoidance, Minimization, and Mitigation of Visual Resources Impacts

Revolution Wind Export Cable

None.

Landfall Work Area and Onshore Transmission Cable

None.

Onshore Substation

Screening will be implemented at the OnSS to the extent feasible to reduce visibility along portions of Camp Road. Additionally, the Project access road will benefit from a landscape treatment that is consistent with residential landscape vegetation and materials. This type of treatment is recommended to make the facility entrance appear similar to existing residential driveways in the area.

Interconnection ROW

None.

Interconnection Facility and TNEC ROW

ICF will be sited within previously disturbed and developed areas to the extent possible.

9.2.4 Avoidance, Minimization, and Mitigation of Noise Impacts

Revolution Wind Export Cable

Nosie generated by vessels, including the DP vessels for cable installation, aircraft use, and possible sheet pile cofferdam installation will be short-term and similar to existing noise in the area.

Landfall Work Area and Onshore Transmission Cable

Cofferdam installation (either sheet pile or gravity cell) will occur during daytime hours and would be within all applicable state and local noise standards.

Onshore Substation

Sound from construction of the OnSS is estimated to be in the low to mid 50's dBA (Leq) at the closest residential receptors south of the Project site on Camp Avenue and in the low to mid 50's dBA (Leq) at residences east of the Project site at the Mill Creek Townhouses. These construction sound levels would meet all applicable state and local noise standards.

Interconnection ROW

Construction sound levels would meet all applicable state and local noise standards.

Interconnection Facility and TNEC ROW

Construction sound levels would meet all applicable state and local noise standards.

9.2.5 Avoidance, Minimization, and Mitigation of Cultural Resource Impacts

In accordance with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585, avoidance and mitigation actions for cultural resources will be developed through Section 106 consultation with BOEM as the lead federal agency, the RIHPHC and Native American Tribes.

9.3 Post-Construction Phase

Following the completion of construction, Revolution Wind will use industry standard restoration and mitigation measures on all transmission line construction projects to minimize the impacts of projects on the natural and social environment. These measures include revegetation and stabilization of disturbed soils, ROW vegetation management practices and vegetation screening maintenance at road crossings and in sensitive areas. Other measures are used on a site-specific basis. Revolution Wind will implement the following standard and site-specific mitigation measures for the proposed Project.

9.3.1 Avoidance, Minimization, and Mitigation of Natural Resource Impacts

9.3.1.1 Revolution Wind Export Cable

The post-construction phase of the RWEC-RI is not expected to result in adverse impacts to natural resources in Rhode Island, including State waters. However, Revolution Wind is developing an Avian Post-Construction Monitoring Plan for the Project that will summarize the approach to monitoring; describe overarching monitoring goals and objectives; identify the key avian species, priority questions, and data gaps unique to the region and Project Area that will be addressed through monitoring; and describe methods and time frames for data collection, analysis, and reporting. Post-construction monitoring will assess impacts of the Project with the purpose of filling select information gaps and supporting validation of the Project's Avian Risk Assessment. Focus may be placed on improving knowledge of ESA-listed species occurrence and movements offshore, avian collision risk, species/species-group displacement, or similar topics. Where possible, monitoring conducted by Revolution Wind will build on and align with post-construction monitoring conducted by the other Orsted/Eversource offshore wind projects in the Northeast region. Revolution Wind will engage with federal and state agencies and eNGOs to identify appropriate monitoring options and technologies, and to facilitate acceptance of the final plan. Revolution Wind will document any dead (or injured) birds/bats found incidentally on vessels and structures during O&M and provide an annual report to BOEM and USFWS.

9.3.1.2 Landfall Work Area and Onshore Transmission Cable

There are no anticipated post-construction impacts associated with the Landfall Work Area or the onshore Transmission Cable. All utility infrastructure will be underground within the parking lot for the Landfall Work Area and within existing paved roads for the Onshore Transmission Cable.

9.3.1.3 Onshore Substation

As discussed in 9.2.1.2, all temporarily disturbed areas will be restored with vegetation. The 30-foot perimeter around the OnSS fence line will be managed to encourage the growth of grasses, ferns, and low growing shrubs. The management strategy will include the removal of invasive plants in compliance with federal and state regulations (e.g., herbicide use will not be permitted within regulated wetlands) as required by permit conditions.

Construction debris will be removed from the Project site and disposed of at an appropriate landfill. Pre-existing drainage patterns, ditches, roads, and fences will be restored to their former condition, where appropriate. Permanent slope breakers and erosion control devices will be installed in areas where the disturbed soil has the potential to impact wetland resource areas.

9.3.1.4 Interconnection ROW

The post-construction measures for the Interconnection ROW will be the same as discussed within Section 9.3.1.3, except that the Interconnection Facility will have a 40-foot-wide maintained ROW.

9.3.1.5 Interconnection Facility and TNEC ROW

The mitigation measures for the ICF and TNEC ROW are the same as those described in Sections 9.2.1.3 with the exception that the area of vegetative management includes a 10-foot-wide perimeter around the ICF and the 120-foot-wide TNEC ROW.

9.3.2 Avoidance, Minimization, and Mitigation of Socioeconomic Impacts

9.3.2.1 Population and Economy

<u>Revolution Wind Export Cable</u>

The preferred RWEC-RI route is not expected to result in post-construction adverse impacts to local populations or economic resources in Rhode Island, including state waters. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for this Project component. Where possible, local workers will be hired to meet post-construction labor needs associated with the RWEC-RI; construction-related labor is expected to be minimal and limited to maintenance activities.

Landfall Work Area and Onshore Transmission Cable

The Landfall Work Area and Onshore Transmission Cable will be sited on properties under private ownership within the Quonset Business Park and within public ROW belonging to the QDC and the Town of North Kingstown. Project infrastructure within the Landfall Work Area (including the TJBs) along with the Onshore Transmission Cable will be buried and will therefore not result in a permanent impact – no displacement of residences or business are expected. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for these Project components. Where possible, local workers will be hired to meet post-construction labor needs associated with the infrastructure sited within the Landfall Work Area as well as the Onshore Transmission Cable; construction-related labor is expected to be minimal and limited to maintenance activities.

Onshore Substation

The OnSS is not expected to result in post-construction adverse impacts to local populations and economic resources in Rhode Island. This facility will be sited on currently vacant parcels adjacent to TNEC's Davisville Substation; therefore, no displacement of residences or business would result. Revolution Wind is not proposing mitigation under the post-construction phase for this Project component. Where possible, local workers will be hired to meet post-construction labor needs associated with the OnSS; construction-related labor is expected to be minimal and limited to maintenance activities.

Interconnection ROW

The Interconnection ROW is not expected to result in post-construction adverse impacts to local populations or economic resources in Rhode Island. This Project component will be sited in the area to be occupied by the OnSS, which is currently vacant, and the parcel occupied by TNEC's Davisville Substation. Therefore, no displacement of residences or business would result.

Revolution Wind is not proposing mitigation under the post-construction phase for the Interconnection ROW. Where possible, local workers will be hired to meet post-construction labor needs associated with this Project component; construction-related labor is expected to be minimal and limited to maintenance activities.

Interconnection Facility and TNEC ROW

The ICF and TNEC ROW are not expected to result in post-construction adverse impacts to local populations or economic resources in Rhode Island. These Project components will be sited on the parcel occupied by TNEC's Davisville Substation. Therefore, no displacement of residences or business would result.

Revolution Wind is not proposing mitigation under the post-construction phase for the ICF and TNEC ROW. Where possible, local workers will be hired to meet post-construction labor needs associated with these Project components; construction-related labor is expected to be minimal and limited to maintenance activities.

9.3.2.2 Land Use

Revolution Wind Export Cable

The preferred RWEC-RI route is not expected to result in post-construction adverse impacts to land uses in Rhode Island. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for this Project component.

Landfall Work Area and Onshore Transmission Cable

The Landfall Work Area and Onshore Transmission Cable are not expected to result in post-construction adverse impacts to land uses in Rhode Island. These Project components will be sited on properties under private ownership within the Quonset Business Park, requiring the acquisition and maintenance of easements, as well as within public ROW belonging to the QDC and the Town of North Kingstown.

The required easements will be granted to Revolution Wind by the owners of the selected privately-owned properties. The provision of these easements will not impact the existing operations of these properties, avoiding a change in land use. The Onshore Transmission Cable is sited primarily within public ROW, as well as on parcels where permanent easements are expected to be acquired, avoiding the need for property acquisitions along with potential land use changes and associated displacements. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for these Project components.

Onshore Substation

The OnSS is not expected to result in post-construction adverse impacts to land uses in Rhode Island. This Project component will be sited on currently vacant parcels and will be compatible with surrounding land uses, as it is adjacent to the parcel occupied by TNEC's Davisville Substation. No displacement of residences or business would result.

Revolution Wind is not proposing mitigation under the post-construction phase for this component of the Project. However, it may implement screening to reduce potential visibility and noise from/to adjacent properties to the extent necessary in compliance with local ordinances and permitting requirements.

Interconnection ROW

The Interconnection ROW is not expected to result in post-construction adverse impacts to land uses in Rhode Island. This Project component will be sited on a currently vacant parcel and the property containing TNEC's Davisville Substation and will be compatible with existing and surrounding land uses. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for this Project component.

Interconnection Facility and TNEC ROW

The ICF and TNEC ROW are not expected to result in post-construction adverse impacts to land uses in Rhode Island. These Project components will be sited on the property containing TNEC's Davisville Substation and will be compatible with existing and surrounding land uses. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for these Project components.

9.3.2.3 Electric and Magnetic Fields

The calculated magnetic fields at peak loading directly over the duct banks is well below the International Commission on Non-Ionizing Radiation Protection reference level of 2,000 mG and the International Committee on Electromagnetic Safety exposure reference level of 9,040 mG for the general public.

9.3.2.4 Transportation

Transportation impacts during the post-construction phase of the RWEC-RI and Onshore Facilities are not typically expected except during non-routine maintenance that would require uncovering the buried cables/infrastructure.

9.3.3 Avoidance, Minimization, and Mitigation of Visual Resource Impacts

Revolution Wind Export Cable

The post-construction phase of the RWEC-RI is not expected to result in adverse impacts to visual resources in Rhode Island. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for this Project component.

Landfall Work Area and Onshore Transmission Cable

The post-construction phase of the Landfall Work Area and Onshore Transmission Cable is not expected to result in adverse impacts to visual resources in Rhode Island. Accordingly, Revolution Wind is not proposing mitigation under the post-construction phase for this Project component.

Onshore Substation

The screening buffers will be maintained as part of the vegetation management plan.

Interconnection ROW

None.

Interconnection Facility and TNEC ROW

The screening buffers will be maintained as part of the vegetation management plan.

9.3.4 Avoidance, Minimization, and Mitigation of Noise Impacts

Noise from the post-construction phase of the RWEC-RI and Onshore Facilities are not typically expected except during non-routine maintenance that would require uncovering the buried cables/infrastructure.

9.3.5 Avoidance, Minimization, and Mitigation of Cultural Resource Impacts

In accordance with BOEM's Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585, avoidance and mitigation actions for cultural resources will be developed through Section 106 consultation with BOEM as the lead federal agency, the RIHPHC and Native American Tribes.

10

Permit Requirements

Revolution Wind must obtain permits under the following federal, state and local statutes and regulations prior to the construction of the Project.

10.1 State Permits

10.1.1 Energy Facility Siting Board License

The Project will require a license to construct a major energy facility from the EFSB pursuant to the EFSA (R.I.G.L. Section 42-98-1 *et seq.*).

10.1.2 Rhode Island Coastal Resources Management Council

The Project will require concurrence from RI CRMC with Revolution Wind's Federal Consistency Certification pursuant to Section 307 of the Coastal Zone Management Act ("CZMA") (16 U.S.C. § 1456) and CZMA regulations (15 CFR Part 930, subpart E) and § 11.10 of RI Ocean Special Area Management Plan [Ocean SAMP] (650-RICR-20-05-11.10). The Project will also require a Category B Assent and Submerged Lands License pursuant to RI CRMC Management Procedures (the "Red Book") (650-RICR-20-00-1.1 *et seq.*) and a Freshwater Wetlands Permit pursuant to the Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast (650-RICR-20-00-2.1 *et seq.*). RI CRMC retains the authority to issue assents and licenses under the EFSA, R.I.G.L. §42-98-7(a)(3).

10.1.3 Rhode Island Department of Environmental Management

RIDEM has been delegated federal authority to enforce Sections 401 and 402 of the CWA, which regulates discharges into waters of the U.S., and RIDEM's review is therefore not preempted by the EFSB. Consequently, any development that potentially affects the water quality of waters of the State must apply for authorization from RIDEM under the Water

Quality Regulations (250- RICR-150-05-1.1 *et seq.*), the Rules and Regulations for Dredging and the Management of Dredged Materials (250-RICR-150-05-2.1 *et seq.*) and/or the RIPDES Regulations (250-RICR-150-10-1.1 *et seq.*) and the General Permit for Stormwater Discharge Associated with Construction Activity. The RIDEM Division of Marine Fisheries must be consulted as part of RIDEM's Section 401 application review process.

The State's Water Quality Certification satisfies the requirements of the USACE Section 10/404 application review process.

RIDEM may also declare animals and plants endangered under the Rhode Island ESA (RIGL §§ 20-37-1 *et seq.*), which prohibits the importation, sale, transportation, storage, traffic, ownership, or other possession or use of any animal or plant listed under the federal ESA. While an independent permitting process does not exist for RI ESA review, RIDEM offices/divisions having permitting authority are required to consult with the RIDEM Natural Heritage Program, which implements the RI ESA. Pursuant to R.I.G.L. § 42-98.7(2), the EFSB may request an advisory opinion with respect to these matters.

10.1.4 Quonset Development Corporation

QDC is a quasi-state agency, established as a special purpose subsidiary of the Rhode Island Commerce Corporation (formerly the RI Economic Development Corporation), which is responsible for the development and management of the Quonset Business Park. The QDC has promulgated Development Regulations that outline requirements for land development, building construction, and utilities in the Quonset Business Park (880-RICR-00-00-4.1 *et seq.*). Development Plan Review is required for any and all proposed activities that change the existing character of lands within the Park. The Onshore Transmission Cable and the Onshore Facilities will be located within the Quonset Business Park. Although the EFSB's jurisdiction preempts the QDC's authority to issue binding decisions with respect to the Project, the EFSB must request an advisory opinion from the QDC. Revolution Wind will file applications for QDC Development Plan Review for the OnSS and the ICF. Revolution Wind will file a QDC Utility Permit Application for the portions of the Onshore Transmission Cable to be located below QDC roadways.

10.2 Local Permits

At the municipal level, Onshore Facilities are proposed in the Town of North Kingstown, Rhode Island. Zoning review, Special Use Permit, and Site Plan Review are preempted by the authority of the EFSB, and consequently the Zoning Board and Planning Board will issue advisory opinions to the EFSB on these topics. Local building permits, street opening permits and/or easements are not pre-empted by the authority of the EFSB and will be required. These permits, approvals and easements will be obtained prior to construction, after engagement with the local regulatory community, and once design of the Onshore Facilities is finalized.

10.3 Federal Permits

10.3.1 Bureau of Ocean Energy Management

BOEM has the authority to regulate activities associated with the production, transportation, or transmission of renewable energy resources on the OCS under the Outer Continental Shelf Lands Act ("OCS Lands Act") (43 U.S.C. § 1337). Pursuant to this authority, BOEM must ensure that any approved activities are safe, conserve natural resources on the OCS, are undertaken in coordination with relevant federal agencies, provide a fair return to the United States, and are compliant with all applicable laws and regulations (30 CFR § 585.102), including the NEPA.

BOEM issued the Lease Area to Revolution Wind on October 1, 2013, for development of a renewable energy facility. The construction and operation of the Project will require a Construction and Operations Plan ("COP") that is compliant with BOEM regulations (30 CFR § 585) and approved by BOEM prior to the start of construction. Additionally, the Project will request an easement from BOEM for the portion of the export cables that traverses federal waters.

10.3.2 National Environmental Policy Act

BOEM will lead the preparation of an Environmental Impact Statement ("EIS") to evaluate potential impacts associated with implementation of the Project. Federal agencies, identifying as cooperating agencies in the NEPA process, are responsible for reviewing the Project's impacts to protected resources under their jurisdiction and evaluating the need for mitigation measures. These agencies will have the opportunity to comment through interagency consultations required for federal permitting (NEPA, USACE Individual Permit Application). In addition, through the NEPA process, BOEM will be required to satisfy Section 106 of the NHPA, which requires consideration of historic properties.

Under Executive Order 13807 (One Federal Decision [OFD]), which mandated a process for improving the coordination and timeliness of environmental reviews of major infrastructure projects, BOEM is responsible for coordinating and streamlining the permitting review process undertaken by all federal agencies with jurisdiction over the Project except the USCG and the FAA as described below. This includes the following steps:

- Issuance of a Single EIS and Record of Decision ("ROD") with a 90-day authorization deadline.
- Establishing concurrent agency reviews and limiting agency comments to issues that are within the agency's area of expertise or jurisdiction.
- All RODs issued within 2 years of the Notice of Intent.
- Establishing agency concurrence points.
- Timely elevation of inter-agency disputes.
- Establishing schedule exceptions limited to authorizing agency's "Special Circumstances" or applicable law making a 2-year schedule impracticable; or for developer requests or unresponsiveness.

10.3.3 United States Coast Guard

The USCG will issue a Private Aids to Navigation Permit (PATON) approval for installation of the WTGs and OSSs A request for a LNMs will be submitted to the USCG prior to on scene construction activities to enable USCG to issue the LNM. An LNM is a weekly notification published by the USCG to disseminate information to mariners concerning aids to navigation, hazards to navigation, and other items of interest to marine users.

10.3.4 United States Environmental Protection Agency

The EPA regulates air quality on the OCS pursuant to the Clean Air Act ("CAA") Outer Continental Shelf Air Permit (42 U.S.C. § 7627; 40 CFR Part 55, 60), including emissions from all phases of Project implementation. The EPA's jurisdiction includes vessels when they are permanently or temporarily attached to the seabed (40 CFR 55.2), as well as vessels associated with the Project while operating at the RWF or within 25 nm (46.3 km) of the activity. Due to the location of the Project, Massachusetts would most likely be designated as the Corresponding Onshore Area ("COA"), making the Project subject to Massachusetts air quality regulations in addition to EPA regulations.

10.3.5 Army Corps of Engineers

The Project will require an ACOE Section 10 Individual Permit, Section 404 Permit for the filling of wetlands in connection with the construction of the structures in wetlands, clearing in wetlands, and the construction of certain temporary access roads.

USACE has jurisdiction over the Project pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 ("RHA"), and Section 404 of the CWA due to the Project's location within navigable waters, federally maintained navigation channels and Waters of the United States.

Section 10 of the RHA (33 U.S.C. § 403) requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States. USACE Section 10 review of the Project will occur concurrently with the Section 404 review. Section 404 of the CWA (33 U.S.C. § 1344) establishes federal regulatory authority over the discharge of dredged or fill material into Waters of the United States, including wetlands. USACE will review the Project as an Individual Permit. The Individual Permit process includes an application sufficiency review, review of proposed project impacts on the environment, public notice and a public hearing.

The USACE New England District will be a cooperating agency under BOEM's NEPA process to satisfy the NEPA requirements for these authorizations. USACE reviews under RHA Section 10 and CWA Section 404 will be processed concurrently with BOEM's NEPA review and USACE approval would be issued as part of the OFD.

10.3.6 Historic Preservation Office

Consultation with the RIHPHC (State Historic Preservation Office) and the Tribal Historic Preservation Office is ongoing and will be completed as required by Section 106 of the National Historic Preservation Act.

10.3.7 Federal Aviation Administration

The Project will require a Determination of No Hazard to Air Navigation pursuant to 14 CFR Part 77. The U.S. Department of Transportation's FAA has jurisdiction over structures greater than 200 ft (61 m) AGL within 12 nm (22 km) of shore, which is the extent of the territorial sea. Although FAA's jurisdiction is limited to 12 nm (22 km), FAA airspace may extend beyond this distance requiring coordination between BOEM and the FAA to mitigate any impacts. Additionally, BOEM may require compliance with the marking and/or lighting recommendations identified in the FAA's Advisory Circular 70/7460-1L for WTGs beyond FAA jurisdiction given that BOEM does not currently have prescriptive guidelines for air navigation safety.

10.3.8 National Marine Fisheries Service

Pursuant to the MMPA (16 U.S.C. § 1361 *et seq.*), certain species and population stocks of marine mammals that are, or may be, in danger of extinction or depletion as a result of human activities should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management, and the primary objective of their management should be to maintain the health and stability of the marine ecosystem. The MMPA designated NMFS as the primary agency responsible for the protection of whales, dolphins, porpoises, seals, and sea lions.

Construction and operation of the Project requires consultation with NMFS and will likely require an Incidental Take Authorization under the MMPA and an Incidental Take Statement ("ITS") in accordance with the federal ESA. If construction or operation is likely to impact listed species under USFWS jurisdiction (such as terrestrial animal or plant species, sea turtles or avian species), then an ITS may be required from USFWS.

This page intentionally left blank.

11

Bibliography

Abt Associates. 2020. The Emissions & Generation Resource Integrated Database for 2018 (eGRID2018), prepared for the U.S. Environmental Protection Agency, Washington, DC, January 2020.

AKRF, Inc., AECOM, and A. Popper. 2012. Essential Fish Habitat Assessment for the Tappan Zee Hudson River Crossing Project.

Atlantic Coastal Cooperative Statistics Program (ACCSP). 2019. Data Warehouse, Non-Confidential Commercial Landings, Summary; using Data Warehouse [online application], Arlington, VA: Available at https://www.accsp.org; Public Data Warehouse; accessed (June 28, 2019).

Bureau of Ocean Energy Management (BOEM). 2013. *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Rhode Island and Massachusetts, Revised Environmental Assessment*. Office of Renewable Energy Programs. OCS EIS/EA. BOEM 2013-1131. May.

Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs. 2017. Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585.

Burke VJ, Standora EA, Morreale SJ. 1993. Diet of juvenile Kemp's ridley and loggerhead sea turtles from Long Island, New York. Copeia 1993(4):1176-1180.

Chinman, R. A. and S. W. Nixon. 1985. Depth-Area-Volume Relationships in Narragansett Bay. The University of Rhode Island Mar. Tech. Rept. 87, U.R. I. Sea Grant, Graduate School of Oceanography, Narragansett, RI, 64 pp.

Collie, J.S., A.D. Wood, and H.P. Jeffries. 2008. Long-term shifts in the Species Composition of a Coastal Fish Community. Canadian Journal of Fisheries and Aquatic Sciences 65:1352–1365.

DeGraaf, R.M. and M. Yamasaki. 2001 New England Wildlife: Habitat, Natural History, and Distribution. University Press of New England. 496 pp.

Dunne, T. and Leopold, L .B. 1978: Water in environmental planning. Freeman, New York. 818 pp.

Eastern Research Group (ERG). 2017. BOEM Offshore Wind Facilities Emission Estimating Tool Technical Documentation. Retrieved from https://www.boem.gov/Technical-Documentation-stakeholder/.

EDR. 2020. *Visual Resource Assessment (VRA) Revolution Wind Onshore Facilities*. Prepared for Revolution Wind, LLC. Syracuse, N.Y.

Evans PGH, Baines ME, Anderwald P. 2011. Risk assessment of potential conflicts between shipping and cetaceans in the ASCOBANS Region. Presented to the 18th ASCOBANS Advisory Committee Meeting, May 2011 (unpublished). Paper AC18/Doc. 6-04(S)rev.1. 32 pp.

Exponent. 2020a. *Revolution Wind Farm Electric-and Magnetic-Field Assessment*. December 2020.

Exponent. 2020b. Revolution Wind Farm *Onshore Magnetic-Field Assessment, Appendix Q2*. March 2020.

Fugro. 2020. *Revolution Wind Integrated Geotechnical and Geophysical Site Characterization Study*. Norfolk, VA.

Fulweiler, R.W., A.J. Oczkowski, K.M. Miller, C.A. Oviatt, M.E.Q. Pilson, 2015. Whole truths vs. half truths - And a search for clarity in long term water temperature records. Estuarine, Coastal, and Shelf Science 157: A1-A6.

Germano, J., J. Parker, and J. Charles. 1994. Monitoring cruise at the Massachusetts Bay Disposal Site, August 1990. DAMOS Contribution No. 92. U.S. Army Corps of Engineers, New England Division. Waltham, Massachusetts.

Greater Atlantic Region Fisheries Office (GARFO). 2017. GARFO Master ESA Species Table- Sea Turtles.

Guida, V., A. Drohan, H. Welch, J. McHenry, D. Johnson, V. Kentner, J. Brink, D. Timmons, and E. Estela-Gomez. 2017. Habitat Mapping and Assessment of Northeast Wind Energy Areas. Sterling, VA: US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-088. 312 p.

Guidehouse. 2020a. *Advisory Opinion on the Economic Development Benefits of the Proposed Project*. September 2020.

Guidehouse. 2020b. Economic Development Benefits of the Proposed Project in Rhode Island - Offshore and Onshore. July 2020. Letter.

Hare, J.A., W.E. Morrison, M.W. Nelson, M.M. Stachura, E.J. Teeters, R.B. Griffis, and C.A. Griswold. 2016. A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast US Continental Shelf. PLoS One 11(2), 30.

Hayes SA, Josephson E, Maze-Foley K, Rosel PE, Byrd B, Chavez-Rosales S, Cole TVN, Garrison LP, Hatch J, Henry A, Horstman SC, Litz J, Lyssikatos MC, Mullin KD, Orphanides C, Pace RM, Palka DL, Powell J, Wenzel FW. 2020. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2019 U.S. Department of Commerce, National Oceanic and

Atmospheric Administration, National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. NOAA Technical Memorandum NMFS-NE-264, July 2020. 479 pp.

Hirsch, N.D., L.H. DiSalvo, and R. Peddicord. 1978. Effects of dredging and disposal on aquatic organisms. Technical Report DS-78-5. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS. NTIS No. AD A058 989.

Hyde, K. 2009. "Seasonal and interannual variability of phytoplankton population in Rhode Island and Block Island Sound." In Sound Connections: The Science of Rhode Island and Block Island Sounds. Proceedings of the 7th Annual Ronald C. Baird Grant Science Symposium. Rhode Island Sea Grant, Narragansett, RI.

INSPIRE Environmental. 2020. *Benthic Assessment Technical Report*. Prepared for Revolution Wind, LLC, Providence, R.I.

International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-836, 2010.

Kafka, Alan & Hubenthal, Michael & Lewis, G.B. (2014). Why Does the Earth Quake in the Eastern US? Investigating Intraplate Earthquakes in the Earth Science Classroom (Workshop).

Kenny, A.J. and H.L. Rees. 1994. The effects of marine gravel extraction on the macrobenthos: Early postdredging recolonization. Marine Pollution Bulletin 28: 442–447.

Kleisner, K.M., M.J. Fogarty, S. McGee, J.A. Hare, S. Moret, C.T. Perretti and V.S. Saba. 2017. "Marine species distribution shifts on the US Northeast Continental Shelf under continued ocean warming." Progress in Oceanography 153: 24-36.

J. King Consulting, LLC. 2018. Mapping Obstructions to Cable Routing in West Passage of Narragansett Bay and Rhode Island Sound. 8pp + figures.

Long Island Commission on Aquifer Protection (LICAP). 2016. State of the Aquifer 2016.

McManus, M.C., J.A. Hare, D.E. Richardson, and J.S. Collie. 2018. Tracking shifts in Atlantic mackerel (*Scomber scombrus*) larval habitat suitability on the Northeast US Continental Shelf. Fisheries Oceanography 27(1): 49–62.

McMaster R.L., Ashraf A. 1973. Drowned and buried valleys on the southern New England continental shelf Marine Geology, 15(4), pp. 249-268.

McMaster, R.L. 1984. Holocene stratigraphy and depositional history of the Narragansett Bay System, Rhode Island, U.S.A.: Sedimentology, v. 31, no. 6, p. 777–792.

McMullen, K.Y., L.J. Poppe, E.R. Twomey, W.W. Danforth, T.A. Haupt, and J.M. Crocker. 2007a. Sidescan Sonar Imagery, Multibeam Bathymetry, and Surficial Geologic Interpretations of the Sea Floor in Rhode Island Sound, off Sakonnet Point, Rhode Island: U.S. Geological Survey Open File Report 2007-1150, DVD-ROM. Accessed October 11, 2017. https://pubs.er.usgs.gov/publication/ofr20071150.

McMullen, K.Y., L.J. Poppe, R.P. Signell, J.F. Denny, J.M. Crocker, A.L. Beaver, and P.T. Schattgen. 2007b. Surficial geology in central Narragansett Bay, Rhode Island—

Interpretations of sidescan sonar and multibeam bathymetry: U.S. Geological Survey Open-File Report 2006–1199, DVD-ROM.

McMullen, K.Y., L.J. Poppe, J.F. Denny, T.A. Haupt, and J.M. Crocker. 2008. Sidescan sonar imagery and surficial geologic interpretations of the sea floor in Central Rhode Island Sound. U.S. Geological Survey Open-File Report 2007-1366. Accessed October 10, 2019. https://pubs.er.usgs.gov/publication/ofr20071366.

McMullen, K.Y., L.J. Poppe, E.R. Twomey, W.W. Danforth, T.A. Haupt, and J.M. Crocker. 2011. Sidescan Sonar Imagery, Multibeam Bathymetry, and Surficial Geologic Interpretations of the Sea Floor in Rhode Island Sound, off Sakonnet Point, Rhode Island. U.S. Geological Survey Open File Report 2007-1150. Accessed October 15, 2019. https://pubs.er.usgs.gov/publication/ofr20071150.

Minerals Management Service (MMS [BOEM]). 2007. Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf. Final Environmental Impact Statement. Chapter 4 – Affected Environment. United States Department of the Interior, MMS, Washington, DC.

Narragansett Bay Commission (NBC). Snapshot of Upper Narragansett Bay. Water Clarity: Turbidity, PAR, Secchi Disk, TSS. 2019 Data. http://snapshot.narrabay.com/WaterQualityInitiatives/WaterClarity

Narragansett Bay Estuary Program (NBEP). 2017. State of Narragansett Bay and Its Watershed (Appendix, pages 474-495). Technical Report. Providence, RI.

National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries). 2019a. Vessel Trip Report (VTR) data processed by Northeast Fisheries Science Center Social Sciences Branch, provided to INSPIRE Environmental, June 2019.

National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries). 2019b. *Recreational Fisheries Statistics Queries.* Office of Science and Technology, Marine Recreational Information Program. Accessed on May 24, 2019. https://www.st.nmfs.noaa.gov/SASStoredProcess/do?

Needell, S.W., O'Hara, C.J., and Knebel, H.J. 1983. Maps showing geology and shallow structure of western Rhode Island Sound, Rhode Island: U.S. Geological Survey Miscellaneous Field Studies Map MF-1537, 11 p.

Oakley, Bryan A., and Jon C. Boothroyd. 2012, Reconstructed Topography of Southern New England Prior to Isostatic Rebound with Implications of Total Isostatic Depression and Relative Sea Level. Quaternary Research 78(01):110–118. DOI:10.1016/j.yqres.2012.03.002.

O'Hara, C.J. and R.N. Oldale. 1980. Maps showing geology and shallow structure of eastern Rhode Island Sound and Vineyard Sound, Massachusetts: U.S. Geological Survey Miscellaneous Field Studies Map MF-1186, 41 p.

Petersen, Mark D., Frankel, Arthur D., Harmsen, Stephen C., Mueller, Charles S., Haller, Kathleen M., Wheeler, Russell L., Wesson, Robert L., Zeng, Yuehua, Boyd, Oliver S., Perkins, David M., Luco, Nicolas, Field, Edward H., Wills, Chris J., and Rukstales, Kenneth S. 2008.

Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2008–1128, 61 p.

Poppe, L.J., K.Y. McMullen, W.W. Danforth, M.A. Blankenship, A.R. Clos, K.A. Glomb, P.G. Lewit, M.A. Nadeau, D.A. Wood, and C.E. Parker. 2014b. Combined multibeam and bathymetry data from Rhode Island Sound and Block Island Sound – A regional perspective: U.S. Geological Survey Open-File Report 2014–1012, 9 p.

Quonset Development Corporation. May 2011. Quonset Business Park Development Package.
http://www.quonset.com/_resources/common/userfiles/file/FINAL_Dev_Package2011.pdf

Quonset Development Corporation. September 17, 2019. Quonset Business Park: Master Land Use Development Plan.
http://www.quonset.com/_resources/common/userfiles/file/Master%20Plan/QDC%20MP%20Website.pdf. Accessed September 20, 2019.

Rector, D. 1981. Soil Survey of Rhode Island. United States Department of Agriculture, Soil Conservation Service. 214 pp.

Rhode Island Executive Climate Change Coordinating Council (RIEC4). 2016. Rhode Island Greenhouse Gas Emissions Reduction Plan. Retrieved from http://climatechange.ri.gov/state-actions/reducing-emissions.php.

Rhode Island Statewide Climate Resilience Action Strategy, 2017
http://climatechange.ri.gov/documents/resilientrhody18.pdf

Rhode Island Coastal Resources Management Council (RI CRMC). 2010. Rhode Island Ocean Special Area Management Plan. Adopted by the RI CRMC on October 19, 2010.
http://seagrant.gso.uri.edu/oceansamp/documents.html

Rhode Island Department of Environmental Management (RIDEM). 2010. Water Quality Regulations, July 2006, Amended December 2010.

Rhode Island Department of Environmental Management (RIDEM), The Nature Conservancy, and the University of Rhode Island. 2015. Rhode Island Wildlife Action Management Plan. Available at: http://www.dem.ri.gov/programs/fishwildlife/wildlifehuntered/swap15.php. Accessed September 28, 2019.

Runkle, J., K. Kunkel, D. Easterling, B. Stewart, S. Champion, L. Stevens, R. Frankson, and W. Sweet, 2017: Rhode Island State Climate Summary. *NOAA Technical Report NESDIS 149-RI,* 4 pp.

Selden, R.L., R.D. Batt, V.S. Saba, and M.L. Pinsky. 2018. Diversity in thermal affinity among key piscivores buffers impacts of ocean warming on predator-prey interactions. Global Change Biology, 24(1), 117-131.

Staker, R.D. and S.F. Bruno. 1977. Phytoplankton of Coastal Waters off Eastern Long Island (Block Island Sound), Montauk, and New York. New York Ocean Science Laboratory.

South Atlantic Fishery Management Council (SAFMC). 2003. Fishery Management Plan for the Dolphin and Wahoo Fishery of the Atlantic Including a Final Environmental Impact

Statement, Regulatory Impact Review, Initial Regulatory Flexibility Analysis, and Social Impact Assessment/Fishery Impact Statement.

Tech Environmental (Tech). 2020. Air Emissions Calculations and Methodology, Revolution Wind Farm. Prepared for Revolution Wind, LLC. 52pp.

Town of North Kingstown. 2019. *The Town of North Kingstown Comprehensive Plan 2019 10-year Re-write*. Prepared by Interface Studio. Available at: https://www.northkingstown.org/DocumentCenter/View/3282/North-Kingstown-Comprehensive-Plan-September-2019-FINAL-REV

United States Army Corps of Engineers (USACE) Waterways Experiment Station. 1987. Corps of Engineers Wetlands Delineation Manual. Prepared by Environmental Laboratory. 143 pp. Available at: https://www.lrh.usace.army.mil/Portals/38/docs/USACE%2087%20Wetland%20Delineation%20Manual.pdf

United States Army Corps of Engineers (USACE). 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0). 176 pp.

United States Department of Agriculture (USDA). 2020. Natural Resources Conservation Service's Web Soil Survey Available at: http://websoilsurvey.sc.egov.usda.gov.

United States Department of Agriculture, Natural Resource Conservation Service. January 1993. Highly Erodible Soil Map Units of Rhode Island. Rhode Island Field office Technical Guide, Section II D.

United States Department of Agriculture, Natura Resources Conservation Service. Prime and Other Important Farmlands. 2012. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ri/soils/?cid=nrcs144p2_016661

United States Environmental Protection Agency (EPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with and Adequate Margin of Safety. 242 pp.

United States Environmental Protection Agency (EPA). 2012. National Coastal Condition Report IV, EPA/842-R-10-003. U.S. EPA, Office of Research and Development/Office of Water. Washington, DC. https://www.epa.gov/sites/production/files/2014-10/documents/0_nccr_4_report_508_bookmarks.pdf

United States Fish and Wildlife Service (USFWS). 2016. Northern Long-eared Bat Final 4(d) Rule – Questions and Answers. Available at: https://www.fws.gov/midwest/endangered/mammals/nleb/FAQsFinal4dRuleNLEB.html. Accessed September 28, 2019.

Van Waerebeek K, Baker AN, Félix F, Gedamke J, Iñiguez M, Sanino GP, Secchi E, Sutaria D, van Helden A, Wang Y. 2007. Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Latin American Journal of Aquatic Mammals 6(1):43-69.

Walsh, H.J., D.E. Richardson, K.E. Marancik, and J.A. Hare 2015. Long-Term Changes in the Distributions of Larval and Adult Fish in the Northeast U.S. Shelf Ecosystem. PLoS One 10(9): e0137382.