New England Wind 2 Connector

Analysis to Support Petition Before the Energy Facilities Siting Board

Docket #EFSB 22-06

Volume I: Text and Figures

November 1, 2022

Submitted by
Commonwealth Wind, LLC
125 High Street, 6th Floor
Boston, MA 02110

Submitted to
Energy Facilities Siting Board
One South Station
Boston, MA 02114

Prepared by
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In Association with
Foley Hoag LLP
Stantec, Inc.
Geo SubSea LLC
Public Archaeology Laboratory

November 1, 2022

Mr. Andrew Greene, Director
Energy Facilities Siting Board
One South Station
Boston, MA 02110

Subject: **New England Wind 2 Connector**
Section 69J Petition and related submittals

Dear Mr. Greene:

Commonwealth Wind, LLC, a wholly owned subsidiary of Avangrid Renewables, LLC, (the "Company") is pleased to submit this Section 69J Petition (Petition) for the New England Wind 2 Connector (the "Project"). The Project comprises the Massachusetts-jurisdictional components of the Commonwealth Wind project, an offshore wind project located within Lease Area OCS-A 0534 in federal waters under the jurisdiction of the Bureau of Ocean Energy Management (BOEM).

In May 2021, the Massachusetts Electric Distribution Companies (EDCs), in coordination with the Massachusetts Department of Energy Resources (DOER), issued a third offshore wind solicitation as part of a procurement schedule developed by the EDCs and DOER. The Company submitted and was subsequently awarded a bid for Commonwealth Wind, a more than 1,200 megawatt (MW) offshore wind project within Lease Area OCS-A 0534. Commonwealth Wind/New England Wind 2 Connector is the largest renewable energy project ever proposed in New England.

Avangrid Renewables is a 50 percent partner in the nation's first commercial-scale offshore wind project, Vineyard Wind 1 (800 MW), and a 100 percent owner of Park City Wind (800 MW). Vineyard Wind 1 is currently under construction and Park City Wind is proceeding through permitting. Through its development of Vineyard Wind 1/Vineyard Wind Connector 1 (EEA #15787) and Park City Wind/New England Wind 1 Connector (EEA #16231), the Company has established meaningful and enduring relationships with federal, tribal, state, regional, and local officials, as well as other stakeholders. The Project will generally utilize the same offshore export cable corridor (OECC) as Vineyard Wind Connector 1 and New England Wind 1 Connector. While unique permits are required for the New England Wind 2 Connector, the Company has significant experience working with the relevant permitting authorities and local officials.

The Project will serve the public interest by delivering more than 1,200 MW of zero-carbon power to Massachusetts, contributing to the achievement of the Commonwealth of Massachusetts's ambitious greenhouse gas reduction goals. Commonwealth Wind/New England Wind 2 Connector will also advance job creation and the development of an offshore wind workforce and supply chain in the Commonwealth and the entire New England region. Further, the Project will deliver affordable energy during the winter months, helping offset the need for oil or imported natural gas during times of peak demand while generating significant air quality benefits for the region and the planet. The Project will additionally enhance energy security by increasing the reliability and diversity of the energy supply.

As described in greater detail in the Petition, the New England Wind 2 Connector would provide a reliable energy supply, with a minimum impact on the environment, at the lowest possible cost.

Thank you for your consideration of the Project. We are committed to working with federal, tribal, state, local, and regional officials, as well as other stakeholders, to maximize this unique, timely and important opportunity to establish southern New England as the center for the offshore wind industry in the United States, and to make large reductions in carbon emissions.

Sincerely,

Kenneth L. Kimmell
Vice President of Development for Offshore Wind

Enclosures

125 High Street, 6th Floor, Boston, MA 02110

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Volume II – Attachments

List of Acronyms

AC	alternating current
ACEC	Areas of Critical Environmental Concern
AIS	Air Insulated Substation
AUL	Activity and Use Limitation
BACT	Best Available Control Technology
BLSF	Bordering Land Subject to Flooding
BMPs	Best Management Practices
BOEM	Bureau of Ocean Energy Management
BVW	Bordering Vegetated Wetland
BWSC	Bureau of Waste Site Cleanup
CAA	Clean Air Act
CBA	Community Benefit Agreement
CBOs	Community-Based Organizations
CCC	Cape Cod Commission
CFR	Code of Federal Regulations
CFRF	Commercial Fisheries Research Foundation
CGP	Construction General Permit
cm	centimeter
CMP	Construction Management Plan
CMR	Code of Massachusetts Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	Corresponding Onshore Area
COP	Construction and Operations Plan
CPT	Cone Penetration Tests
CRC	University of Rhode Island Coastal Resources Center
CRM	cultural resource management
CWA	Clean Water Act
CWMP	Comprehensive Wastewater Management Plan
CZM	Massachusetts Office of Coastal Zone Management
CZMA	Coastal Zone Management Act
DCR	Massachusetts Department of Conservation and Recreation
DEI	Diversity Equity and Inclusion
DH	deep downhole
DMF	Division of Marine Fisheries
DOER	Massachusetts Department of Energy Resources
DP	Dynamic Positioning
DPU	Massachusetts Department of Public Utilities
DRI	Development of Regional Impact
DPW	Department of Public Works

List of Acronyms (Continued)

EA	Environmental Assessment
EDCs	Massachusetts Electric Distribution Companies
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EFSB	Energy Facilities Siting Board
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMF	electric and magnetic field
ENF	Environmental Notification Form
EPA	U.S. Environmental Protection Agency
EPC	Engineering, Procurement and Construction
ESA	Endangered Species Act
ESPs	electrical service platforms
FAA	Federal Aviation Administration
FAB	Rhode Island Fishermen's Advisory Board
FAST	Fixing America's Surface Transportation Act
FCP	Fisheries Communications Plan
FDR	Facilities Design Report
FHWA	Federal Highway Administration
FIR	Fabrication & Installation Report
FONSI	Finding of No Significant Impact
ft^2	square feet
FTA	Federal Transit Administration
FTB	fluidized thermal backfill
FTE	full time equivalent
GIS	Gas Insulated Substation
GWSA	Commonwealth of Massachusetts 2008 Global Warming Solutions Act
HAB	Habitat Advisory Board
HCA	Host Community Agreement
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HPFF	High-Pressure Fluid-Filled
HSE	Health, Safety, and Environmental
HVAC	high voltage alternating current
HVDC	high voltage direct current
IHA	Incidental Harassment Authorization
in	inch
ISO-NE	ISO-New England
IVW	Isolated Vegetated Wetlands
IWPA	Interim Wellhead Protection Area

List of Acronyms (Continued)

km	kilometers
kV	kilovolt
kW	kilowatt
LAER	Lowest Achievable Emission Rate
LID	Low Impact Development
LIPA	Long Island Power Authority
LOA	Letter of Authorization
LSCSF	Land Subject to Coastal Storm Flowage
LSF	Lands Subject to Flooding
LSP	Licensed Site Professional
m	meters
MA WEA	Massachusetts Wind Energy Area
MACRIS	Massachusetts Cultural Resource Information System
MARPOL	International Convention for the Prevention of Pollution from Ships
MassCEC	Massachusetts Clean Energy Center
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MassGIS	Massachusetts Geographical Information System
MBTA	Migratory Bird Treaty Act
MBUAR	Massachusetts Board of Underwater Archaeological Resources
MC-FRM	Massachusetts Coast Flood Risk Model
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MHC	Massachusetts Historical Commission
MHHW	Mean Higher High Water
MHW	Mean High Water
MLPs	Municipal Light Plants
MLW	Mean Low Water
mm	millimeter
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MTBM	micro tunnel boring machine
MVC	Martha's Vineyard Commission
MW	megawatts
NE Wind 2 Connector	New England Wind 2 Connector
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NHESP	MassWildlife's Natural Heritage & Endangered Species Program
NHPA	National Historic Preservation Act
NJ	New Jersey

List of Acronyms (Continued)

NMFS	National Marine Fisheries Service
nmi	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPCC	Northeast Power Coordinating Council
NPDES	National Pollutant Discharge Elimination System
NR	National Register
NREL	National Renewable Energy Laboratory
NY	New York
NYSERDA	New York State Energy Research and Development Authority
O&M	operations and maintenance
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OECC	Offshore Export Cable Corridor
OFL	Onboard Fisheries Liaison
OMP	Ocean Management Plan
ORW	Outstanding Resource Waters
OSHA	Occupational Safety and Health Administration
OSRP	Oil Spill Response Plan
OVA	Osterville Village Association
PAL	the Public Archaeology Laboratory
PAM	Passive Acoustic Monitoring
PATON	Private Aids to Navigation
PBD	Public Benefit Determination
PCBs	polychlorinated biphenyls
PJM	Pennsylvania-Jersey-Maryland
PM	Particulate Matter
PMP	Probable Maximum Precipitation
PNF	Project Notification Form
POI	Potential Interconnection Points
PPA	Power Purchase Agreement
ppm	parts per million
PPPP	Piping Plover Protection Plan
PSO	Protected Species Observer
PVC	polyvinyl chloride
QP	queue position
RFA	Riverfront Area
RFI	Request for Interest
RFP	Request for Proposal

List of Acronyms (Continued)

RI	Rhode Island
RMAT	Resilient Massachusetts Action Team
ROD	Record of Decision
ROSA	Responsible Offshore Science Alliance
ROV	Remotely Operated Vehicle
ROW	Right-of-Way
RSD	rippled scour depressions
SAP	Site Assessment Plan
SAV	Submerged Aquatic Vegetation
SEMA	Southeast Massachusetts Area
SMAST	School for Marine Science and Technology
SO_2	sulfur dioxide
SO_x	sulfur oxides
SPCC Plan	Spill Prevention, Control and Countermeasures Plan
SR	State Register
SSU	special, sensitive, and unique
STATCOM	Static Synchronous Compensator
SWDA	Southern Wind Development Area
SWPPP	Stormwater Pollution Prevention Plan
TBF	To be filed
THPO	Tribal Historic Preservation Officers
TMDL	Total Maximum Daily Load
TMP	Traffic Management Plan
TOY	Time of Year
tpy	tons per year
TSHD	Trailing Suction Hopper Dredge
TSS	Total Suspended Solids
ULSD	Ultra-Low Sulfur Diesel
UMass	University of Massachusetts
URAM	Utility-Related Abatement Measure
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFW	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds
WHOI	Woods Hole Oceanographic Institute
WPA	Wetland Protection Act
WTG	wind turbine generator
XLPE	cross-linked polyethylene

Section 1.0

Project Overview and Description

1.0 PROJECT OVERVIEW AND DESCRIPTION

The Commonwealth Wind Project is an offshore wind energy generation facility in federal waters within the southern portion of Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0534 (Lease Area) (see Figure 1-1) in the federally designated Massachusetts Wind Energy Area (MA WEA) (see Figure 1-2). The Commonwealth Wind Project will deliver more than 1,200 megawatts (MW) of carbon-free energy to the ISO-New England (ISO-NE) electrical grid. The Commonwealth Wind Project is proposed in response to a solicitation in 2021 for a commercial-scale offshore wind project by the Massachusetts Electric Distribution Companies (EDCs) in coordination with the Massachusetts Department of Energy Resources (DOER). In December 2021, the Commonwealth Wind Project was selected as one of two winning bids. Commonwealth Wind, LLC, a wholly owned subsidiary of Avangrid Renewables, LLC, (collectively referred to herein as "the Company") is the Project proponent of New England Wind 2 Connector (NE Wind 2 Connector or "the Project"), which is the Massachusetts-jurisdictional elements of the Commonwealth Wind Project and is necessary to deliver the offshore wind power generated by the Commonwealth Wind Project to the ISO-NE electrical grid. The offshore wind energy generation facility itself will be located in the southern portion of Lease Area OCS-A 0534; the north/northeastern portion of Lease Area OCS-A 0534 is being developed and will include the Park City Wind project (see Figure 1-1).

Major elements of the Commonwealth Wind Project will include wind turbine generators (WTGs) and foundations, offshore electrical service platforms (ESPs) and foundations, inter-array cables[1], offshore export cables, onshore export cables, and an onshore substation that will step up transmission voltage to 345 kilovolts (kV) for interconnection with the regional power grid at the existing 345-kV West Barnstable Substation.[2]

At its nearest point, the portion of Lease Area OCS-A 0534 that will be utilized for the Commonwealth Wind Project is just over 20 miles (32 kilometers [km]) from the southwest corner of Martha's Vineyard, approximately 24 miles (38 km) from Nantucket, and approximately 37 miles (60 km) south of the Cape Cod mainland.

Massachusetts reviews, including those by the Energy Facilities Siting Board (EFSB) and other state, regional, and local entities, will focus on the elements of the Project proposed within state boundaries (i.e., the New England Wind 2 Connector). These include portions of the offshore export cables in state waters, all of the onshore export cables, the proposed new onshore substation, the 345-kV grid interconnection from the new onshore substation to the grid interconnection point at the existing Eversource 345-kV West Barnstable Substation, and some modifications to the 345-kV West Barnstable Substation to accommodate the interconnection from NE Wind 2 Connector. The offshore export cables

[1] Inter-array cables connect several WTGs to a single ESP.

[2] The Project's grid interconnection is proposed at the 345-kV West Barnstable Substation constructed as part of the NSTAR Lower SEMA project, as distinguished from the 115-kV Oak Street Substation located on the northern side of the same Eversource-owned parcel.

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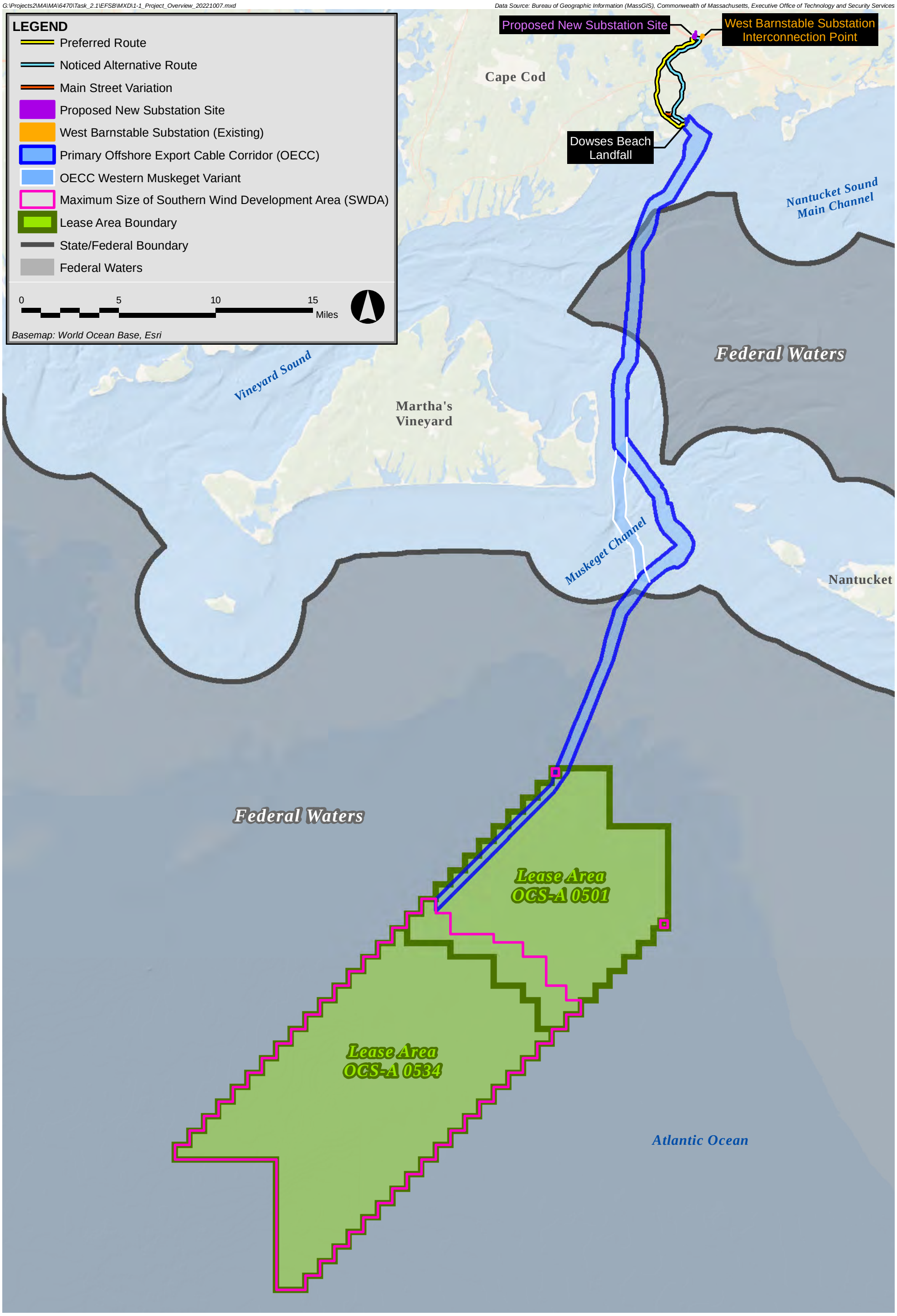
Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



New England Wind 2 Connector Project

Figure 1-1
Project Overview

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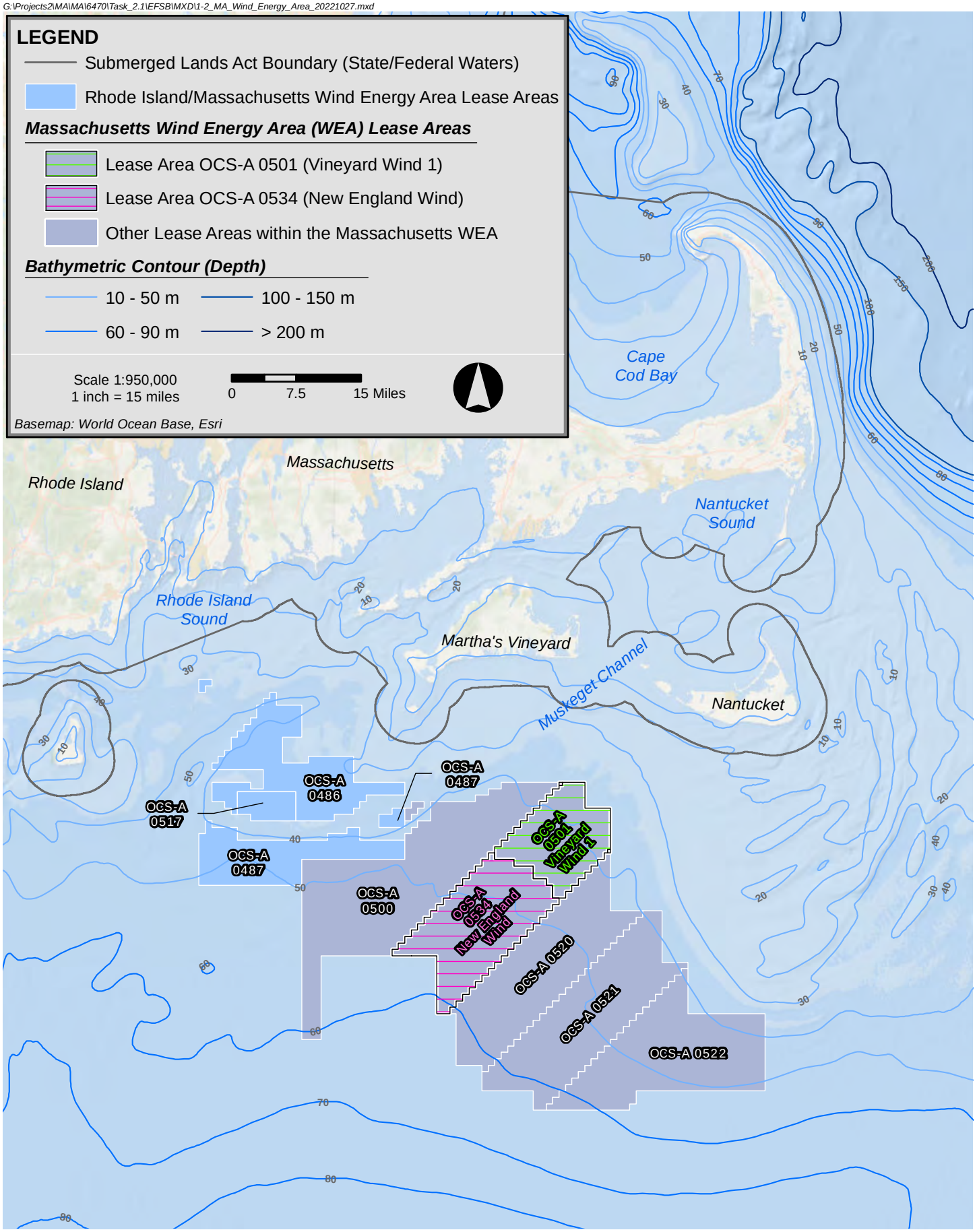

New England Wind 2 Connector Project

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Figure 1-2
Massachusetts Wind Energy Area

will be installed within an Offshore Export Cable Corridor (OECC) that travels from the northwestern corner of the Lease Area to the landfall site at Dowses Beach in Barnstable. The OECC is the same one proposed for NE Wind 1 Connector, with two primary differences: (1) the OECC for the NE Wind 2 Connector diverges to the west in Barnstable waters to provide access to the Dowses Beach Landfall Site; and (2) while the OECC proposed for the NE Wind 1 Connector in the vicinity of Muskeget Channel is the preferred route for the NE Wind 2 Connector, the Company has identified a Western Muskeget option that could be used to install one or two of the three offshore export cables associated with NE Wind 2 Connector if warranted by further engineering analysis.[3] The OECC will pass through state waters in the offshore areas of Edgartown, Nantucket, Barnstable, and Mashpee before making landfall in Barnstable. The maximum length of the OECC in state and federal waters is up to 47.2 miles[4]. Of this, the maximum total length of the OECC within state waters is approximately 21.9 miles. Onshore Project elements will be located entirely within the Town of Barnstable. A Project locus is provided as Figure 1-1. All proposed elements of the Commonwealth Wind Project will be subject to review under federal processes coordinated by BOEM.

1.1 Introduction/Siting Board Jurisdiction

This document supports the Company's petition to construct a transmission line and related equipment that connects a proposed offshore wind energy generation facility located in federal waters to the ISO-NE electrical grid in Barnstable, Massachusetts. The NE Wind 2 Connector will enable the delivery of more than 1,200 MW of carbon-free energy to the regional electric grid.

Pursuant to G.L. c. 164, §§ 69G and 69J, the EFSB has jurisdiction over the construction of *"a new electric transmission line having a design rating of 69 kilovolts or more and which is one mile or more in length on a new transmission corridor"* and "*an ancillary structure which is an integral part of the operation of any transmission line that is a facility"* (980 CMR 1.01). As such, the Company submits the analysis in this Petition (the "Analysis") to the EFSB in support of its Petition for authority to construct, operate, and maintain 275-kV transmission cables from the Commonwealth Wind offshore wind energy generation facility proposed in federal waters to a new onshore substation proposed west of Oak Street and north of Massachusetts Department of Transportation (MassDOT) State Highway Route 6 as well as 345-kV transmission cables from the new onshore substation to an interconnection point located at the West Barnstable Substation in the Town of Barnstable, Massachusetts. The EFSB has jurisdiction over the proposed onshore

[3] The Western Muskeget option was originally proposed as part of the OECC for the Vineyard Wind Connector 1 (approved by the Siting Board in *Vineyard Wind*, EFSB 17-05), before the Eastern Muskeget option was ultimately selected. The Western Muskeget option for the NE Wind 2 Connector is the same corridor originally proposed in EFSB 17-05.

[4] An additional length of offshore export cable within the portion of Lease Area OCS-A 0534 that will be utilized for the Commonwealth Wind Project (up to approximately 21 - 26 miles [approximately 34 - 42 km] per cable) will be needed to reach the electrical service platform(s).

transmission, the proposed onshore substation, and the proposed offshore transmission within state waters. As indicated in *Alliance to Protect Nantucket Sound v. Energy Facilities Siting Board*, 457 Mass. 663, 686 (2010), the EFSB may also consider in-state impacts, if any, of the proposed offshore transmission in federal waters.[5]

The purpose of the New England Wind 2 Connector is to connect the Commonwealth Wind Project offshore wind energy generation facility to the ISO-NE electrical grid. The Project will serve the public interest by generating more than 1,200 MW of carbon-free energy, increasing the reliability and diversity of the regional and statewide energy supply by helping to wean the Commonwealth off its dependence on a single fuel (natural gas), and creating jobs, local supply chains, and broader economic development.

Routing for the proposed offshore and onshore export cables between the Commonwealth Wind offshore wind energy generation facility in federal waters and the existing Eversource 345-kV West Barnstable Substation is shown on a United States Geological Survey (USGS) quadrangle base map on Figure 1-1. Figure 1-3 shows the proposed onshore export cable routing from the Dowses Beach Landfall Site in Barnstable to the proposed onshore substation site (i.e., transmission routes) and from the proposed onshore substation site to the existing West Barnstable Substation interconnection point (i.e., grid interconnection routes). The Preferred Route and Noticed Alternative for the onshore export cables are both located entirely within the Town of Barnstable. The Project's proposed onshore substation is located on privately owned, undeveloped wooded parcels west of Oak Street near the Oak Street Bridge overpass of Route 6, approximately 0.25 miles west of the interconnection location at the West Barnstable Substation.

The OECC will pass through state waters in the offshore areas of Edgartown, Nantucket, Barnstable, and Mashpee before making landfall in Barnstable (see Figure 1-4). All sections of the cable route within state waters lie within the Massachusetts Ocean Management Plan (OMP) planning area. The OECC has a typical width of approximately 3,500 feet (1,060 meters [m]), but ranges from approximately 3,100 to 5,500 feet (950 to 1,700 m). The maximum length of the OECC in state waters is approximately 21.9 miles (35 km), and its total length in both federal and state waters is up to approximately 47.2 miles (76 km).

[5] After crossing into state waters between Martha's Vineyard and Nantucket and continuing north, the proposed OECC will pass through the pocket of federal waters located within Nantucket Sound before re-entering state waters and making landfall. To avoid any confusing fragmentation of the discussion of offshore export cables, but without intending to expand the jurisdiction of the Siting Board, the pocket of federal waters within Nantucket Sound is included in the Petition's description of offshore export cable routing. As discussed in Section 5.2, prior experience with offshore cable installation, together with specific plans for installation of offshore export cables for this Project, indicates that impacts will be limited to installation and contained within the immediate area of a given portion of cable, meaning that work in adjoining federal waters is not likely to have any in-state impacts.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

LEGEND

- Preferred Route
- Noticed Alternative Route
- Main Street Variation
- Grid Interconnect Route Option G1
- Grid Interconnect Route Option G2
- Grid Interconnect Route Option G3
- Proposed New Substation Site
- West Barnstable Substation (Existing)

Scale 1:21,600
1 inch = 1,800 feet

0 900 1,800 Feet

Basemap: Nearmap Aerial, April 2022

ROW 342
6
ROUTE 6 TRENCHLESS CROSSING
SERVICE ROAD
ROW 381
ROW 345
OAK STREET
OLD STAGE ROAD
OLD FALMOUTH ROAD
OSTERVILLE WEST BARNSTABLE ROAD
LUMBERT MILL ROAD
28
FALMOUTH ROAD
FIVE CORNERS ROAD
OLD MILL ROAD
MAIN STREET
WIANNO AVENUE
EAST BAY ROAD
DOWSES BEACH LANDFALL
Centerville Harbor
Nantucket Sound

New England Wind 2 Connector Project

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Figure 1-3
Onshore Project Components

G:\Projects2\MA\MA\6470\Task_2.1\EFSB\MXD\1-4_OECC_20221007.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

LEGEND

- Offshore Export Cable Corridor (OECC)
- OECC Western Muskeget Variant
- New England Wind 2 Connector OECC Dowses Spur
- New England Wind 1 Connector OECC Craigville Spur
- Maximum Size of Southern Wind Development Area (SWDA)
- Lease Area Boundary
- State/Federal Boundary

Scale 1:190,080
1 inch = 3 miles

0 1.5 3 Miles

Basemap: Nautical Chart 13200, NOAA (Soundings in Fathoms)

Dowses Beach Landfall

Hyannis

R TR (WOCB) 1240 kHz

Pt Gammon

(use chart 13237)

Woods Hole

(use chart 13237)

Nobska Pt

N A N T U C K

S O U N D

W Chop

E Chop

Vineyard Haven

Oak Bluffs

Federal Waters

(use chart 13237)

Fl 6s 65ft 9M

Cape Poge

AERO Rot W & G

Edgartown

M A R T H A ' S V I N E Y A R D

Katama

Wasque Pt

Nantucket

Muskeget I

Wasque Shoal

Muskeget Channel

(use chart 13237)

Tuckernuck I

Fl Y 4s HORN

AERO R Bn 194

RW "MC" Mo (A) WHIS

Federal Waters

Obstn

PA (rep 1995)

Lease Area OCS-A 0501

Lease Area OCS-A 0534

New England Wind 2 Connector Project

Figure 1-4
Offshore Export Cable Corridor (OECC)

As more fully described in Section 4.1, this OECC was identified through a process that included consultations with the Massachusetts Ocean Team and consideration of a number of factors, such as the resources and guidance provided by the Massachusetts OMP, bathymetric data, and geophysical surveys conducted from 2017 through 2020. The OECC for the NE Wind 2 Connector is almost entirely (approximately 96%) the same OECC that was proposed for the NE Wind 1 Connector (which was also largely the same as the OECC proposed for the Vineyard Wind Connector 1). The only portion of the OECC proposed for the NE Wind 2 Connector that has not been previously reviewed as part of the Vineyard Wind Connector 1 and/or NE Wind 1 Connector projects is the approximately 488-acre area (approximately 4% of the area of the OECC within state waters) in Centerville Harbor that provides access to the Dowses Beach Landfall Site (see Figure 1-4). Consistent with the approach taken in the federal permitting process, in which the Company has requested BOEM approval of the OECC, shown in Figure 1-4 as part of a "project envelope" allowing for optimization of cost, environmental protection, and reliability within a preapproved "envelope," the Company requests that the EFSB approve the Primary OECC and Western Muskeget Variant for installation of the three proposed offshore export cables.[6]

The balance of Section 1 presents an overview of the NE Wind 2 Connector. For general background, Section 1 also includes a description of the offshore development activities for Commonwealth Wind in federal waters. The remaining sections of this Analysis provide detailed information to support the Project, specifically: Project Need (Section 2); Project Alternatives (Section 3); Route Selection (Section 4); a comparison of the Preferred and Noticed Alternative onshore routes (Section 5); and an analysis of Consistency with the Policies of the Commonwealth (Section 6).

1.2 Offshore Wind, Background

The primary driver for offshore wind projects in the region is their ability to deliver carbon-free renewable energy that will provide economical bulk power, while reducing carbon dioxide (CO_2) emissions. This is in the context of ambitious state programs to decarbonize electric power production and legislation such as the Commonwealth's 2008 Global Warming Solutions Act (GWSA) and the 2021 law "An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy". The 2021 Act revised GHG reduction goals from those established by the GWSA at 50% from 1990 levels by 2030, 75% from 1990 levels by 2040, and net zero emissions by 2050 (see M.G.L. chapter 21N, sections 3(b) and 4). As one of the major renewable energy sources in New England, offshore wind energy is critical to meeting these targets, and is a cornerstone of the Commonwealth's Clean Energy and Climate Plan for 2025 and 2030 (*see, e.g.*, pages iv, xi, xiv, 4-5, 62-65, 69-70).

[6] Approval of the entire width of the corridor will provide flexibility in the engineering and installation stages to ensure the final cable alignments utilize the most recent data available from the dynamic marine environment and thereby avoid and minimize impacts.

An additional driver for offshore wind projects is the promise of significant economic benefits to local communities, states, and the region as a whole. These benefits can come in the form of new jobs created for the development, construction, and operations/maintenance for these projects, port infrastructure development, advancement of domestic manufacturing and assembly capacity, investment in industry research and development, environmental monitoring, and research. A successful New England drive to promote the offshore wind industry can support a steady flow of projects that will leverage economies of scale in the supply chain while fostering development of a robust industry.

Project benefits are described in greater detail Section 1.6. The remainder of this Section 1.2 highlights some of the benefits the Project provides to demonstrate how the bundle of benefits associated with offshore wind development will reach local, state, regional, national, and global communities.

The NE Wind 2 Connector will enable the Commonwealth Wind Project to provide greenhouse gas reductions with global effect and particular benefits to states across the region that have adopted greenhouse gas emission reduction goals. It will also provide significant economic development at the regional level, with unique benefits in local communities. And, by reducing reliance on the regionally constrained natural gas supply on cold peak gas demand days, the Project will foster winter grid reliability at multiple scales: on Cape Cod, in Massachusetts, and in the greater ISO-NE electrical grid.

In addition to promoting the growth of a regional industry, the NE Wind 2 Connector and Commonwealth Wind Project will also generate significant and specific local benefits (see Section 1.6). The Company expects to negotiate and ultimately execute a Host Community Agreement (HCA) with the Town of Barnstable to provide funding to the Town to offset potential impacts associated with hosting the Project. The Company also intends to coordinate with the Town on the planned installation of a municipal sewer line along segments of the onshore export cable route.

Local benefits are not limited to Barnstable, but rather will spread to communities across southeastern Massachusetts and southern New England (see Section 1.6). The Company includes an investment of $20 million in education, innovation, and environmental initiatives to benefit local communities. The Company has developed meaningful partnerships, including several with local nonprofits, to provide wide-ranging economic and job opportunities, as well as new opportunities for Environmental Justice (EJ) Population residents to directly benefit from offshore wind.

1.2.1 Background on Offshore Wind Lease Areas

BOEM (within the United States Department of the Interior) has evaluated areas along the Atlantic Coast with respect to potential suitability for offshore wind development. Working in conjunction with the Department of Energy's National Renewable Energy Laboratory (NREL), BOEM has identified a series of suitable tracts on the Outer Continental Shelf from South Carolina north to Massachusetts.

The location of the Massachusetts offshore wind lease areas, including Lease Area OCS-A 0534, was determined through a process that involved significant public input over a period of several years. The process began with the formation of a Massachusetts-BOEM task force, composed of representatives from many federal, state, tribal, and local government agencies, as well as public stakeholder meetings with the community, labor groups, and the fishing industry, starting in 2009. As a result of this initial planning, BOEM identified a preliminary MA WEA of approximately 2,224 square nautical miles.[7]

BOEM then published a Request for Interest (RFI) on December 29, 2010. This RFI requested expressions of commercial interest from potential developers, as well as any information from the public relevant to determining the suitability of BOEM's WEA for wind energy project development. BOEM then provided for a second period of public comment, which ended on April 18, 2011. Responses from 10 companies were received, along with 260 public comments.

After careful consideration of public comments as well as input from BOEM's intergovernmental Massachusetts Renewable Energy Task Force, BOEM extensively modified the WEA in response to stakeholder concerns. For example, BOEM excluded certain areas identified as important habitats that could be adversely affected if ultimately developed for offshore wind. BOEM also excluded an area of high sea duck concentration as well as an area of high fisheries value to reduce potential conflict with commercial and recreational fishing activities. The distance from the BOEM WEA to the nearest shore was also extended to further reduce any possible viewshed impacts. These extensive revisions in response to public comments resulted in the WEA being reduced to approximately 40% percent of its original size.

On February 6, 2012, BOEM published a "Call for Information and Nominations" (the Call) for areas within the revised BOEM WEA, and that same month BOEM also published a Notice of Intent to prepare an Environmental Assessment (EA) for the "Call Area." The EA was made available for public review on November 12, 2012, a revised EA was issued on June 4, 2014, and BOEM issued a "Finding of No Significant Impact" (FONSI), which concluded that reasonably foreseeable environmental effects associated with the commercial wind lease issuance would not significantly

[7] 2,941.2 square miles, or 1,882,393 acres.

impact the environment. The EA and FONSI were limited to the potential issuance of leases; a project subsequently proposed for a specific lease area would be the subject of a more detailed environmental review.

On January 29, 2015, BOEM held a competitive lease sale, conducted as an auction, for the four lease areas within the Massachusetts WEA. While the lease areas were to be awarded to the highest cash bid, prior to the auction BOEM awarded Vineyard Wind[8] a discount to the bid amounts it would have to pay in recognition of the Community Benefits Agreement the Company had entered into with the local, community-based non-profit cooperative Vineyard Power. Vineyard Wind won Lease Area OCS-A 0501 in the auction and another bidder won a lease area immediately adjacent to the west. The other two available lease areas within the Massachusetts WEA, south of Nantucket, were not awarded in the 2015 lease sale, although they were awarded in a 2018 lease sale. In a parallel process working with the state of Rhode Island, BOEM awarded a lease area to a third bidder, located due south of Rhode Island. Figure 1-2 illustrates the various lease areas.

At the time of the 2015 lease area award, Vineyard Wind's Lease Area OCS-A 0501 was more than 166,886 acres (approximately 261 square miles, or 675 square kilometers) and approximately 10 miles (16 km) wide and 30 miles (48 km) long.[9] On June 28, 2021, BOEM segregated Lease Area OCS-A 0501 into two lease areas: Lease Area OCS-A 0501, which is being developed for the Vineyard Wind 1 project, and Lease Area OCS-A 0534, which is being developed for New England Wind (which includes the Park City Wind and Commonwealth Wind Projects) (see Figure 1-2). For the Commonwealth Wind Project, the Company is proposing to develop the southern portion of this Lease Area. At its nearest point, the boundary of New England Wind is just over 20 miles (32 km) from the southwest corner of Martha's Vineyard, approximately 24 miles (38 km) from Nantucket, and approximately 37 miles (60 km) south of the Cape Cod mainland.

The lease area has high wind speeds,[10] favorable seafloor conditions, moderate depths, and reasonable proximity to multiple grid interconnection points in an area of high electrical load with a strong need for new generation capacity.

8 At the time of the auction, Vineyard Wind LLC was called Offshore MW LLC

9 As shown on Figure 1-2, the perimeter of the Lease area is irregular or "sawtoothed" in configuration hence the overall area is less than that of a true 10- by 30-mile rectangle.

10 Initial metocean data collected by AWS Truepower, working in connection with the Massachusetts Clean Energy Center (MassCEC) and Woods Hole Oceanographic Institute (WHOI) has a mean wind speed at 100m of 10.3 meters per second (23 miles per hour) (Oct 2016-June 2017).

1.2.2 Overview of Massachusetts Offshore Wind Legislation and the Procurement of Commonwealth Wind Under Section 83C

Section 83C of Chapter 169 of the Acts of 2008, as amended by Chapter 188 of the Acts of 2016, An Act to Promote Energy Diversity, Chapter 8 of the Acts of 2021, An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, Chapter 24 of the Acts of 2021, An Act Making Appropriations for the Fiscal Year 2022, and Chapter 179 of the Acts of 2022, An Act Driving Clean Energy and Offshore Wind, is intended to ensure a diversified electrical energy portfolio for the Commonwealth, while strengthening the Massachusetts clean energy economy, and help ensure that the greenhouse gas reduction requirements under the Commonwealth's 2008 GWSA, as recently amended by An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, are achieved. As detailed in Governor Baker's climate roadmap, offshore wind is a critical component to meeting the Commonwealth's legally binding greenhouse gas emissions reduction targets. The GWSA emissions reduction targets and the Commonwealth's strategy to achieve them are discussed in Section 6.4.2.

Section 83C seeks to facilitate financing of offshore wind generation resources, enhance regional reliability (including during winter peak demand), mitigate environmental impacts, and promote economic development. Section 83C furthers the development of an offshore wind industry in New England that provides clean energy to the New England electric grid, improves reliability of that system, and offers significant economic and environmental benefits to the region. By design, procurement of an offshore wind generation project through Section 83C and execution of associated Power Purchase Agreements (PPAs) with the EDCs makes it likely that such a project will be developed and will contribute to the regional energy supply. Section 83C requires the solicitation and procurement of 5,600 MW of offshore wind energy generation by June 30, 2027.

On May 7, 2021, in coordination with DOER, the EDCs issued a third request for proposals (RFP or 83C III solicitation) in response to the DOER's direction to solicit 1,600 MW of Offshore Wind Energy Generation.[5] In late 2021, after a bid evaluation process, the EDCs and DOER selected Commonwealth Wind as part of its third offshore wind competitive procurement process to advance to contract negotiations. In April 2022, the Proponent executed PPAs for the output of 1,200 MW of Commonwealth Wind. In May 2022, the EDCs filed these agreements with the Massachusetts Department of Public Utilities (DPU), which DPU docketed as D.P.U. 22-70, 22-71, and 22-72 for the Eversource, National Grid, and Unitil PPAs, respectively. Those DPU dockets are pending. An additional 32 MW will be contracted with Municipal Light Plants (MLPs), and depending upon final turbine selection, it is possible that this Project may have additional capacity to make available to interested buyers.

1.2.3 Massachusetts Ocean Management Plan

Initially released in 2009 and subsequently revised in 2015 and again in 2021, the Massachusetts OMP creates a framework for managing uses and activities within the state's ocean waters including offshore wind projects and associated transmission. As described in greater detail in Section 6.4.5, jurisdiction of the OMP covers the area from the seaward limit of state waters (generally three miles offshore) to a nearshore boundary that lies approximately 0.3 miles seaward from Mean High Water (MHW).

A large part of the planning process for the OMP was devoted to mapping and evaluating natural resources and existing water-dependent uses (e.g., navigation and fishing). This resulted in a series of maps identifying special, sensitive, and unique (SSU) resources and existing water-dependent uses that are relevant for particular types of projects. The OMP and relevant OMP Regulations, found at 301 CMR 28.00, include management standards for SSU Resources. Specific to cable projects, the OMP identifies the following SSUs: (1) core habitat of the North Atlantic right whale, fin, and humpback whales; (2) hard/complex seafloor; (3) eelgrass; and (4) intertidal flats. As described in Section 4.1.2, in 2017, 2018, 2019, and 2020 the Company or its affiliates and predecessors performed marine surveys to identify and refine feasible routes for the proposed offshore export cables that would avoid and minimize impacts to these resources.

The OMP identifies some preliminary corridors for offshore wind transmission cables that are in presumptive compliance with siting standards of the OMP. The Project team considered these corridors while assessing offshore routing alternatives, but they were unsuitable for the Project given that water depths within the mapped preliminary corridors are frequently too shallow, and the mapped corridors do not accommodate a landfall site in Barnstable (the Company determined such a landfall was needed to minimize onshore and overall routing distances). Section 6.4.5 provides additional detail about Project consistency with the OMP.

1.3 Project Overview

The following sections describe the proposed NE Wind 2 Connector, including, for background, a brief description of components in federal waters and more detailed discussions of the offshore and onshore export cables as well as proposed substation infrastructure. Portions of the Commonwealth Wind Project within state geographic jurisdiction and hence the focus of this Petition, known as the New England Wind 2 Connector, include the entire onshore export cable route, the proposed onshore substation and grid interconnection, and the portion of the OECC (offshore export cable route) in state waters (see Figure 1-1).

After crossing into state waters between Martha's Vineyard and Nantucket and continuing north, the proposed offshore export cables extending from the WEA will pass through the area of federal waters located within Nantucket Sound before re-entering state waters and making landfall. To avoid any confusing fragmentation of the discussion of offshore transmission, the pocket of federal waters within Nantucket Sound is included in the description of offshore export cable routing.

1.3.1 Offshore Wind Array (Federal Waters, for background)

The federal permitting process for the Commonwealth Wind Project commenced in July 2020 with the filing of the phased Construction and Operations Plan (COP) for New England Wind with BOEM. New England Wind encompasses Lease Area OCS-A 0534 as well as portions of Lease Area OCS-A 0501. New England Wind includes two phases of development and both Park City Wind and Commonwealth Wind are included within the identified phases. Commonwealth Wind is proposed within the southwestern section of Lease Area OCS-A 0534. The offshore wind energy generation facility for Commonwealth Wind is being developed and permitted at the federal level using a "project envelope" concept. The envelope concept allows an applicant to describe a range of reasonably foreseeable project parameters that allows for a robust environmental review and permitting process while maintaining a reasonable degree of flexibility with respect to selection and purchase of key components (e.g., WTGs, foundations, offshore cables, offshore substations). Further, the envelope approach will allow the Project to optimize cost, environmental protection, and reliability.

Other key elements of the federal development activities for the Commonwealth Wind Project, as bounded by the project envelope, are as follows:

- WTGs, entirely within federal waters: Depending on the final footprint of Park City Wind, the total number of WTG/ESP positions expected to be available for the Commonwealth Wind Project ranges from 64 to 88. The windfarm layout will be oriented in an east-west, north-south grid pattern with one nautical mile (approximately 1.15-mile) spacing between positions.
- Regional Emissions Reductions: The WTGs for this Project will be among the most efficient renewable energy generators commercially available for offshore use at the time of construction. It is expected that the WTGs will be capable of operating with an annual capacity factor of approximately 50%.[11] Assuming a minimum of 1,200-MW, the Project will cause a reduction of 2.35 million tons per year (tpy) of greenhouse gas emissions (as carbon dioxide equivalent [CO_2e]), by displacing fossil-fueled electric generation.[12] The Project will also reduce nitrogen oxides (NOx) emissions by 1,255 tpy and sulfur oxides (SOx) by 666 tpy.

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[11] Capacity factor is standard industry measure. A power plant operating at 100% load for 8,760 hours per year would have a capacity factor of 100%. The same plant operating at 100% load for 4,380 hours per year would have a capacity factor of 50%.

[12] The avoided emissions analysis assumes a total Commonwealth Wind capacity of approximately 1,200 MW with a 50% average capacity factor transmitted using 275-kV HVAC cables. The analysis is based on NPCC New England subregion annual non-baseload output emission rates from the U.S. Environmental Protection Agency's (EPA's) Emissions & Generation Resource Integrated Database eGRID2018(v2) released 3/9/2020. https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid.

- WTG foundations, entirely within federal waters: WTG foundations may be monopiles, jackets (piled), or bottom-frame foundations (piled, or gravity pad).
- ESPs, entirely within federal waters: Up to three ESP(s) will serve as the common interconnection point(s) for the WTGs. The ESP(s) would be supported by a monopile, piled jacket (with 3–12 piles), or suction bucket jacket foundation.
- Offshore export cables: Three 275-kV offshore export cables will deliver power from the Commonwealth Wind Project offshore wind energy generation facility to the landfall site at Dowses Beach in Barnstable.
- Inter-array Cables, entirely within federal waters: 66-kV to 132-kV inter-array cables will be buried beneath the seafloor and connect radial "strings" of WTGs to a shared ESP.

The construction-related or operations-related impacts of the non-jurisdictional portions of the Commonwealth Wind Project on resources within Massachusetts are predominantly those associated with vessel activity as those vessels transit through state waters to the lease area in federal waters. Given the limited spatial extent of impacts from the offshore cable installation, no impacts in state waters are expected from cable installation activities in federal waters.

Navigation and vessel traffic impacts are discussed in Section 5.5.1.4. As described therein, the Company is not proposing any restrictions on navigation, fishing, or the placement of fixed or mobile fishing gear; however, construction and installation activities may temporarily affect navigation and/or fishing activities in the vicinity of construction and installation vessels. These impacts are temporary in nature and largely limited to the Project's construction and installation period. Safety zones will be determined by the U.S. Coast Guard (USCG) and are anticipated to be activity-specific. Regarding cable installation, safety zones will be around the cable installation as it proceeds and will not preclude activity along the entire routes for the duration of construction. The Company, through its fisheries liaison, will coordinate with fishermen while these discussions with the USCG are underway.

Aside from temporary safety zones around Project vessels and the potential for increased vessel traffic during the construction and installation phase, no significant disruption of established navigation patterns or aids to navigation is anticipated.

1.3.2 Offshore Export Cables

The Commonwealth Wind Project offshore wind energy generation facility in federal waters will connect to the landfall site at Dowses Beach via three 275-kV high voltage alternating current (HVAC) offshore export cables. The Project's proposed offshore export cables will be installed within an OECC previously identified through consultations with the Massachusetts Ocean Team and multiple seasons of marine surveys (see Section 4.1.2). The OECC will pass through state waters in the offshore areas of Edgartown, Nantucket, Barnstable, and Mashpee before making landfall in Barnstable (see Figure 1-4). All sections of the cable route within state waters lie within the Massachusetts OMP planning area.

The Project's proposed offshore export cables will be installed within a shared OECC (referred to as the Primary OECC). The Primary OECC will travel from the northwestern corner of the portion of Lease Area OCS-A 0534 that will be utilized for the Commonwealth Wind Project, along the northwestern edge of Lease Area OCS-A 0501, and northward along the eastern side of Muskeget Channel towards the southern shore of Barnstable, Massachusetts. The OECC for the NE Wind 2 Connector is largely the same OECC (approximately 96%) that was proposed for the Vineyard Wind Connector 1 and NE Wind 1 Connector (formerly Vineyard Wind Connector 2). The portion of the OECC associated with the NE Wind 2 Connector Project not previously reviewed as part of Vineyard Wind 1 and/or NE Wind 1 Connector Projects is located in Centerville Harbor where the corridor diverges from the Primary OECC to make landfall at the Dowses Beach Landfall Site. This small segment of the NE Wind 2 Connector OECC totals approximately 488 acres (see orange shading on Figure 1-4). Using a substantially shared OECC provides an efficient, consolidated route from the Lease Areas to point of landfall divergence, and minimizes environmental, operational, and commercial impacts relative to longer alternative routes.

The offshore export cables will be installed within the shared OECC, but with sufficient separation to allow for safe installation and any future repair work, if required. As described in Section 5.5.1, the three sets of cables within the OECC (Vineyard Wind Connector's two offshore export cables, NE Wind 1 Connector's two offshore export cables, and NE Wind 2 Connector's three offshore export cables) will typically be separated by a distance of 164 to 328 feet to provide appropriate flexibility for routing, installation, and maintenance or repairs. This separation distance could be further adjusted, pending ongoing routing evaluation, to account for local conditions, such as deeper waters, micro-siting for sensitive habitat areas, or other environmental or technical reasons.

From the landfall site to the Lease Area in federal waters, the maximum length of the OECC in state waters is approximately 21.9 miles (35 km), and its maximum length in both federal and state waters is up to 47.2 miles (76 km). Due to micro-siting of cables within the OECC to maximize constructability and minimize impacts to sensitive habitats, the maximum length per cable within the Primary OECC is approximately 23 miles (37 km) in state waters and approximately 50.6 miles (81 km) in state and federal waters combined (see Table 4-3 in Section 4.1.3). The OECC ranges in width from 3,100 to 5,500 feet along the portions located in Massachusetts state waters, with a typical width of 3,500 feet.

Three 275-kV HVAC offshore export cables will deliver power from the Commonwealth Wind Project's offshore wind energy generation facility to the landfall site at Dowses Beach in Barnstable. Each offshore export cable will consist of three cores for power transmission and one or more fiber optic cables[13] for communication, temperature measurement, and protection of

[13] Fiber optic cables are typically integrated into the offshore export cable but may be bundled externally to the export cable. In either scenario, the fiber optic and export cables would be installed simultaneously.

the high-voltage system (see Figure 1-5). Each cable will typically include three copper or aluminum conductors, with each conductor encapsulated by solid cross-linked polyethylene (XLPE) insulation. Water-blocking sheathing will be used to prevent water infiltration. Specific cable designs and cable technologies continue to evolve. The three insulated conductors will be twisted with a synthetic filler between the conductors, and the twisted or bundled conductors will then be wrapped in stainless steel wire and polyethylene rod armoring and finally encased in a tough outer sheath. This AC offshore cable system will not contain any fluids, and this type of transmission has been used extensively on European offshore wind projects.

Installation of the offshore and onshore export cables, including the transition from offshore-to-onshore, is described in more detail in Section 5.5. At the landfall site, horizontal directional drilling (HDD) will be used to complete the offshore-to-onshore transition, minimizing Project-related impacts to the beach, intertidal zone, and nearshore areas, as well as ensuring that the cables remain sufficiently buried and permanently out of the human environment at the shoreline. The transition between the offshore-to-onshore export cables will be made in underground concrete transition vaults (three vaults total, one per cable) that will be installed within the paved parking lot of Dowses Beach (see Attachment B1 for a full plan set showing the offshore to onshore operation). Following construction, manhole covers will be the only visible components of the cable system associated with the HDD. Activities at the landfall site where cables will transition from offshore-to-onshore are not expected to be performed during the summer season unless otherwise coordinated with the Town.

1.3.3 Onshore Export Cables

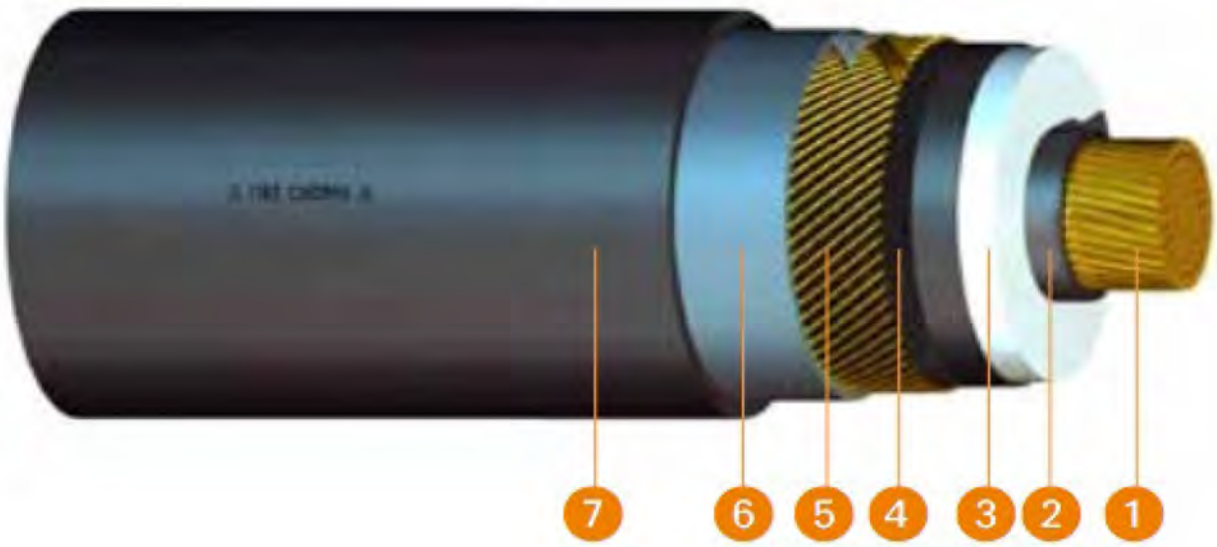
Each three-core offshore export cable will transition to three separate single-core onshore export cables in transition vaults located under the paved parking lot of the Dowses Public Beach Landfall Site. The 275-kV single-core onshore export cables will consist of a copper or aluminum conductor covered by XLPE solid insulation and wrapped in a metallic sheath with non-metallic outer jacket. The primary functions of these last layers are to prevent direct contact between the conductor and the ground and to control and minimize thermal and electrical losses. The cables will not contain any fluids. A manufacturer's cutaway of a model onshore cable is provided as Figure 1-6.

Three cables will make up a single AC circuit. All three circuits will be installed in a single, common underground concrete duct bank along the entire length of the onshore export cable route which will include a separate conduit for each onshore export cable and fiber optic cable. The conduit within the duct bank, which is shown in a typical cross-section on Sheet 26 of Attachment B2, will be constructed of polyvinyl chloride (PVC) or high-density polyethylene (HDPE) and encased in concrete. Spare conduits and grounding will also be accommodated within the duct bank. Final layout and configuration of the conduits within the duct bank will vary somewhat along the onshore export cable route, and the final layout and configuration is subject to final design and survey, including survey of existing utilities. The Company anticipates that the three-circuit duct bank will be arranged three conduits wide by four conduits deep for the majority of the onshore

Design:

1. Conductor (Al or Cu)
2. Inner semi-conducting layer
3. XLPE insulation
4. Outer semi-conducting layer
5. Swellable tape
6. Lead sheath
7. PE oversheath
8. Fibre optic cable
9. Filler profiles
10. Bedding (PP)
11. Armouring
12. Outer sheath (PP)

Figure 1-5
Typical Offshore Export Cable Cutaway



Design:

1. Conductor (Al or Cu)
2. Inner semi-conducting layer
3. XLPE insulation
4. Outer semi-conducting layer
5. Wire screen (Al or Cu)
6. Lead sheath
7. PE oversheath

Figure 1-6
Typical Onshore Export Cable Cutaway

export cable route (see Section 5.5.3 for additional details). The duct bank will have a typical depth of cover of 3.5 feet; however, if required due to existing conditions (e.g., at certain utility crossings), the depth of cover will be 7 feet (see Attachment B2).

Once the duct bank is in place and backfilled, the cables are pulled through the conduit via underground splice vaults and associated manholes, which are placed in groups every 1,500 – 3,000 feet or more along the duct bank. The splice vaults are typically two-piece (top and bottom) pre-formed concrete chambers with openings at both ends to connect with the duct bank conduits and admit the cables. Each splice vault is typically 6 feet wide by 26 feet long and up to 8 feet deep (interior dimensions), subject to further engineering (see Attachment B2).

Installation of the in-road underground duct bank and onshore export cables within public roadway layouts will be performed during the off-season, or as otherwise permitted by the Town and/or MassDOT, to minimize traffic disruption. All work will conform to MassDOT and Town specifications for new road construction. The construction crews involved in trench excavation are expected to progress at an average rate of approximately 80 to 200 feet per day.

Once the proposed duct bank and associated onshore export cables arrive at the proposed new onshore substation site (described in Sections 1.3.4 and 5.5.4), the voltage will step up to 345-kV in preparation for interconnection to the grid at the West Barnstable Substation. From the proposed new onshore substation, the 345-kV grid interconnection cables will be installed underground along a grid interconnection route between the new onshore substation and the existing West Barnstable Substation, where they will interconnect with the ISO-NE electrical grid. The cable technology proposed for the Project is described in greater detail in Section 3.1.3.

A thorough routing analysis was performed to identify a Preferred Route and a Noticed Alternative Route for the onshore export cables, which connect the landfall site to the proposed onshore substation, and this routing analysis is provided in its entirety in Section 4.0. The Company has identified three grid interconnection routes, which connect the proposed new onshore substation to the interconnection location. The three grid interconnection routes are discussed in Section 4.6. A map showing the onshore routing is provided as Figure 1-3. The Preferred and Noticed Alternative routes are described geographically in Section 1.5, and the routes are compared in detail in terms of their potential impacts on the natural and developed environments in Section 5.0.

1.3.4 Onshore Substation

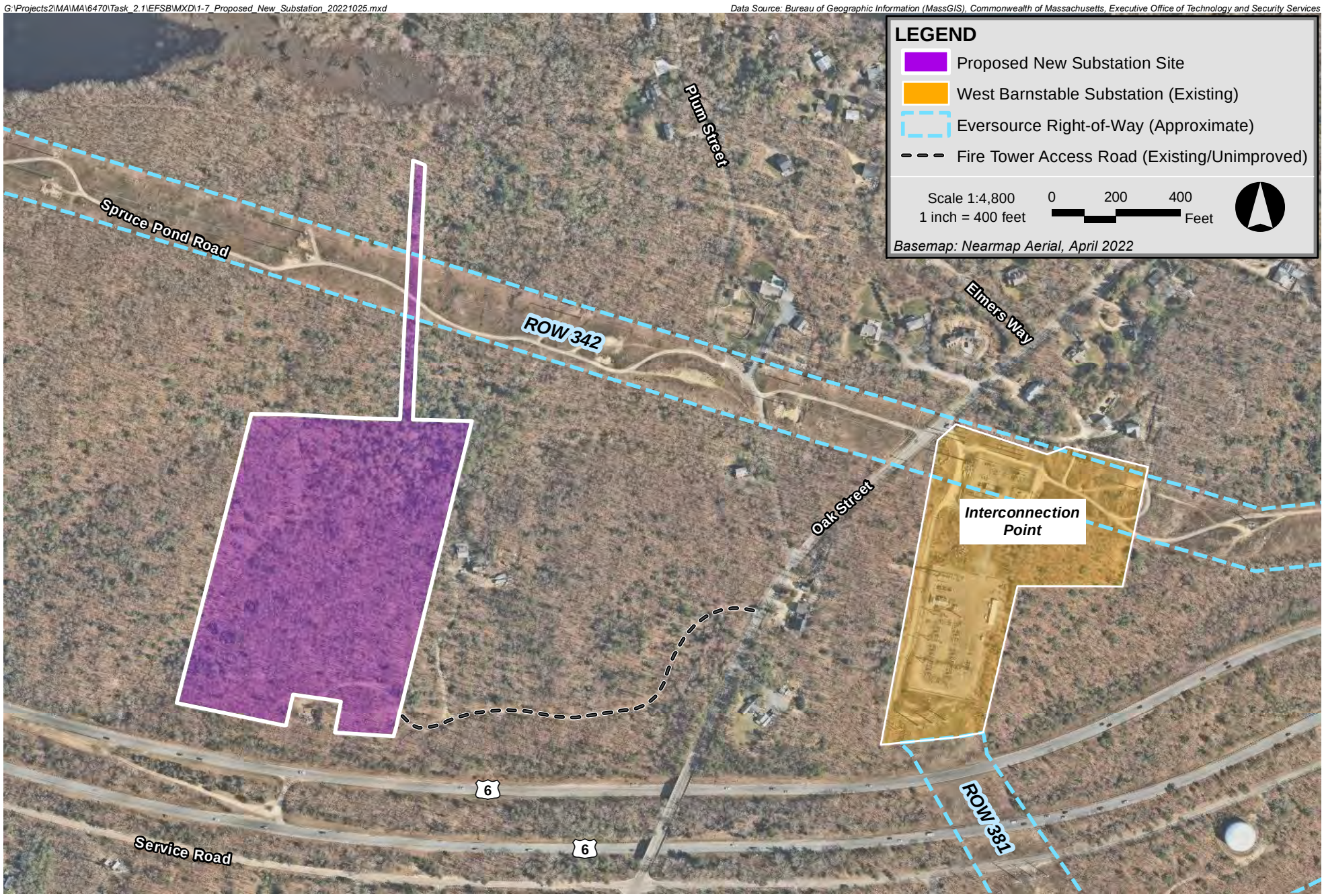
The proposed onshore Project substation is required to step up power from 275 kV to 345 kV before connecting to the existing West Barnstable substation, which is located approximately 0.4 miles from the substation site. The Project substation is proposed on three privately owned parcels totaling approximately 15.2 acres located west of Oak Street in West Barnstable (see Figure 1-7). The site is comprised primarily of undeveloped wooded uplands, and the parcels are located in a residentially zoned area as well as an Aquifer Protection Overlay District. To the west, the proposed substation site is bordered by undeveloped land. To the north, the site, including a 40-foot-wide "panhandle" that extends from the north of the property, is bordered by two protected parcels that are part of the Spruce Pond Conservation Area owned by the Town of Barnstable and managed by the Conservation Commission. The existing Eversource right-of-way (ROW) #342 and Spruce Pond Road are located in the Spruce Pond Conservation Area. To the east, the site is bordered by a residential parcel developed with one single family home. To the south is the Route 6 layout managed by MassDOT.

1.3.4.1 Containment System

The proposed onshore substation site is located within a Potential Public Water Supply Area mapped by the Cape Cod Commission (CCC). None of the substation equipment will contain polychlorinated biphenyls (PCBs). The Company will provide full-volume (110%) containment systems for major substation components using dielectric fluid (i.e., the main transformers, iron core reactors, and equipment containing dielectric fluid associated with the STATCOMS, as applicable). While sumps for transformers are standard practice, they are not normally used for other lower-volume fluid-filled equipment given the low probability of any leakage. However, the Company will commit to this additional containment above and beyond standard practices given the sensitive nature of the Cape Cod watershed. The containment sumps will be designed to fully contain the dielectric fluid in the very unlikely event of a complete, catastrophic failure of the transformer or other equipment.

In addition, as the developers of the Vineyard Wind Connector 1 and NE Wind 1 Connector have committed to doing pursuant to their HCAs with the Town of Barnstable, the Company expects to commit, as part of an HCA agreement, to adding additional containment volume as follows. For substation components identified above (i.e., the main transformers, iron core reactors, and equipment containing dielectric fluid associated with the STATCOMS), in anticipation of an extreme rain event, the Company will increase the 110% containment volume to account for the simultaneous Probable Maximum Precipitation (PMP) event in a 24-hour period, which will be determined for the substation site in consultation with the Town of Barnstable.

Also included in the design as additional mitigation is a common drain system that routes each individual containment area through an oil-absorbing inhibition device to an oil/water separator before draining to the infiltration basin.



New England Wind 2 Connector Project

Figure 1-7

Proposed New Substation Site and Existing West Barnstable Substation – Aerial Locus

In addition, a Spill Prevention, Control and Countermeasures (SPCC) Plan will be included in the Project's Construction Management Plan (CMP). The Company will also include spill response in its emergency response plan as part of the Project's overall safety management system. Appropriate spill containment kits and spill control accessories will be strategically situated at the substation and may include absorbent pads, temporary berms, absorbent socks, drip pans, drain covers/plugs, appropriate neutralizers, over pack containers all for immediate use in the event of any inadvertent spills or leaks. All operators will be trained in the use and deployment of such spill prevention equipment. The Company will also have a third-party licensed spill response contractor on call.

1.3.4.2 Stormwater Management

The substation site has no existing impervious areas. Building the substation will create approximately 1.2 acres of impervious surfaces associated with the proposed buildings and paved surfaces. The proposed stormwater management system incorporates Low Impact Development (LID) strategies, which are designed to capture, treat, and recharge stormwater runoff. These measures provide a treatment train to improve the quality of stormwater runoff, reduce the quantity of stormwater runoff, and provide infiltration and recharge to groundwater. These are considered Best Management Practices (BMPs) by Massachusetts Department of Environmental Protection (MassDEP). A summary of the LID measures to be incorporated is provided below:

- Perforated under-drains will be installed throughout the site, which will collect stormwater that has percolated through the crushed rock surfaces and direct it through a series of water quality measures, then towards the attenuation and infiltration swales and stormwater basin. In addition to the proposed water quality measures, the stormwater that percolates through the crushed rock will receive a degree of filtration, removing some suspended solids.
- Some stormwater will flow overland into a riprap lined swale along the eastern side of the site, which also provides opportunity for settlement and filtration of pollutants.
- A hydrodynamic vortex separator device will be installed upstream of the proposed infiltration basin.
- The subsurface drainage collection system includes a number of structures which include sediment sumps, which will assist in removing a significant amount of the suspended solids.
- There is one attenuation/detention basin proposed: the existing localized depression located in the north-eastern corner of the substation site, outside of the substation facility fenceline/wall, will function as an infiltration basin (see Attachment B4). As noted above, the localized depression, which will collect and infiltrate the remaining runoff from the substation site.

- A berm/dam structure will be installed within the existing localized depression area such that no outflow from the proposed substation will leave the site during storms up to and including the 50-year 24-hr design rainfall event.

The stormwater management design will meet or exceed the Massachusetts Stormwater Policy recommendations, and the Project will comply with MassDEP Stormwater Standards. In addition, the stormwater management system has been designed in consideration of the Resilient Massachusetts Action Team (RMAT) Design Standards and Guidelines. The stormwater management system has been designed to accommodate the 24-hour storm event (2-year, 10-year, 50-year (RMAT), and 100-year) using Extreme Precipitation Estimates from the Northeast Regional Climate Center.

1.3.4.3 Lighting

Outdoor lighting is planned at the proposed substation. Light fixtures are typically holophane type fixtures equipped with light shields to prevent light from encroaching into adjacent areas. Light shields may be rotated within fixtures to the most effective position to keep light overflow from leaving the substation site. The design will be sensitive to night sky lighting considerations. There are typically a few lights illuminated for security reasons on dusk–to-dawn sensors as well as a few on motion-sensing switches, depending on the application needed for the site. The majority of lights will be switched on for emergency situations and maintenance activities but would not be used on a regular basis. The Company will work with the Town of Barnstable to ensure the lighting scheme complies with applicable Town requirements.

1.3.5 West Barnstable Substation Modifications

Some modifications to the 345-kV West Barnstable Substation will be necessary to accommodate the interconnection from NE Wind 2 Connector. All work at the existing Eversource West Barnstable Substation will be performed by Eversource. The area required for modifications and upgrades has been estimated at approximately 1.5 acres. The modifications may include upgrades for added electric grid capacity or for the physical interconnection of the Project. The Company is consulting with Eversource on the specific design and location of these modifications. The final design will need to be formulated in collaboration with Eversource, which is the entity that will perform the work and own and operate the modifications after construction. An aerial view of the 345-kV West Barnstable Substation site is provided in Figure 1-7.

1.4 Existing Infrastructure in Routing Area

1.4.1 Transmission Infrastructure

Existing transmission infrastructure was assessed and considered for the routing analysis presented in Section 4.0.

On the onshore side, 345-kV transmission extends onto Cape Cod before terminating at the West Barnstable Substation, while 115-kV transmission extends past the West Barnstable Substation to Barnstable Switching Station before continuing further onto the Cape. Eversource Energy is the electric provider on Cape Cod, and both of the substations in Barnstable are Eversource-owned. See Figure 1-8.

On the offshore side, existing offshore cables in the overall routing study area include transmission cables associated with the Block Island Wind Farm, trans-Atlantic communication cables, four distribution and associated communications cables that connect Martha's Vineyard to the mainland in Falmouth, and two transmission cables extending to Nantucket. In addition, the two offshore export cables for Vineyard Wind 1/Vineyard Wind Connector 1 and two offshore export cables for Park City Wind/NE Wind 1 Connector are proposed within the same OECC as this Project but east of the three proposed cables, such that no crossings will be necessary. A segment of submarine cable also provides power and data connection to an academic offshore research platform south of Martha's Vineyard.

Other offshore cables may be under consideration in the relatively near future to bring electricity to the mainland from the other federal offshore lease areas located in the WEA. The Company will coordinate closely with other wind developers when cable crossings are required. Additional details on cable crossings are provided in Section 5.5.1.3.

The OECC does not cross any existing offshore cables, although well-established engineering techniques could be used to achieve such a crossing should it become necessary (see Section 5.5.1.3). Offshore construction methodology is discussed in Section 5.5.1.

1.4.2 Marine Infrastructure

Existing marine infrastructure was considered during the offshore routing analysis described in Section 4.1. This analysis included an assessment of features reported on nautical charts jointly issued by the U.S. Department of Commerce, the National Oceanic and Atmospheric Administration (NOAA), and the National Ocean Service, and include features such as navigation channels, anchorage areas, and ordnance disposal sites. The Project will not cross navigation channels, while anchorage areas are present through much of Nantucket Sound and the waters off the south shore of Cape Cod.

1.5 Summary of Routing

The routing analysis provided in Section 4.0 identifies the OECC for the offshore export cables from the Lease Area to the landfall site; the Preferred and Noticed Alternative routes for connecting the landfall site to the proposed new onshore substation site; and three grid interconnection route options for connecting the new onshore substation site to the interconnection location. The routes are described geographically below and are compared in terms of their potential impacts on the natural and developed environments in Section 5.0.

G:\Projects2\MA\MA\6470\Task_2.1\EFSB\MXD\1-8_Interconnection_Routing_Universe_20221007.mxd

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division

LEGEND

- Potential Undersea Cable Route
- Existing Submarine Cable
- 345 kV Substation
- 115 kV Substation
- 345 kV Transmission Line
- 115 kV Transmission Line
- Block Island Wind Farm Turbine Location
- Block Island Transmission Cable
- Eversource Service Territory
- National Grid Service Territory
- Eversource & National Grid Service Territory
- Interstate Boundary
- Massachusetts Boundary (Submerged Lands Act)
- Stellwagen Bank
- Cape Cod Ocean Sanctuary
- Massachusetts Ocean Management Planning Area
- Rhode Island/Massachusetts Wind Energy Area Lease Areas

Massachusetts Wind Energy Area (WEA) Lease Areas

- Lease Area OCS-A 0501 (Vineyard Wind 1)
- Lease Area OCS-A 0534 (New England Wind)
- Other Lease Areas within the Massachusetts WEA

Scale 1:633,600
1 inch = 10 miles

0 5 10 Miles

Basemap: Ocean/World Basemap, ESRI

MA

RI

Carver

Pilgrim

Cape Cod Bay

Tremont

Canal

Bourne

West Barnstable (345 & 115 kV)

Barnstable

Brayton Point

Kent County

Pine Street

Mashpee

Falmouth

Narragansett Bay

Buzzards Bay

Nantucket Sound

Rhode Island Sound

OCS-A 0486

OCS-A 0517

OCS-A 0487

OCS-A 0500

OCS-A 0501

OCS-A 0534

OCS-A 0520

OCS-A 0521

OCS-A 0522

New England Wind 2 Connector Project

AVANGRID | Offshore Wind

Figure 1-8
Interconnection Routing and Existing Infrastructure

1.5.1 Offshore Routing

As described in Section 4.1, multiple seasons of marine surveys and consultations with the Massachusetts Ocean Team identified and refined feasible routes for proposed offshore export cables that would avoid and minimize impacts to offshore and nearshore resources. The OECC shown on Figure 1-4 is the product of those processes.

The Project's proposed offshore export cables will be installed within a shared OECC (referred to as the Primary OECC). The Primary OECC will travel from the northwestern corner of the portion of Lease Area OCS-A 0534 utilized for the Commonwealth Wind Project, along the northwestern edge of Lease Area OCS-A 0501, and northward along the eastern side of Muskeget Channel towards the southern shore of Barnstable, Massachusetts. The OECC for the NE Wind 2 Connector is largely (approximately 96%) the same OECC that was proposed for the Vineyard Wind Connector 1 and NE Wind 1 Connector (formerly Vineyard Wind Connector 2). The portion of the OECC associated with the NE Wind 2 Connector Project not previously reviewed as part of Vineyard Wind 1 and/or NE Wind 1 Connector Projects is located in Centerville Harbor where it is necessary for the cables to leave the Primary OECC to make landfall at the Dowses Beach Landfall Site. This small segment of the NE Wind 2 Connector OECC totals approximately 488 acres (see the orange area on Figure 1-4). Using a substantially shared OECC provides an efficient, consolidated route from the Lease Areas to point of landfall divergence, and minimizes environmental, operational, and commercial impacts relative to longer alternative routes.

During the NE Wind 1 Connector permitting process, the OECC was widened (as compared to the Vineyard Wind Connector 1 corridor) by approximately 984 feet to the west along the entire corridor and by approximately 984 feet to the east in portions of Muskeget Channel, for a total width of approximately 3,100 to 5,500 feet. NE Wind 2 Connector names the Primary OECC as its preferred route but includes a supplemental route through the Western Muskeget Variant (see Figure 1-4). This supplemental route would be utilized in the event technical, or space constraints necessitate that one or up to two cables need to be placed within the Western Muskeget Variant due to installation and micro-siting of the two aforementioned Connector projects. The three possible scenarios include:

- OECC Scenario 1 – 3 cables in the Primary OECC
- OECC Scenario 2 – 2 cables in the Primary OECC and 1 cable in the Western Muskeget Variant
- OECC Scenario 3 – 1 cable in the Primary OECC and 2 cables in the Western Muskeget Variant

The OECC provides a relatively direct route for connecting the offshore wind energy generation facility to the Dowses Beach Landfall Site in Barnstable. The OECC maintains sufficient water depths for installation, avoiding and minimizing passage through shoals and large seabed slopes (see Section 4.1 for a more detailed discussion about OECC route selection). As described in

Section 6.4.5, the OECC also avoids and minimizes impacts to SSU areas identified in the Massachusetts OMP, completely avoiding core habitat of the North Atlantic Right Whale and eelgrass. The OECC also minimizes impacts to hard/complex bottom.

The OECC is suitable for cable installation, but large sand waves are present in certain areas, and pre-cable-laying dredging may be needed to ensure sufficient cable burial beneath the stable seabed (target depth is approximately 5 to 8 feet [1.5 to 2.5 meters]) (see Sections 5.2.1.4 and 5.5.1.2). In addition, where the seafloor materials are so dense that reaching the target burial depth is unlikely, cable protection may be needed, although the Company is seeking to avoid the use of such armoring, where possible (see Section 5.2.1.3).

The discussion of offshore routing in Section 4.1 demonstrates that the OECC is the best option for installing the proposed export cables. The corridor avoids core habitat mapped for whales, avoids eelgrass, and minimizes passage through hard/complex bottom mapped in the Massachusetts OMP.

1.5.2 Onshore Export Cable Routes (Landfall Site to Proposed Substation)

The Preferred and Noticed Alternative for the export cable routes from the landfall site to the proposed substation site are described below.

1.5.2.1 Preferred Onshore Export Cable Route (Main Street)

As shown on Figure 1-3, the preferred onshore export cable route for the Project is located entirely within public roadway layouts or within the existing parking lot area at Dowses Beach and has a total length of approximately 6.7 miles. As shown in Table 1-1, the route begins in the parking lot of the Dowses Beach Landfall Site and proceeds generally west on Dowses Beach Road to East Bay Road. From there the route proceeds approximately 0.2 miles in a southerly direction along East Bay Road. At the end of East Bay Road, the route turns northwest on Wianno Avenue, which it follows for approximately 0.9 miles to Main Street. The route continues north on Main Street for approximately 1.1 miles to Osterville-West Barnstable Road, which it then follows for approximately 1.9 miles to Old Falmouth Road. The route then turns and continues in a northeast direction and follows Old Falmouth Road for approximately 0.9 miles then turns eastward on Old Stage for approximately 0.2 miles to the Oak Street intersection. Turning north on Oak Street, the route follows Oak Street for approximately 1.0 mile before turning west on Service Road and continuing another 0.2 miles to a staging area for the proposed trenchless crossing of Route 6 into the substation site, where voltage will step up to 345-kV in preparation for interconnection with the existing electrical grid.

Table 1-1 Preferred Onshore Export Cable Route Summary (Main Street)

Road Segment (from landfall to substation site)	*Approximate Length (miles)*
Dowses Beach Road	0.2
East Bay Road	0.2
Wianno Avenue	0.9
Main Street	1.1
Osterville-West Barnstable Road	1.9
Old Falmouth Road	0.9
Old Stage Road	0.2
Oak Street	1.0
Service Road	0.2
Route 6 Trenchless Crossing	0.1
total	6.7

The trenchless crossing of Route 6 will be accomplished via pipe jacking methodologies. Pipe jacking methodologies include micro tunnel, earth pressure balance machines, conventional non-pressurized tunnel-boring machines, and open shield machines. Two micro tunnel crossings are proposed at this location. Micro tunnel is defined as a pipe jacking operation that utilizes a micro tunnel boring machine (MTBM) pushed into the earth by hydraulic jacks mounted and aligned in a jacking shaft. A concrete casing pipe is lowered into the shaft and inserted between the jacking frame and the MTBM or previously jacked pipe. Slurry lines and power and control cable connections are made, and the pipe and MTBM are advanced along the planned alignment. This process is repeated until the MTBM reaches the reception shaft. Upon completion of the tunnel, the equipment is removed, the carrier pipeline/conduits are pulled through the concrete casing pipe utilizing rollers or an alternative method, and the annular space is grouted.

Each micro tunnel will have a dedicated jacking shaft and dedicated receiving shaft. The jacking shafts and staging area for the two micro tunnels will be located in the new substation property. Each circular jacking shaft has an outside diameter of approximately 41 feet (12.5 m). The receiving shafts will be located on the north side of Service Road / south side of Route 6 in a common 75 feet by 170 feet (22.9 m by 51.8 m) staging area. Each rectangular receiving shaft is approximately 29 feet by 20 feet (8.8 m by 6.1 m) in outside dimensions.

1.5.2.2 Noticed Alternative Onshore Export Cable Route (Old Mill Road)

The Noticed Alternative onshore export cable route associated with the Project is located entirely within public roadway layouts or within the existing parking lot area at Dowses Beach and has a total length of approximately 6.6 miles (see Figure 1-3). As shown in Table 1-2, it begins in the parking lot of the Dowses Beach Landfall Site and proceeds generally northwest on Dowses Beach Road to East Bay Road. From there the route travels approximately 0.7 miles in a northwesterly

direction along East Bay Road. At the north end of East Bay Road, the route crosses Main Street and proceeds in a northeasterly direction approximately 1.7 miles on Old Mill Road, Bumps River Road, and Five Corners Road. The route then turns to the northwest on Lumbert Mill Road and continues for approximately 1.5 miles to Osterville-West Barnstable Road. Turning again toward the northeast, the route follows Osterville-West Barnstable Road a short distance before merging onto Old Falmouth Road and continuing approximately 0.9 miles to Old Stage Road. The route follows Old Stage Road for approximately 0.2 miles to Oak Street, then proceeds on that road for approximately 1.0 mile before turning westward on Service Road and continuing another 0.2 miles to a staging area for the trenchless crossing of Route 6 to the proposed substation site.

Table 1-2 Proposed Noticed Alternative Onshore Export Cable Route Summary (Old Mill Road)

Road Segment (from landfall to substation site)	*Approximate Length (miles)*
Dowses Beach Road	0.2
East Bay Road	0.7
Old Mill Road, Bumps River Road, and Five Corners Road	1.7
Lumbert Mill Road	1.5
Osterville-West Barnstable Road	0.1
Old Falmouth Road	0.9
Old Stage Road	0.2
Oak Street	1.0
Service Road	0.2
Route 6 Trenchless Crossing	0.1
total	6.6

1.5.2.3 Main Street Variation

The Main Street Variation provides a link between the Preferred Route and Noticed Alternative. The Main Street Variation is approximately 0.3 miles long and traverses Main Street between the intersection of East Bay Road, Main Street and Old Mill Road and the intersection of Wianno Avenue and Main Street. The Main Street Variation provides the flexibility to respond to changing circumstances during the Siting Board process should East Bay Road or Wianno Avenue become the preferred route segment in this area based on more detailed engineering design and additional community and stakeholder outreach. In addition, the Main Street Variation allows for flexibility as discussions advance with the Town of Barnstable regarding the potential to coordinate with future proposed sewer projects.

1.5.3 Onshore Grid Interconnection Routes (Proposed Substation Site to Interconnection Location)

As described in Section 4.6, the Company has identified three grid interconnection route options for the 345-kV portion of the onshore export cables that will connect the new onshore substation to the regional electric grid at the West Barnstable Substation (see Figure 1-3). Engineering review of the options is ongoing. This section describes the three options under consideration for the grid interconnection route.

1.5.3.1 Grid Interconnection Route Option G1 – Fire Tower Access Road to Oak Street

Grid interconnection Option G1 is approximately 0.4 miles in length and includes installing the grid interconnection cables within the existing Fire Tower access road off Oak Street, then northeasterly along Oak Street, then into the northern portion of the West Barnstable Substation parcel. This grid interconnection option requires widening the existing access road to accommodate construction-period activities and long-term maintenance and operation of the substation. This option would likely include work on land subject to Article 97 jurisdiction.

1.5.3.2 Grid Interconnection Route Option G2 – Eversource ROW #342

Grid interconnection Option G2 is approximately 0.4 miles in length and includes installing the grid interconnection cables to the north within the approximately 40 foot wide "panhandle" to the existing electric transmission corridor (Eversource ROW #342). The route would then turn to the east and be constructed within the existing Eversource ROW #342 corridor and connect into the northern portion of the West Barnstable Substation parcel. The "panhandle" does not include an existing access road and construction of this alternative would require clearing and grading on topographically challenging terrain from the proposed substation to Eversource ROW #342. Because this option would utilize the narrow "panhandle," grading and vegetation removal on land subject to Article 97 jurisdiction may be warranted.

1.5.3.3 Grid Interconnection Option G3 – Route 6 State Highway Layout to Oak Street

Grid interconnection Option G3 is approximately 0.5 miles in length and includes installing the grid interconnection cables that would be constructed within the northern portion of the existing Route 6 State Highway Layout from the new onshore substation site extending east to Oak Street. This route would be within this proposed access road up to the intersection with Oak Street and then would turn north onto Oak Street and would be located within Oak Street and into the northern portion of the West Barnstable Substation parcel. This grid interconnection option would require additional access permits and coordination with MassDOT and clearing vegetation within the SHLO and could reduce a vegetative visual buffer between Route 6 and the proposed substation site.

1.6 Project Benefits

The NE Wind 2 Connector/Commonwealth Wind Project are expected to create a range of environmental and economic benefits for southeastern Massachusetts, the Commonwealth as a whole, and the entire New England region. These benefits will extend across the design, environmental review, and permitting phase, the procurement, fabrication, and construction/commissioning phase, the multi-decade operating phase, as well as the future decommissioning effort.

Project benefits are expected to include:

- **Clean renewable energy at large scale and a high-capacity factor:** The location of the associated WTGs well offshore in a favorable wind regime, coupled with the efficiency of the WTGs, will enable the Project to deliver substantial quantities of power on a reliable basis, including during times of peak grid demand. The WTGs for the Project will be among the most efficient models currently available for offshore use. It is expected that the WTGs will be capable of operating with an annual capacity factor of approximately 50%. While the Commonwealth Wind Project will deliver more than 1,200 MW to the regional electric grid, the avoided emissions analysis conservatively assumed a capacity of 1,200 MW and annual capacity factor of 50%, reducing ISO-NE CO_2e emissions by approximately 2.35 million tpy. In addition, NOx emissions across the New England grid are expected to be reduced by approximately 1,255 tpy with SO_2 emissions being reduced by approximately 666 tpy.
- **Reducing winter energy price spikes:** The Project adds high and stable winter capacity factor offshore wind generation to the region, increasing resources available to meet electric demand needs with offshore wind-generated energy, freeing up natural gas resources to be used for necessary home heating demands. The Project will therefore be unaffected by the risk of potential fossil fuel constraints and will help to alleviate price volatility. The Project could reduce the need for the gas- and oil-burning Canal Units 1 and 2 to run, especially during winter peak events when winds are high and conditions ideal for wind energy generation.
- **Improving the reliability of the electric grid in Southeastern Massachusetts:** The Project will connect to the bulk power system on Cape Cod, and thus will increase the supply of power to Barnstable County and other parts of southeastern Massachusetts, an area which has experienced significant recent (and planned) generation unit retirements. Because of its interconnect location and generation type, adding more than 1,200 MW of offshore wind generation to the current power generation portfolio will provide fuel diversification and enhance the overall reliability of power generation and transmission in the region and in particular the Southeast Massachusetts Area (SEMA), which has seen, and will continue to see, substantial changes in generation capacity. This will mitigate future costs for ensuring reliable service for Massachusetts customers.

- **Additional economic benefits for the region:** Project construction will generate substantial economic benefits, including opportunities for regional maritime industries (tug charters, other vessel charters, dockage, fueling, inspection/repairs, provisioning).
- **New employment opportunities:** The Company is committed to spurring and facilitating the creation, development, growth, and sustainability of a long-term offshore wind industry in New England, including a robust local supply chain, a well-trained local workforce throughout development, construction, and operations activities, local port facilities capable of fabrication and construction of key project components, and advanced manufacturing capabilities, all of which will cement New England as a leader in offshore wind. Commonwealth Wind estimates the Project will create 11,000 full time equivalent (FTE) direct job years.
- **Support for Massachusetts policies:** The Project is entirely consistent with the Commonwealth's GWSA goals because supplying emissions-free energy to the New England electric grid will displace fossil fuel sources, including in Massachusetts, which would otherwise operate to supply that power.

The following sections present these project benefits in more detail.

1.6.1 Energy Reliability Benefits

The proposed NE Wind 2 Connector would enhance the reliability and diversity of the energy mix on Cape Cod and in the Commonwealth of Massachusetts. This is particularly important given that several base load/cycling plants have already retired or are slated for retirement across New England, including:

- Brayton Point Power Plant (Somerset, MA): 1,600 MW, shut down in 2017;
- Pilgrim Nuclear Power Plant (Plymouth, MA): 690 MW, shut down in 2019;
- Vermont Yankee Nuclear Power Plant (Vernon, VT): 620 MW, shut down in 2014;
- Montaup Power Plant (Somerset, MA): 174 MW, shut down in 2010;
- Mt. Tom Station (Holyoke, MA): 136 MW, shut down in 2014; and
- Mystic Station (Everett, MA): 2,000 MW, planned for closure in 2024.

In addition, other plants such as Canal Generating Station (1,200 MW, oil/natural gas-fired, two units commissioned in 1968 and 1976), located in Sandwich, are approaching their normal end of life, making it important for other energy generation alternatives to fill the gap.

Between the decommissioning of nuclear power plants at Pilgrim and Vermont Yankee and the 1990s closings of Yankee Rowe (185 MW) and Maine Yankee (900 MW), New England has lost or is about to lose a significant portion of its large "zero-carbon" base load plants.

Lastly, Cape Cod is at the outer edge of the regional transmission system. The Cape is essentially supplied by one 345-kV and two 115-kV radial feeds. While recent significant investments in transmission reliability have strengthened the electricity supply to Cape Cod, the NE Wind 2 Connector would further improve reliability by feeding power into the center of the Cape transmission system. Connecting a substantial electricity supply to Cape Cod will mitigate future costs for ensuring reliable service to Massachusetts customers.

The Commonwealth Wind Project can supply almost double peak load for all of Cape Cod. As the offshore wind industry has developed, wind turbines have moved further offshore. When coupled with higher hub heights and longer, more efficient blades, the WTGs will take full advantage of a superior wind regime that is found far from shore. Moreover, summer offshore wind patterns will allow Commonwealth Wind to produce substantial power during summer afternoons/early evenings, which coincides with typical peak power demand periods on the Cape and the Islands.

The NE Wind 2 Connector will also reduce winter electricity price spikes because of Commonwealth Wind's high and stable winter capacity factor. It will enhance energy supply diversity, and as a wind project will not be affected by possible cold weather gas limitations or supply shortages. As such, it will help to promote price stability and energy security.

1.6.2 Community and Economic Benefits

The Project is expected to generate numerous economic benefits in Massachusetts and across New England. Economic benefits will be realized throughout the preconstruction, construction, operations and maintenance, and decommissioning phases, and including the following:

- **Host Community Agreement**: The Company intends to negotiate and ultimately execute an HCA with the Town of Barnstable to provide funding to the Town for hosting the Project. The Company also intends to coordinate with the Town on the planned installation of a municipal sewer line along segments of the onshore cable route.
- **Investment in Diversity Equity and Inclusion (DEI):** The DEI Plan for the NE Wind 2 Connector/Commonwealth Wind Project includes $15 million to fund DEI, workforce, and supply chain initiatives that will support local content, increase diversity in the industry, and provide EJ Population residents and other underrepresented populations real opportunities to join the offshore workforce and supply chain. To execute the DEI Plan, the Company has partnered with a diverse group of nonprofit partners located throughout Massachusetts. As part of the DEI Plan, the Company will also leverage its "buying power" through Commonwealth Wind's procurement process to ensure DEI is advanced by its industry partners and becomes a core value of the offshore wind sector as it is established in the U.S.
- **Funding Commitment:** The Company includes an investment of up to $35 million in local partnerships and programs. These programs include a robust DEI Plan aimed at building a diverse, equitable, and inclusive offshore wind sector as well as a range of community benefits, environmental benefits, and innovation initiatives.

- **Community Benefits, Environmental Benefits, and Innovation Initiatives:** The Company includes an investment of $20 million in education, innovation, and environmental initiatives to benefit local communities. The Company has developed meaningful partnerships, including several with local nonprofits, to provide wide-ranging economic and job opportunities as well as new opportunities for EJ Population residents to directly benefit from offshore wind.
- **Additional economic benefits for the region:** Project construction will generate more localized economic benefits, including opportunities for regional maritime industries.
- **New employment opportunities:** The Company is committed to spurring and facilitating the creation, development, growth, and sustainability of a long-term offshore wind industry in New England, including a robust local supply chain, a well-trained local workforce throughout development, construction, and operations activities, local port facilities capable of fabrication and construction of key project components, and advanced manufacturing capabilities, all of which will cement New England as a leader in offshore wind. The Company estimates the Project will create 11,000 FTE direct job years.

1.6.3 Environmental Benefits

1.6.3.1 Emissions

Table 1-3 quantifies the emissions associated with conventional power generation that would be avoided by using electricity generated from the Commonwealth Wind offshore wind energy generation facility in federal waters. The displacement analysis uses Northeast Power Coordinating Council (NPCC) New England air emissions data from EPA's Emissions & Generation Resource Integrated Database (eGRID2018(v2) released March 2020). The avoided emissions analysis conservatively assumes an annual capacity factor of 50% with a capacity of 1,200 MW. Constituents included in the analysis are CO_2, NOx, and SO_2.

Table 1-3 Avoided Air Emissions in New England (estimated)

Pollutant	*CO_2e*	*NOx*	*SO_2*
Annual Avoided Emissions (tons/year)	2.35 million	1,255	666

The Project would result in substantial avoided emissions in the New England region. The Project will significantly decrease the region's reliance on fossil fuels and enhance the reliability and diversity of the energy mix on Cape Cod, in the Commonwealth of Massachusetts, and across New England. Thus, the potential Project-related impacts should be considered in conjunction with the Project's energy reliability, economic, and environmental benefits.

1.6.3.2 Accelerated Water Quality Improvements

The Town of Barnstable is implementing a Comprehensive Wastewater Management Plan (CWMP) to protect the Town's coastal waters, ponds and drinking water by managing nutrient pollution from wastewater. The CWMP includes the expansion of the Town's sewer system to mitigate negative wastewater quality impacts to the regional watershed which is primarily caused by septic systems. As described in the CWMP, "The 30-year plan is comprised of three 10-year phases, predominantly focused on sewer expansion. Each phase consists of multiple individual projects that will proceed through permitting. The plan is designed to reduce nutrient pollution in embayments to a level consistent with regulatory thresholds known as Total Maximum Daily Loads (TMDLs). By reducing nutrient pollution in embayments, the plan also protects water quality in ponds, and drinking water sources. In addition to meeting water quality thresholds, the plan is designed to provide the wastewater infrastructure needed to support community economic development and affordable housing needs."[1]

The Vineyard Wind Connector 1 project and the NE Wind 1 Connector project, pursuant to HCAs between the companies and the Town of Barnstable, are working with the Town to coordinate the construction of the onshore export cables with the Town's installation of sewer infrastructure where there is overlap with the onshore export cable routes. This coordination is beneficial to the Town as it reduces the potential need to disrupt local roads and neighborhoods with repeat construction activities, coordinates utility corridors, and will provide significant cost savings. The cost savings arise due to the fact that the Company will pay for pre-design investigative work and the final coating and repaving.

The Company intends to coordinate with the Town on the planned installation of municipal sewer infrastructure along the selected route for the New England Wind 2 Connector onshore export cables which may result in benefits and significant cost savings for the Town.

1.7 Port Facilities

The harbors of Bridgeport, CT, Salem, MA, New Bedford, MA, and New London, CT are expected to be used as the main construction ports for Commonwealth Wind. Crowley Wind Services recently purchased 42 acres surrounding Salem Harbor Station to make upgrades to the site for use as an offshore wind port facility in Salem ("Salem Wind Port"). Crowley Wind Services intends to be the long-term offshore wind port operator for the site with the intention of serving the regional offshore wind industry. The Company hopes to lease space from the facility for a period of approximately three years, after which the expectation is that the facility will be used by other wind developers. Crowley Wind Services submitted an Environmental Notification Form (ENF) to

[1] https://barnstablewaterresources.com/comprehensive-waste-water-management-plan/

the Massachusetts Environmental Policy Act (MEPA) Office for the Salem Wind Port in October 2022 (EEA# 16618). It is currently under review and requires the submission of a mandatory Environmental Impact Report (EIR).

Long-term operations and maintenance (O&M) of the Project will be required and will likely be done in conjunction with other offshore wind projects. The Company is considering several locations for O&M operations within New Bedford and Southeastern Massachusetts, Vineyard Haven, MA and Bridgeport, CT, where facilities for crew transfer vessels, accommodations, warehouses etc. may be located. As the Project is in the preliminary stages of the state and local permitting process, details are not yet available for the siting of the O&M facilities; however, the Company will not develop the facilties, but intends to be a leasee along with other potential leasee's of the space.

1.8 Construction Overview

The Company has selected cable installation techniques to maximize efficiency while minimizing potential impacts. Offshore cable installation is proposed via jetting, jet-plow, plow, or mechanical trenching. Onshore export cable installation is proposed via open-cut trenching to accommodate a buried concrete duct bank. All work will conform to MassDOT and Town specifications for new road construction. The transition from offshore-to-onshore export cables is proposed via HDD, which will minimize Project-related impacts to the beach, intertidal zone, and nearshore areas, as well as ensuring that the cables remain sufficiently buried and permanently out of the human environment at the shoreline. Section 5.5 contains a more detailed description of construction methodologies, including proposed mitigation measures.

1.9 Schedule

Federal and Massachusetts environmental reviews, and subsequent federal, state, regional and local permitting are underway. Construction of the Project including the duct bank and onshore substation will begin in 2025 and, under the current schedule, commercial operations are expected to commence in 2028. The Company will provide additional detail on the anticipated schedule as further details are available. A more detailed description of construction hours and schedule is provided in Section 5.5.6.

1.10 Agency and Community Outreach

The consultations of the Company and its affiliates and predecessors with agencies, tribes, municipalities, and other stakeholders began in 2020 with the introduction of the New England Wind development which contemplated multiple phases. The Company has developed and maintained meaningful and long-lasting relationships with federal, state, and local regulators along with a diverse array of stakeholders that were built from its involvement with the Vineyard Wind 1 Connector/Vineyard Wind 1 and NE Wind 1 Connector/Park City Wind projects and will continue to build upon these relationships for this Project.

1.10.1 Agency Meetings and Consultations

The Company and its affiliates and predecessors have been consulting with BOEM, federal and state agencies, regional commissions, affected municipalities, and federally recognized tribes regarding the status of the Commonwealth Wind project including the portions within state waters on a near monthly basis since the COP was filed with BOEM in 2020. A list of meetings related to New England Wind 2 Connector/Commonwealth Wind conducted to date with agencies, municipalities, and tribes is provided in Table 1-4. The Company plans to maintain an active level of consultation and outreach as the design effort continues and the Project proceeds through the licensing and permitting phase.

Following the submittal of initial federal filings in 2020, there have been and will continue to be a number of agency-convened public hearings and informational meetings. These include BOEM/National Environmental Policy Act (NEPA) scoping sessions and NEPA document public comment periods, EFSB public statement hearing(s), and a MEPA consultation session.

Table 1-4 Consultations with agencies, municipalities, and tribes

Group	*Date*	*Topic*
Federal Agencies		
BOEM	July 2019 – October 2022	Project overview and kick-off meeting Survey updates Project review and COP updates Lease Area discussion BOEM/ACP/Developer Tribal Consultation Working Groups Weekly project update meetings
EPA	November 2020 April 2021 May 2021 July 2021 October 2021 December 2021 January 2022 June 2022 July 2022 August 2022 October 2022	Project overview Review of modeling protocols and metocean data Pre-application meetings Review of permit completeness
USCG	March 2021 September 2021	Project consultation

Table 1-4 Consultations with agencies, municipalities, and tribes (Continued)

Group	*Date*	*Topic*
Federal Agencies		
NMFS	March 2020 March 2021 August 2021 January 2022 March 2022 April 2022 May 2022 June 2022 October 2022	Project consultation Review of acoustic modelling protocol and inputs Pre-application meetings Review of Letter of Authorization application
U.S. Army Corps of Engineers (USACE)	August 2020 April 2022	Project consultation Pre-application meetings
U.S. Fish and Wildlife Service (USFWS)	May 2020 October 2022	Project overview Project consultation
State and Regional Agencies/Working Groups		
Massachusetts Office of Coastal Zone Management (CZM), MassDEP, MassWildlife's Natural Heritage & Endangered Species Program (NHESP)	August 2022	Project introduction
CZM	March 2022 June 2022 July 2022 August 2022 September 2022	Project consultation and consistency review discussions
Massachusetts Department of Conservation and Recreation (DCR)	September 2022	Project Introduction
EFSB	August 2021	Project introduction
MassDOT	August 2022	Project introduction
State and Regional Agencies/Working Groups		
Massachusetts Fisheries Working Group on Offshore Wind (Massachusetts Executive Office of Energy and Environmental Affairs [EEA] & MassCEC)	March 2021 June 2021 September 2021 March 2022 May 2022 October 2022	Project and fishing study/outreach updates
Massachusetts Habitat Working Group on Offshore Wind (EEA, MassCEC, CZM, NHESP, and Division of Marine Fisheries [DMF])	December 2019 December 2020 February 2021 May 2021 September 2021 January 2022 April 2022 September 2022	Project and scientific study updates
New York State Energy Research and Development Authority Environmental Technical Working Group	November 2021 December 2021 February 2022	Discussions on regional science priorities and coordination Development of new avian survey guidelines

Table 1-4 Consultations with agencies, municipalities, and tribes (Continued)

Group	*Date*	*Topic*
State and Regional Agencies/Working Groups		
Regional Wildlife Science Collaborative (including all subcommittee meetings)	May 2022 June 2022 July 2022 August 2022 September 2022	Discussions on regional science priorities and coordination
Rhode Island Coastal Resources Management Council	February 2020 August 2022 September 2022 November 2022	Cable working group Federal Consistency Review Meetings
Local Agencies and Stakeholders/Municipalities/Tribes		
Barnstable: Town Council	March 2022	Project Introduction
Town of Aquinnah	October 2022	Review of technical reports for Section 106 consultation
Chappaquiddick Wampanoag Tribe	April 2020 June 2021	Pre-survey meeting
Mashpee Wampanoag Tribe (Tribal Historic Preservation Officer [THPO])	March 2020 March 2021 July 2021 November 2021 March 2022 April 2022 June 2022 October 2022	Pre-survey meeting/project update and introduction to Avangrid NE Wind Consultation on onshore Geotech investigations
Shinnecock Indian Nation Tribe	March 2020 March 2021 February 2022 October 2022	Pre-survey meeting Review of technical reports for Section 106 consultation
Wampanoag Tribe of Gay Head (Aquinnah) (THPO)	May 2020 March 2021 July 2021 December 2021 February 2022 July 2022 October 2022	Pre-survey meeting/project update and introduction to Avangrid NE Wind Consultation on onshore Geotech investigations
Narragansett Indian Tribe	March 2021 February 2022	Pre-survey meeting
Mashantucket Pequot Tribal Nation	March 2021 February 2022 October 2022 (2)	Pre-survey meeting Workforce Development Review of technical reports for Section 106 consultation
Mohegan Tribe of Indians	February 2022	Pre-survey meeting
Delaware Tribe of Indians	February 2022	Pre-Survey meeting

1.10.1.1 Massachusetts Energy Facilities Siting Board Staff

Project representatives met with the EFSB Director and staff on August 4, 2022, to introduce the Project and discuss its background, design, and schedule.

1.10.1.2 Massachusetts Environmental Policy Act Office

Project representatives met with the MEPA Office on June 22, 2022, to review Project background, design, and schedule.

1.10.1.3 Interagency Meeting

Project representatives met with representatives from CZM, MassDEP, NHESP, and MEPA on August 10, 2022, to also review Project background, design, and schedule.

1.10.1.4 Massachusetts Department of Transportation

On August 11, 2022, the project team met with staff from MassDOT's District 5 Office to discuss the project's trenchless Route 6 crossing. The project team also presented grid interconnection and access alternatives that utilized the State Highway Layout.

1.10.1.5 Department of Conservation and Recreation

On September 12, 2022, the project team met with DCR staff to introduce the project and to solicit feedback on the potential project impacts on the West Barnstable Fire Tower operations.

1.10.1.6 Municipalities and Tribes

As listed in Table 1-4 above, the Company and its representatives have introduced the project to the Barnstable Town Council. In addition, the Company has held multiple meetings with the Osterville Village Association (OVA).

The Company has consulted with numerous federally recognized tribes and other tribal organizations for the New England Wind Development as a whole as identified above. As the Federally recognized tribes in the Commonwealth, both the Mashpee Wampanoag Tribe and the Wampanoag Tribe of Gay Head (Aquinnah) are given timely notices of onshore geotechnical work done by the project to provide an opportunity to oversee ground disturbing work associated with Geotech investigations.

1.10.2 Stakeholder Coordination

The Company and its affiliates and predecessors have been partnering with Vineyard Power Cooperative on the NE Wind 1 and 2 Connectors. The Company executed a Community Benefit Agreement (CBA) with Vineyard Power on January 1, 2022. This CBA called for, among other items, Vineyard Power to advocate for and support offshore wind legislation in Massachusetts, support the Project through education and outreach, and called for Vineyard Power to provide advice and

guidance through the permitting and financing processes. Community outreach and education have been primary objectives for Vineyard Power since its formation in November 2009. Vineyard Power accomplishes these objectives by informing the public about federal and state renewable energy goals and processes, including regulatory frameworks, and ensuring that communities have a voice in reaching desired outcomes. As the Project continues its development and ultimately construction, the Company and Vineyard Power are committed to continuing the outreach efforts to ensure that local communities understand, welcome, and benefit from the proposed Project. Community outreach, education, and engagement within the communities of Martha's Vineyard, Nantucket, and Cape Cod will continue along with outreach to state and local agencies and local tribes.

In addition to the consultations described in Table 1-4, extensive and ongoing consultations have been conducted by the Company and its affiliates and predecessors and Vineyard Power, with key stakeholders. The Company frequently advertises outreach events in local newspapers, social media, press releases, emails, and other media outlets to reach an array of stakeholders. The Company regularly invites the public to learn more about the Project through open houses, where the Company's team members exhibit information in a public space and are available for questions or comments on NE Wind 2 Connector. The Company has held dozens of information sessions and continues to hold open house sessions in Barnstable and across the Cape Cod and Islands region. The Company and Vineyard Power also sponsor and staff information tables at a variety of environmental, fisheries-related, and local events to reach a variety of stakeholders.

The Company is a member of, and active participant in, the Massachusetts Fisheries Working Group on Offshore Wind Energy, the Massachusetts Habitat Working Group on Offshore Wind Energy, the Responsible Offshore Science Alliance (ROSA), and the New York State Energy Research and Development Authority (NYSERDA) Fisheries Technical Working Group and NYSERDA Environmental Technical Working Group. The Company's parent, Avangrid Renewables, is also a member of the Regional Wildlife Science Collaborative Industry Caucus and attends subcommittee meetings. Avangrid also regularly attends the Rhode Island Fishermen's Advisory Board (FAB) meetings and Habitat Advisory Board (HAB) meetings. Avangrid Renewables is in near daily communication with individual fishermen from the commercial (fixed and mobile gear) and recreational fishing sectors. The Company's Fisheries Liaisons and Fisheries Representatives have also been consistently meeting with fisheries stakeholders.

In addition to the agencies, tribes, and municipalities listed above, the following list includes, but is not limited to, the groups that the Company has been and will continue to consult with:

- 350 Cape Cod
- Alliance for Business Leadership
- Alliance to Protect Nantucket Sound
- American Saltwater Guides Association
- Anglers for Offshore Wind

- Association to Preserve Cape Cod
- Barnstable Clean Water Coalition
- Barnstable-Yarmouth Lions Club
- Bristol Community College
- Browning the Green Space
- Buzzards Bay Coalition
- Cape and Vineyard Electrical Cooperative
- Cape Cod Fishermen's Alliance
- Cape Cod Chamber of Commerce
- Cape Cod Climate Change Collaborative
- Cape Cod Community College
- Cape Cod Technology Council
- Cape Light Compact
- Climate Action Business Association
- Coalition for Social Justice
- Commercial Fisheries Center of Rhode Island
- Conservation Law Foundation
- Eastern Fisheries
- Environment Massachusetts
- Environmental Business Council of New England
- Environmental Council of Rhode Island
- Environmental League of Massachusetts
- Fishing Partnership Support Services
- Greentown Labs
- KSJ Seafood Inc.
- Long Island Commercial Fishing Association
- Massachusetts Fisheries Institute
- Massachusetts Fisheries Working Group
- Massachusetts Fishermen's Partnership and Support Services
- Massachusetts Habitat Working Group
- Martha's Vineyard Fishermen Preservation Trust

- Massachusetts Audubon Society
- Massachusetts Clean Energy Center
- Massachusetts Lobstermen's Association
- Mass Maritime Academy
- Mid-Atlantic Fisheries Management Council
- Mystic Aquarium
- National Academies of Sciences, Offshore Renewable Energy Development and Fisheries Conference
- National Wildlife Federation
- Natural Resources Defense Council
- NE Fisheries Sciences Center
- NE Fishery Management Council
- NE Fishery Sector Managers VII, VIII X, XI, XIII
- New Bedford Harbor Development Commission
- New Bedford Ocean Cluster
- New Bedford Port Authority
- New England Aquarium
- New England Energy and Commerce Association
- New York League of Conservation Voters
- North Shore Chamber of Commerce
- OneSouthCoast Chamber
- Osterville Business and Professional Assc.
- Osterville Men's Club
- Osterville Rotary Club
- Osterville Village Association
- Recreational Fishing Alliance
- Regional Wildlife Science Collaborative
- Rhode Island Marine Fisheries Council
- Rhode Island Saltwater Angler's Association
- Salem Alliance for the Environment
- Scallop Industry Advisors Meeting

- Sierra Club
- Stoveboat- Saving Seafood
- Survival Systems USA
- The Nature Conservancy
- Unitarian Church of Barnstable Green Sanctuary Committee
- University of Massachusetts (Dartmouth)
- University of Massachusetts (Amherst)
- University of Connecticut
- University of Rhode Island Coastal Resources Center (CRC)
- Woods Hole Oceanographic Institution

The Company plans to maintain an active level of consultation and outreach as the environmental review and permitting processes continue and is available to meet with any interested party. Project updates and other information can be found at www.commonwealthwind.com. Any interested parties can sign up for Project updates by visiting www.commonwealthwind.com/learnmore.

1.10.3 Advance Notice

The project is not located within one mile of any EJ Populations. Therefore, the project is not subject to MEPA's Public Involvement Protocol for Environmental Justice Populations. However, an advance notification of the Company's intention to file an ENF for the New England Wind 2 Connector was voluntarily distributed by the Company to support the MEPA Office's initiative to enhance public participation opportunities for members of the public, including those with limited English proficiency. The proposed project is located within a one-mile radius of a population with limited English proficiency. Therefore, the notice was translated into Brazilian Portuguese and Spanish. The Advance Notice was circulated to the distribution list provided by the MEPA Office as well as additional Community-Based Organizations (CBOs) that the Company believed would benefit from advance notification. The Advance Notice was initiated on September 7, 2022, approximately one month before the ENF was published in the Environmental Monitor which began the public comment period. Additionally, the ENF comment period was extended by 30 days to allow for an extended review for interested parties.

1.10.4 Abutter Outreach

The Company has planned and hosted several community open house events in Barnstable, with more to come. Public notices and meetings will be held for this filing, the ENF and other state, regional and local filings, and the Company will send out additional mailers to abutters (and others) providing relevant Project details, contact information, and other means for residents to

connect with Company representatives to obtain information and provide feedback. On numerous occasions, neighborhood-level conversations have resulted in important local insights that improve the Project and reduce potential neighborhood disruption during construction.

In addition, the Company will continue to regularly host public informational events and will widely advertise those events utilizing numerous outlets, including email, web, digital and print media, direct mail, and posting in municipal and community bulletins. As with the Vineyard Wind Connector 1 and New England Wind 1 Connector, Company representatives plan to continue the efforts to appear before community and civic groups and to host office hours, info sessions and community forums in a range of public venues, including libraries, community centers, senior centers, town offices, and recreational areas. Public events provide an opportunity for interested residents and officials to learn about Project details, connect with Project staff, to have their questions answered and provide meaningful feedback.

Following submittal of the EFSB Petition, the EFSB staff is expected to finalize an abutter notification letter. The letter likely will include a description of the New England Wind 2 Connector, including the Preferred Route and Noticed Alternative (with a supporting map). The letter likely will also include a description of the EFSB review process and will invite interested citizens to attend an EFSB-convened Public Hearing(s). As mentioned above, the Company will continue its outreach efforts to the community at large.

The abutter notification letter will be sent to all direct abutters along the Preferred Route and Noticed Alternative (and variants), including and owners of property directly across any street or way from the right of way, and abutters to any of those owners within 300 feet for all routes described in the Petition. The letter will also be sent to Town officials and others as directed by the EFSB.

1.11 Project Team

The Company has assembled a capable and highly experienced team of project developers, planners, engineers, environmental scientists, attorneys, and outreach specialists for the Project. The team's principal organizations are described below.

1.11.1 Avangrid Renewables

Avangrid Renewables, the sole owner and operator of Commonwealth Wind, is a leader in the renewable energy industry in the U.S. and is amongst the nation's largest renewable operators. Avangrid Renewables' mission is to lead the transformation to a competitive clean energy future. Headquartered in Portland, Oregon, Avangrid Renewables has regional offices in Boston, Connecticut, and Virginia. Avangrid Renewables owns and controls over 7,800 MW of wind and solar power facilities in more than 22 states. Active offshore wind projects under development include Park City Wind and Commonwealth Wind off the coast of Massachusetts and Kitty Hawk

off the coast of North Carolina and Virginia. Through a 50-50 partnership with Copenhagen Infrastructure Partners, Avangrid Renewables is constructing Vineyard Wind 1, the first utility-scale offshore wind project in the U.S. off the coast of Massachusetts.

Avangrid Renewables is a wholly owned subsidiary of AVANGRID and part of the IBERDROLA Group. IBERDROLA, S.A. is an energy pioneer with one of the largest renewable asset bases of any company in the world, with more than 38,000 MWs of renewable energy spread across a dozen countries.

1.11.2 Vineyard Power

The Project team also includes Vineyard Power, a community-owned 501(c)(12) non-profit based on the island of Martha's Vineyard since November 2009. With a growing membership base of over 1,390 households and businesses, the 21st-Century energy cooperative aims to produce electricity from local, renewable resources while advocating for and keeping the benefits within the island community. Avangrid has entered into a CBA with Vineyard Power. The relationship between Vineyard Wind and Vineyard Power has enabled significant input into the Project design process from members of the local community, such that the Project design addresses local concerns and enhances opportunities for local benefits.

1.11.3 Epsilon Associates, Inc. (Lead Environmental Consultant)

Epsilon Associates is an approximately 80-person engineering and environmental consulting firm based in Maynard, Massachusetts. For the New England Wind 2 Connector, Epsilon's role is lead environmental consultant for the necessary state, regional, and local permitting for the state-jurisdictional aspects of the Project. Epsilon is also the lead environmental consultant for federal permitting of Commonwealth Wind.

Epsilon's engineers, scientists, planners, and regulatory specialists are engaged in environmental analyses, modeling, licensing, and permitting for energy infrastructure projects throughout the northeast. In recent years, Epsilon has worked with clients to permit Vineyard Wind 1/Vineyard Wind 1 Connector, Park City Wind/New England Wind 1 Connector, NSTAR Electric Company d/b/a Eversource Energy Martha's Vineyard Reliability project, NSTAR Electric/Comcast Martha's Vineyard Hybrid Cable Project, New England Power Company d/b/a National Grid's second Nantucket Cable Project, NSTAR Electric 345-kV Southeast Massachusetts (SEMA) Transmission Upgrade Project, NSTAR Electric Company d/b/a Eversource Energy Barnstable Reliability Project, NSTAR Electric Company d/b/a Eversource Energy Mid-Cape Reliability Project, and the NSTAR Electric 115-kV Line 139 Project.

1.11.4 Foley Hoag LLP, Counsel

Foley Hoag is a highly respected law firm with offices in Boston, New York, Washington DC, and Paris. The firm is known for its work in the energy, clean tech, and environmental sectors, including assisting Vineyard Wind in obtaining state, regional, and local permits for the Vineyard Wind. Foley Hoag is also working on the Park City Wind/New England Wind 1 Connector and will continue these efforts, including before the Siting Board, for the New England Wind 2 Connector.

1.11.5 Stantec, Engineering Design support

Stantec is a multi-national engineering and professional services firm with more than 22,000 employees operating from over 400 locations. The firm provides a full range of power sector services including project management, conceptual project development, detailed engineering and design, and construction management, as well as startup and commissioning services. Stantec's in-house staff has extensive experience in detailed engineering and design of underground electrical duct banks, transmission lines, trenchless technologies, and substations. Stantec has executed a multitude of underground electrical transmission projects up to 345-kV and overhead transmission projects up to 765-kV, as well as substations up to 500-kV DC and 765-kV AC. For the New England Wind 2 Connector, Stantec engineers based in Quincy, Hyannis (Barnstable) and Boston, MA have provided engineering and design support for the onshore transmission lines, landfall, and substation.

1.11.6 Gradient Corporation

Based in Boston, MA, Gradient is responsible for the electric and magnetic field (EMF) modeling and analysis. Peter Valberg, PhD and Christopher Long, ScD are widely recognized experts in the field. Drs. Valberg and Long have presented EMF modeling results and analysis before the EFSB for many above-ground and underground transmission projects. Recent examples include the Vineyard Wind 1 project, 345-kV NSTAR Lower SEMA project, the 115-kV Eversource Line 139 project on the Cape, the Eversource/National Grid 345-kV Woburn to Wakefield project, and the 115-kV Eversource Baker Needham project.

1.11.7 Geo SubSea

Jeff Gardner, President of Geo Subsea LLC, serves as the Field Program Manager for and subject matter expert on marine geology and geophysics. Having supervised and conducted hundreds of surveys in the U.S. and around the world for over 27 years, he is well versed in most aspects of marine operations, including geological, geophysical, geotechnical, and oceanographic studies. Mr. Gardner has been involved in the offshore wind industry since its infancy in the U.S., playing a significant role in survey programs for Deepwater Wind's Block Island Project, the Cape Wind Energy Project, and Vineyard Wind 1, not to mention performing surveys and consulting for most of the other offshore wind projects on the east coast and some overseas. Thus, he is very familiar with state and federal agency requirements and has been involved in most aspects of geophysical and geotechnical activities from pre-survey planning to field surveys to post-survey data processing, interpretation, and product development, as well as client representation at

meetings. He holds a BS in Marine Geology and an MS in Oceanography along with national and state Professional Geology certifications. His specialty includes the use of geophysical methods to study coastal processes, marine sediments and stratigraphy, underwater archaeology, and benthic habitats.

1.11.8 Public Archaeology Laboratory

The Public Archaeology Laboratory (PAL) is a leading New England cultural resource management (CRM) firm. PAL's outstanding reputation within the CRM industry springs from more than a quarter-century of high-quality performance in support of more than 3,000 development and planning projects. PAL has a staff of more than 45 professional archaeologists, architectural historians, preservation planners, and support personnel. PAL provides services in the fields of archaeology and historic architectural survey, cemetery investigations, expert testimony, section 106, HABS/HAER, and state level documentation. PAL conducted due diligence, reconnaissance, and sensitivity assessments as well as intensive (location) survey for Vineyard Wind 1 and has performed and is continuing to perform terrestrial archaeological monitoring during all ground disturbing activities associated with the Vineyard Wind 1 Project in areas of moderate to high archaeological sensitivity, including construction activities within the staging areas for the HDDs at Covell's Beach and the onshore transmission route. PAL is part of the New England Wind 1 Connector and New England Wind 2 Connector Project teams.

1.12 Conclusion

The Project will directly advance the Commonwealth's renewable energy and greenhouse gas emission reduction targets (*see, e.g.*, G.L. c. 21N) and improve the reliability and diversity of the energy mix in the Commonwealth by providing more than 1,200 MW of carbon-free energy to the regional electric grid. The Petitioner seeks authority to construct the NE Wind 2 Connector, and for the reasons described in greater detail in the subsequent sections of this Analysis, the Project conforms to the Siting Board's standards on need, alternatives, routing, and minimization of environmental impacts and costs under G.L. c.164, § 69J.

Section 2.0

Project Need

2.0 PROJECT NEED

As described in Section 1.0, the purpose of the New England Wind 2 Connector (NE Wind 2 Connector, or "the Project") is to deliver clean, renewable wind energy to the ISO-NE electrical grid from an offshore wind energy generation facility known as Commonwealth Wind located in Lease Area OCS-A 0534 in the federally designated MA WEA in federal waters off the coast of Massachusetts (see Figure 1-2). The NE Wind 2 Connector is the Massachusetts-jurisdictional offshore and onshore transmission and step-up substation necessary to deliver the power generated by Commonwealth Wind to the ISO-NE electrical grid.

As discussed in Section 2.1, Commonwealth Wind was developed in response to an RFP issued by the Massachusetts EDCs[1] in coordination with the Massachusetts DOER that solicited up to 1,600 MW of Offshore Wind Energy Generation.[2] The RFP was issued pursuant to Section 83C of Chapter 169 of the Acts of 2008 ("Section 83C"), as amended by the *Act to Promote Energy Diversity*, St. 2016, c. 188, § 12. Section 83C has subsequently been amended, including to require procurement of approximately 5,600 MW aggregate nameplate capacity of offshore wind energy generation.[3]

Additionally, since 2009, BOEM has spearheaded a focused effort to identify, study, characterize, and refine suitable offshore wind energy lease areas on the Outer Continental Shelf (OCS) in federal waters along the Atlantic seaboard. As described in Section 1.2.1, the locations of the offshore wind lease areas, including Lease Area OCS-A 0534, were determined through a process that involved significant public input over a period of several years. The process began with formation of a Massachusetts-BOEM task force composed of representatives from federal, state, tribal, and local government agencies, as well as public stakeholder meetings. In January 2015, BOEM conducted an auction resulting in the award of Lease Area OCS-A 0501 to Vineyard Wind. On June 28, 2021, BOEM segregated Lease Area OCS-A 0501 into two lease areas: Lease Area OCS-A 0501, which is being developed for the Vineyard Wind 1 project, and Lease Area OCS-A 0534, which is being developed for New England Wind (which includes the Park City Wind and Commonwealth Wind projects) (see Figures 1-1 and 1-2).

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1 The Massachusetts electric distribution companies are Fitchburg Gas & Electric Company d/b/a Unitil (Unitil), Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid (National Grid), and NSTAR Electric Company d/b/a Eversource Energy (Eversource).

2 The RFP was approved by the Massachusetts Department of Public Utilities (DPU) pursuant to Section 83C of An Act Relative to Green Communities, St. 2008 c. 169, as amended by St. 2016, c. 188, § 12 (Section 83C) and in accordance with Section 21(a) of Chapter 227 of the Acts of 2018. *See Joint Petition for Approval of a Proposed Timetable and Method of Solicitation*, D.P.U. 21-40 (May 5, 2021).

3 *See* An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy. St. 2021, c. 8, §§ 91 & 92; An Act Making Appropriations for the Fiscal Year 2022, St. 2021, c. 24, §§ 69 & 72; An Act Driving Clean Energy and Offshore Wind, St. 2022, c. 179, §§ 13, 60-62, 70, 80.

On December 14, 2021, BOEM reassigned Lease Area OCS-A 0534 from Vineyard Wind LLC to Park City Wind LLC. Full development of Lease Area OCS-A 0534 (and a portion of the adjacent Lease Area OCS-A 0501) by Park City Wind LLC is currently under federal review by BOEM as New England Wind (see Figure 1-1). At least two projects have been identified within New England Wind: Commonwealth Wind and Park City Wind, both of which are supported by signed PPAs in Massachusetts and Connecticut, respectively.[4] The state-jurisdictional components of Park City Wind and Commonwealth Wind are being permitted at the state-level as two separate projects, known as NE Wind 1 Connector and NE Wind 2 Connector, respectively. Park City Wind is an approximately 800-MW project in the northern portion of Lease Area OCS-A 0534, and the current proposal for Commonwealth Wind (for which NE Wind 2 Connector will provide transmission) consists of developing the southern portion of the Lease Area (see Figure 1-1).

In addition to working closely with BOEM to define and refine the Massachusetts WEA, the Commonwealth's long-standing efforts to facilitate offshore wind energy is showcased through numerous legislative efforts to promote offshore wind procurement as discussed in Section 1.2. The Commonwealth has also been working to support the economic development of the offshore wind industry supply chain through the construction of a blade testing facility in Charlestown, and development of the New Bedford Marine Commerce Terminal and Port Infrastructure Assessment, which began in 2017. The latter is a two-phase project that aims to identify waterfront properties that could support additional construction and operation activities for offshore wind facilities. The New Bedford Marine Commerce Terminal is a purpose-built 26-acre facility that will support staging, construction, operation, and maintenance of offshore wind installations. The MassCEC has been the focal point for many of these efforts and continues to be an important clearinghouse for the exchange of data and information within the wind energy community. In August 2022, the Governor signed *An Act Driving Clean Energy and Offshore Wind*, St. 2022, c. 179, which includes multiple provisions that will strengthen support of the development of offshore wind generation, including by providing new tools to MassCEC.

As summarized in Section 1.2 and discussed in further detail in Section 6, construction of the Project will serve the public interest by generating 1,200 or more MW of carbon-free energy, increasing the reliability and diversity of the regional and statewide energy supply by helping to decrease the Commonwealth's dependence on a single fuel (natural gas), and create jobs, local supply chains and broader economic development. The Project is fully consistent with policies of the Commonwealth.

Section 1.6 discusses benefits the Commonwealth Wind/NE Wind 2 Connector Project are expected to bring to the Commonwealth and larger region. The discussion below describes why the NE Wind 2 Connector is needed for those benefits to be realized.

[4] Park City Wind/NE Wind 1 Connector will deliver approximately 800 MW of power to the ISO-NE electric grid to meet Park City Wind LLC's obligations under long-term contracts with Connecticut electric distribution companies. At a minimum, Commonwealth Wind/NE Wind 2 Connector will deliver 1,200 MW to investor-owned Electric Distribution Companies serving the ratepayers of Massachusetts and 32 MW to Massachusetts municipal light plants.

2.1 Overview of Massachusetts Offshore Wind Legislation and the Procurement of Commonwealth Wind Under Section 83C

Section 83C of Chapter 169 of the Acts of 2008, as amended by Chapter 188 of the Acts of 2016, An Act to Promote Energy Diversity, Chapter 8 of the Acts of 2021, An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, Chapter 24 of the Acts of 2021, An Act Making Appropriations for the Fiscal Year 2022, and Chapter 179 of the Acts of 2022, An Act Driving Clean Energy and Offshore Wind, is intended to ensure a diversified electrical energy portfolio for the Commonwealth, while strengthening the Massachusetts clean energy economy, and helping ensure that the greenhouse gas reduction requirements under the Commonwealth's 2008 GWSA, as recently amended by An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, are achieved. As detailed in Governor Baker's climate roadmap, offshore wind is a critical component to meeting the Commonwealth's legally binding greenhouse gas emissions reduction targets. The GWSA emissions reduction targets and the Commonwealth's strategy to achieve them are discussed in Section 6.4.2.

Section 83C seeks to facilitate financing of offshore wind generation resources, enhance regional reliability (including during winter peak demand), mitigate environmental impacts, and promote economic development. Section 83C furthers the development of an offshore wind industry in New England that provides clean energy to the New England electric grid, improves reliability of that system, and offers significant economic and environmental benefits to the region. By design, procurement of an offshore wind generation project through Section 83C and execution of associated PPAs with the EDCs makes it likely that such a project will be developed and will contribute to the regional energy supply. Section 83C requires the solicitation and procurement of 5,600 MW of offshore wind energy generation by June 30, 2027.

On May 7, 2021, in coordination with DOER, the EDCs issued a third request for proposals (RFP or 83C III solicitation) in response to the DOER's direction to solicit 1,600 MW of Offshore Wind Energy Generation.[5] In late 2021, after a bid evaluation process, the EDCs and DOER selected Commonwealth Wind as part of its third offshore wind competitive procurement process to advance to contract negotiations. In April 2022, the Company executed PPAs for the output of 1,200 MW of Commonwealth Wind. In May 2022, the EDCs filed these agreements with the DPU, which DPU docketed as D.P.U. 22-70, 22-71, and 22-72 for the Eversource, National Grid, and Unitil PPAs, respectively. An additional 32 MW will be contracted with Municipal Light Plants, and depending upon final turbine selection, it is possible that this project may have additional capacity to make available to interested buyers.

[5] The RFP was approved by the Massachusetts Department of Public Utilities pursuant to Section 83C of An Act Relative to Green Communities, St. 2008 c. 169, as amended by St. 2016, c. 188, § 12 (Section 83C) and in accordance with Section 21(a) of Chapter 227 of the Acts of 2018. *See Joint Petition for Approval of a Proposed Timetable and Method of Solicitation*, D.P.U. 21-40 (May 5, 2021).

2.2 Need for New England Wind 2 Connector

The Siting Board's review of proposed transmission facilities is conducted pursuant to G.L. c. 164, § 69J. In reviewing petitions for such facilities, the Siting Board assesses the need for proposed transmission facilities to meet reliability, economic efficiency, or environmental objectives (G.L. c. 164, §§ 69H, 69J). Pursuant to its review, the Siting Board requires an applicant seeking to construct a transmission line to interconnect a new or expanded generating facility to show: (1) that the existing transmission system is inadequate to interconnect the new or expanded generator; and (2) that the new or expanded generator is likely to be available to contribute to the regional energy supply.[6] If the new or expanded generator exists, or is under construction, the availability showing will be deemed to have been made. If the generator is planned, and is subject to the Siting Board's jurisdiction, that showing may be made by obtaining the Siting Board's approval of the generating facility.[7] If the generator is planned, and not subject to the Siting Board's jurisdiction, as is the case for the Project, the showing may be made on a case-by-case basis based on indicators of project progress (e.g., progress in permitting or in obtaining project financing).[8]

2.2.1 Inadequacy of the Existing Transmission System

As discussed in Section 1.0, the Company is in the process of permitting Commonwealth Wind (as part of New England Wind), an offshore wind energy generation project in federal waters under the jurisdiction of BOEM, that will generate in excess of 1,200 MW of clean power. The location of the Massachusetts offshore wind lease areas, including the lease area to be occupied by Commonwealth Wind, was determined through a process that involved significant public input over a period of several years (see Section 1.2.1). Currently, there is no existing transmission to connect this new wind energy generation project in the offshore lease area to the onshore ISO-NE electrical grid.[9] Therefore, the transmission proposed as the NE Wind 2 Connector is needed to deliver power generated at the federal lease area to the ISO-NE electrical grid.

The Company has conducted an extensive analysis of offshore and onshore routing alternatives, described in detail in Section 4.0. As a result, the proposed NE Wind 2 Connector avoids and minimizes impacts while enabling in excess of 1,200 MW to interconnect at the existing 345-kV West Barnstable Substation.

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6 *Vineyard Wind LLC*, EFSB 17-05/D.P.U. 18-18/18-19, at 11 (2019) (Vineyard Wind 1).

7 *Vineyard Wind 1* at 12.

8 *Vineyard Wind 1* at 12.

9 The NE Wind 1 Connector, which is in the permitting process to provide transmission for Park City Wind, proposed in the northern part of the same lease area, cannot be used to interconnect Commonwealth Wind to the electrical grid for several reasons. First, the NE Wind 1 Connector lacks the capacity to manage the additional generation. Second, the onshore duct bank could not accommodate the three additional proposed circuits due to space constraints within roadway layouts as well as the desire to limit cable heating and maximize reliability.

2.2.2 Likelihood that new or expanded generation source will be available to contribute to regional energy supply

Multiple indicators establish that Commonwealth Wind (i.e., the generation for which the NE Wind 2 Connector transmission is proposed) is likely to be available to contribute to the regional energy supply. First, there is support for development of the project at federal and state levels, and the project has been developed in response to and in conjunction with federal and state policies. As described in Section 1.2.1 of this Petition, on January 29, 2015, BOEM held a competitive lease sale, conducted as an auction, for the four lease areas within the Massachusetts WEA.

The Project is also specifically supported by Section 83C, and the primary purpose of which is to facilitate the financing of offshore wind generation resources in the Commonwealth and cause such resources to be put into operation to contribute to achieving the Commonwealth's climate and clean energy goals. As described above, Commonwealth Wind was bid into the RFP, was selected as a winning bid, and has entered into PPAs with the EDCs, which have been filed for approval with the DPU, all pursuant to Section 83C. The Company expects the PPAs to be approved by the DPU in accordance with Section 83C.

By legislative design and purpose, Section 83C is intended to "facilitate the financing" of offshore wind generation projects and to ensure that projects selected and contracted under its processes are developed and contribute to the regional energy supply. Thus, Section 83C itself makes it likely that selected projects will be built and put into operation, by, among other things, providing counterparties for contractual offtake from offshore wind projects.

Development of Commonwealth Wind is also likely because of the valuable nature of the wind resource in the Lease Area OCS-A 0534. The Lease Area is an excellent offshore wind site because it has high wind speeds, suitable seafloor conditions, moderate water depths, reasonable proximity to multiple grid interconnection locations in an area of high electrical load, and an identified need for new generation capacity. These characteristics alone, but even more so in connection with the strong federal and state policies in place, support a conclusion that Commonwealth Wind is likely to be available to contribute to the regional energy supply.

Many significant indicators of progress have already been achieved, and will continue to be achieved, during the review of this Petition to establish that Commonwealth Wind is likely to be available to contribute to the regional energy supply. Relevant indicators may include: attaining permitting milestones; reaching a host community agreement with Barnstable; progress towards regulatory approval of the PPAs; steps taken to vet and pre-authorize offshore areas as suitable and desirable for offshore wind development; information demonstrating that the areas at issue have characteristics that make it desirable for the development of offshore wind generation; and participation in forward capacity auctions. These types of indicators represent steps that each increase the likelihood that the Commonwealth Wind project is "likely to be available."

Commonwealth Wind and the NE Wind 2 Connector have achieved significant indicators of progress showing they are likely to be available to contribute to the regional energy supply. For instance:

- Lease Area OCS-A 0534, in which the offshore wind energy generation facility for Commonwealth Wind will be built, was delineated through a process that involved significant public input over a period of several years and was intended to select an area that addressed concerns and was appropriate for offshore wind generation. The process is described in more detail in Section 1.2.1.

- On May 10, 2018, BOEM approved a Site Assessment Plan (SAP) for Lease OCS-A 0501; at the time, Lease Area OCS-A 0501 included the area now defined as Lease Area OCS-A 0534, since the original lease area was not segregated into two separate lease areas until June 2021. At the time, a meteorological-oceanographic buoy (metocean buoy) was installed that has provided data used to inform the design and permitting strategy for Commonwealth Wind.

- The Commonwealth enacted Section 83C and has repeatedly acted to strengthen and reinforce Section 83C over time so as to ensure the procurement of offshore wind energy generation projects that will be successfully constructed and will contribute energy to the regional power grid.

- Section 83C has been amended to require procurement of approximately 5,600 MW of aggregate nameplate capacity of offshore wind energy generation by June 30, 2027. Approximately 3,200 MW have been awarded, including Commonwealth Wind.

- Commonwealth Wind bid into the RFP, the third conducted under Section 83C and was selected as a winning bid.

- Commonwealth Wind has executed the PPAs with the EDCs for 1,200 MW of output from Commonwealth Wind. 32 MW are anticipated to be contracted to MLPs or other offtake users.

- The EDCs have filed the PPAs for approval with the DPU pursuant to Section 83C.

- The Company or its affiliates and predecessors have conducted extensive outreach to stakeholders to address concerns at early stages of project development. This has included meetings with numerous fishing groups and/or individuals, and the Commonwealth and BOEM have facilitated ongoing working groups for fisheries and habitat concerns. The Company or its affiliates and predecessors have also met with stakeholders in the host community (Barnstable), Martha's Vineyard and Nantucket, and local Native American tribes, among others. Section 1.10 contains additional information about ongoing outreach efforts.

- The federal permitting process for Commonwealth Wind commenced in July 2020 with the filing of the phased COP for New England Wind, with BOEM as the lead federal agency. The COP addresses the full development of New England Wind, thus includes both Commonwealth Wind and Park City Wind. Progress towards the Record of Decision (ROD) is ongoing. On June 30, 2021, BOEM published a Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for New England Wind. Two COP updates were filed with BOEM in Fall 2021 and Spring 2022. In its review of the COP, BOEM must comply with its obligations under NEPA, the National Historic Preservation Act (NHPA), the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Migratory Bird Treaty Act (MBTA), the Clean Air Act (CAA), and the Endangered Species Act (ESA). Thus, BOEM coordinates and consults with numerous other federal agencies including the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFW), the U.S. Environmental Protection Agency (EPA), and the USGC during the review process. BOEM also coordinates with the Commonwealth under the Coastal Zone Management Act (CZMA) to ensure that the project is consistent with the state's coastal zone management program. All of these coordination and consultation processes are underway. On July 20, 2022, NMFS deemed an Application for New England Wind under the Marine Mammal Protection Act (MMPA) adequate and complete. The Company anticipates that BOEM will issue a draft environmental impact statement (Draft EIS) at the end of 2022, and a ROD within several months after the issuance of a Final EIS in 2023 under NEPA.

- An application was filed with the USACE on August 1, 2022, and an OCS Air Permit application was filed with the EPA on October 7, 2022.

- The development is an eligible FAST-41 project. The Fixing America's Surface Transportation Act (FAST Act) was signed into law on December 4, 2015. Title 41 of this Act (42 U.S.C. § 4370m et seq.), referred to as "FAST-41," created a new governance structure, set of procedures, and funding authorities to improve the Federal environmental review and authorization process for covered infrastructure projects.

- The project filed an ENF with the MEPA office on September 30, 2022, which was published in the Environmental Monitor on October 7, 2022.

2.3 Conclusion

In accordance with Siting Board precedent, the Company has evaluated the need for the NE Wind 2 Connector, which in turn would enable benefits such as achieving the Commonwealth's renewable energy and greenhouse gas emission reduction targets (*see, e.g.*, G.L. c. 21N) and improving the reliability and diversity of the energy mix in the Commonwealth. Based on this information, and other information that will be submitted in this proceeding, the Company will demonstrate that the NE Wind 2 Connector is necessary to achieve these goals and that it satisfies the demonstration of need in G.L. c. 164 §§ 69H, 69J.

Section 3.0

Project Alternatives

3.0 PROJECT ALTERNATIVES

In accordance with G.L. c. 164 § 69J, this section presents a description of alternatives to the NE Wind 2 Connector ("the Project"). Section 69J indicates that alternatives can include other methods of transmitting or storing energy, other site locations, other sources of electrical power or gas, or a reduction of requirements through load management. This section focuses on fundamental Project alternatives including No-Build and transmission alternatives related to cable technologies and strategies. Sections 4 and 5 further assess alternatives to the NE Wind 2 Connector as proposed, including: interconnection locations, landfall sites, onshore and offshore export cable routes, and substation sites.

With respect to project alternatives, the NE Wind 2 Connector is distinguishable from many other projects previously considered by the Siting Board because it is being proposed in response to a specific Legislative mandate. As described in Section 2.1, Section 83C requires that the Commonwealth's electric distribution companies enter into agreements for the long-term purchase of 5,600 MW of offshore wind energy with eligible projects via a series of competitive procurements.

Given that NE Wind 2 Connector is tailored to meet specific legislative requirements for offshore wind energy under Section 83C, typical project alternatives (i.e., non-transmission alternatives such as load management, solar, onshore wind, combustion-based generation) are only briefly addressed in this section as none would meet the legislative mandate and Project purpose.

3.1 Project Alternatives

In support of the preferred alternative to advance the region's goals for utility-scale, zero-carbon offshore wind energy generation, the Company evaluated "No-Build" and related alternatives and potential transmission system alternatives (e.g., different cable configurations and interconnection points). Through this analysis, the Company demonstrates and confirms that the proposed Project best meets the identified need with a minimum impact on the environment and at the lowest possible cost.

3.1.1 No-Build and Related Alternatives

Under the No-Build Alternative, the Company would not pursue the NE Wind 2 Connector, preventing the delivery of over 1,200 MW of essential zero-carbon energy to the ISO-NE regional electrical grid. This would preclude the realization of the Project's extensive environmental and economic benefits, which are discussed in detail in Section 1.6. It would also deprive Massachusetts of a key project to meet the Commonwealth's goals under the Global Warming Solutions Act, and not contribute to, and in fact undermine attainment of the requirements set forth in Section 83C.

Similarly, non-transmission alternatives, sources of power other than offshore wind (such as solar, onshore wind, or combustion-based generation), and load management would not allow the delivery of offshore wind energy to the regional grid nor contribute to meeting the requirements and objectives of Section 83C. Replacing the Project with an alternative other than offshore wind generation under Section 83C would frustrate the Commonwealth's objectives under Section 83C.

None of these alternatives would meet the region's offshore wind energy generation requirements and none would satisfy Section 83C (see Section 2.1). For these reasons, they were not considered further.

3.1.2 Proposed NE Wind 2 Connector

The Project consists of the Massachusetts-jurisdictional offshore and onshore transmission necessary to deliver over 1,200 MW of offshore wind power generated in the southern portion of federal Lease Area OCS-A 0534 by the Commonwealth Wind project to the ISO-NE electrical grid. Specifically, the NE Wind 2 Connector will connect to the onshore electrical grid via three 275-kV three-core HVAC offshore export cables that will travel through federal and state waters, make landfall at Dowses Beach in Barnstable, then travel in a buried concrete duct bank to the proposed step-up substation, from which the Project will connect to the ISO-NE electrical grid at the 345-kV West Barnstable Substation.[1]

The proposed offshore export cables will make landfall at a Town-owned paved parking lot at Dowses Beach. HDD will be used to accomplish the transition from offshore to onshore, thus avoiding construction impacts to the beach, intertidal zone, and nearshore area. As more fully described in Section 4.1, the Company intends to install the offshore export cables within an OECC that travels from the northwestern corner of the offshore development area to the landfall site. The OECC is the same as NE Wind 1 Connector, with two primary differences: (1) the OECC for the NE Wind 2 Connector diverges to the west in Barnstable waters to provide access to the Dowses Beach Landfall Site; and (2) while the OECC proposed for the NE Wind 1 Connector in the vicinity of Muskeget Channel is the preferred route for the NE Wind 2 Connector, the Company has identified a Western Muskeget Option that could be used to install one or two of the three offshore export cables if warranted by further engineering analysis.[2] The OECC is the product of detailed marine surveys, consultations with the Massachusetts Ocean Team, and input from federal resource agencies and stakeholders that have occurred over many years in connection with multiple offshore wind energy projects.

Once onshore, each of the three offshore export cables will transition to three separate single-core cables. This transition will be accomplished via buried transition vaults/joint bays in the paved portion of the existing parking lot at Dowses Beach (one vault for each three-core offshore export cable). From the transition vaults/joint bays, the single-core onshore cables will be

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[1] The Project's grid interconnection is proposed at the 345-kV West Barnstable Substation constructed as part of the NSTAR Lower SEMA Project, as distinguished from the 115-kV Oak Street Substation located on the northern side of the same Eversource-owned parcel.

[2] The Western Muskeget Option was originally proposed as part of the OECC for the Vineyard Wind Connector (approved by the Siting Board in *Vineyard Wind*, EFSB 17-05), before the Eastern Muskeget Option was ultimately selected. The Western Muskeget Option for the NE Wind 2 Connector is the same corridor originally proposed in EFSB 17-05.

contained within an underground concrete duct bank that will be installed primarily within existing Town roadway layouts. The underground duct bank will extend from the Dowses Beach Landfall Site to the proposed onshore substation site, a distance of approximately 6.7 miles.

A step-up substation (275-kV to 345-kV) is proposed on three privately-owned undeveloped, wooded parcels totaling approximately 15.2 acres. The site is located north of Route 6 west of Oak Street, approximately 0.3 miles west of the interconnection location at the West Barnstable Substation. The Company has an option to purchase the parcels from the current owners. Underground 345-kV cables contained within a concrete duct bank will be installed from the new substation to the grid interconnection at the existing 345-kV West Barnstable Substation along one of three grid interconnection route options, which will cover a distance of approximately 0.4 to 0.5 miles.

Alternative landfall sites, substation locations, interconneciton locations, and export cable routes are considered and assessed in detail in Section 4.0 of this Petition. The Preferred and Noticed Alternative routes for the onshore export cables (from the landfall site to the proposed onshore substation site) are compared and described in detail in Sections 1.5 and 5.0.

3.1.3 Transmission Alternatives

The following subsections describe potential transmission alternatives for the Project in terms of cable technologies and interconnection strategies. The discussion focuses on practical aspects of transmission alternatives as well as implications for reliability, environmental impacts, and cost.

3.1.3.1 Cable Technology Alternatives

HVAC vs. HVDC

For the NE Wind 2 Connector, HVAC is preferred to high-voltage direct current (HVDC) transmission because it is more cost effective given the transmission length; highly reliable, consistent with the cable technology approved for the Vineyard Wind Connector and proposed for the NE Wind 1 Connector; and available within a timeframe consistent with the schedule for the NE Wind 2 Connector. Cabling is more expensive for HVAC because each cable has three circuits which require three copper conductors. HVDC cables only have one circuit in each cable, a (+) and a (-), requiring less copper. However, HVDC converter stations are more expensive than HVAC substations. Therefore, for offshore export cable lengths significantly greater than 62-75 miles (100-120 km), the wind developer has accrued enough cable savings to offset the extra costs of the converter stations required for HVDC transmission. In terms of reliability, because each HVAC cable has three complete circuits, they provide more reliability than HVDC cables because if one cable goes offline, power can still be transmitted through one of the remaining cables.

HVDC is used successfully for long-distance power transmission and has been proposed for long-distance projects in the Northeast such as the Champlain Hudson Power Express and Clean Path New York, neither of which would be an offshore application.[3] Only three U.S. offshore wind projects with an offtake agreement have proposed HVDC technology due to their further offshore routes which rendered alternating current (AC) infeasible or less cost-effective: Sunrise Wind in New York (168.4 km[4]), Beacon Wind 1 in New York (> 250 km[5]), and Mayflower Wind in Massachusetts (156 – 200 km[6]). Globally, the majority of offshore wind projects constructed to date have been with AC systems. Several large HVDC projects in the United Kingdom are currently under construction (Dogger Bank and Sofia) or in development (East Anglia 3, Hornsea 3, and Norfolk Boreas and Norfolk Boreas), but manufacturing capacity for the necessary cables is limited due to the limited HVDC project and supply chain experience, which imposes significant lead-time requirements that are incompatible with the Commonwealth Wind and NE Wind 2 Connector project schedule. In contrast, the cable manufacturer for NE Wind 2 Connector, Prysmian, is developing a Massachusetts manufacturing facility at Brayton Point that will supply HVAC offshore cables for the NE Wind 2 Connector on a timeframe consistent with the expected schedule for the Project. While HVDC did not fit with Prysmian's initial business objective for their Brayton Point facility, HVDC technology is continually being developed and may become available following additional offshore wind project developments within the region.

The Company's successful bid into the Massachusetts 83C procurement was based on AC cable technology.[7] To date, U.S. projects with offshore routes less than 62-75 miles (100-120 km), as is the case with Commonwealth Wind and the NE Wind 2 Connector, have all been proposed with AC cable technology. For all these reasons, AC transmission was selected over HVDC as the most suitable and cost-effective solution for Commonwealth Wind and the NE Wind 2 Connector.

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[3] According to the website for the Champlain Hudson Power Express, that project would be a "$4.5 billion infrastructure project" and would accommodate 1,250 MW, with a total length of 339 miles (in waterways and underground). *See* Champlain Hudson Power Express, available at https://chpexpress.com/ (last accessed Sept. 14, 2022). According to the website for Clean Path New York, that project would be an $11 billion infrastructure project that includes generation assets and a 175-mile, underground and underwater transmission line. *See* Clean Path New York, available at https://www.cleanpathny.com/ (last accessed Sept. 14, 2022).

[4] https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/SRW01_COP_Rev3_2022-08-19_508.pdf

[5] https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Developer-Summaries-Compiled.pdf

[6] https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Mayflower%20Wind%20COP%20Volume%20I_0.pdf

[7] The majority of offshore wind projects in advanced stages of development in the region will be HVAC. The only exceptions among projects that have met the milestone of being selected through competitive solicitations to date are a project proposed by Mayflower Wind (see *Mayflower Wind Energy LLC*, EFSB 22-04), the Beacon Wind project, proposed by Equinor Wind US LLC and the Sunrise Wind project, a joint venture between Orsted and Eversource. All of these projects require longer cable lengths than the NE Wind 2 Connector.

Transmission Voltage

The voltage of the proposed export transmission system will be 275-kV. For some time, 220-kV has been the standard and accepted operating voltage for comparable connections of offshore projects in Europe. More recently, offshore wind projects have proposed 275-kV cables (e.g., NE Wind 1 Connector and the Mayflower 1 project noted above). The 275-kV cables are similar in construction and physical size to 220-kV cables but operate at higher voltage/lower amperage for a given power rating. The higher-voltage cables have lower power losses and can have lower magnetic field levels for a given power flow.

An even higher voltage such as 345-kV could theoretically be used for an offshore wind project, but there are no tested offshore cables of this type, and a long type-testing process would be required.

Voltages lower than 275-kV or 220-kV are not desired for this Project, as they would increase the number of cables required and increase overall power losses. Therefore, selecting lower-voltage cables than 275-kV would increase Project costs, extend the installation schedule, and enlarge the area impacted in the offshore and onshore environments.

Cable Type

Cross-linked polyethylene plastic (XLPE) insulation will be used for the Project's offshore and onshore cables, and XLPE is considered state-of-the-art technology for offshore transmission worldwide. XLPE cables are solid dielectric cables that do not contain any type of insulating fluids. XLPE cables have proven to be more reliable with greater ease of handling than high-pressure fluid-filled (HPFF) and oil-impregnated cables. XLPE also allows for standard and quicker jointing and termination.

The proposed offshore and onshore export cables are described in greater detail in Sections 1.3.2 and 1.3.3, respectively.

3.1.3.2 Single vs. Multiple Interconnection Locations

An analysis of potential interconnection locations is provided in Section 4.2 in the context of the routing analysis. In designing the Project, the Company has also considered whether the NE Wind 2 Connector should connect to the regional electrical grid at a single interconnection point or multiple interconnection points. Specifically, the Company considered a Dual Interconnection Alternative that would have interconnected 400 MW in Acushnet and 800 MW in West Barnstable. This alternative would have required a second OECC making landfall within a town located along Buzzards Bay, and was considered in case technical engineering or other issues were identified with accommodating all three proposed circuits at the landfall site, along the onshore route, or at the proposed interconnection at West Barnstable Substation.

Preliminary interconnection load flow analysis shows that the Project could interconnect over 1,200 MW at the existing 345-kV West Barnstable Substation, provided certain infrastructure improvements are made at the substation (see Section 1.3.5). Furthermore, engineering confirmed the viability of accommodating the three circuits at the landfall site and along the onshore route, allowing the Company to dismiss the Dual Interconnection Alternative. Maintaining a single point of interconnection at the West Barnstable Substation results in a cost-effective and efficient construction sequence. This eliminates the need for additional onshore cabling, avoids the need for a second distinct OECC, avoids the need to construct new substations in multiple locations, and significantly reduces the environmental impacts of cabling both offshore and onshore, as well as landing at two separate sites.

As described in Section 4.2, multiple potential interconnection points on Cape Cod were considered for the Project. West Barnstable was determined to be the best interconnection location for the Project. Based on this, the Company sought and now holds ISO-NE interconnection queue positions (QP) 806 and QP 1109 for an interconnection at West Barnstable Substation. Moreover, the Company has been able to secure an option to purchase parcels totaling approximately 15.2 acres less than a mile west of the existing West Barnstable Station.

3.1.3.3 Generator Lead Line Approach vs. Shared Transmission

As the utility-scale offshore wind effort has emerged in federal waters off the southern New England coast, the subject of "shared transmission" (i.e., "networked transmission" or an "offshore transmission backbone") has been part of the conversation. This was the case beginning in 2009 with the BOEM/stakeholder lease area identification and evaluation process, and the conversation continues today. However, given the many significant challenges with shared transmission, the offshore wind industry and governmental bodies have been moving forward with projects that utilize generator lead lines and direct interconnections.

The Company considered a shared transmission option for Commonwealth Wind, but rejected that approach given the timeline required for the Project under the legislatively authorized procurement. Coordinating shared transmission solutions could conceivably provide some benefits for some projects in the future, but is not a viable solution for the NE Wind 2 Connector. The NE Wind 2 Connector was developed, bid into the Section 83C RFP, and selected through the Section 83C process as a generator lead line project. A different approach is not consistent with that process at this point or desirable.

Because of the characteristics of Commonwealth Wind and Lease Area OCS-A 0534, a generator lead line is superior to a shared transmission alternative based on cost, reliability, and environmental grounds. The Lease Area is relatively close to attractive interconnection locations on Cape Cod, where a direct route enables the transmission from multiple projects (i.e., Vineyard Wind Connector, NE Wind 1 Connector, and NE Wind 2 Connector) within the same OECC. Such projects can be developed expeditiously to deliver the benefits of offshore wind generation to New England in a timely manner without the inherent risks associated with shared transmission investments.

The shared transmission strategy for NE Wind 2 Connector has additional drawbacks, including substantial technological, development, and regulatory risks, which are currently not present in the generator lead line approach for NE Wind 2 Connector. For example, any delay or other issue that affects timing, cost, or design of shared transmission infrastructure could significantly impact the timing, cost, or design of an offshore wind project and vice versa. In a generator lead line approach, a single party is responsible for the generation and transmission component of an offshore wind project, and can take an integrated approach to design, development, financing, construction, and operation, internalizing the costs thereof. Shared transmission introduces significant coordination challenges with respect to project development, permitting, stakeholder engagement, and other processes that determine impacts and mitigation techniques. Beyond the increased risks, for the NE Wind 2 Connector to be developed with a shared transmission approach, the associated shared transmission approach would need to be developed, proposed, and likely selected through a competitive process. Those steps have not occurred to date and pursuing them would not allow the development of the associated offshore wind generation facility that was procured through Section 83C, or the delivery of the associated clean energy on the anticipated timeline. In addition, requiring such an approach would gravely jeopardize the ability of this project to meet its commercial operation date in 2028.

Moreover, shared transmission infrastructure is not necessarily preferable from an environmental perspective for the NE Wind 2 Connector. Consider a scenario in which a shared transmission network was developed for 1,600 MW of offshore wind capacity interconnecting to ISO-NE. The current maximum loss of source for a Normal Design Contingency, utilized for planning purposes in ISO-NE, is approximately 1,200 MW. This effectively limits the amount of capacity that can interconnect to the grid from a single source to approximately 1,200 MW regardless of whether transmission is independently developed or a project-specific generator lead line. To comply with this limit, a shared transmission infrastructure designed to support 1,600 MW of offshore wind capacity would, at a minimum, have to include two sets of two export cables to interconnect at two separate points of interconnection, likely through separate onshore landings and onshore transmission routes. In this scenario, the resulting shared transmission infrastructure does not yield any environmental advantages relative to project-specific generator lead lines developed for the same capacity of offshore wind. Finally, to the extent that shared transmission infrastructure is likely to increase complexity and development timelines for offshore wind deployment, it would delay and potentially frustrate the region's efforts to reduce greenhouse gas emissions in line with state-mandated targets, leading to greater environmental impacts.

Experience to date has been that offshore wind projects with generator lead lines, rather than shared transmission projects, are selected through state procurements. The first Massachusetts Section 83C procurement, issued in Fall 2017, included a provision for a shared transmission option. That option was not selected, rather the initial 800-MW PPA went to Vineyard Wind LLC. The Vineyard Wind offering was based on a wind turbine array in Lease Area OCS-A 0501 and a generator lead line. Use of a proven, cost-effective AC cable technology, together with a modest cable length and an interconnection that could be accomplished without significant system

upgrades, was a significant element of Vineyard Wind's cost-competitive 800-MW proposal for Vineyard Wind 1/Vineyard Wind Connector. The state, regional, and local permitting of the Vineyard Wind Connector was completed in approximately two years.

Since the initial Section 83C award to Vineyard Wind, other offshore wind projects have been advanced from U.S. lease areas, all involving generator leads (i.e., direct transmission interconnections). They include (in approximate chronological order of offtake award):

- South Fork Wind (Orsted), 130 MW (connection into Long Island Power Authority (LIPA) system, eastern end of Long Island);
- Skipjack Wind 1 (Orsted), 120 MW (connection into Pennsylvania-Jersey-Maryland [PJM] system, Maryland or Delaware for offtake in Maryland);
- MarWin (US Wind), 270 MW (connection into PJM system, Delaware for offtake in Maryland);
- Revolution Wind (Orsted and Eversource), 704 MW (interconnection to ISO-NE grid at Davisville Substation, Rhode Island [RI]);
- Empire Wind 1 (Equinor Wind US LLC), 816 MW (interconnection at Gowanus Substation in Brooklyn, New York [NY]);
- Sunrise Wind (Orsted and Eversource), 880 MW (grid interconnection into Holbrook and West-Bus substations in Brookhaven, NY in east-central Long Island);
- Ocean Wind 1 (Orsted and PSEG), 1,100 MW (interconnection into PJM system in Oyster Creek, New Jersey [NJ]);
- Mayflower Wind (Shell and EDP Renewables); 804 MW + 400 MW in subsequent 2021 award (connection to ISO-NE grid at Brayton Point, Somerset, MA);
- Park City Wind/NE Wind 1 Connector, 804 MW (connection to ISO-NE grid at the 345-kV West Barnstable Substation);
- Empire Wind 2 (Equinor Wind US LLC), 1,260 MW (interconnection at Barrett Substation, Oceanside, NY);
- Beacon Wind (Equinor Wind US LLC), 1,230 MW (interconnection at Astoria Substation in Queens, NY);
- Ocean Wind 2 (Orsted), 1,148 MW (interconnection into PJM system in Ocean City, NJ);
- Atlantic Shores 1 (Shell and EDF), 1,510 MW (interconnection into PJM system at Cardiff Substation, Egg Harbor, NJ);
- Commonwealth Wind/NE Wind 2 Connector, 1,232 MW (connection to ISO-NE grid at the 345-kV West Barnstable Substation);
- Skipjack Wind 2 (Orsted), 846 MW (connection into PJM system, Maryland or Delaware for offtake in Maryland);

- Momentum Wind (US Wind), 809 MW (connection into PJM system, Delaware for offtake in Maryland); and
- Coastal Virginia Offshore Wind (Dominion Energy), 2,640 MW (connection into Dominion system, Virginia).

Shared transmission will likely be considered in future Massachusetts solicitations. Building on the 2016 Energy Diversity Act, in 2018 Massachusetts passed An Act to Advance Clean Energy which required DOER to (1) require the EDCs to conduct solicitations and procurements for up to 1,600 MW of additional offshore wind; and (2) require solicitation of transmission from wind energy areas.[8] In response to this legislative mandate, DOER published an Offshore Wind Study in May 2019 that concluded, among other things that shared transmission should be considered for future solicitations, but that transmission only solicitations would need to be conducted prior to soliciting the associated generation.[9] The third Section 83C solicitation was conducted, and the Commonwealth Wind Project was selected, but a transmission-only solicitation has not occurred in Massachusetts to date.

3.2 Conclusion

The Company evaluated the No-Build and related alternatives as well as transmission alternatives. Since the Project is in direct response to the Commonwealth's goals for offshore wind generation (see Section 1.2), there are no practicable alternatives to a transmission line connecting offshore wind generation to the onshore electrical grid (including non-transmission alternatives such as energy efficiency) that are suitable.

The analysis concluded that given the Commonwealth's and region's goals for offshore wind generation, coupled with reliability needs stemming from the loss and expected loss of base load generation, the No-Build and related alternatives could be dismissed from consideration.

Furthermore, the cable technology alternatives considered were design-related decisions that, as articulated in Section 3.1.3.1, dictated selection of the proposed transmission infrastructure.

As a result of this analysis, proposed transmission infrastructure was advanced to the transmission routing analysis presented in Section 4.0. The Project's alternative analysis, as presented herein and in Sections 4.0 and 5.0, demonstrates that the proposed Project best addresses the identified need with minimal environmental and construction impacts and at the lowest possible cost.

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[8] In 2021, two acts provided further authority for soliciting shared transmission options. *See* An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy, St. 2021 c. 8, § 95, An Act Making appropriations for the Fiscal Year 2022, St. 2021, c. 24, § 72. That authority was further elaborated upon in the 2022 Act Driving Clean Energy and Offshore Wind, St. 2022, c. 179, §§ 70, 82.

[9] DOER. May 2019. *Offshore Wind Study*. Prepared with support from Levitan & Associates. https://www.mass.gov/files/documents/2019/05/31/OSW%20Study%20-%20Final.pdf.