US Wind

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Construction and Operations Plan:

Maryland Offshore Wind Project

VOLUME I: Project Information

uswindinc.com

Construction and Operations Plan

Volume I. Project Information

Revised June 2024

Maryland Offshore Wind Project

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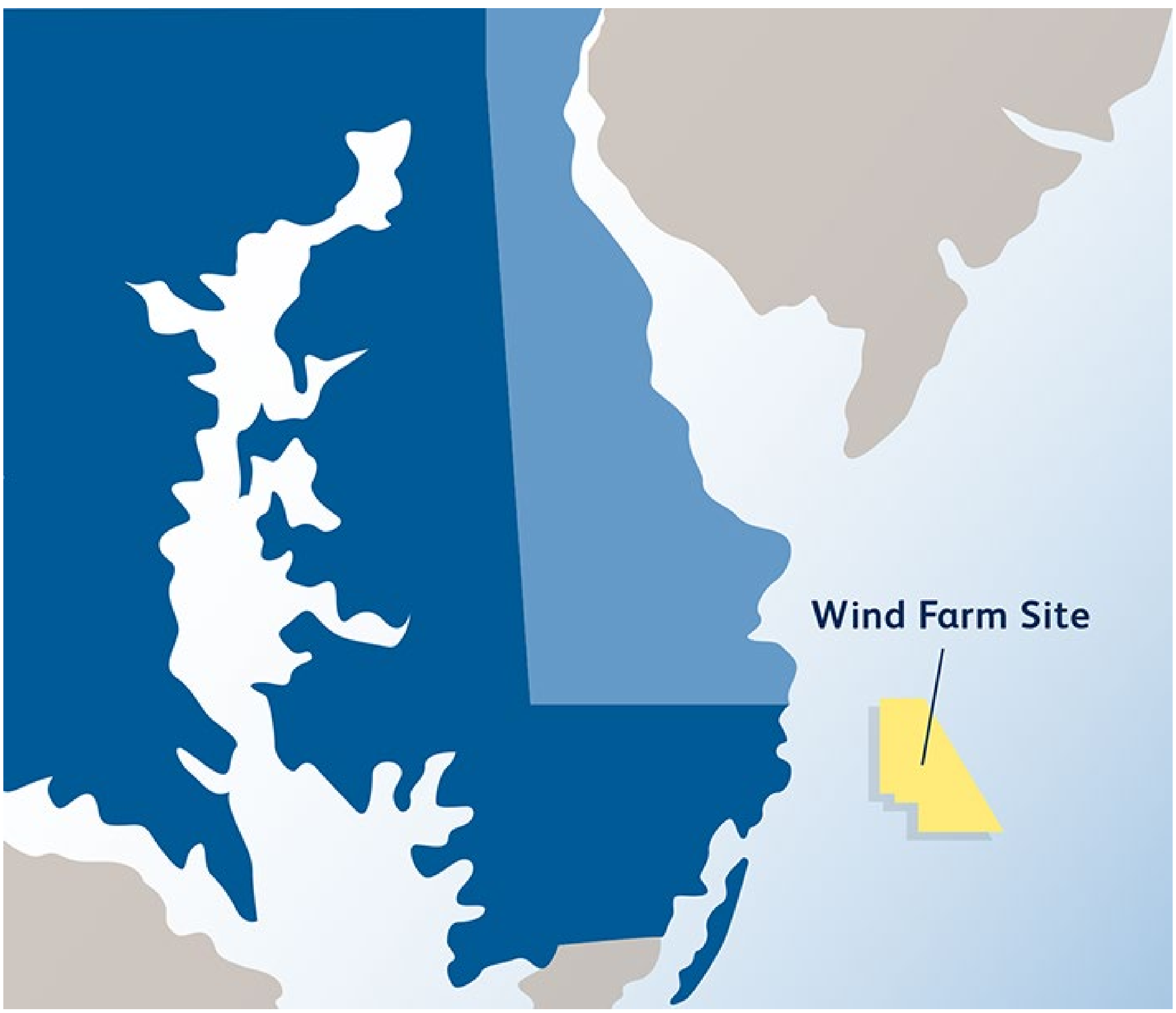

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Glossary of Terms

Term	Definition
Barrier Beach Landfalls	Locations on land where the Offshore Export Cables may come ashore, specifically 3R's Beach Parking Lot and Tower Road Parking Lot
Indian River Substation	Delmarva Power and Light (DPL) Substation adjacent to the NRG Indian River Power Plant
Inland Bays	Collection of inland bays in Delaware: Indian River Bay, Rehoboth Bay, Little Assawoman Bay
Inter-array Cables	Cables in the Lease area connecting WTGs in strings to OSSs
Interconnection Facilities	US Wind substations at Point of Interconnection
Lease	OCS-A 0490
Lease area	Area described in the Lease
Maryland WEA	The Wind Energy Area off Maryland that became US Wind's Lease area
Met Tower	Designed and fabricated structure proposed to be deployed in the Lease area, previously covered under an approved SAP
Metocean Buoy	Floating LiDAR buoy, including trawl-resistant bottom mount, deployed in Lease area under approved SAP
O&M Facility	Operations and maintenance facility (admin building and quayside) in the Ocean City, Maryland, region
Offshore Export Cable Corridors	Offshore export cable routes labelled 1 and 2
Offshore Export Cables	Up to 4 cables to be located in the selected Offshore Export Cable Corridor(s)
Onshore Export Cable Corridor 1	Area assessed as part of the routing within Indian River Bay, part of the Project Design Envelope
Onshore Export Cable Corridors	Potential onshore cable routes labelled 1, 1a, 1b, 1c, and 2
Onshore Export Cable South Corridor	"Onshore" cable corridor through Indian River Bay, proposed route from proposed landfall at 3R's Beach to proposed US Wind substations adjacent to Indian River Substation
Onshore Export Cables	Up to 4 cables to be located in the selected Onshore Export Cable Corridor(s)
Point of Interconnection	Where the Project interconnects to the regional electric grid (PJM)
The Project	Maryland Offshore Wind Project; encompasses all project facilities onshore and offshore

Term	Definition
Submarine Cables	All cables in water, proposed to be buried beneath the seabed or bay bottom (Indian River Bay)
US Wind Substations	The substation or substations that US Wind will build to connect to the Point of Interconnection

Acronyms and Abbreviations

Notation	Definition
°	Degrees
°C	Degrees Celsius
°F	Degrees Fahrenheit
3/C	Three Conductor
AC	Alternating Current
ACHP	Advisory Council on Historic Preservation
ADCP	Acoustic Doppler Current Profiler
Apollo	Apollo Global Management
Barrier Beach Landfalls	3R's Beach or Tower Road
BGEPA	Bald and Golden Eagle Protection Act
BOEM	Bureau of Ocean Energy Management
CBRA	Cable Burial Risk Assessment
CEJA	Clean Energy Jobs Act
CFR	Code of Federal Regulations
cm	Centimeter
COA	Corresponding Onshore Area
COMAR	Code of Maryland Regulation
COP	Construction and Operations Plan
CPS	Cable Protection Systems
CTD	Conductivity, Temperature, And Depth
CTV	Crew Transfer Vessel
CVA	Certified Verification Agent
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program

Notation	Definition
DE	Delaware
DelDOT	Delaware Department of Transportation
DGS	Maryland Department of General Services
DNREC	Department of Natural Resources and Environmental Control
DoD	Department of Defense
DPL	Delmarva Power and Light
EHS	Environmental, Health and Safety
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPC	Engineering, Procurement, and Construction
ESA	Endangered Species Act
ESP	Electric Service Platform
FAA	Federal Aviation Administration
FDR	Facility Design Report
FIR	Fabrication and Installation Report
FIR	Facility Installation Report
Flotel	Floating Hotel
ft	Feet
G&G	Geotechnical and Geophysical
GIF	Gulf Island Fabrication, Inc.
GW	Gigawatts
HDD	Horizontal Directional Drilling
HRG	High Resolution Geophysical
HV	High Voltage
ICPC	International Cable Protection Committee
IEC	International Electrotechnical Commission
IMCA	International Marine Contractors Association
IMO	International Maritime Organization

Notation	Definition
in	Inches
ISA	Interconnection Service Agreement
ITP	Inspection and Test Plan
Keystone	Keystone Engineering, Inc.
kJ	Kilojoules
km	Kilometers
kV	Kilovolt
LNTM	Local Notice to Mariners
m	Meters
m^2	Square Meters
MAPC	Maritime Applied Physics Corporation
MBTA	Migratory Bird Treaty Act
MCE	Mission Compatibility Evaluation
MDE	Maryland Department of Environment
MD	Maryland
MEA	Maryland Energy Administration
metocean	Meteorological and Ocean
Metocean Buoy	Monitoring Buoy
Met Tower	Meteorological Tower
MHHWL	Mean Higher High Water Line
mi	Statute Miles
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSF	Module Support Frame
MSL	Mean Sea Level
MV	Medium Voltage
MW	Megawatt
NAAQS	National Ambient Air Quality Standards

Notation	Definition
NAD	North American Datum
NDAA	National Defense Authorization Act
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJ	New Jersey
NM	Nautical Miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OE/AAA	Obstruction Evaluation/ Airport Airspace Analysis
OEM	Original Equipment Manufacturer
OREC	Offshore Wind Renewable Energy Credit
OSRP	Oil Spill Response Plan
OSS	Offshore Substations
PA	Pennsylvania
PATON	Private Aids to Navigation
PDE	Project Design Envelope
PE	Polyethylene
PJM	PJM Grid Operator
POI	Point of Interconnection
PSC	Public Service Commission
RI	Rhode Island
RNA	Rotor-Nacelle Assembly

Notation	Definition
RoD	Record of Decision
ROV	Remotely Operated Vehicle
ROW	Right-Of-Way
RPS	Renewable Portfolio Standard
RTO	Regional Transmission Organization
SAP	Site Assessment Plan
SC	South Carolina
SCADA	Supervisory Control and Data Acquisition
SCRP	Species Conservation and Research Program
SHPO	State Historical Preservation Office
SMS	Safety Management System
SPS	Sparrows Point Steel
The Act	Maryland Offshore Wind Energy Act
The Clearinghouse	The Military Aviation and Installation Assurance Siting Clearinghouse
THPO	Tribal Historic Preservation Officers
ton	Tonnes
TP	Transition Piece
TSS	Traffic Separation Scheme
U.S.	United States
USA	United States of America
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VA	Virginia
WEA	Wind Energy Area
WGS	World Geodetic System

Notation	Definition
WTG	Wind Turbine Generators
XLPE	Cross-Linked Polyethylene

Executive Summary

US Wind, Inc. (US Wind) is developing the Maryland Offshore Wind Project (the Project), an offshore wind energy project of up to approximately 2 gigawatts (GW) of nameplate capacity within OCS-A 0490 (the Lease), a Lease area of approximately 80,000 acres located off the coast of Maryland on the Outer Continental Shelf. The purpose of the Project is to provide offshore wind renewable energy generation within the Lease area to fulfil renewable energy standards and targets set by the state of Maryland and the United States.[1] The Project will produce utility-scale power to the regional electric grid, help reduce greenhouse gas emissions, diversify the nation's energy portfolio, and create new economic development opportunities, including employment creation, in the region. This Construction and Operations Plan (COP) provides an overview of the Project's construction, operations and maintenance, and decommissioning, in accordance with Bureau of Ocean Energy Management (BOEM) regulatory requirements.[2]

The COP is organized as two volumes. Volume I provides information about the Project's technology and components, including construction, operations, and decommissioning of the Project. Necessary regulatory approvals are also part of Volume I. Volume II of the COP presents information about the existing site conditions and various resources, potential impacts of the Project, and related avoidance, minimization, and mitigation measures to minimize impacts. A summary of impacts and mitigation measures can be found in Volume II.

US Wind Lease Background

US Wind obtained the Lease in 2014 when the company won an auction for two leases from BOEM, which in 2018 were combined into the Lease. The COP seeks approval from BOEM to construct and operate the Project in accordance with the exclusive rights and privileges granted to US Wind in the Lease to conduct authorized activity to develop renewable energy in the Lease area, as set forth in Addendum A of the Lease. The Project includes MarWin, a wind farm of approximately 300 MW for which the State of Maryland awarded to US Wind Offshore Renewable Energy Credits (ORECs) in 2017; Momentum Wind, consisting of approximately 808 MW for which the State of Maryland awarded additional ORECs in 2021; and build out of the remainder of the Lease area to fulfill ongoing, government-sanctioned demands for offshore wind energy.

Overview of the Project

The Project consists of the construction, operation and maintenance, and decommissioning of the offshore wind electric generating facility located in the Lease area, easements, export cables, and onshore transmission and substation connections. US Wind adopted the project design envelope (PDE) approach to present the Project in the COP and includes a reasonable range of design scenarios to encompass the maximum potential effects of development.[3]

Use of the PDE allows for the reasonable evaluation of maximum effects and retains the flexibility needed to plan the Project during the rapid evolution of technology in the offshore wind sector. Under this PDE approach, the Project has an upward limit of 121 wind turbine generators (WTG), up to four (4) offshore substations (OSS), and one (1) meteorological tower (Met Tower) located

[1] *See* The White House, "Tackling the Climate Crisis at Home and Abroad," E.O. 14008 (Jan. 27, 2021); Maryland Offshore Wind Energy Act of 2013, 2013 Md. Laws, ch. 3, codified as Public Utilities Article ("PUA"). §§ 7-704.1 – 7-704.2, Annotated Code of Maryland; *see also* The Maryland Clean Energy Jobs Act of 2019 (2019 Md. Laws, ch. 757).

[2] 30 CFR Part 585.

[3] *See* BOEM Project Design Envelope Guidance (2018).

in the roughly 80,000-acre Lease area. The Project will be interconnected to the onshore electric grid by up to four (4) new 230-275 kV export cables into a new, an expanded or an existing substation in Delaware. In this COP, US Wind identifies preferred site configurations or component designs based on the current understanding of site conditions and evaluation of potential impacts; however, such site configurations and component designs will be further refined during the fabrication and installation phases of the Project in a manner consistent with BOEM regulations. As a result, the impacts of the final, approved Project may be less than the various scenarios considered in the COP.

Project elements include offshore structures, inter-array and export cables, and onshore infrastructure as described in more detail below:

- **Wind Turbine Generators (WTGs)**
  - Up to a maximum of 121 WTGs are proposed in the Lease area under the PDE, spaced 0.77 NM east to west and 1.02 NM north to south.
  - The PDE maximum size is a WTG with 18 MW nameplate capacity.
  - Foundations for the wind turbines will be monopiles: large diameter coated steel tubes driven into the seabed. Layers of rock will be used for scour protection around the foundations.
  - Use of a staging facility at Sparrows Point in the Greater Baltimore area to receive WTGs and other components. Sparrows Point could also supply monopile foundations and fabricate and assemble other Project elements, as well as support the equipment needs of other offshore wind projects.
  - Use of the best commercially available technology suitable for the site to minimize the number of WTGs and site impacts and maximize efficiency of the Project.
- **Offshore Substations (OSSs)**
  - Up to 4 OSSs are included in the PDE.
  - OSS foundations will be monopiles, jackets on piles (“piled jackets”), or jackets on suction buckets. Rocks for scour protection will be placed around the monopile and piled jacket foundations. Jackets on suction buckets include scour protection built in.
  - Fabrication of the OSSs may be completed at Sparrows Point or other suitable locations.
- **Meteorological Tower (Met Tower)**
  - Consists of a 100 m mast on a 279 sq. m deck atop a Braced Caisson foundation.
  - Includes measurement devices to record weather conditions such as winds and waves.

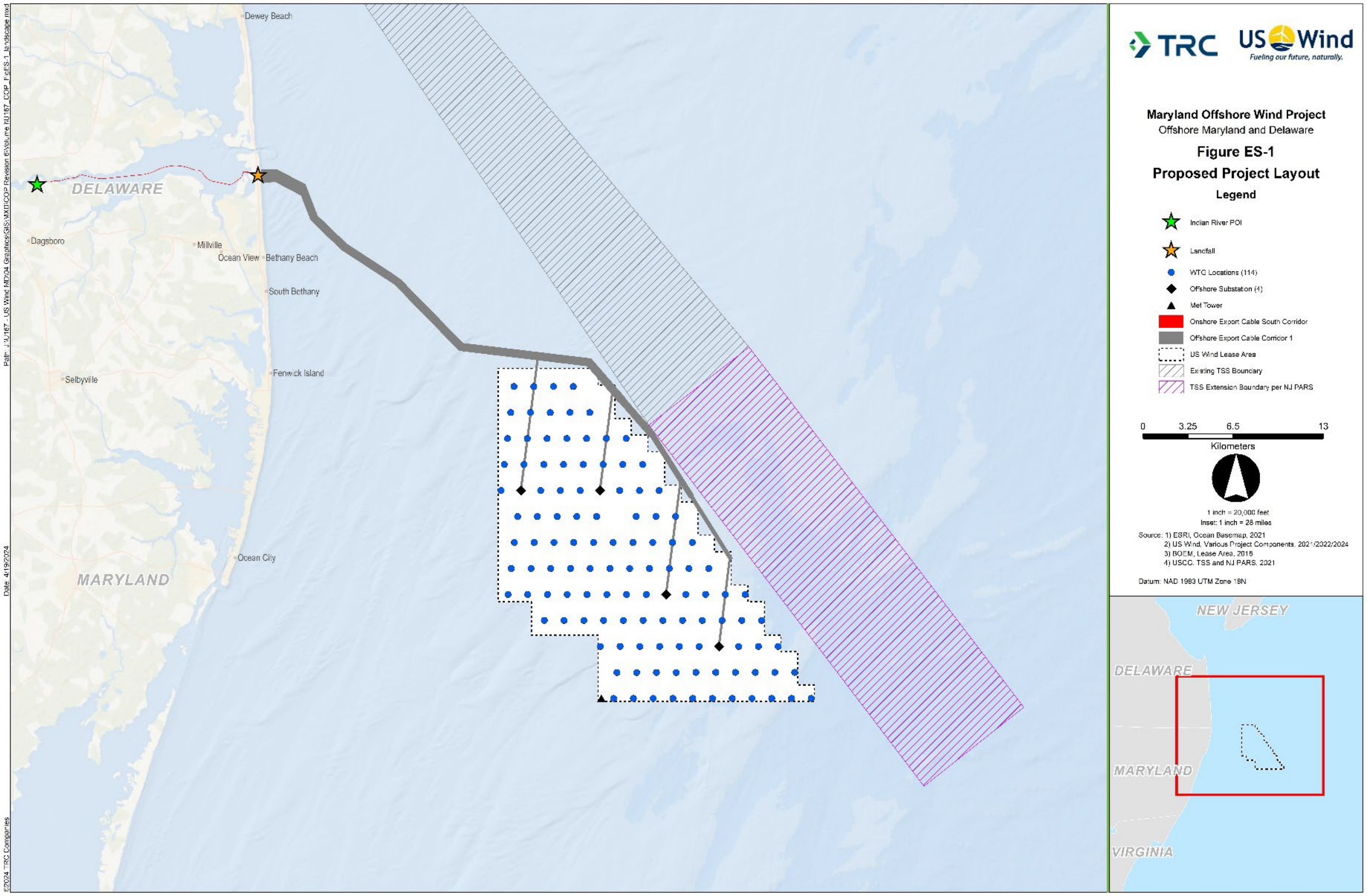


Figure ES-1. Proposed Project Layout

- **Inter-Array Cables**
  - Submarine inter-array cables designed for 66 kV will connect the WTGs in strings of 4-6 to the OSSs.
  - Inter-array cables will be buried in the seabed. The cable ends will be installed in cable protection systems (CPS) close to the WTG foundations where burial may not be possible. Scour protection rocks will later stabilize these CPS systems.
- **Offshore Export Cables**
  - Up to 4 offshore export cables are included in the PDE. Export cables consist of an offshore portion, the Offshore Export Cables, from the Lease area to the landing location, through a transition vault to the onshore portion, and the Onshore Export Cables that connect to the Point of Interconnection (POI).
  - Offshore Export Cables are planned as 230-275 kV 3/C submarine cable. Offshore Export Cables would run from the OSS to a planned landfall in the vicinity of the Indian River Inlet.
  - Two potential landing locations are included in the PDE, both in Delaware Seashore State Park parking lots at 3R's Beach and Tower Road.
  - Proposed cable route, Offshore Export Cable Corridor 1, would land at the 3R's Beach landfall. Other offshore route options are included in the PDE.
  - Cable corridors offshore have been sited to avoid conflicts with existing uses, such as active sand borrow areas used for beach nourishment and storm resiliency projects along the Delmarva Peninsula.
- **Onshore Export Cables**
  - Onshore Export Cables are the portion of the export cables from the landfall location to the POI located onshore.
  - Up to 4 Onshore Export Cables are included in the PDE, as well as multiple routes to the associated POI.[4]
  - The proposed Onshore Export Cable Corridor 1 traverses Indian River Bay after landfall at 3R's Beach and connects to onshore substations next to the POI at Indian River Substation. Transition from water to land, and land to water, would be accomplished by horizontal directional drilling (HDD). HDD will minimize impacts to sensitive shore areas.
  - All onshore cable infrastructure will be buried.
- **Onshore Substation**
  - Proposed POI to the regional electric grid is the existing Indian River Substation owned by Delmarva Power and Light (DPL) in Dagsboro, Delaware.

[4] US Wind removed Onshore Export Cable Corridor 3 and Onshore Export Cable Corridor 4, connecting to Cool Springs and Milford Substations, respectively, from the PDE due to changes by the regional grid operator, PJM, in the interconnection request review process in December 2022.

- **US Wind Onshore Substations**
  - Proposed construction of new onshore substations in the vicinity of the existing Indian River Substation. These substations would provide for a transition for the Onshore Export Cables to connect to the Indian River Substation.
- **Operations and Maintenance (O&M) Facility**
  - An O&M Facility is proposed in the Ocean City, Maryland, region to allow for efficient access to the Project once operational.

Table ES-1. Project Compliance Summary

Regulations	Description	Section
30 CFR 585.626 (a)		
(1) Shallow Hazards	The results of the shallow hazards survey with supporting data	Volume II - Section 2.0 Volume II Appendix II-A1 Volume II Appendix II-A2
	(i) Shallow faults;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(ii) Gas seeps or shallow gas;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(iii) Slump blocks or slump sediments;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(iv) Hydrates; or	Volume II Appendix II-A1 Volume II Appendix II-A2 No evidence has been observed
	(v) Ice scour of seabed sediments.	Volume II Appendix II-A1 Volume II Appendix II-A2 No evidence has been observed
(2) Geological Survey	The results of the geological survey with supporting data	Volume II - Section 2.0 Volume II Appendix II-A1 Volume II Appendix II-A2
	(i) Seismic activity at your proposed site;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(ii) Fault zones;	Volume II Appendix II-A1 Volume II Appendix II-A2

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	(iii) The possibility and effects of seabed subsidence; and	Volume II Appendix II-A1 Volume II Appendix II-A2
	(iv) The extent and geometry of faulting attenuation effects of geologic conditions near your site	Volume II Appendix II-A1 Volume II Appendix II-A2
(3) Biological	The results of the biological survey with supporting data. A description of the results of biological surveys used to determine the presence of live bottoms, hard bottoms, and topographic features, and surveys of other marine resources such as fish populations (including migratory populations), marine mammals, sea turtles, and sea birds.	Volume II Section 7.0 Volume II Appendix II-D
4) Geotechnical Survey	The results of your sediment testing program with supporting data, the various field and laboratory test methods employed, and the applicability of these methods as they pertain to the quality of the samples, the type of sediment, and the anticipated design application. You must explain how the engineering properties of each sediment stratum affect the design of your facility. In your explanation, you must describe the uncertainties inherent in your overall testing program, and the reliability and applicability of each test method	Volume II Section 3.0 Volume II Appendix II-B1 Volume II Appendix II-B2 Volume II Appendix II-B3 Additional information to be provided during FDR/FIR per Departure letter
	(i) The results of a testing program used to investigate the stratigraphic and engineering properties of the sediment that may affect the foundations or anchoring systems for your facility.	Volume II Appendix II-A Additional information to be provided during FDR/FIR per Departure letter
	(ii) The results of adequate *in situ* testing, boring, and sampling at each foundation location, to examine all important sediment and rock strata to determine its strength classification, deformation properties, and dynamic characteristics.	Information to be provided during FDR/FIR per Departure letter

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	(iii) The results of a minimum of one deep boring (with soil sampling and testing) at each edge of the project area and within the project area as needed to determine the vertical and lateral variation in seabed conditions and to provide the relevant geotechnical data required for design.	Information to be provided during FDR/FIR per Departure letter
(5) Archeological Resources	The results of the archaeological resource (historic and prehistoric) survey with supporting data as required by the NHPA (16 U.S.C. 470 et seq.), as amended.	Volume II Section 14 Volume II Appendix II-I
(6) Overall Site Investigation	An overall site investigation report for your facility that integrates the findings of your shallow hazards surveys and geologic surveys, and, if required, your subsurface surveys with supporting data	Volume II - Section 3.0 Volume II Appendix II-A1 Volume II Appendix II-A2
	An analysis of the potential for:	
	(i) Scouring of the seabed;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(ii) Hydraulic instability;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(iii) The occurrence of sand waves;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(iv) Instability of slopes at the facility location;	Volume II Appendix II-A1 Volume II Appendix II-A2
	(v) Liquefaction, or possible reduction of sediment strength due to increased pore pressures;	Volume II Appendix II-A1 Volume II Appendix II-A2 Additional information to be provided during FDR/FIR per Departure letter
	(vi) Degradation of subsea permafrost layers	Information to be provided during FDR/FIR per Departure letter

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	(vii) Cyclic loading	Information to be provided during FDR/FIR per Departure letter
	(vii) Lateral loading	Information to be provided during FDR/FIR per Departure letter
	(ix) Dynamic loading	Information to be provided during FDR/FIR per Departure letter
	(x) Settlements and displacements	Information to be provided during FDR/FIR per Departure letter
	(xi) Plastic deformation and formation collapse mechanisms	Information to be provided during FDR/FIR per Departure letter
	(xii) Sediment reactions on the facility foundations or anchoring systems.	Information to be provided during FDR/FIR per Departure letter
30CFR 585.626 (b)		
(1) Contact information	The name, address, e-mail address, and phone number of an authorized representative.	Volume I Section 1.3
(2) Designation of operator, if applicable	As provided in §585.405.	Volume I Section 1.4
(3) The construction and operation concept	A discussion of the objectives, description of the proposed activities, tentative schedule from start to completion, and plans for phased development, as provided in §585.629.	Volume I Executive Summary Volume I Section 1.0
(4) Commercial lease stipulations and compliance	A description of the measures you took, or will take, to satisfy the conditions of any lease stipulations related to your proposed activities.	Volume I Section 1.7
(5) A location plat	The surface location and water depth for all proposed and existing structures, facilities, and appurtenances located both offshore and onshore, including all anchor/mooring data.	Volume I Sections 2.1, 2.4, 2,5, 2.6, 2.7, 3.3.2, 3.4.1, 3.5, 3.6, 3.8, 3.9 Volume I Appendix I-F Volume I Appendix I-K

Table ES-1. Project Compliance Summary

Regulations	Description	Section
(6) General structural and project design, fabrication, and installation	Information for each type of structure associated with your project and, unless BOEM provides otherwise, how you will use a CVA to review and verify each stage of the project.	Volume I Section 3.0 Volume I Appendix I-D
(7) All cables and pipelines, including cables on project easements	Location, design and installation methods, testing, maintenance, repair, safety devices, exterior corrosion protection, inspections, and decommissioning.	Volume I Sections 2.5, 2.6, 3.6, 6.1, 7.0
(8) A description of the deployment activities	Safety, prevention, and environmental protection features or measures that you will use.	Volume I Section 5.0; Appendix I-A; Appendix I-B;
(9) A list of solid and liquid wastes generated	Disposal methods and locations.	Volume I Appendix I-G
(10) A listing of chemical products used (if stored volume exceeds Environmental Protection Agency (EPA) Reportable Quantities)	A list of chemical products used; the volume stored on location; their treatment, discharge, or disposal methods used; and the name and location of the onshore waste receiving, treatment, and/or disposal facility. A description of how these products would be brought onsite, the number of transfers that may take place, and the quantity that will be transferred each time.	Volume I Appendix I-H
(11) A description of any vessels, vehicles, and aircraft you will use to support your activities	An estimate of the frequency and duration of vessel/vehicle/aircraft traffic.	Volume I Section 4.0
(12) A general description of the operating procedures and systems	(i) Under normal conditions.	Volume I Section 6.1
	(ii) In the case of accidents or emergencies, including those that are natural or manmade.	Volume I Section 6.2
(13) Decommissioning and site clearance procedures	A discussion of general concepts and methodologies.	Volume I Section 7.0
(14) A listing of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the	(i) The U.S. Coast Guard, U.S. Army Corps of Engineers, and any other applicable authorizations, approvals, or permits, including any Federal, State or local	Volume I Section 8.0

Table ES-1. Project Compliance Summary

Regulations	Description	Section
proposed activities, including commercial operations	authorizations pertaining to energy gathering, transmission or distribution (e.g., interconnection authorizations).	
	(ii) A statement indicating whether you have applied for or obtained such authorization, approval, or permit.	Volume I Section 8.0
(15) Your proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	A description of the measures you will use to avoid or minimize adverse effects and any potential incidental take before you conduct activities on your lease, and how you will mitigate environmental impacts from your proposed activities, including a description of the measures you will use as required by this part and 30 CFR 285, subpart H.	Volume II Section 1.5 Master Mitigation and Monitoring Summary
(16) Information you incorporate by reference	A listing of the documents you referenced.	Volume II Section 19.0
(17) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with your proposed activities	Contact information and issues discussed.	Volume I Appendix I-I
(18) Reference	A list of any document or published source that you cite as part of your plan. You may reference information and data discussed in other plans you previously submitted or that are otherwise readily available to BOEM.	Volume II Section 19.0
(19) Financial assurance	Statements attesting that the activities and facilities proposed in your COP are or will be covered by an appropriate bond or security, as required by §§585.515 and 585.516.	Volume I Section 1.5

Table ES-1. Project Compliance Summary

Regulations	Description	Section
(20) CVA nominations for reports required in 30 CFR 285, subpart G	CVA nominations for reports in 30 CFR part 285, subpart G, as required by § 285.706, or a request for a waiver under § 285.705(c).	Volume I Section 1.6
(21) Construction schedule	A reasonable schedule of construction activity showing significant milestones leading to the commencement of commercial operations.	Volume I Section 1.1.4
(22) Air quality information	As described in §585.700 of this section.	Volume I Section 8.0 Volume II Section 5.0 Volume II Appendix II-C1
(23) Other information	Additional information as required by BOEM.	Volume II Section 16.0 Volume II Appendix II-K
30CFR 585.627 (a)		
(1) Hazard information	Meteorology	Volume II Section 2.0
	Oceanography	Volume II Section 2.0
	Sediment transport	Volume II Section 3.0 and 4.0 Volume II Appendix II-B
	Geology and shallow geological or manmade hazards	Volume II Section 3.0 Volume II Appendix II-A1 Volume II Appendix II-A2
(2) Water quality	Turbidity and total suspended solids from construction.	Volume II Section 4.0 Volume II Appendix II-B
(3) Biological resources	Benthic communities	Volume II Section 7.0 Volume II Appendix II-D
	Marine mammals	Volume II Section 9.0
	Sea turtles	Volume II Section 10.0
	Coastal and marine birds	Volume II Section 6.0 Volume II Section 12.0 Volume II Appendix II-N
	Fish and shellfish	Volume II Section 7.0 Volume II Appendix II-D Volume II Section 8.0 Volume II Appendix II-E

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	Plankton	Volume II Section 8.0 Volume II Section 9.0
	Seagrass and plant life	Volume II Section 7.0 Volume II Appendix II-D Volume II Section 8.0 Volume II Appendix II-E
(4) Threatened or endangered species	As defined by the ESA (16 U.S.C. 1531 *et seq.*).	Volume II Section 6.0 Volume II Section 8.0 Volume II Section 9.0 Volume II Section 10.0 Volume II Section 11.0 Volume II Section 12.0 Volume II Section 13.0
(5) Sensitive biological resources or habitats	Essential fish habitat	Volume II Section 8.0 Volume II Appendix II-E
	Refuges and preserves	Volume II Section 11.0
	Special management areas identified in coastal management programs, sanctuaries, and rookeries	Volume II Section 11.0
	Hard bottom habitat	Volume II Section 7.0 Volume II Appendix II-D Volume II Section 8.0 Volume II Appendix II-E
	Chemosynthesis communities	Not Applicable
	Calving grounds	Volume II Section 9.0
	Barrier islands, beaches, dunes, and wetlands	Volume II Section 6.0
(6) Archaeological resources	As required by the NHPA (16 U.S.C. 470 *et seq.*), as amended.	Volume II Section 14.0 Volume II Appendix II-I
(7) Social and economic resources	Employment	Volume II Section 17.1 Volume II Appendix II-L
	Existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water)	Volume II Section 17.2
	Land use	Volume II Section 17.2

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	Subsistence resources and harvest practices	Volume II Section 17.4
	Recreation	Volume II Section 17.3
	Recreational and commercial fishing (including typical fishing seasons, location, and type)	Volume II Section 17.5 Volume II Appendix II-F2
	Minority and lower income groups	Volume II Section 17.4
	Coastal zone management programs	Volume II Section 18.0 Volume II Appendix II-M
	Viewshed	Volume II Section 15.0 Volume II Appendix II-J
(8) Coastal and marine uses	Military activities	Volume II Section 16.0 Volume II Appendix II-K
	Vessel traffic	Volume II Section 16.0 Volume II Appendix II-K
	Energy and nonenergy mineral exploration or development	Volume II Section 17.6
(9) Consistency Certification	As required by the CZMA regulations:	
	(i) 15 CFR part 930, subpart D, if your COP is submitted before lease issuance.	Volume II Section 18.0 Volume II Appendix II-M
	(ii) 15 CFR part 930, subpart E, if your COP is submitted after lease issuance.	Volume II Section 18.0 Volume II Appendix II-M
(10) Other resources, conditions, and activities	As identified by BOEM	To be determined
30 CFR 585.627 (b)		
	You must submit one paper copy and one electronic copy of your consistency certification. Your consistency certification must include:	Volume II Section 18.0 Volume II Appendix II-M
	1) One copy of your consistency certification either under subsection 307(c)(3)(B) of the CZMA (16 U.S.C. 1456(c)(3)(B)) and 15 CFR	Volume II Section 18.0 Volume II Appendix II-M

Table ES-1. Project Compliance Summary

Regulations	Description	Section
	930.76, or under subsection 307(c)(3)(A) of the CZMA (16 U.S.C. 1456(c)(3)(A)) and 15 CFR 930.57, stating that the proposed activities described in detail in your plans comply with the State(s) approved coastal management program(s) and will be conducted in a manner that is consistent with such program(s); and	
	2) “Necessary data and information,” as required by 15 CFR 930.58.	Volume II Section 18.0 Volume II Appendix II-M
30CFR 585.627 (c)		
	You must submit your oil spill response plan to the Bureau of Safety and Environmental Enforcement (BSEE), as required by 30 CFR part 254.	Volume I Appendix I-A
30CFR 585.627 (d)		
	You must submit your Safety Management System to BSEE as required by 30 CFR 285.810.	Volume I Appendix I-B

US Wind
Fueling our future, naturally.

1.0 Introduction

1.1 Project Overview

US Wind, Inc. (US Wind) is developing the Maryland Offshore Wind Project (the Project), an offshore wind energy project of up to approximately 2 gigawatts of nameplate capacity within OCS-A 0490 (the Lease), a Lease area of approximately 80,000 acres located approximately 18.5 km (11.5 miles) off the coast of Maryland on the Outer Continental Shelf. US Wind obtained the Lease in 2014 when the company won an auction for two leases from the Bureau of Ocean Energy Management (BOEM) which in 2018 were combined into the Lease.

The Lease granted US Wind, subject to BOEM's approval of the Construction and Operations Plan (COP), the exclusive rights and privileges to conduct authorized activity to develop renewable energy in the Lease area, as set forth in Addendum A of the Lease. The Project includes MarWin, a wind farm of approximately 300 MW for which the State of Maryland awarded to US Wind Offshore Renewable Energy Credits (ORECs) in 2017; Momentum Wind, consisting of approximately 808 MW for which the State of Maryland awarded additional ORECs in 2021; and any subsequent developments authorized within the Lease area.

Under a Project Design Envelope (PDE) approach, the Project could include as many as 121 wind turbine generators (WTG), up to four offshore substations (OSS), and one meteorological tower (Met Tower) in the Lease area. The Project will be interconnected to the onshore electric grid by up to four new 230-275 kV export cables to new US Wind substations, with an anticipated connection to the existing Indian River Substation near Millsboro, Delaware.

US Wind drafted the COP in accordance with all relevant laws and regulations as well as BOEM's Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (v.4) issued on May 27, 2020 (COP Guidelines).[5]

1.1.1 Project Background

In November 2010, BOEM (at that time the Bureau of Ocean Energy Management, Regulation and Enforcement), in partnership with the Maryland Energy Administration, announced a request for interest in renewable energy development off Maryland in an area selected by the Maryland Renewable Energy Task Force for potential development. The task force reviewed available information and expressions of commercial interest by companies, resulting in the designation of the Wind Energy Area in Maryland in February 2011.[6] Based on expressions of interest, BOEM determined there was competitive interest in the area, and accordingly, issued a Call for Information and Nominations in February 2012 to initiate the competitive leasing process.[7] Also, in February 2012, BOEM finalized its Environmental Assessment under the National Environmental Policy Act (NEPA) for commercial lease issuance and site assessment activities on the Atlantic Outer Continental Shelf offshore New Jersey, Delaware, Maryland, and Virginia with a Finding of No Significant Impact.[8] On December 17, 2013, Secretary of the Interior Sally Jewell, BOEM Director Tommy Beaudreau, and Maryland Governor Martin O'Malley announced

[5] 30 CFR Part 585.
[6] 76 Fed. Reg. 7226 (Feb. 9, 2011).
[7] 77 Fed. Reg. 5553 (Feb. 3, 2012).
[8] 77 Fed. Reg. 5560 (Feb. 3, 2012).

the proposed sale in the Maryland Wind Energy Area defined by the task force.[9] The final Sale Notice was announced in July 2014.[10]

A commercial lease sale for the Maryland Wind Energy Area covering approximately 80,000 acres was held by BOEM on August 19, 2014, for leases OCS-A 0489 and OCS-A 0490. At the conclusion of the sale, BOEM awarded both leases to US Wind for a total bid price of $8,701,098. The commercial wind energy leases to US Wind went into effect on December 1, 2014. The leases were issued pursuant to subsection 8(p) of the Outer Continental Shelf (OCS) Lands Act (OCSLA).[11]

By Lease amendment, made effective March 1, 2018, US Wind's commercial leases OCS-A 0489 and OCS-A 0490 were merged into a single lease, retaining lease number OCS-A 0490, with lease OCS-A 0489 automatically terminated.

After securing the Lease, US Wind began gathering information and taking steps necessary to advance the Project.

- In June 2015, US Wind conducted an initial high resolution geophysical (HRG) and geotechnical survey to map sea floor and subsea geology and to characterize benthic habitat, potential paleo-cultural resources, and potential geological hazards in the Lease area.
- US Wind submitted to BOEM a Site Assessment Plan (SAP) in April 2016. The SAP detailed the methods and procedures that US Wind would use to collect and analyze meteorological and oceanographic data and information on the conditions of the marine environment within the Lease area. The SAP for the installation of a meteorological tower (Met Tower) was approved by BOEM on March 22, 2018.
- In August through September 2016, US Wind completed additional surveys to provide necessary data for linear siting of an export cable route. The HRG survey covered the approximate 35 km (21.7 mile) long export cable route under consideration at the time from mainland Delaware to the Lease area.
- An inshore HRG survey was conducted in Indian River Bay, which included collection of vibracores for sediment analysis, during October and November of 2016.
- An HRG survey of an additional section within Indian River Bay, including vibracores and benthic sampling, was conducted in September and October of 2017.
- In July 2018, US Wind executed the interconnection service agreement (ISA) for 247.8 MW with PJM Interconnection, the Regional Transmission Organization (RTO) that serves the Delmarva Peninsula. US Wind followed with the submission of additional uprates for 7.3 MW and 68 MW separately, which are in the PJM Interconnection queue to increase the current interconnection capacity up to 323.1 MW. The 7.3 MW uprate was filed as PJM Queue position AF1-007 and the 68 MW uprate was filed as PJM Queue position AH1-634.

[9] 78 Fed. Reg. 76643 (Dec. 18, 2013).
[10] 79 Fed. Reg. 38060 (July 3, 2014).
[11] 43 U.S.C. § 1337(p).

- US Wind postponed installation of the Met Tower in 2019, which is now proposed in the COP (see Sections 2.4 and 3.4). In light of this change, US Wind submitted an SAP on May 5, 2020, revised October 22, 2020, to collect and analyze meteorological and oceanographic data and information on the conditions of the marine environment within the Lease area through the use of a meteorological and ocean (“metocean”) monitoring buoy (the “Metocean Buoy”). Cancellation of the Met Tower SAP was granted by BOEM March 23, 2022.
- In March 2021, US Wind filed interconnection applications for additional development associated with the Momentum Wind project and future development in the Lease area. The US Wind related PJM Queue Positions are AG2-347 (for 448.8 MW) and AG2-348 (for 897.6 MW) interconnecting at the Indian River substation.
- BOEM approved the Metocean Buoy SAP on May 5, 2021, and the Metocean Buoy was deployed May 19, 2021.
- From April 2021 to May 2022, US Wind conducted an HRG survey of the complete Lease area and alternate export cable routes in the Atlantic, including shallow geotechnical explorations and benthic survey of the alternate export cable routes.
- From May 2022 to September 2022, US conducted an HRG survey of Onshore Export Cable Corridor 1 in Indian River Bay, as well as benthic survey, geotechnical surveys, and a shellfish density survey.
- From September 2022 to March 2023, US Wind conducted nearshore geotechnical surveys in Delaware state waters in the Atlantic Ocean in the vicinity of landing locations for Offshore Export Cables, and in Onshore Export Cable Corridor 1 in Indian River Bay.
- In May 2023, US Wind, PJM, and Delmarva (the parties to the existing MarWin Interconnection Agreement) executed an amended ISA to reflect a MarWin 2025 COD, and correspondingly shift the project timelines formally to 2025.
- In June 2023, US Wind, PJM, and Delmarva executed the AF1-007 ISA, to also reflect the 2025 COD and issued to supersede the AB1-056 ISA, such that the AF1-007 ISA now reflects the 247.8 MW and 7.3 MW under a single agreement.
- On December 19, 2023, US Wind and the state of Delaware signed an initial term sheet and began the start of formal negotiations for benefits to the state. The term sheet includes an outline of potential agreements for a lease of state land, for energy credits to reduce electricity costs, and for funding for workforce development and environmental projects.
- Throughout the process to date, US Wind engaged stakeholder and maritime communities on the Eastern Shore, Baltimore, and Ocean City, Maryland, as well as state and federal agencies and tribal representatives as summarized in Appendix I-I and II-L2. US Wind conducts extensive outreach to Minority Business Enterprises in Maryland and the Eastern Shore described in Volume II Section 17.

In addition to these preliminary site assessment efforts under the Lease, US Wind also engaged in the OREC solicitation process under state law. Maryland passed the Maryland Offshore Wind Energy Act (the Act) in 2013, which paved the way for offshore wind development in the state.[12]

[12] Maryland Offshore Wind Energy Act of 2013, 2013 Md. Laws, ch. 3, codified as Public Utilities Article (“PUA”). §§ 7-704.1 – 7-704.2, Annotated Code of Maryland.

The Act encouraged development by amending the state's Renewable Portfolio Standard (RPS) to include offshore wind projects located between 16 and 48 km (10 and 30 miles) off Maryland's coast and by providing financial support for projects in the form of Offshore Wind Renewable Energy Credits (OREC).

US Wind submitted an application for approval of an offshore wind project and ORECs to the Maryland Public Service Commission (PSC) in February of 2016. On May 11, 2017, the PSC found that US Wind satisfied the requirements enumerated in PUA § 7-704.1(e) to be a Qualified Offshore Wind Project pursuant to PUA § 7-701(k).[13] Following this approval, US Wind was authorized to sell up to 913,845 ORECs per year produced by its Qualified Offshore Wind Project, for a duration of 20 years.

In 2019, the Maryland General Assembly passed the Clean Energy Jobs Act (CEJA), a law that requires the state to generate 50% of its electricity from renewable sources by 2030 and calls for an additional minimum of 1,200 MW of offshore wind energy to be procured from projects near Maryland's coast.[14] As a direct result of CEJA's passage, Maryland opened a solicitation window for applications from offshore wind developers to apply for ORECs. US Wind submitted an application to the state for ORECs that would allow the company to build Momentum Wind, an offshore project of up to approximately 1,200 MW of clean, renewable energy, fully satisfying the offshore wind goals set forth in that law. On December 17, 2021, the PSC awarded US Wind additional ORECs for Momentum Wind in the amount of 2,513,753 per year for 20 years, for a project nameplate capacity of approximately 808 MW[15].

In late March 2023, Maryland announced an increase to the state goal for offshore wind energy: 8.5 GW of offshore wind by 2031. The goal was included in the *Promoting Offshore Wind Energy Resources (POWER) Act of 2023* (Senate Bill 0781 / House Bill 0793), signed into law by Governor Wes Moore on April 21, 2023. The legislation provides new opportunities for power offtake for federal offshore wind leaseholders off the Delmarva Peninsula through a new procurement of offshore wind-generated electricity through a power purchase agreement with the Maryland Department of General Services (DGS). The law requires that the solicitation be issued to bid on or before July 31, 2024, and DGS may enter into a contract with one or more developers for up to 5 million megawatt-hours annually in September 2025. On May 9, 2024, Governor Moore signed into law House Bill 1296 / Senate Bill 1161, which, among other things, removes the 5 million megawatt-hour cap on the DGS offshore wind energy procurement and mandated a second solicitation to be issued by DGS on or before December 31, 2025.[16]

1.1.2 Purpose and Need

The purpose of the Project is to develop offshore wind energy under the Lease and to transmit this energy to the Delmarva Peninsula in fulfilment of state and federal clean energy standards and targets. The Project includes MarWin, a wind farm of approximately 300 MW for which US Wind was awarded ORECs in 2017 by the state of Maryland; Momentum Wind, consisting of

[13] Order No. 88192, Case No. 9431, Public Service Commission, State of Maryland (May 11, 2017).
[14] The Maryland Clean Energy Jobs Act of 2019 (2019 Md. Laws, ch. 757).

[15] US Wind's current contracts with the state of Maryland are for delivered ORECs, which are equivalent to megawatt hours (MWh) of electricity. In US Wind's best professional judgement, projects of approximately 300 MW and 808 MW would generate 913,845 and 2,513,753 MWh per year, respectively, with a high degree of certainty based on the presumed wind speeds and WTG availability.
[16] House Bill 1296 / Senate Bill 1161 also allows qualified offshore wind developers to apply for outstanding Round 1 and Round 2 ORECs created as a result of changes in the market and to add additional capacity to existing projects to make up for the shortfall.

approximately 808 MW for which the State of Maryland awarded additional ORECs in 2021; and build out of the remainder of the Lease area to fulfill ongoing, government-sanctioned demands for offshore wind energy. Once developed, the Project will play a critical role in advancing the offshore wind targets set forth by the federal government and the state of Maryland, reduce greenhouse gas emissions, increase grid reliability, and support economic development growth in the region, including thousands of union jobs. The Project may also provide renewable energy to other states and private enterprises in the region.

As a follow up to Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad," which set forth a renewed commitment to U.S. offshore wind development, the Biden Administration in March 2021 announced a new federal effort to facilitate the deployment of 30 gigawatts (GW) of offshore wind energy by 2030.[17] There are currently 23 active commercial leases in various stages of development, including US Wind's Lease area within the Mid-Atlantic region. BOEM's award of leases and timely review and authorization of project proposals comports with Congress' intent expressed in the Outer Continental Shelf Lands Act (OSCLA) to make the Outer Continental Shelf available for the "expeditious and orderly development," including for renewable projects. 43 U.S.C. §§ 1332 & 1337(p).

The Project is essential to achieving Maryland's renewable energy goals. As a result of two successful bids to secure ORECs from the PSC, US Wind currently has more than a gigawatt of offshore wind energy under contract with the state. While this advances the state's renewable energy goals of 50% by 2030, the full buildout of US Wind's Lease area would go further in achieving those targets and boost President Biden's offshore wind goals.

Offshore wind is Maryland's largest clean energy resource; as such, the state is unlikely to meet its goals without the full capacity of offshore wind energy US Wind intends to develop in the Lease area. Thus, the sizeable contribution available from development of US Wind's Lease on approximately 80,000 acres would power more than 500,000 homes in the region with clean, renewable energy, support thousands of union jobs, and may also provide renewable energy to other states and private enterprises in the Mid-Atlantic.

With regard to U.S. Army Corps of Engineer (USACE) authorizations, the Project's purpose, as determined by USACE for section 404(b)(1) guidelines evaluation, is offshore wind energy generation. The overall Project's purpose for section 404(b)(1) guidelines evaluation, as determined by USACE, is the construction and operation of commercial-scale, offshore wind energy. The purpose of the USACE section 408 action, as determined by EC 1165-2-220, is to evaluate the applicant's request and determine whether the proposed alterations are injurious to the public interest or impair the usefulness of the USACE project. The USACE section 408 permission is needed to ensure that congressionally authorized projects continue to provide their intended benefits to the public.

1.1.3 Project Design Envelope Approach

Offshore wind technology is advancing rapidly, while the development and approvals process spans multiple years. Therefore, the Project development plans must maintain a level of flexibility

[17] The White House, "Tackling the Climate Crisis at Home and Abroad," E.O. 14008 (Jan. 27, 2021); *see also* White House Statement: Biden Administration Jump Starts Offshore Wind Energy Projects to Create Jobs (March 29, 2021) at https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/29/fact-sheet-biden-administration-jumpstarts-offshore-wind-energy-projects-to-create-jobs/.

so that the most advanced and appropriate technologies can be efficiently deployed. BOEM recognized the need for such flexibility and issued *Draft Guidance Regarding the Use of a Project Design Envelope in a Construction and Operations Plan* (BOEM 2018). Accordingly, US Wind uses a PDE approach in development of the Project and presents a reasonable range of design parameters that will allow for evaluation of a maximum design scenario.

Under this PDE approach, the Project has an upward limit of 121 WTGs, up to four OSSs, and one Met Tower located in the Lease area (Figure 1-1). The Project will be interconnected to the onshore electric grid by up to four new 230-275 kV export cables into a substation in Delaware. In this COP, at times US Wind has identified preferred site configurations or component designs based on the current understanding of site conditions and evaluation of potential impacts, which will be further refined during design as well as the fabrication and installation phases of the Project in a manner consistent with BOEM regulations.

Project elements include offshore structures, inter-array and export cables, and onshore infrastructure. A summary of the PDE parameters is provided in Table 1-1.

Table 1-1. Summary of PDE Parameters

Parameter	Description
Project Layout	
Total Structures	Up to 126, including WTGs, OSSs, and Met Tower
Project Capacity	Up to 2.2 GW
Spacing	0.77 NM E-W (1.43 km, 0.89 mi) 1.02 NM N-S (1.89 km, 1.17 mi)
Water Depths	Approximately 14 – 41 m (46 – 135 ft)
WTG	
Total WTGs	Up to 121
WTG Size	Up to 18 MW
Foundation Type	Monopiles
Rotor Diameter	Up to 250 m (820 ft)
Hub Height	Up to 161 m (528 ft)
Height Tip of Blade	Up to 286 m (938 ft)
OSS	
Total OSS	Up to 4
Foundation Type	Monopiles, or jackets on piles or suction buckets
Met Tower	

Table 1-1. Summary of PDE Parameters

Parameter	Description
Total Met Towers	1
Foundation Type	Braced Caisson
Cables	
Offshore Export Cables	4 – 230-275 kV AC submarine
Maximum Length of Offshore Export Cables (4 Total)	229.3 km (124 NM)
Inter-array Cables	66 kV AC submarine
Maximum Length of Inter-array Cable	202.2 km (127 mi)
Onshore Export Cables	Up to 4 – 3-phase 230-275 kV or 12 single phase
Maximum Length of Onshore Export Cables (4 Total)	68.1 km (42 mi)

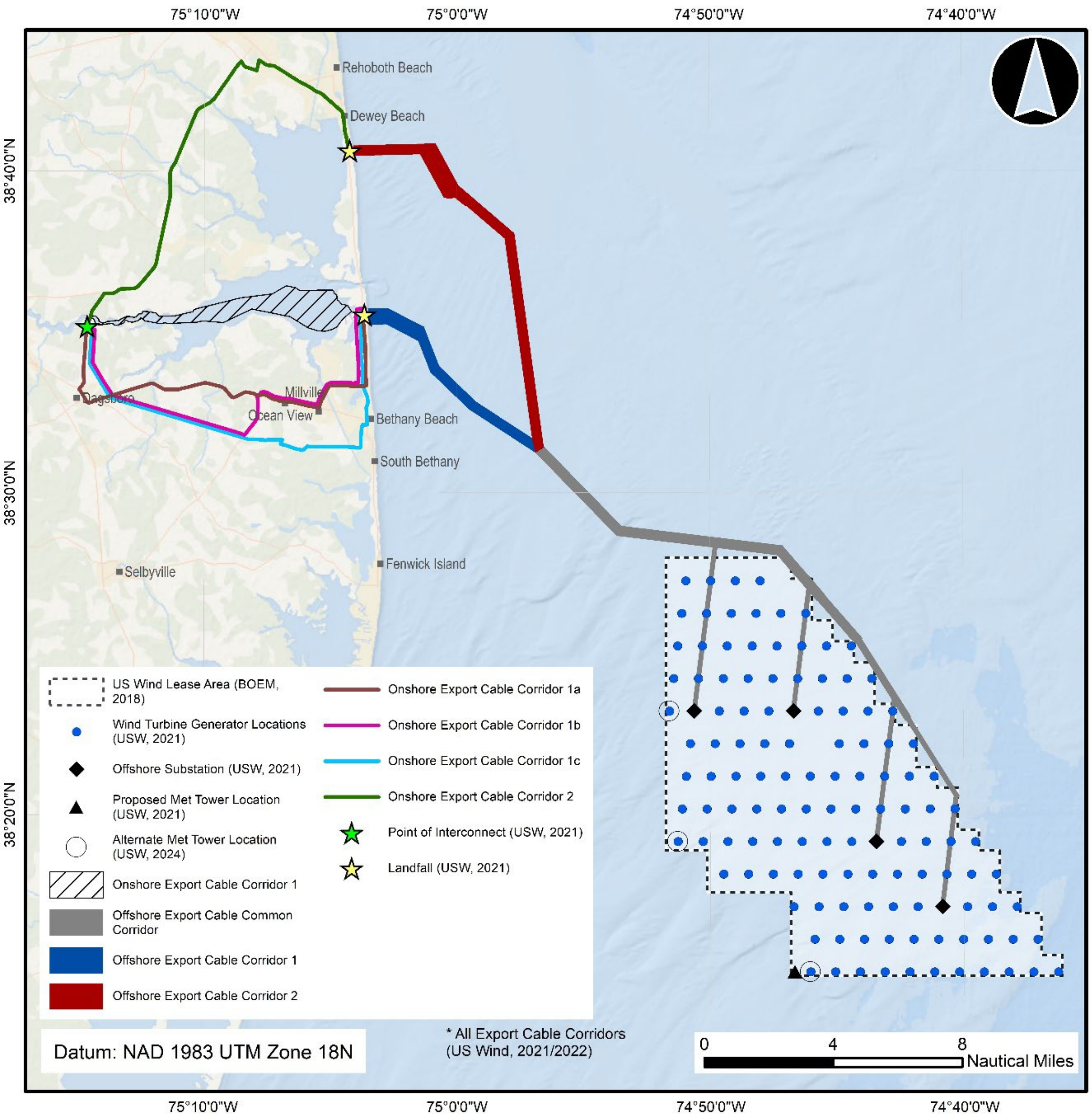


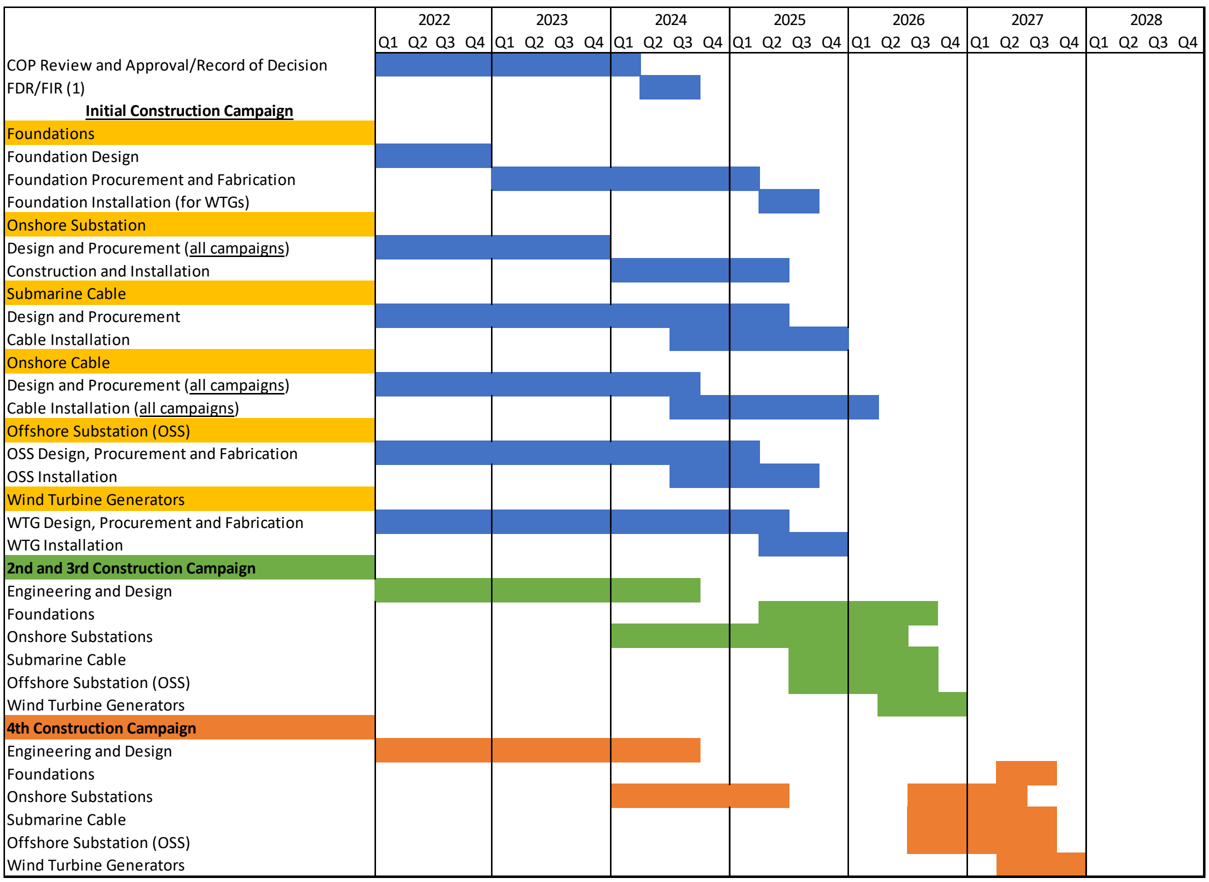
Figure 1-1. Project Design Envelope Layout

1.1.4 Schedule

US Wind proposes to implement continuous development and construction to efficiently develop the Project and fulfill existing and potentially future obligations. This construction approach is necessary as a result of various factors, such as varying permitting timelines, manufacturing timelines, vessel availability, supply chain dynamics, technological adjustments, and seasonal restrictions. This approach will also ensure that construction impacts are minimized and streamlined.

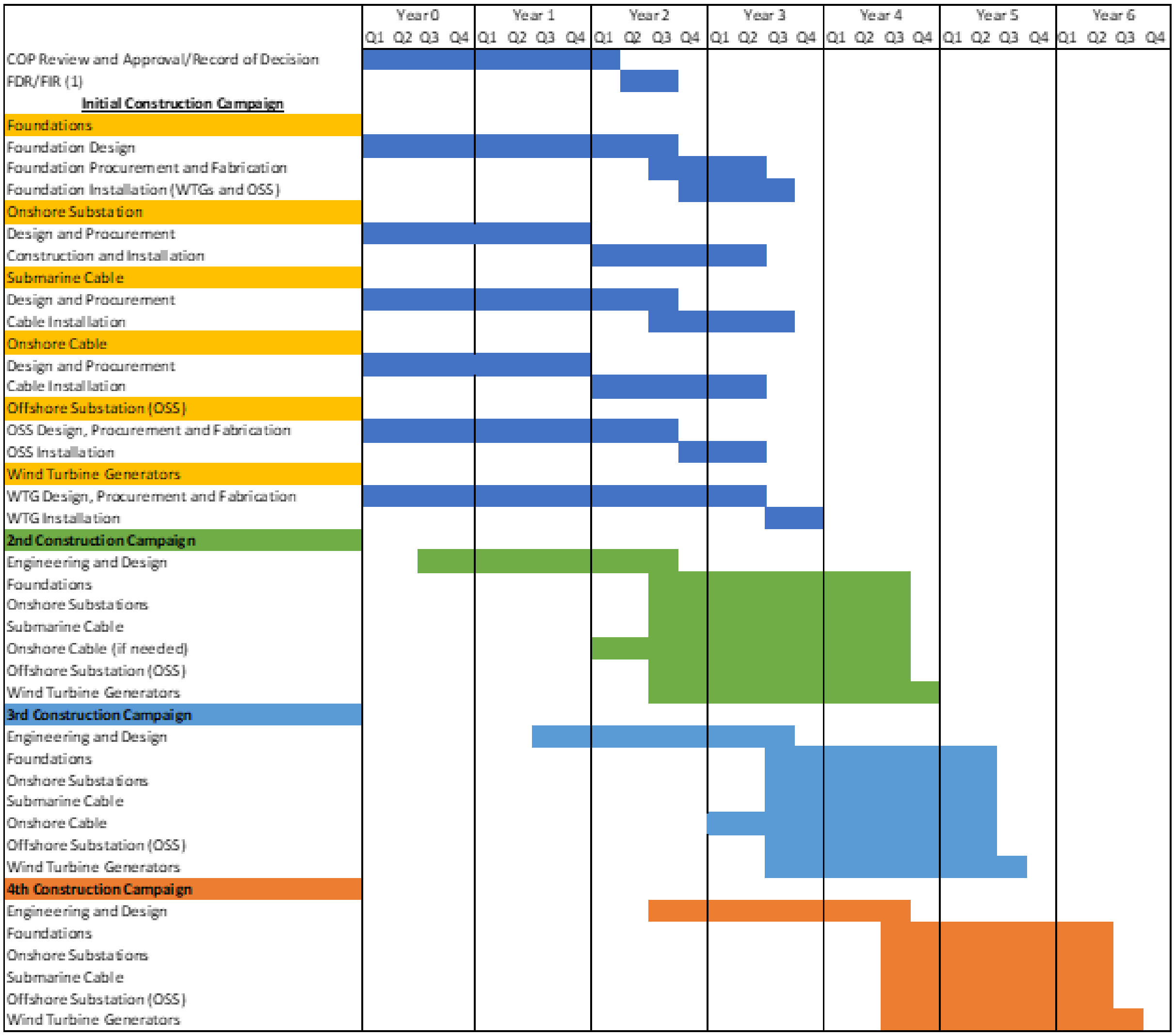
As noted in Section 1.1, the Project includes MarWin for which US Wind was awarded ORECs in 2017. MarWin represents the first construction campaign with approximately 300 MW and approximately 21 WTGs to be located in the southeastern portion of the Lease area. The target commercial operation date of MarWin is December 2025. US Wind anticipates development to the northwest in approximately 300-400 MW sections constructed over up to three campaigns. In the context of Maryland's renewable energy procurement process, the subsequent developments would comprise Momentum Wind and any future build out of the remaining Lease area.

Figure 1-2 presents an overview of the potential construction campaigns, beginning with MarWin. An alternative schedule, staggering the construction campaigns, is presented in Figure 1-3 as an optional scenario.



NOTES
1) US Wind may seek separate, earlier FDR/FIR approvals pre-COP approval, as permitted under the departure regulatory approval process
2) Activity not constant during identified windows
3) No underwater impact hammering assumed December through March
4) Onshore construction of up to 4 cables occurs Years 2024-2026 to align with all construction campaigns

Figure 1-2. Proposed Project Schedule



NOTES
1) US Wind may seek separate, earlier FDR/FIR approvals pre-COP approval, as permitted under the departure regulatory approval process
2) Activity not constant during identified windows
3) No underwater impact hammering assumed December through March

Figure 1-3. Alternate Project Schedule

1.2 Company Overview

US Wind is a Baltimore, Maryland-based offshore wind developer, owner, and operator. US Wind was founded in 2011 and is majority owned by Renexia S.p.A., a leader in renewable energy development in Italy and a subsidiary of Toto Holding Group. Toto Holding Group has more than 40 years of experience specializing in large infrastructure construction projects, rail transportation, and aviation.

Renexia is focused on the development and, through its subsidiary Renexia Services, the construction of large renewable energy plants. Renexia's global portfolio, including the Project, encompasses 2 GW of onshore wind, offshore wind, and solar projects in the USA, Italy, and Africa.

In 2020, funds managed by affiliates of Apollo Global Management (Apollo) made a major investment in US Wind. As a result of that investment, Apollo became a minority owner of US Wind. Apollo committed up to $265 million in capital to US Wind and provides US Wind access to Apollo's deep experience in global capital markets and in building major infrastructure projects. As of March 31, 2021, Apollo's assets under management were approximately $461 billion. Since Apollo's inception, Apollo-managed and affiliated funds have invested more than $20 billion in infrastructure-related assets and companies.

1.3 Contact Information

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1.4 Designation of an Operator

US Wind will operate the Project. If another operator is proposed at a later date, US Wind would provide written notice per 30 CFR § 585.405(e) for BOEM approval.

1.5 Financial Assurance

In compliance with BOEM regulation at 30 CFR § 585.516, before approval of the COP and the commencement of the installation of the Project, US Wind will provide a supplemental bond or other financial assurance issued by a primary financial institution to guarantee compliance with all terms and conditions of the Lease, COP approval, and the decommissioning obligation.

1.6 CVA Nomination

US Wind includes the nomination of Bureau Veritas North America as the Certified Verification Agent (CVA)[18] under confidential cover in Appendix I-C as well as a scope of work in Appendix I-D. The scope specifies the level of work to be performed by the CVA at all phases of the Project and identifies the high-level list of documents and subject matter that the CVA will review. BOEM separately approved the US Wind CVA nomination in March 2022.

1.7 Commercial Lease Stipulations and Compliance

Table 1-2 demonstrates US Wind's compliance to date with the stipulations in the Lease.

Table 1-2. Lease Stipulations and Compliance

Stipulation	Compliance
4(a): The Lessee (US Wind) must make all rent payments to the Lessor in accordance with applicable regulations in 30 CFR Park 585, unless otherwise specified in Addendum B.	US Wind has made and will continue to make all rent payments to the Lessor (BOEM) in accordance with applicable regulations, unless otherwise specified in Addendum B.
4(b): The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum B.	US Wind will make all operating fee payments to the Lessor in accordance with applicable regulations, as specified in Addendum B.
5: The Lessee may conduct those activities described in Addendum A only in accordance with a SAP or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP, except as provided in applicable regulations in 30 CFR Part 585.	US Wind will conduct activities as described in the SAP approved May 5, 2021, and the COP.

[18] 30 CFR §§ 285.705 - 585.714.

Table 1-2. Lease Stipulations and Compliance

Stipulation	Compliance
7: The Lessee must conduct, and agrees to conduct, all activities in the leased area in accordance with an approved SAP or COP, and with all applicable laws and regulations. The Lessee further agrees that no activities authorized by this lease will be carried out in a manner that: • could unreasonably interfere with or endanger activities or operations carried out under any lease or grant issued or maintained pursuant to the OCS Shelf Lands Act (the Act), or under any other license or approval from any Federal agency; • could cause any undue harm or damage to the environment; • could create hazardous or unsafe conditions; or • could adversely affect sites, structures, or objects of historical, cultural, or archaeological significance, without notice to and direction from the Lessor on how to proceed.	US Wind will conduct activities as described and in accordance with the approved SAP and COP and will conduct all activities in the Lease area in accordance with all applicable laws and regulations. US Wind will implement minimization, avoidance, and mitigation measures as well as safety measures to ensure that activities will be carried out in a manner that does not: • unreasonably interfere with or endanger activities or operations carried out under any lease or grant issued or maintained pursuant to the Act, or under any other license or approval from any Federal agency; • cause any undue harm or damage to the environment; • create hazardous or unsafe conditions; or • adversely affect sites, structures, or objects of historical, cultural, or archaeological significance, without notice to and direction from the Lessor on how to proceed.
10: The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum B.	US Wind will provide the necessary financial assurances as described in Section 1.5 of Volume I.
13: Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.	US Wind will remove or decommission the Project in accordance with all applicable regulations. A preliminary decommissioning plan is described in Section 7 of Volume I.

Table 1-2. Lease Stipulations and Compliance

Stipulation	Compliance
14: The Lessee must: 1) maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free from recognized hazards to employees of the Lessee or of any contractor or subcontractor operating under this lease; 2) maintain all operations within the leased area in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other Federal agencies with jurisdiction, intended to protect persons, property, and environment on the OCS; and 3) provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other Federal agency with jurisdiction.	US Wind will: 4) maintain all places of employment in compliance with applicable standards and free from recognized hazards; 5) maintain all operations within the leased areas in compliance with applicable regulations and federal agency orders to ensure the protection of persons, property, and the environment on the OCS; and 6) provide any requested documents and records and allow prompt access to relevant sites to any inspector authorized by the Lessor or other Federal agency with jurisdiction.
15: The Lessee must comply with the Department of the Interior's non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply with these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.	US Wind will comply with the applicable debarment and suspension regulations and will communicate the requirement to comply to persons with whom it does business related to this lease.
16: During the performance of this lease, the Lessee must fully comply with paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended (reprinted in 41 CFR 60-1.4(a)), and the implementing regulations, which are for the purpose of preventing employment discrimination against persons on the basis of race, color, religion, sex, or national origin.	US Wind will fully comply with paragraphs (1) through (7) of section 202 of Executive Order 11246, as amended.
Addendum B, III: Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described in Addendum B, Section III.	US Wind will make payments as described in Addendum B, Section III.

Table 1-2. Lease Stipulations and Compliance

Stipulation	Compliance
Addendum C, 2 Schedule: 2.1.1.2 Site Characterization. COP Survey Plan, 2.1.2 Pre-Survey Meeting with the Lessor, and 2.2 Progress Reporting.	US Wind has and will continue to comply with these stipulations regarding the Lessor's review of a survey plan prior to commencement of survey activities and the scheduling of a pre-survey meeting with a Qualified Marine Archaeologist present, and the submission of a semi-annual progress report through the duration of the site assessment term regarding progress on survey plans and any modifications to the schedule.
Addendum C, 3 National Security and Military Operations: 3.1 Hold and Save Harmless, 3.2 Evacuation or Suspension of Activities, 3.3 Electromagnetic Emissions	US Wind has and will continue to comply with these stipulations when conducting site characterization activities in support of the COP submittal.
Addendum C, 4 Standard Operation Conditions: 4.1.1 Vessel Strike Avoidance Measures, 4.2 Archaeological Survey Requirements, 4.3 Geological and Geophysical (G&G) Survey Requirements, 4.4 Protected Species Reporting Requirements, 4.5 Lighting Requirements	US Wind has and will continue to comply with these conditions when conducting activities in support of the SAP and survey activities.

1.8 Design Standards

US Wind is developing the Project under a design basis approach as described in Attachment C of the COP Guidelines. Appendix I-E provides the hierarchy of design standards US Wind will apply and the corresponding justification.

2.0 Project Infrastructure

2.1 Location

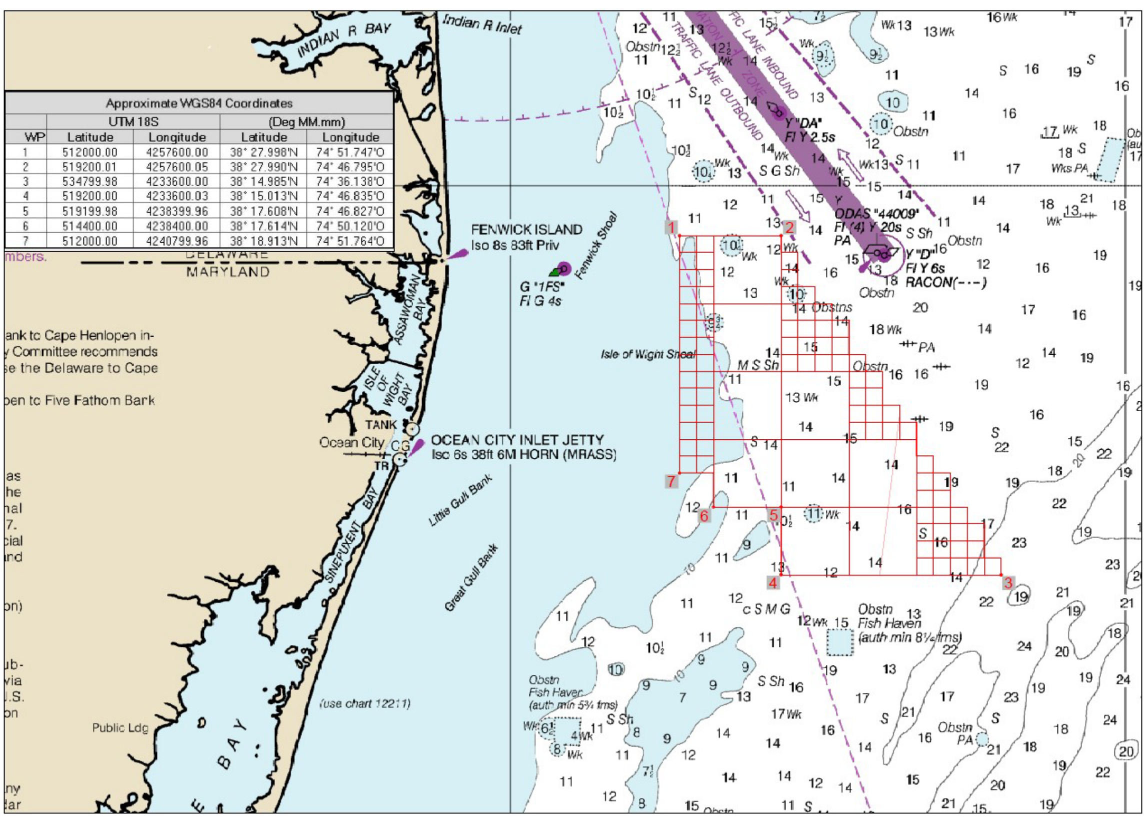
The Project will be located in the Lease area and includes an offshore export cable corridor for connection to onshore infrastructure.

The Lease area covers 79,707 acres, with the western edge located approximately 16.2 km (10.1 miles) to the closest point on the Maryland coastline as shown in Figure 2-1. Figure 2-2 provides an overview of the proposed Project showing WTG and OSS positions, and offshore export cable corridors.

Proposed WTG locations are evenly distributed across the Lease area at a distance of 0.77 NM (1.4 km, 0.89 miles) in the East-West direction and 1.02 NM (1.88 km, 1.17 miles) in the North-South direction. The proposed OSSs are located to service groups of WTGs. The coordinates of the WTGs and OSSs are listed in Appendix I-F. Inter-array cables will run in a radial fashion from the WTGs toward the OSS locations.

The Met Tower is proposed in a location along the southern edge of the Lease area. The proposed location for the Met Tower is 38.252352° -74.777755° as shown in Figure 2-2.

Project Lease area map depicting the different water depths according to NOAA.



Approximate WGS84 Coordinates				
	UTM 18S		(Deg MM.mm)	
WP	Latitude	Longitude	Latitude	Longitude
1	512000.00	4257600.00	38° 27.998'N	74° 51.747'O
2	519200.01	4257600.05	38° 27.990'N	74° 46.795'O
3	534799.98	4233600.00	38° 14.985'N	74° 36.138'O
4	519200.00	4233600.03	38° 15.013'N	74° 46.835'O
5	519199.98	4238399.96	38° 17.608'N	74° 46.827'O
6	514400.00	4238400.00	38° 17.614'N	74° 50.120'O
7	512000.00	4240799.96	38° 18.913'N	74° 51.764'O

Figure 2-1. Lease Area

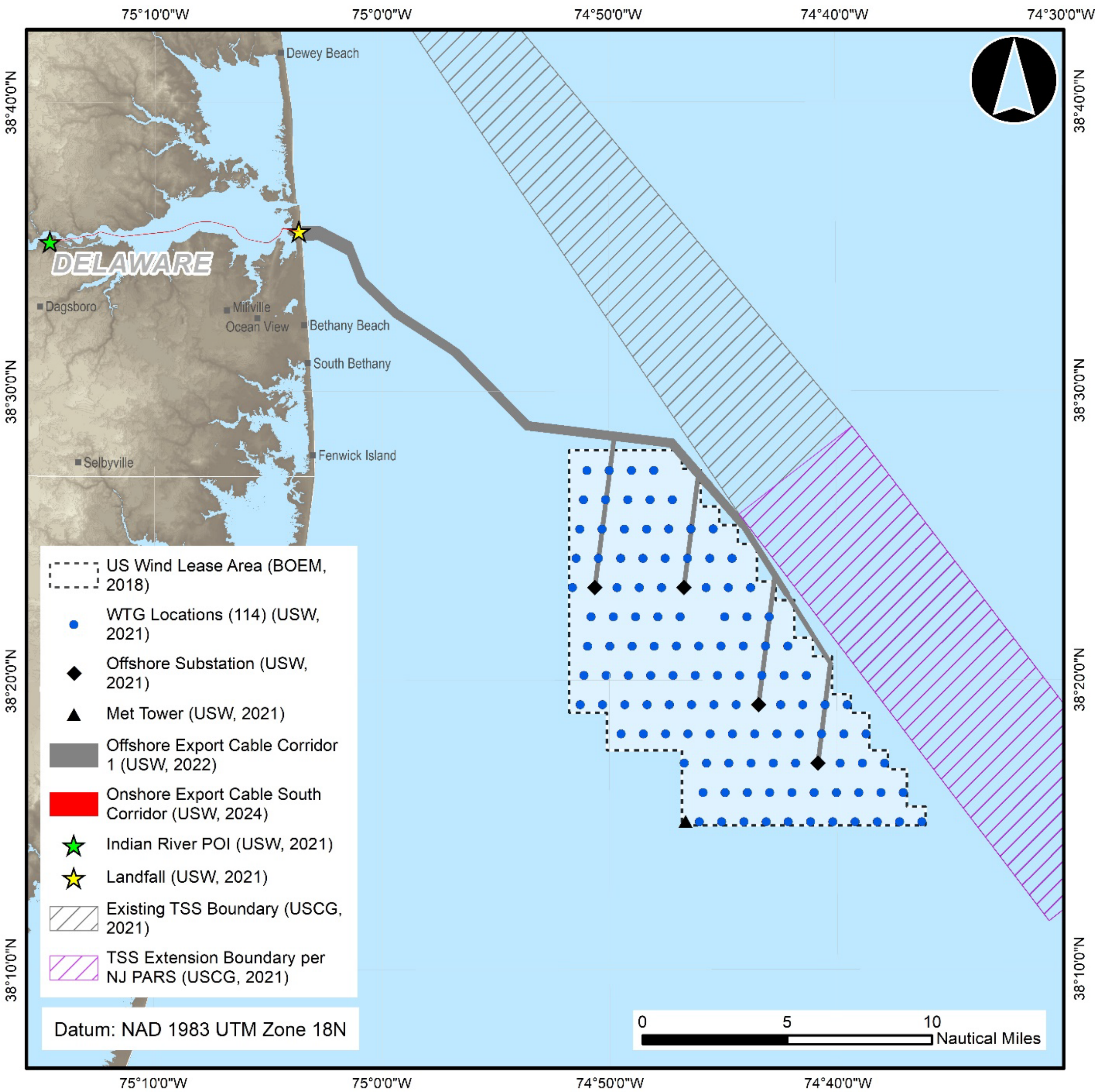


Figure 2-2. Proposed Project

The maximum design scenario in the PDE includes WTGs in 121 locations. US Wind's proposed layout would ensure no WTGs or OSSs are located within 1 NM of the outer boundary of the south-eastbound traffic lane of the current Traffic Separation Scheme for the Southeastern approach to the Delaware Bay or its proposed extension[19] (see Volume II, Section 16.1 for discussion), and therefore includes up to 114 WTG as shown in Figure 2-3.

[19] TSS boundary extension based on New Jersey PARS.

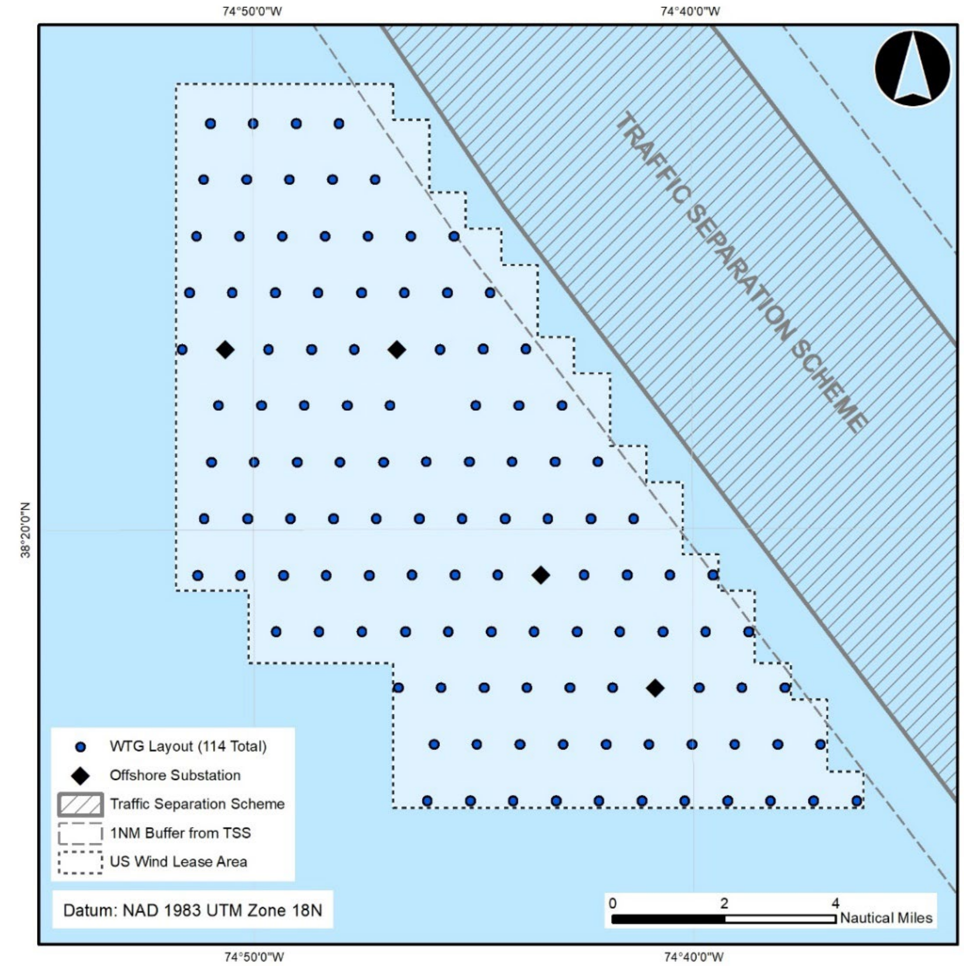


Figure 2-3. Proposed Layout with 1 NM TSS Setback

The proposed offshore export cables would exit the Lease area and traverse Offshore Export Cable Corridor 1, making landfall south of the Indian River Inlet at 3R's Beach. From there, the onshore export cables would extend through Indian River Bay to the US Wind substations and connect to the POI at the Indian River Substation (Onshore Export Cable Corridor 1). Additional options include the offshore export cables making landfall at the Tower Road parking lot, north of Indian River inlet, and crossing over land to the Indian River Substation as described in Section 2.5.

2.2 Wind Turbine Generators

US Wind is considering contemporary and near-term offshore WTG models with individual nameplates of up to 18 MW. The WTGs under consideration have industry standard three-bladed, upwind, horizontal-axis configurations. The rotor-nacelle assembly (RNA) sits atop a multi-section tubular steel tower at a hub height of up to 161 m MSL. One WTG US Wind is considering within the PDE is the GE Haliade X -14.7 wind turbine at a hub height of 139 m MSL. This Haliade X configuration employs the platform's 220 m rotor diameter and has a nameplate of 14.7 MW. An overview of the proposed scenario and maximum WTG characteristics evaluated for the project are outlined in Table 2-1.

Table 2-1. WTG Envelope

Wind Turbine Generators (WTGs)	Project Design Envelope
Turbine Generation Capacity	18 MW[20]
Total Tip Height	286 m (938 ft)
Hub Height	161 m (528 ft)
Rotor Diameter	250 m (820 ft)
Air Gap[21]	36 m (118 ft)
WTG Locations	121

The range of WTG dimensions included in the PDE is further illustrated in Figure 2-4.

Obstruction aviation lights are planned on the nacelle and tower of each WTG. US Wind expects to install two medium-intensity obstruction aviation lights on top of each nacelle and four low intensity obstruction lights mid-way on each tower (approximately 70-80 m above MSL), as well as a helicopter hoist status light. Navigation aids are likely to differ based on location within the wind farm. See Volume II, Section 16.3 for discussion and Appendix II-K2 for US Wind's preliminary aviation and navigation lighting and marking plan for the maximum design scenario and proposed layout.

[20] The 18 MW WTG referred to here is a configuration on a 250-m rotor diameter platform, inclusive of nameplate capacities other than 18 MW.
[21] Lower tip height in relation to MSL

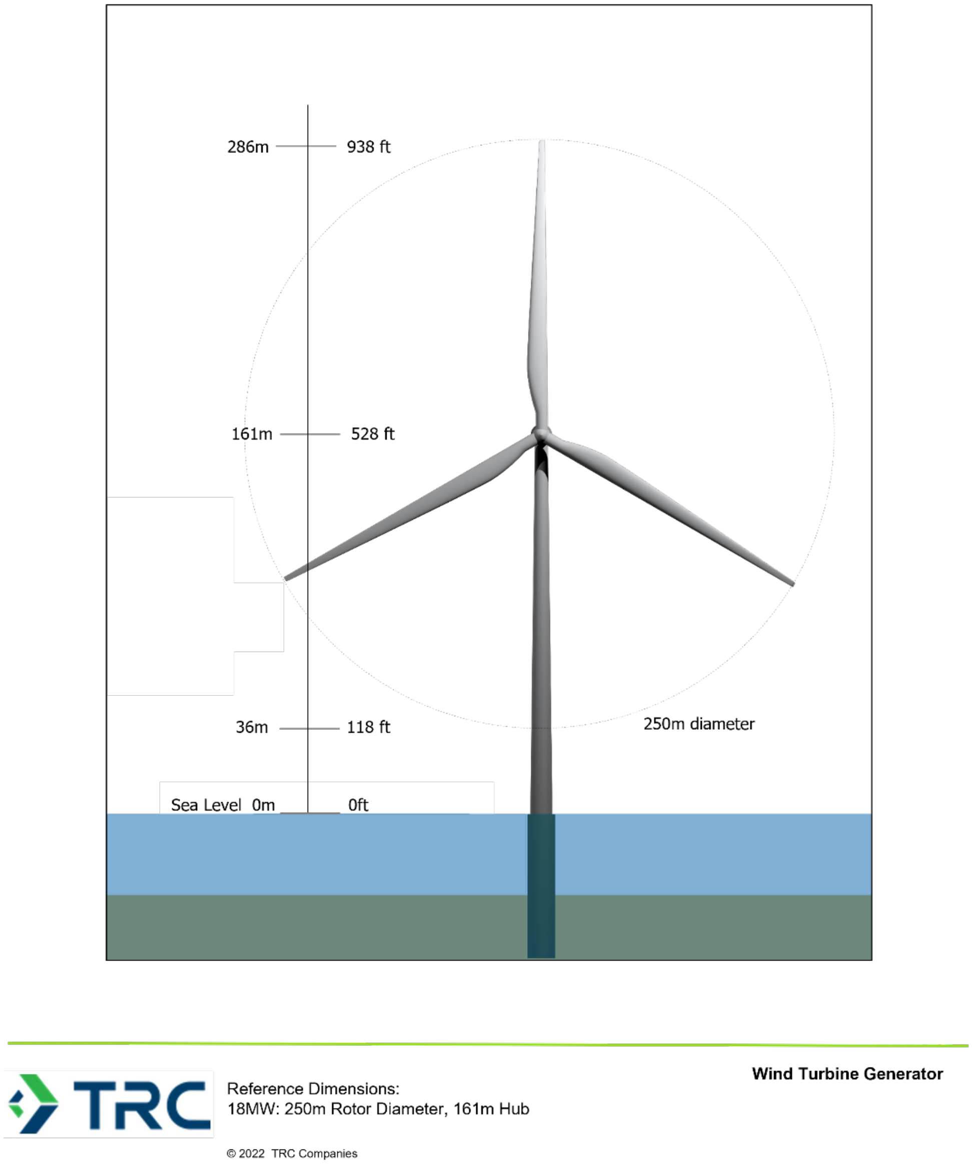


Figure 2-4. Dimensions for PDE Maximum 18 MW

2.2.1 Monopile WTG Foundations

The WTGs will be installed on monopile foundations which are large diameter coated steel tubes driven into the seabed. The diameter, weight, length, and wall thickness of the monopile vary based on water depth, geotechnical conditions, metocean conditions and WTG size. The selection of monopile foundations is discussed further below. Additional design detail information will be provided in the Facility Design Report/Facility Installation Report (FDR/FIR) analysis, which is envisioned as occurring in an early stage of the pre-construction planning process.

Approximate weights and dimensions of the monopile foundations within the Project Design Envelope are provided in Table 2-2.

Table 2-2. Monopile Design Ranges

Approximate Foundation Parameters	Units	Project Design Envelope
Water depth[22]	m(ft)	14 – 41 (46 – 135)
Interface height	m(ft)	22 (73)
Maximum pile penetration	m(ft)	50 (164)
Maximum Monopile + TP total length	m(ft)	110 (360) @ max depth
Maximum Monopile mass, primary steel	tonnes (ton)	2,200 (2,424) @ max depth
Maximum TP mass, primary steel	tonnes (ton)	364 (401)
Maximum Total mass, primary steel[23]	tonnes (ton)	2,200 (2,425)
Monopile diameter	m(ft)	8-11 (26-36)

The monopile foundations consist of a monopile with integrated or separate transition piece (TP) as shown in Figure 2-5. The top of the monopile typically consists of a flanged connection that allows for a bolted connection between the TP or turbine tower. The foundation TP acts as an interface between the monopile and WTG tower. The TP commonly incorporates space for switch gear, dehumidification equipment and control systems while also providing boat landing, access and service platforms. If a monopile foundation without a separate TP is selected, the switch gear, dehumidification equipment and control systems would be installed in a suspended structure inside the monopile, with the boat landing, access, and service platform attached to the exterior of the foundation. US Wind intends to include scour protection in the form of rock around the base of the monopile foundation, an area of approximately three times the diameter of the foundation.

Corrosion protection would be provided using a combination of coating and cathodic protection, as well as corrosion allowances. Details will vary depending on the structure and the results of detailed design exercises, however the following, high-level, system is envisaged:

1. Above the splash zone the structures will be protected using coating or non-corroding components (e.g. concrete, etc.). This area is accessible to enable inspection and repair of the coating (or service and replace components) throughout the operational life, as required.

[22] The same reference datum is assumed for both depth and interface height.
[23] Mass based on current design, subject to modification pending final design and site conditions.

2. In the (upper) splash zone, components of the structure not covered by cathodic protection (described below) will be protected using coating. As this area is not considered accessible for repair, corrosion allowances will be included to cover the period after the end of the coating lifetime.

Below sea level, the structures will be protected using cathodic protection. Cathodic protection will be provided by impressed current cathodic protection; a well-proven technology used at many offshore wind farms worldwide. Coating and/or corrosion allowances may also be applied to cover portions where impressed current cathodic protection is unavailable.

For monopiles, the same strategies will be applied to both the internal and external surfaces. To avoid the concentration of gases like hydrogen, bromide or chloride near the submerged anodes inside the monopiles the space between the water line and the air-tight platform (with cable hang-off's) would be vented to the outside. Water exchange holes would also be included in the monopiles.

US Wind considered alternate foundations for the WTGs; however, these were not carried forward in the design process. Monopiles are the proposed foundation due to site conditions as well as market conditions with the potential to source monopiles in Maryland from Sparrows Point. Jacket foundations for the WTGs would not likely be available or cost-effective for the Project. Suction caisson foundations have not been used for WTGs and remain unproven. Gravity-base structures are not widely used in conditions such as those found within the Lease area.

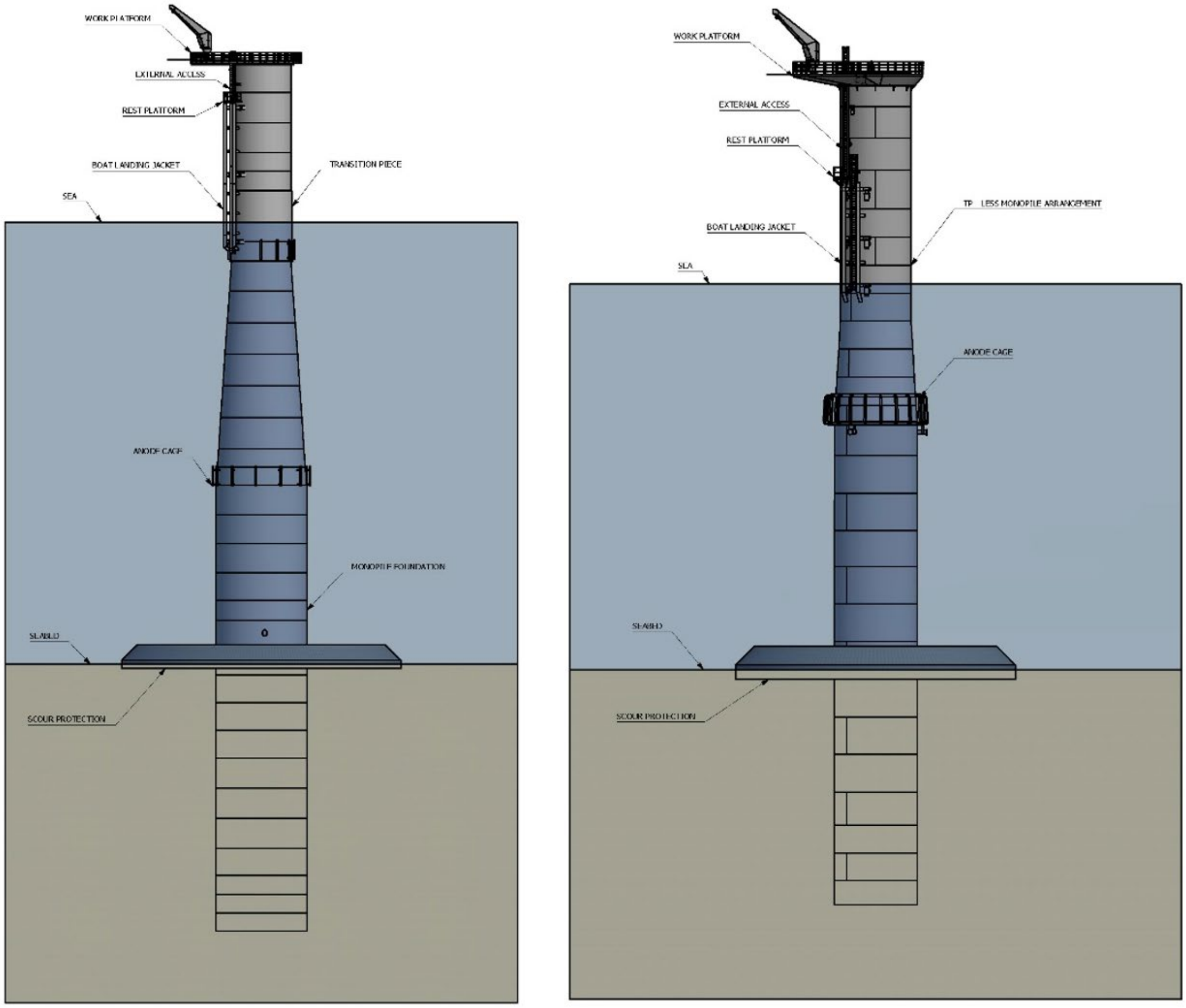


Figure 2-5. Monopile Foundations with and without Transition Pieces

2.3 OSS

US Wind proposes to deploy up to 4 offshore substations[24] OSSs for the Project, one for each grouping of approximately 300 to 400 MW of WTG capacity, deployed atop monopile or jacket foundations. US Wind is evaluating a modular configuration of the OSS topsides, each of which are anticipated to contain medium-voltage ("MV") switch gear (66 kV), HV transformer (66 kV to 230 kV), Supervisory Control and Data Acquisition (SCADA) interface, control systems and a connection to the export cables, a generator, as well as the associated safety and ancillary equipment. The back-up generator is needed to power the SCADA and other communication and control systems in case of a grid connection outage. The modular topside configuration is intended to be standardized to the extent possible for cost reduction, ease of installation, and to facilitate review and approval.

[24] The term offshore substation (OSS) refers to the same structure and Project components referenced elsewhere in the industry as the electric service platform (ESP), offshore transformer module (OTM), and similar names.

As an alternative, US Wind is also evaluating the combination of some or all substation components onto one or two larger platforms. For this approach, equipment serving two or more arrangements of 300 to 400 MW (up to the full capacity of the Project) would be combined onto one or two large jacket foundations. If larger combined OSSs are selected, these would be located in the interior positions (UE-06 and/or UJ-10, see Appendix I-F) of the layout in Figure 2-2.

OSS topside dimensions are anticipated to range from 30 m by 43 m and 50 m high (98 ft by 141 ft by 164 ft) for a single module OSS in multiple locations and up to 40 m by 80 m and 60 m high (131 ft by 262 ft by 197 ft) for an OSS topside if the modules are placed at a single location.

2.3.1 OSS Foundations

Monopile or jacket foundations are being considered for the OSSs. A monopile foundation for an OSS would be similar to a monopile for a WTG as described in Section 2.2.1. A conceptual OSS platform on a monopile is depicted in Figure 2-6. A jacket is a multi-leg lattice structure that is connected to the seabed via piling or suction buckets. An OSS installed on a jacket foundation is shown Figure 2-7.

Figure 2-6. Design of Conceptual OSS atop a Monopile Foundation

Figure 2-7. OSS on Jacket Foundation
Source: HSM Offshore

The PDE includes a three, four or six-leg jacket structure for the OSSs, depending on its capacity. Piles driven into the seabed or suction buckets are used as foundation of the jacket and to support the topsides. In case of piles, these may be pre-installed using a temporary template on the seabed, or post-installed through jacket pile guides. For the jacket on suction bucket configuration, the buckets are integrated into the jacket legs and the structure is installed as one piece, with no piling as shown in Figure 2-8. The weight and dimensions of the jacket will be refined through the design process and provided in the FDR/FIR. Preliminary dimensions in the PDE for the pile and jacket features are provided in Table 2-3.

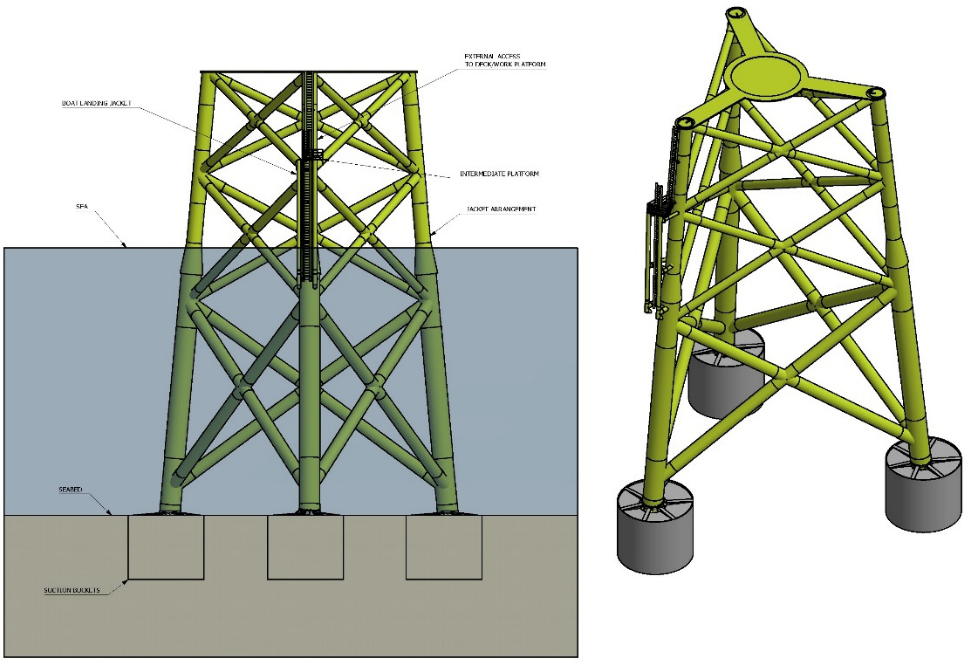


Figure 2-8. Jacket Foundation on Suction Buckets

Table 2-3. OSS Foundation Design Envelope

	Monopiles	Jacket on Suction Buckets	Jacket on Piles
Diameter (each)	8 – 11 m (26 – 36 ft)	10 – 15 m (33 – 49 ft)	2 – 4 m (7 – 13 ft)
Pile Footprint (each)	50.3 – 95.1 m^2 (165.0 – 312.0 ft^2)	78.5 – 176.0 m^2 (257.5 – 577.4 ft^2)	3.1 – 7.1 m^2 (10.2 – 23.3 ft^2)
Pile Penetration Depth	30 – 40 m (98 – 131 ft)	10 – 15 m (33 – 49 ft)	30 – 80 m (98 – 262 ft)

US Wind intends to include scour protection in the form of rock around the base of the OSS foundation, an area of approximately three times the diameter of the piles or buckets.

Suction buckets with scour protection mats incorporated into the buckets may be used if available and feasible. Suction buckets supporting jacket structures are generally able to be installed in a wide variety of soil materials, including silts, sands, and clays, and in general would also be seen as appropriate foundation solution for the Lease area. Should the suction bucket option be pursued further, detailed structural design and installation studies will be performed to fully confirm their suitability, and to develop appropriate installation methods. An additional consideration for suction buckets is both the potential of seabed mobility across the site area as well as scour occurring around the suction buckets. The assumed seabed mobility across the Lease area is not considered to be a significant hazard to the use of suction buckets.

Corrosion protection would be provided using a combination of coating and cathodic protection, as well as corrosion allowances. Details will vary depending on the structure and the results of detailed design exercises, however the following, high-level, system is envisaged:

1. Above the splash zone the structures will be protected using coating or non-corroding components (e.g. concrete, etc.). This area is accessible to enable inspection and repair of the coating (or service and replace components) throughout the operational life, as required.

2. In the (upper) splash zone, components of the structure not covered by cathodic protection (described below) will be protected using coating. As this area is not considered accessible for repair, corrosion allowances will be included to cover the period after the end of the coating lifetime.

Below sea level, the structures will be protected using cathodic protection. Cathodic protection will be provided by sacrificial anodes, a technology well-proven and used at many offshore wind farms worldwide. Coating and/or corrosion allowances may also be applied to cover periods where cathodic protection is unavailable.

2.4 Met Tower

The Project includes a Met Tower which will serve as a permanent metocean monitoring station. The data collected by the Met Tower will be used to support project operations and long-term monitoring.

The Met Tower is a bottom-fixed structure consisting of a steel, lattice mast fixed to a steel deck supported by a steel Braced Caisson style foundation as shown in Figure 2-9. The primary structure has been fabricated and is currently in storage at the Modern American Recycling Services facility in Gibson, Louisiana. The Met Tower is planned to include a robust suite of monitoring, data logging, and remote communications equipment, as well as associated power supply, lighting, and marking equipment. Previously, BOEM granted approval to US Wind for the installation of the Met Tower in the SAP process (see Volume I, Section 1.1.1).

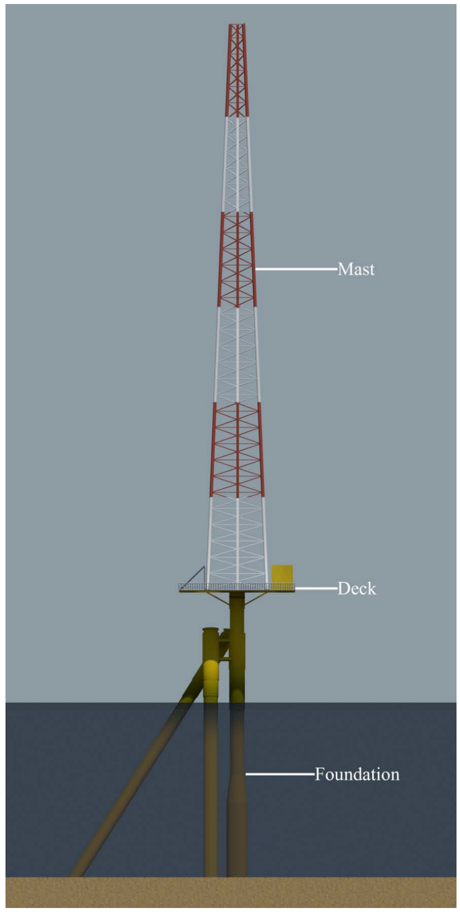


Figure 2-9. Simplified Met Tower Rendering

2.4.1 Met Tower Location

The proposed Met Tower location is at the western edge of the southernmost row of the array. The coordinates for this proposed location, along with three alternate locations are summarized in Table 2-4 below.

Table 2-4. Proposed Met Tower Location Coordinates

Location	Coordinates NAD83 UTM Zone 18 [meters]		Approx. Water Depth [m MLLW]	WTG Location Identifier
	Easting	Northing		
Proposed	519446	4233838	24.4	
Alternate 1	512707	4241318	14.1	UJ-02
Alternate 2	520328	4233830	27.6	UN-08
Alternate 3	512210	4248806	17.5	UE-01

The proposed location was selected to be in line with the east-west turbine row to conform as close as practicable to the gridded array and to limit any additional obstruction to fishing and other vessel traffic transiting across the Lease area. Additionally, the proposed location addresses a number of long-term monitoring priorities for the Project. Specifically, that location is expected to provide nearly unobstructed exposure to the prevailing southwest and northwest wind and wind-drive wave directions, as well as the prevailing southeast swell direction. This exposure improves the value of the wind and wave data the Met Tower collects. These data sets are anticipated to help support operations planning (along with the associated metocean measurements), Project performance audits, and key mitigations for anticipated Project impacts (e.g., coastal radar interference mitigation, public data dissemination, etc.). Additionally, the location is specifically sited within four rotor-diameters of the adjacent WTG to comply with measurement siting guidance in the International Electrotechnical Commission (IEC) standard 61400-12-1[25]. The cited IEC standard governs WTG power performance tests and is a critical technical and commercial tool for assessing the in-situ performance of project WTGs. The proposed location on the western edge of the row also has a clear line of sight to Ocean City, which facilitates high-speed remote data communications.

Two alternate Met Tower locations outside of the Project's regular 1 NM by 0.77 NM array layout in the southernmost row of the array were evaluated from 2021-2024, including geophysical and geotechnical surveys. The alternate locations are not carried forward in the PDE due to potential concerns from BOEM and USCG regarding the separation distance between offshore structures.

In 2024, US Wind identified new alternate locations for the Met Tower at WTG positions as shown in Table 2-4. None of the alternate locations provide the same value to the Project. Significantly, all of the alternate locations would be outside the siting guidance of IEC standard 61400-12-1 and not suitable for the planned performance testing. Removal of any of the WTG locations would negatively impact Project economics. Additional issues with the alternate locations (listed in order of preference) are:

- **Alternate 1 (UJ-02):** Nearly equivalent wind measurement exposure, although significantly shallower than the proposed location which would require extensive redesign and re-fabrication of the foundation.
- **Alternate 2 (UN-08):** Immediately adjacent to the proposed location with good exposure to prevailing winds and waves, although deeper water depth would require extensive redesign and re-fabrication of the foundation. The southernmost row of WTG locations include the highest forecasted energy generation locations.
- **Alternate 3 (UE-01):** Good wind measurement exposure although the location is both distant from the center of the project (i.e. less representative of the whole Lease area) and is shallower than the proposed location, requiring extensive redesign and re-fabrication of the foundation.

Deploying the Met Tower at an alternate location currently proposed to be a WTG would modestly affect the indicative IAC configuration (Figure 2-12), based upon final permits and designs. Because each of the alternate Met Tower locations is at the end of an array column, the potential effects on the indicative IAC layout are expected to be minor. Specifically, the IAC will either be terminated earlier in the string or would bypass the Met Tower position. These reconfigurations would provide flexibility in the installation sequencing of both the Met Tower and the IAC. In all

[25] IEC (International Electrotechnical Commission) Standard 61400-12-1 (second edition, 2017-03)

cases, the IAC strings are planned to be shortened (i.e., to include fewer WTGs), which reduces the impact on the electrical system design. The potential effects on the indicative IAC layout are summarized by position in Table 2-5 below.

Table 2-5. Proposed Met Tower Locations – Potential IAC Routing Effects

Location	Location Identifier	Potential IAC Routing Effects
Proposed	Met Tower	US Wind's preferred location; No effect on IAC design
Alternate 1	UJ-02	The IAC would bypass position UJ-02 with a direct connection between positions UH-02 and UJ-03.
Alternate 2	UN-08	The IAC string would terminate at the adjacent UM-08 position.
Alternate 3	UE-01	The IAC would bypass position UE-01 with a direct connection between the OSS at position UE-02 and the WTG at position UD-01.

2.4.2 Met Tower Design

The Met Tower structure was designed by Keystone Engineering, Inc. (Keystone), an experienced US engineering firm with extensive global experience with bottom-fixed offshore structures, including the Block Island Wind Farm WTG jacket foundations and the Hornsea meteorological mast in the United Kingdom. The Met Tower structure was engineered to employ standard design elements that have been successfully deployed in similar environments. US Wind retained Keystone as the Project Engineer for the Met Tower, and that team will support forthcoming engineering design and structural fabrication and modification.

Because the proposed location is different from the Met Tower location originally approved by BOEM in the now-withdrawn SAP, US Wind engaged Keystone to conduct a re-siting assessment. The scope of the assessment included a desktop review of site conditions between the original location and the proposed location. Based upon the data currently available, Keystone identified no significant risks to the proposed location utilizing the existing structure, pending site-specific geotechnical data review. Relatively minor structural changes were recommended to accommodate the slightly shallower water depth. The re-siting report is provided as Appendix I-K5. A detailed redesign assessment is planned after updated site-specific metocean and geotechnical conditions are available mid-2022.

The following subsections present the current Met Tower configuration and planned equipment suite. US Wind is also evaluating alternative foundation types and other design updates for the Met Tower. Material changes to the configuration summarized below, if any, may be presented in subsequent updates to the COP. The final configuration and equipment suite are subject to update based upon design priorities and will be presented in the FDR.

2.4.2.1 Met Tower Configuration

The Met Tower configuration employs standard, proven design elements that have extensive track records in the US and globally. The foundation is a Braced Caisson design consisting of a main Caisson steel pile and two bracing piles. The main Caisson is a 1.8 m (72 in) diameter pile that tapers to 1.5 m (60 in) diameter above the mudline. The pile will be driven to an anticipated maximum depth of 53 m (175 ft). The two bracing piles are 1.5 m (60 in) diameter each. These piles will be driven to an anticipated maximum depth of 51 m (166 ft). Actual pile depths are anticipated to be shallower based upon water depths at the proposed location but will be confirmed upon Keystone's analysis of site-specific geotechnical data.

Corrosion protection will be provided using a combination of coating and cathodic protection, as well as corrosion allowances. Details will vary depending on the structure and the results of detailed design exercises, however the following, high-level, system is envisaged:

1. Above the splash zone the structures will be protected using coating or non-corroding components (e.g. concrete, etc.). This area is accessible to enable inspection and repair of the coating (or service and replace components) throughout the operational life, as required.

2. In the (upper) splash zone, components of the structure not covered by cathodic protection (described below) will be protected using coating. As this area is not considered accessible for repair, corrosion allowances will be included to cover the period after the end of the coating lifetime.

Below sea level, the structures will be protected using cathodic protection. Cathodic protection will be provided by sacrificial anodes, a technology well-proven and used at many offshore wind farms worldwide. Coating and/or corrosion allowances may also be applied to cover periods where cathodic protection is unavailable.

A steel grillage deck will be fixed onto the installed piles. A galvanized steel lattice mast will be erected onto the deck. Multiple measurement sensors will be placed on cross-arms at various levels on the mast. The height of the Met Tower including the mast and foundation will be approximately 100 m (328 ft) above the mean sea level, and no higher than maximum hub height as described in Table 2-1. The platform deck supporting the mast will be approximately 279 square meters (3,000 square feet).

Additional design details are provided in the following Appendices. The Met Tower Design Basis Report and Ancillary Reports are provided as Appendix I-K1. The Met Tower Design Summary is provided as Appendix I-K2. The preliminary engineering design is provided as Appendix I-K3.

2.4.2.2 Met Tower Equipment Suite

The mast and the platform deck will be equipped with the necessary and proper safety lighting, markings, and signal equipment. See Volume II, Section 16.3 for discussion and Appendix II-K2 for US Wind's preliminary aviation and navigation lighting and marking plan, which includes the Met Tower. Marking and lighting of the Met Tower is anticipated to be consistent regardless of location, depending on final design and USCG review and approval.

The mast will be outfitted with scientific instruments, such as anemometers, vanes, barometers, temperature sensors, relative humidity sensors, pyranometer, and precipitation sensors, for recording empirical environmental and biological conditions in situ. The Met Tower is also planned to include a vertical profiling light detection and ranging (lidar) wind sensor, and a bottom-mounted and sub-surface instrumentation packages to gather oceanographic data and additional biological observations. At a minimum, the subsurface package will include an Acoustic Doppler Current Profiler (ADCP) system to measure currents, wave heights and other oceanographic data, and a conductivity, temperature, and depth (CTD) sensor.

In addition to the monitoring and safety equipment, the Met Tower is planned to have a robust suite of data logging, remote high-speed communications, and power supply equipment. A representative instrumentation package and data collection system planned for the Met Tower is attached at Appendix I-K4.

2.5 Cables

The Project includes offshore and onshore export cables and inter-array cables. The export cables will be comprised of an offshore component, the offshore export cables, located on the OCS and in state waters and an inshore component, the onshore export cables, located solely in state waters or on land. The proposed export cable corridor from the Lease area to US Wind's onshore substations will span between 65-97 km (40-60 miles) in length, dependent on the location of the OSS and the final routing through Indian River Bay or on land to the POI.

Inter-array cables (or inter-turbine) collect and transmit the power from the WTGs to the offshore substation. In US Wind's proposed design, WTGs are connected in strings of approximately five units. Inter-array cables connecting the WTG strings to an OSS will be 66 kV three-core, solid dielectric (XLPE[26] or EPR[27]) construction. The sizes of the cables will vary depending on the distance of a WTG from the OSS and the number of WTGs on a given string. The strings converge at the OSS(s), where the voltage is stepped-up and delivered ashore via one or more high voltage alternating current (AC) submarine export cables. The OSS platforms may also be linked by additional 66 kV cables to provide a level of redundancy.

The proposed offshore export cables connecting each OSS to the landing location will be via a single 230-275 kV, 3/C cable, up to 300 mm (12 in) in diameter. Up to four offshore export cables are possible under the PDE approach planned.

The Project proposes use of two types of industry-standard 3 conductor submarine cables: inter-array cables connecting the WTGs and OSSs and the offshore export cables connecting the OSSs to the landing location. An overview of the construction of the submarine inter-array cable and offshore export cables is provided in Table 2-6. The components of an inter-array cable can be seen in Figure 2-10 and a typical cross section of a 230-275 kV cable, the TKRA 245 kV 3x1x1000 mm2 AQ + FO produced by Nexans, is shown in Figure 2-11.

[26] Cross-linked polyethylene
[27] Ethylene Propylene Rubber

Table 2-6. Submarine Cable Construction

Component	Description
Conductor	The conductor is made of round stranded compacted wires filled with a longitudinal water blocking material. The water blocking material is used to prevent penetration of seawater into the conductor in case of damage to the cable. Conductor water blocking is regarded favorably with respect to aging of extruded insulation systems. Due to different thermal conditions at the landfalls HDD, different conductor material for the landfall section and different conductor material for the offshore part have been selected. Inter-array cables and offshore export cables will use copper or aluminum conductors and range in size from 200-300 mm overall diameter.
Insulation	The insulation system is made of cross-linked polyethylene (XLPE), a material with good mechanical, thermal and electrical properties. The insulation system is designed as follows: • Extruded layer of semi-conducting compound; • Extruded insulation of crosslinked polyethylene; • Extruded layer of semi-conducting compound. XLPE is produced by cross-linking of thermoplastic polyethylene. The cross-linking of the molecules in polyethylene is a chemical process caused by peroxides when subjected to high temperature and pressure. XLPE has thermal properties which permit a continuous maximum conductor temperature of 90 °C (194 ˚F) and a maximum short circuit temperature of 250 °C (482 ˚F). The insulation material has a high dielectric strength, low dielectric constant, high insulation resistance, and the water absorption is very low.
Lead alloy sheath	A lead alloy sheath is applied as radial water barrier. Semi-conductive water swellable tapes are wrapped on the insulated core in the same process. The water swellable tapes will prevent longitudinal water penetration if the cable is damaged.
Core sheath	An inner sheath of semiconducting extruded polyethylene is applied over the lead sheath. The core sheath acts as a mechanical reinforcement of the lead sheath and act as a corrosion protection.
Assembly	The three sheathed cores together with one fiber optic element are laid up with extruded PE fillers applied in the interstices to give a substantially round shape. The assembled cores are bound together with synthetic tapes.
Armor	The cable armor consists of one layer of round, galvanized steel wires. The armor wires are embedded in bitumen. The armor serves as a mechanical protection and a major tensile element during laying and installation.
Outer serving	The outer serving is main corrosion protection of the armor. It consists of asphaltic compound with polypropylene reinforcement.

1	Conductor	Aluminium round stranded compacted longitudinal watertight
2	Conductor screen	Extruded semi-conductive XLPE
3	Insulation	Extruded XLPE
4	Insulation screen	Extruded semi-conductive XLPE
5	Bedding	Semi-conductive swelling tape
6	Metallic screen	Copper wire screen with copper-helix
7	Bedding	Swelling tape
8	Laminated sheath	Al-foil bonded to polymeric sheath
9	Polymeric sheath	HDPE, colour: black
10	Thin outer electrode	Semi-conducting PE skin layer, colour: black approx. thickness: 0.15 mm
11	Fibre optic cable	48 SM
12	Fillers and binder	Polypropylene threads and tapes
13	Bedding	Bedding tapes
14	Armouring	Round steel wires, galvanized
15	Serving	Bitumen impregnated Hessian tapes and Polypropylene threads

Figure 2-10. Inter-array Cable *Source: Nexans*

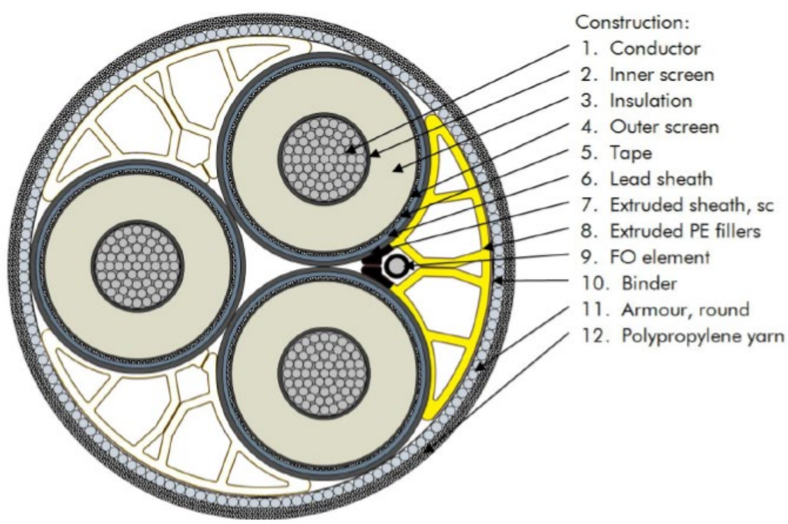


Figure 2-11. 230 kV Cable Cross Section *Source: Nexans*

The onshore export cables may be submarine via the Onshore Export Cable Corridor 1 through Indian River Bay, or land-based cables if a terrestrial route is pursued, which would involve co-location in Delaware Department of Transportation (DelDOT) rights-of-way (ROW) excepting portions of Onshore Export Cable Corridors 1b and 1c that utilize a Sussex County ROW under development. In the case of Onshore Export Cable Corridor 1 the cables would be of the same construction presented in Table 2-5. Cables for any land-based routes would be (1/C) 230-275 kV single copper or aluminum core cables. Three single conductor (singe phase) cables would be installed in parallel, possibly sharing a cement bound sand block (see Appendix I-J) in the right-of-way, to complete the circuit from the OSS to the POI.

2.5.1 Inter-Array Cables

The inter-array cables connect the WTGs to the OSS and will be run in a primarily North/South direction connecting up to 4 to 6 WTGs in a string. The cables will transition from their primary North/South direction to an East/West direction as required to connect the WTG strings to the OSSs. Based on the PDE layout, up to 245 km (152 mi) of Inter-array Cable will be used. Figure 2-12 illustrates the preliminary inter-array cabling for the proposed Project.

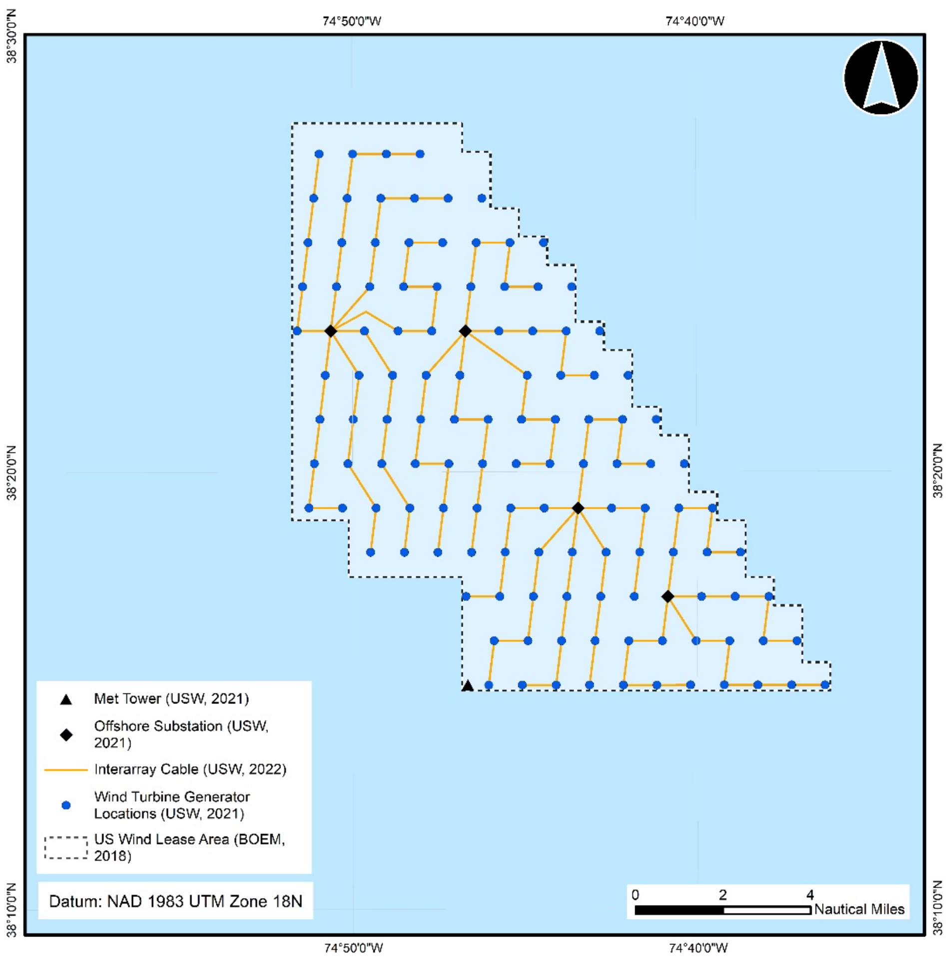


Figure 2-12. Indicative Inter-Array Cable Layout

2.5.2 Offshore Export Cables

Up to four offshore export cables will be located among up to two 600-m (1,968-ft) corridors from the OSSs to the planned landfall at 3R's Beach or Tower Road (Barrier Beach Landfalls). Proposed Offshore Export Cable Corridor 1 connects to 3R's Beach while Offshore Export Cable Corridor 2 connects to Tower Road, as shown in Figure 2-13.

When the cables reach the landfall, they will be pulled into a cable duct that routes the cables under the existing beach to subterranean transition vaults. The transition vaults would be located in existing developed areas such as parking areas.

Spacing between parallel offshore export cables will be approximately three times the water depth, in line with the recommendations from the International Cable Protection Committee (ICPC), to provide ample space for cable repairs as needed.

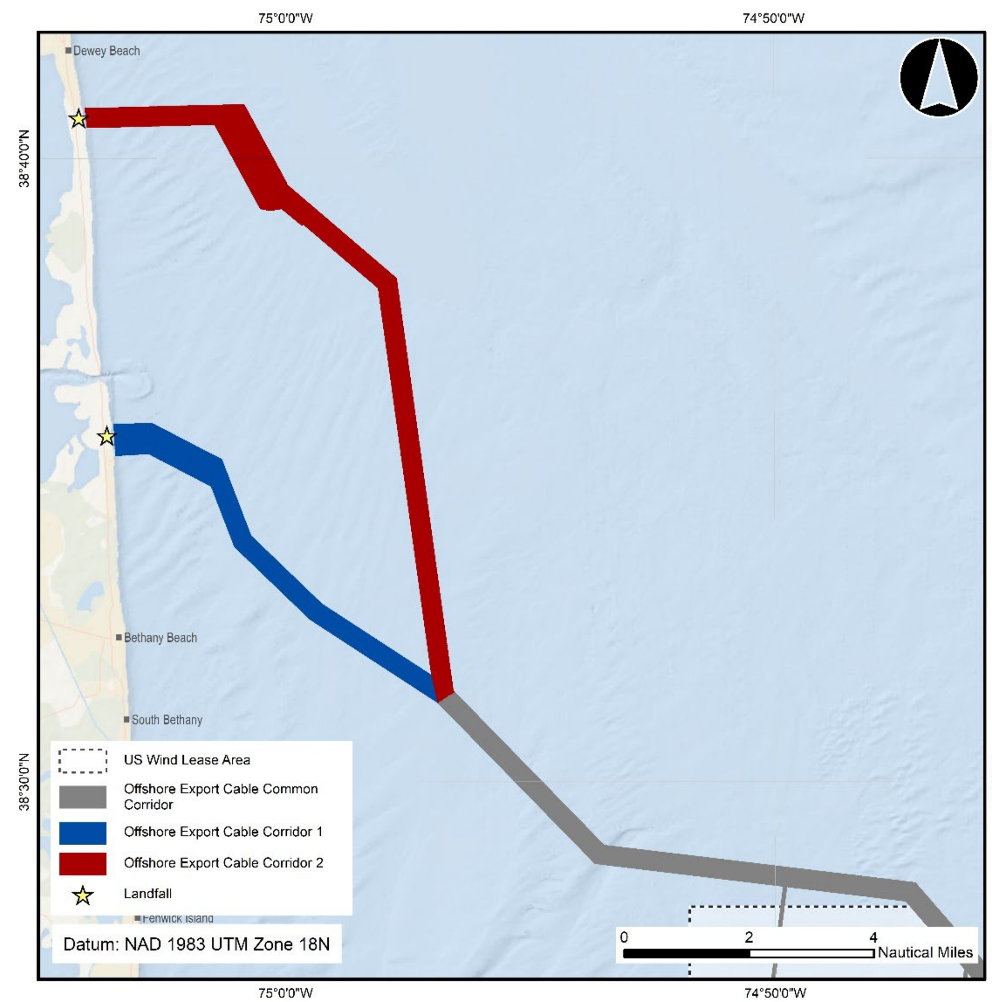


Figure 2-13. Offshore Export Cable Corridors

2.5.3 Onshore Export Cables

US Wind's PDE includes two landfall and transition vault locations. The proposed scenario is a landfall location in vicinity of the 3R's Beach parking lot located approximately 1.6 km (1 mile) south of the Indian River Inlet. A second landfall option is at Tower Road approximately 7.7 km (5 miles) north of the Indian River Inlet.

An overview of the proposed and optional landfall points is provided in Figures 2-14 and 2-15.

Figure 2-14. Anticipated Landfall 3R's Beach Parking

Figure 2-15. Optional Landfall Tower Road

From the landfall location up to four onshore export cables will run from the transition vaults via a cable corridor to the POI. Transition vaults for the Project will be installed below grade and are planned to be installed in existing parking areas, roadways, or similarly developed locations. An example of the access point for an operational transition vault can be seen in Figure 2-16.

Figure 2-16. Typical Transition Vault within Parking Lot Post Construction

Onshore Export Cable Corridor 1 is part of the PDE and the area considered for the onshore export cables. Onshore Export Cable Corridor 1, the proposed route, Onshore Export Cable South Corridor, and additional options are shown in Figure 2-17 and described further in the following subsections.

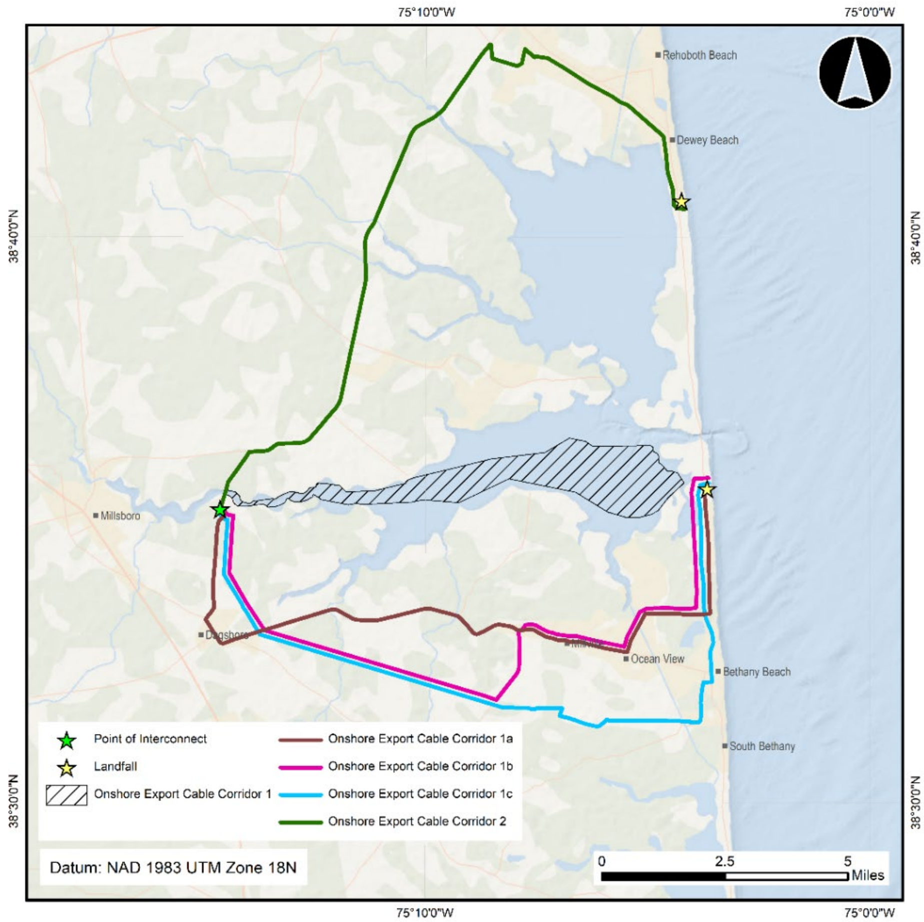


Figure 2-17. Onshore Export Cable Corridors

2.5.3.1 Onshore Export Cable South Corridor

Onshore Export Cable Corridor 1 is part of the PDE for the Project and is associated with landfall at 3R's Beach. Within Onshore Export Cable Corridor 1, US Wind proposes to install cables in the southern route, or Onshore Export Cable South Corridor, within Indian River Bay. An overview of the cable corridors within Indian River Bay is provided in Figure 2-18. US Wind previously considered a northern optional route within Onshore Export Cable Corridor 1, Onshore Export Cable North Corridor, and eliminated the optional route for reasons discussed below.

Onshore Export Cable South Corridor would bring up to four onshore 230-275 kV export cables through cable ducts that route the cables under existing coastal wetlands into Indian River Bay. Onshore Export Cable South Corridor extends approximately 17 km (10 mi) from the transition vaults within a corridor within Indian River Bay to Indian River at the landfall location to the US Wind substations. When the cables reach US Wind's substations' cable ducts, they will be pulled into the cable ducts and into the substations' transition bays. The landfall in Indian River for US Wind's proposed substations is adjacent to the existing Indian River Substation.

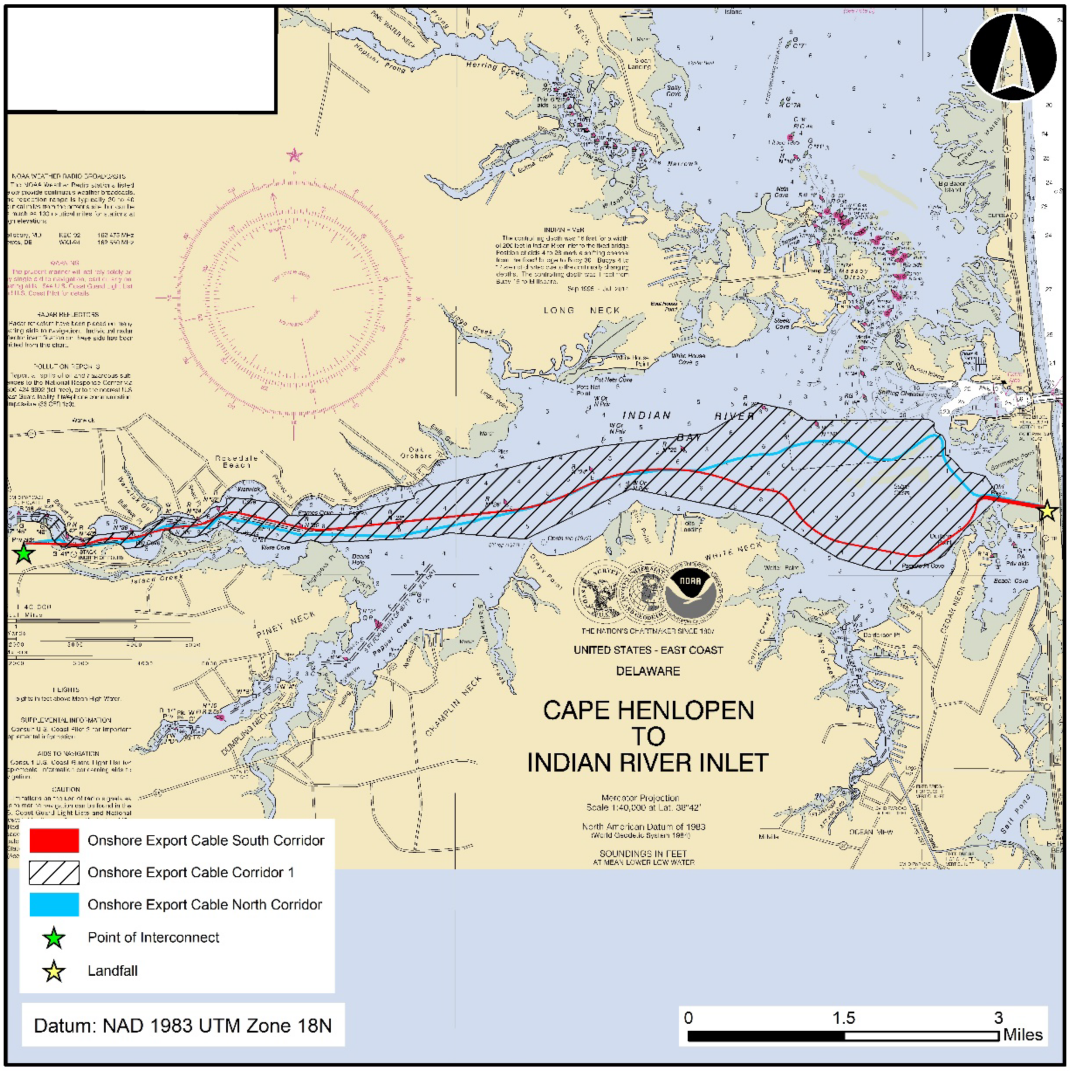


Figure 2-18. Onshore Export Cable Corridor 1

Onshore Export Cable South Corridor in the eastern portion of Indian River Bay avoids the dynamic nature of the area west of the Indian River Inlet. The shifting shoals in the vicinity of the inlet represent a significant risk to the Project for cable unburial which would be extremely difficult to rectify should it occur. The southern route through Indian River Bay also avoids the Indian River Inlet and Bay Federal Navigation Project. The federal navigation channel is not fixed to a particular location and shifts to the deeper sections of the bay. Onshore Export Cable South Corridor avoids the vicinity of the inlet and deconflicts the eastern portion of the cable routing (see Volume II Section 16.2).

The minimum width of the 4-cable installation would be 40 m (131 ft) while the maximum width would be dependent on bay bottom conditions, considering the thermal properties of the soil and proper cable spacing. Onshore Export Cable South Corridor and the potential temporary construction disturbance area are shown in Figure 2-19. Determination of the final alignments for up to 4 cables would be made in consultation with BOEM, USACE, and the Delaware Department of Natural Resources and Environmental Control (DNREC).

Figure 2-19. Onshore Export Cable South Corridor and Temporary Construction Disturbance Area

2.5.3.2 Terrestrial Onshore Export Cable Corridors

US Wind includes four optional terrestrial cable corridors in the PDE in addition to the proposed Onshore Export Cable Corridor 1 as shown in Figure 2-17. [28] Cables would be buried along the terrestrial corridors, pending final design for any road or water crossings, along existing rights-of-way (ROW), or ROW under development. Cables for any land-based routes would be (1/C) 230-275 kV single copper or aluminum core cables. Three single conductor (single phase) cables would be installed in parallel, possibly sharing a cement bound sand block (see Appendix I-J) in the right-of-way, to complete the circuit from the OSS to the POI.

[28] US Wind removed Onshore Export Cable Corridor 3 and Onshore Export Cable Corridor 4, connecting to Cool Springs and Milford Substations, respectively, from the PDE due to changes by the regional grid operator, PJM, in the interconnection request review process in December 2022.

Below is a description of each onshore cable corridor, the landfall associated with each, as well as the POI.

- Onshore Export Cable Corridor 1a: Approximately 26 km (16 mi) from the landfall at 3R's Beach along existing DelDOT ROWs to Indian River POI via a southern route around Indian River Bay. The cables would exit the transition vaults at 3R's Beach, traverse south along Coastal Highway (Route 1), turning west on Fred Hudson Road, south on Central Avenue then along Route 26/Atlantic Avenue to Dagsboro, continuing north on Route 26/Main Street through Dagsboro, and then generally north along Iron Branch Road/Road 332 to the US Wind Substations.
    - There are a total of four (4) terrestrial water crossings along Onshore Export Cable Corridor 1a. Crossings include the Assawoman Canal at Central Avenue, Vines Creek on Route 26, Blackwater Creek, and an unnamed tributary into Salt Pond. Approximately 4.8 km (3 mi) of the 26-km (16-mi) corridor traverse areas of wetlands which are often immediately adjacent to the roadway.
- Onshore Export Cable Corridor 1b: Approximately 26 km (16 mi) along existing DelDOT ROWs and Sussex County ROWs under development from landfall at 3R's Beach to Indian River POI. Cables would exit the transition vaults at 3R's Beach along same route as Onshore Export Cable Corridor 1a until west of Millville then south on Route 17 until turning west/northwest along a Sussex County water line ROW, currently under development, across Route 26 then north in parallel with Iron Branch Road/Road 332 to the US Wind Substations.
    - There are a total of seven (7) terrestrial water crossings along Onshore Export Cable Corridor 1b. The first two of the water crossings are the same as Corridor 1a (Assawoman Canal and an unnamed tributary into Salt Pond). The other five (5) crossings include Blackwater Creek, Vines Creek, Herring Branch, Pepper Creek, and Island Creek. Approximately 7.6 (4.7 mi) of the 26-km (16-mi) corridor traverse areas of wetlands which are often immediately adjacent to the roadway.
- Onshore Export Cable Corridor 1c: Approximately 27 km (17 miles) along existing DelDOT and Sussex County ROWs under development from landfall at 3R's Beach to Indian River POI. The cables would exit transition vaults at 3R's Beach, traverse south along Route 1 through Bethany Beach turning west on Wellington Avenue, south on Kent Avenue to an Exelon substation then turning generally west along an Exelon ROW, picking up the Sussex County ROW after crossing Route 17 and then traversing the same remaining route to the US Wind Substations as Onshore Export Cable Corridor 1b.
    - There are a total of 32 water crossings along Onshore Export Cable Corridor 1c. Water crossings include the Assawoman Canal, Blackwater Creek, Vines Creek, Herring Branch, Pepper Creek, and Island Creek. Additional crossings include unnamed streams or creeks and multiple retention ponds associated with adjacent residential developments. In areas with multiple ponds around residential developments, if Onshore Export Cable Corridor 1c is selected for construction, effort to microsite around these ponds would be made. Approximately 9.3 km (5.8 mi) of the 27-km (17-mi) corridor traverse areas of wetlands which are often immediately adjacent to the roadway.
- Onshore Export Cable Corridor 2: Approximately 28 km (17 miles) along existing DelDOT ROWs from landfall at Tower Road to Indian River POI via a northern route around Indian

River Bay. Cables would exit transition vaults at the Tower Road landfall, traverse north along Coastal Highway/Route 1 through Dewey Beach and Rehoboth, turning west along Airport Road, continuing south along Road 274, west along Route 1D, connecting to Route 24 south/ John J Williams Highway to an Exelon overhead power line ROW, and then crossing Indian River via horizontal directional drill and continuing underground to the US Wind Substations.

- There are a total of eight (8) water crossings along Onshore Export Cable Corridor 2. Crossings include Love Creek, Burton Pond on Route 24, the Lewes and Rehoboth Canal, Sarah Run, Unity Branch, Guinea Creek, Indian River, and an unnamed stream flowing into Sarah Run. Approximately 4.3 km (2.4 mi) of the 28-km (17-mi) corridor traverse areas of wetlands which are often immediately adjacent to the roadway.

US Wind is evaluating the potentially crowded conditions in the ROWs to determine the number of cables that could be accommodated if a particular corridor is selected. Cables in any existing DelDOT ROW may require additional approvals or authorizations as described in Section 8.1.

2.5.3.3 Onshore Export Cable Corridor Evaluation

US Wind evaluated the practicability of construction along various routes for the Onshore Export Cables. DNREC's Division of Fish and Wildlife Species Conservation and Research Program provided additional avoidance and minimization measures in December 2023 that further informs US Wind's selection of Onshore Export Cable South Corridor through Indian River Bay as the proposed route. Table 2-7 presents a summary of the parameters evaluated along with avoidance and minimization measures associated with the parameters. Measures shaded in light green indicate US Wind's conclusion that the measure is practicable to implement for successful construction and ongoing operation.

Table 2-7. Summary of Parameters Considered for the Onshore Export Cable Corridors and Related Avoidance/Minimization Measures

Parameter	Onshore Export Cable				
	South Corridor (preferred) through Indian River Bay	Corridor 1a South of Indian River Bay	Corridor 1b South of Indian River Bay	Corridor 1c South of Indian River Bay	Corridor 2 North of Rehoboth Bay
Length	16 km (10 mi)	26 km (16 mi)	26 km (16 mi)	27 km (17 mi)	28 km (17 mi)
Practicable installation option	Preferred option	**Not practicable** Resistance to new utilities in ROW	**Not practicable** Resistance to new utilities in ROW	**Not practicable** Resistance to new utilities in ROW	**Not practicable** Resistance to new utilities in ROW
Ongoing protection of cables	Burial 1-2 m (3-7 ft) maintains protection of cables	**Not practicable** At risk due to other utility[29] activity in ROW	**Not practicable** At risk due to other utility activity in ROW	**Not practicable** At risk due to other utility activity in ROW	**Not practicable** At risk due to other utility activity in ROW
Archeological/ cultural sensitivity	No resources identified in 2022/2023 surveys and evaluations	"Any undisturbed land [such as temporary construction footprint] were generally classified as locations of **high or moderate archaeological sensitivity**"	"Any undisturbed land [such as temporary construction footprint] were generally classified as locations of **high or moderate archaeological sensitivity**"	"Any undisturbed land [such as temporary construction footprint] were generally classified as locations of **high or moderate archaeological sensitivity**"	"Any undisturbed land [such as temporary construction footprint] were generally classified as locations of **high or moderate archaeological sensitivity**"
Federal/state channels or canals	Avoids Indian River federal navigation channel, areas of overlap cables to be buried at least 6 ft below maintenance depth	HDD under Assawoman Canal	HDD under Assawoman Canal	HDD under Assawoman Canal	HDD under Lewes and Rehoboth Canal

[29] For example, sewer lines, fiberoptic cable, power lines,

Table 2-7. Summary of Parameters Considered for the Onshore Export Cable Corridors and Related Avoidance/Minimization Measures

Parameter	Onshore Export Cable				
	South Corridor (preferred) through Indian River Bay	Corridor 1a South of Indian River Bay	Corridor 1b South of Indian River Bay	Corridor 1c South of Indian River Bay	Corridor 2 North of Rehoboth Bay
Water crossings	1 Indian River Bay	4 Assawoman Canal, Vines Creek, Blackwater Creek, unnamed tributary into Salt Pond	7 Assawoman Canal, Vines Creek, Blackwater Creek, unnamed tributary into Salt Pond, Herring Branch, Pepper Creek, Island Creek	32 Assawoman Canal, Blackwater Creek and Vines Creek, Herring Branch, Pepper Creek, Island Creek, unnamed creeks and retention ponds	8 Love Creek, Burton Pond, Lewes and Rehoboth Canal, Sarah Run, Unity Branch, Guinea Creek, Indian River, unnamed stream
Construction adjacent to wetlands	HDD under wetlands	Potential for impacts during construction 3 miles	Potential for impacts during construction 4.7 miles	Potential for impacts during construction 5.8 miles	Potential for impacts during construction 2.4 miles
Socio-economics	Avoid construction during recreation season Temporary impacts to bury cables	Avoid construction during recreation season Significant traffic, business, and residential disruptions for extended periods, including road closures	Avoid construction during recreation season Significant traffic, business, and residential disruptions for extended periods, including road closures	Avoid construction during recreation season Significant traffic, business, and residential disruptions for extended periods, including road closures	Avoid construction during recreation season Significant traffic, business, and residential disruptions for extended periods, including road closures
Infrastructure owner impacts	No utility lines identified	**Not practicable** Interference with planned infrastructure upgrades; limits opportunity for future expansion projects	**Not practicable** Interference with planned infrastructure upgrades; limits opportunity for future expansion projects	**Not practicable** Interference with planned infrastructure upgrades; limits opportunity for future expansion projects	**Not practicable** Interference with planned infrastructure upgrades; limits opportunity for future expansion projects

Table 2-7. Summary of Parameters Considered for the Onshore Export Cable Corridors and Related Avoidance/Minimization Measures

Parameter	Onshore Export Cable				
	South Corridor (preferred) through Indian River Bay	Corridor 1a South of Indian River Bay	Corridor 1b South of Indian River Bay	Corridor 1c South of Indian River Bay	Corridor 2 North of Rehoboth Bay
Birds	Avoid colonial waterbird nesting sites; avoid construction April 1-July 31	**Not practicable** Avoid construction at water crossings April 16-July 31	**Not practicable** Avoid construction at water crossings April 16-July 31	**Not practicable** Avoid construction at water crossings April 16-July 31	**Not practicable** Avoid construction at water crossings April 16-July 31
Fish/ Essential Fish Habitat	Avoid in-water work March 1-September 30	**Not practicable** Avoid drilling (HDD) at water crossings March 1-September 30	**Not practicable** Avoid drilling (HDD) at water crossings March 1-September 30	**Not practicable** Avoid drilling (HDD) at water crossings March 1-September 30	**Not practicable** Avoid drilling (HDD) at water crossings March 1-September 30
State Natural Areas	Indian River Bay Natural Area	Vines Creek Natural Area	Vines Creek Natural Area	Vines Creek Natural Area	Herring Creek Natural Area

2.6 Substations

Connection of the Project to the electrical grid is anticipated through a combination of substations built by US Wind at the POI.

2.6.1 DPL Substation

US Wind proposes to interconnect to DPL's Indian River 230 kV substation (Indian River Substation), located near Millsboro, Delaware. An aerial view of the Indian River Substation can be seen in Figure 2-20. The Indian River Substation is located adjacent to the Indian River Power Station. DPL (as is the normal practice in an interconnection of new projects) will construct the interconnection (or tie-in) to the US Wind Substations, and the interconnections are part of the DPL transmission system, fully owned and operated by DPL. As standard utility practice, US Wind shall only own and operate its own new substations within the fence line.

US Wind has an established interconnection through ABI-056, and AFI-007, and AH1-634 for 323.1 MW to connect to the Indian River Substation. Interconnection of an additional 448.8 MW and 897.6 MW through queue positions AG2-347 and AG2-348, respectively, may require expansion by DPL of the Indian River Substation to accommodate the additional capacity. Previously, US Wind included potential expansion of the Indian River Substation in the COP, however, US Wind has since come to better understand the potential scope of the Indian River Substation expansion. DPL's plans or decisions to expand the Indian River Substation, and potentially use an easement on the existing property, are all part of the state utility's long term planning process and is not driven solely by the Project. As with all interconnection projects, DPL holds full responsibility and authority over its transmission facilities and will assess the necessity and scope of any substation expansions based on a number of issues that may impact it. US Wind also understands that DPL is currently undertaking a comprehensive planning approach and any upgrades to the Indian River Substation will be focused on grid reliability and optimization; not solely based on a single project. DPL plans for the Indian River Substation expansion would be to accommodate generation expansion in the region (not only the Project but solar, gas, and battery technologies) and to maintain grid reliability.

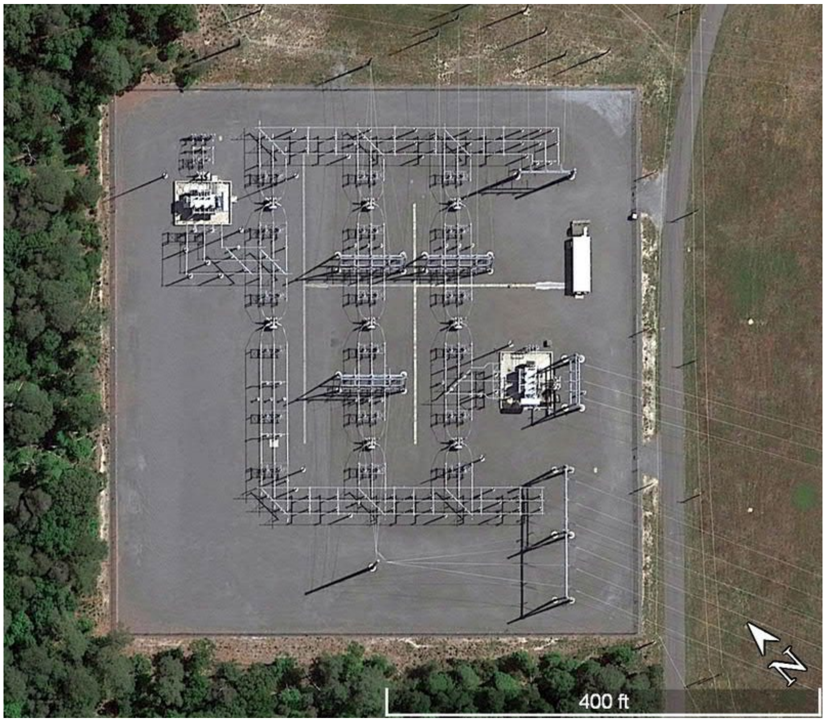


Figure 2-20. Indian River Substation

2.6.2 US Wind Substations

US Wind proposes to construct new substations adjacent to an existing DPL substation at the POI. The anticipated location of US Wind's substations is adjacent to Indian River Substation.

US Wind's substations immediately adjacent to the proposed Indian River Substation are shown in Figure 2-21. The figure demonstrates a preliminary general arrangement of the substations; however, the final design may vary within the shown footprint. The US Wind Substations would be constructed to the west and southwest of the Indian River Substation. The proposed arrangement of the US Wind Substations allows for any future expansion of the Indian River Substation by DPL and allows for sequential construction of the US Wind Substations. The onshore export cables would exit the HDD duct, into underground transition vaults approximately the same size as transition vaults at the Barrier Beach Landing locations, and traverse underground to be terminated at the respective US Wind substation block. Cables connecting from the transition vaults to the new substations would be buried below grade. The US Wind Substations would connect to the Indian River Substation via overhead line. The transmission line between the new US Wind Substations and the Indian River Substation POI is expected to be a short overhead transmission line, subject to any applicable DPL discretion. US Wind proposes that the US Wind Substations will be adjacent to one another such that any overhead transmission line will be less than 152 m (500 ft) long.

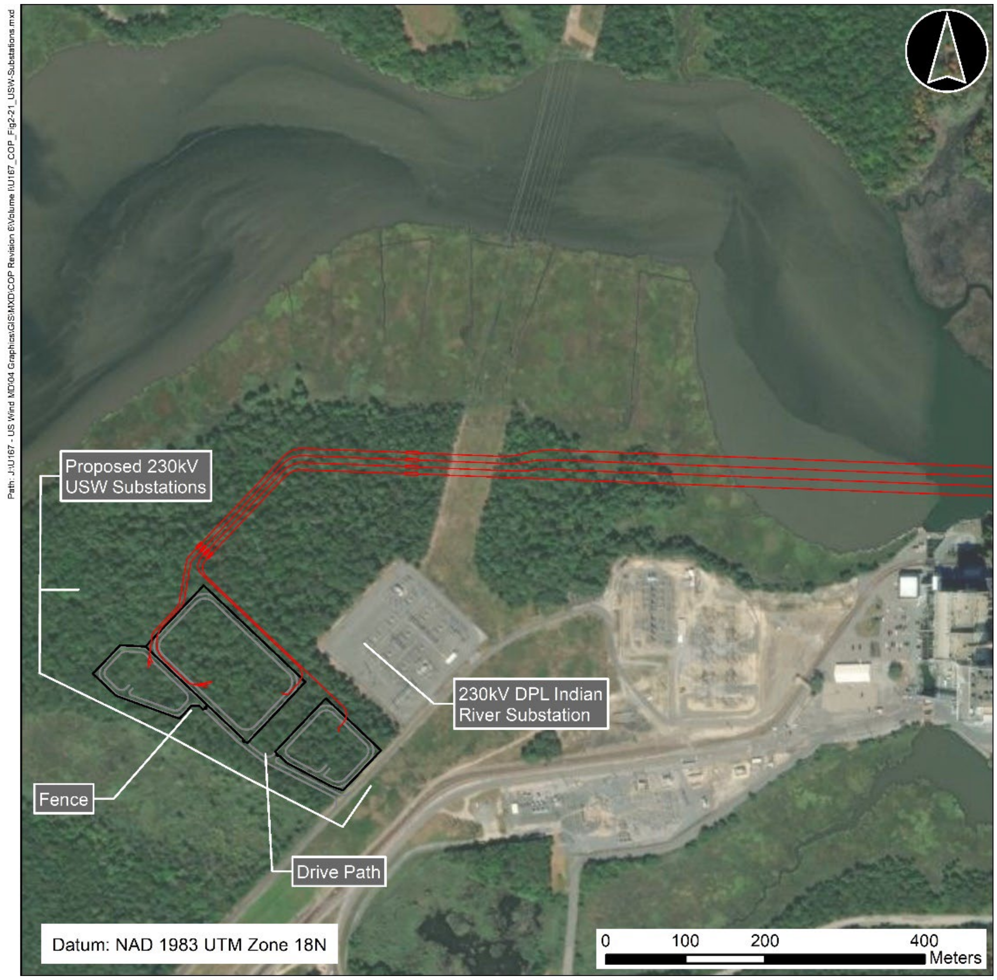


Figure 2-21. DPL Indian River Substation and US Wind Substations (gas insulated)

US Wind is evaluating gas-insulated and air-insulated substations for the Project which have different maximum footprints and tallest structures within the substation. Ground disturbance below the substation is estimated to extend 4 m (12 ft) below grade. Preliminary design drawings of both substations are included in Appendix I-J.

2.7 O&M Facility

The operations and maintenance facility (O&M Facility) will provide a suitable location to plan and coordinate WTG and OSS maintenance and servicing operations for the Project from the Ocean City, Maryland region. The O&M Facility will be comprised of onshore office, crew support, and warehouse spaces with associated parking in the Ocean City commercial harbor and will include quayside and berthing areas for four or more crew transfer vessels (CTVs). The O&M Facility will also house a Marine Coordination Center, which will serve to monitor the status of the WTGs and OSSs via SCADA systems, plan maintenance operations and dispatch CTVs, monitor marine activity in the Project area, coordinate drills and exercises, and communicate with outside agencies.

The proposed O&M Facility location is likely to be located on two adjacent sites on the waterfront in West Ocean City, Maryland. The waterfront sites together are approximately 1.5 acres in size. Specifically, both potential parcels are waterfront properties with suitable water depth and mooring space in the commercial harbor to safely support four or more CTVs. Under the Worcester County zoning regulations, the sites are zoned Commercial Marine which is designated for the commercial fishing industry and “commercial, industrial and recreational uses which of necessity must be located in close proximity to waterfront areas”.

The two waterfront properties currently under consideration are 12933 Harbor Road and 12929 Harbor Road.

US Wind would grade portions of the sites to prepare for construction of new buildings approximately three stories and no more than 13.7 m (45 ft) high, set back at least 7.6 m (25 ft) from the tidal waters. New buildings would include a crew support facility and a temporary warehouse, as well as a combined administrative building and warehouse to be completed later in the Project. Expansion or replacement of the existing waterfront access points would be undertaken in consultation with the Maryland Department of the Environment (MDE) and U.S. Army Corps of Engineers (USACE), including for the replacement or expansion of pavement to allow for vehicle parking and vehicular/forklift access to new cranes or davits that would load materials onto the CTVs stationed at the berth/quayside.

The facility’s waterfront location in the Ocean City commercial harbor will allow technicians efficient access to the Project offshore via CTVs, ensure dedicated monitoring of WTG and OSS operations, support planning and coordination of maintenance activities, allow marine coordination with US Wind CTVs, other marine traffic, and emergency response agencies, and facilitate world-class support of the WTG and OSS maintenance technicians. The co-location of administration, operations, and warehousing will support efficient planning and coordination, limit maintenance crew travel times, house spare parts, tools, and equipment next to the CTVs on the waterfront, and reduce unnecessary handling of parts and equipment. US Wind plans to lease and/or acquire suitable properties that will be capable of berthing four or more CTVs. The waterfront property will support the onloading and offloading of parts, tools, and personnel needed for operations and maintenance on the WTGs and OSSs with ingress/egress to the Project area via the Ocean City Inlet. See Figures 2-22 through 2-25 for an overview of the Ocean City, Maryland, region, waterfront properties under consideration, an overhead view, and a notional rendering of the O&M Facility.

US Wind proposes retrofitting existing quayside facilities, with improved waterfront bulkheads and pier structures, and constructing new buildings.

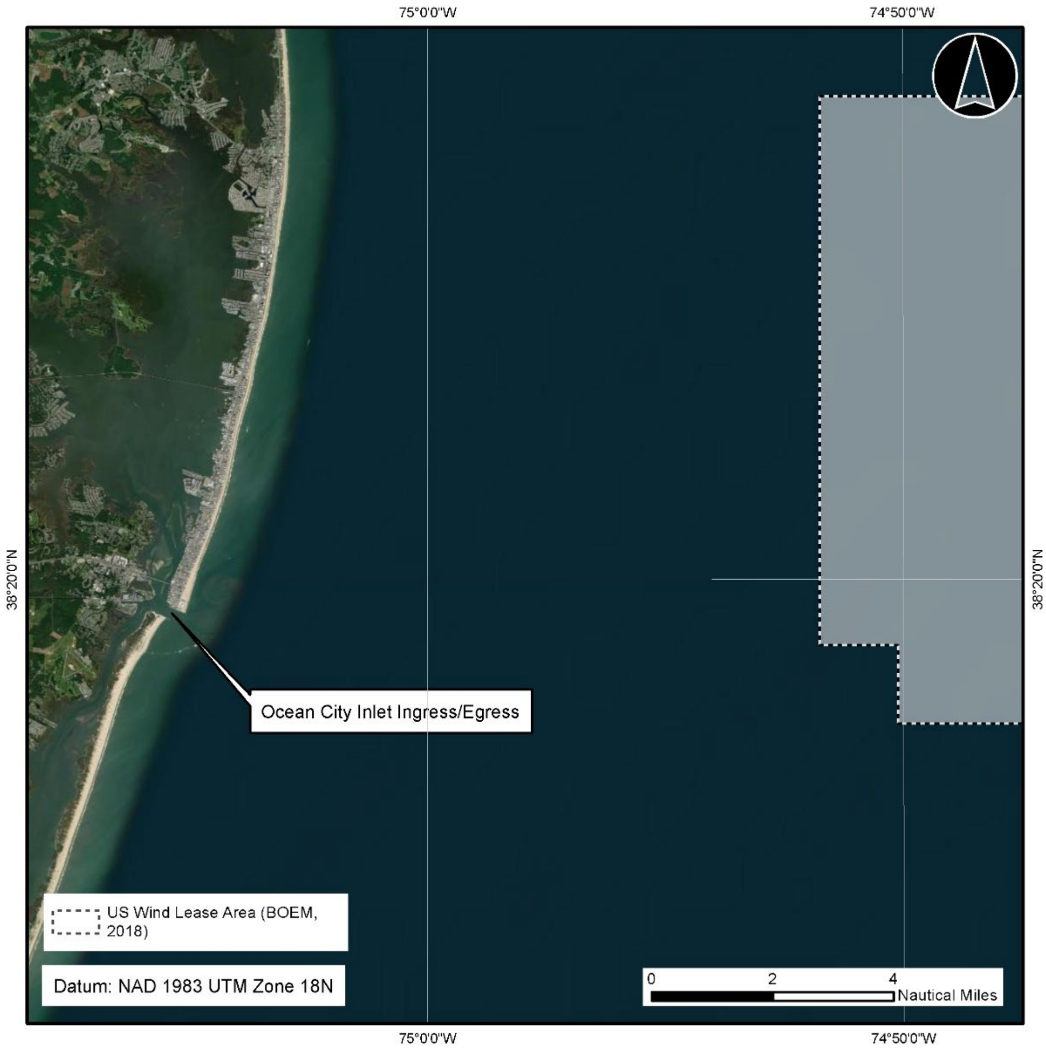


Figure 2-22. Ocean City Inlet Operations Site

Figure 2-23. Potential Ocean City Harbor Quayside Operations Site

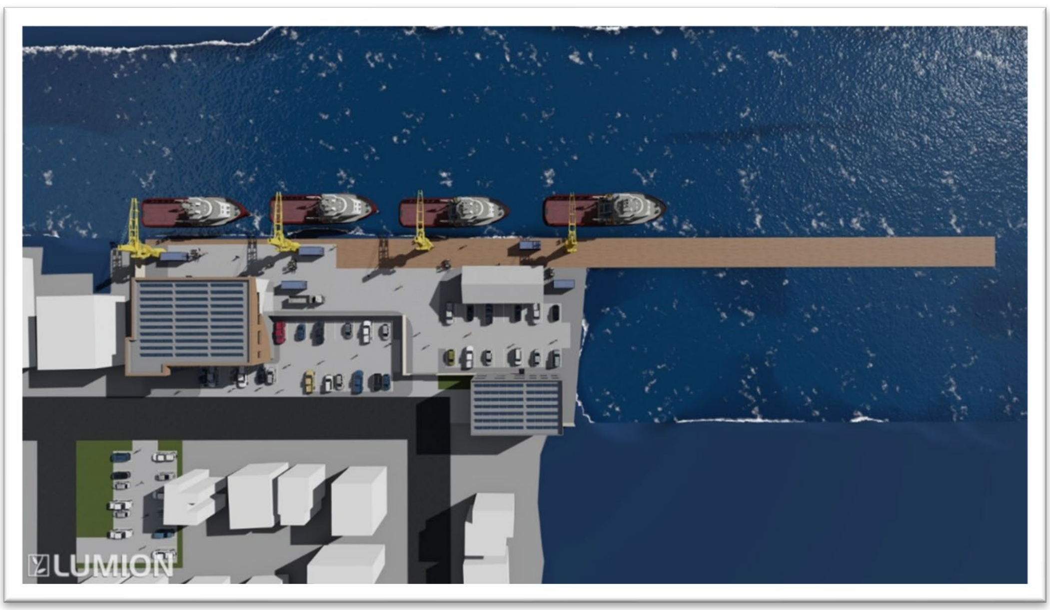


Figure 2-24. Overhead view of notional O&M Facility in Ocean City, MD

Figure 2-25. Notional rendering of O&M Facility in Ocean City, MD

Larger deep draft vessels needed to support routine or unplanned maintenance activities involving larger parts and equipment than cannot be transported via CTV, would likely mobilize from additional ports as presented in Table 2-8.

Table 2-8. Potential O&M Ports

Port	Potential O&M Activities
Ocean City, MD	Maintenance activities for WTGs, OSSs, and routine inspections
Lewes, DE	Maintenance activities for WTGs, OSSs, and routine inspections
Hampton Roads, VA	Major maintenance activities requiring deep draft or jack-up vessels
Baltimore, MD	Major maintenance activities requiring deep draft vessels
Hope Creek, NJ	Major maintenance activities requiring deep draft or jack-up vessels
Port of New York/New Jersey	Major maintenance activities requiring deep draft or jack-up vessels

3.0 Project Fabrication and Installation

Construction of the Project is proposed over up to 4 campaigns. Each construction campaign will follow this general sequence:

- Mobilization and upgrades of construction and staging facilities
- Fabrication and delivery of Project components
- Realize grid connection including onshore export cables and substations
- Vessel mobilization
- Installation of the OSS
- Offshore export cable installation (optionally before the OSS)
- WTG monopile foundation installation
- Inter-array cable installation
- WTG installation and commissioning

US Wind continues to evaluate and refine the Project design and works with suppliers to select the Project components, equipment fabrication and assembly locations, as well as the transport and installation strategies for the Project. The final size of the Project and the development of the supply chain will govern the duration of component fabrication and Project construction activities. These aspects of construction and installation will be further solidified under BOEM's review and approval process of the COP. Details regarding Project components will be included in various FDR/FIR processes (see Section 8.2).

3.1 Construction and Fabrication Facilities

Due to the global nature of the offshore wind supply chain, it is likely that some Project elements will be manufactured and transported to a staging facility for final assembly and transport to the Project site. The construction and staging facilities for the Project will allow for the receipt and fabrication of Project components as well as the pre-assembly of components prior to installation offshore. A facility at Sparrows Point, in addition to other locations, as needed, is anticipated to be utilized to support multiple Project activities including:

- Fabrication or assembly of foundations
- Storage and pre-assembly for turbines
- Storage and trans-shipment of export and inter-array cables
- Fabrication or assembly of OSSs and/or support components
- Fabrication or assembly of feeder barges
- Loadout of project components for installation offshore
- Support for other offshore wind projects' fabrication needs

US Wind evaluated several potential locations for construction and staging of Project components and anticipates utilizing facilities in the Greater Baltimore area, including Sparrows Point. Other port facilities elsewhere on the U.S. East Coast could be utilized to support the Project (see Table

3-1) and will be considered by US Wind on an as needed basis. It is assumed that development of some infrastructure at the potential port sites will be required. US Wind will engage with the facility operators and component suppliers to determine where upgrades are occurring to support the offshore wind industry.

To the extent that upgrades or modifications at an existing port facility may occur, those upgrades or modifications would serve to support the U.S. offshore wind industry in general. Given the numerous states that are procuring, facilitating, and funding offshore wind development, both existing and upgraded as well as new port facilities are expected to serve multiple offshore wind projects and, potentially, also offshore wind-related and other maritime industries.

US Wind anticipates that a separate corporate entity will be established to conduct a significant portion of fabrication, assembly, and staging activities for this Project and other offshore wind projects at a location in the Greater Baltimore area, which is expected to be at Sparrows Point[30].

US Wind expects that component fabrication and facility preparation will commence 2 to 3 years prior to offshore construction and that Project construction activities will occur over a period of between 2 to 5 years.

Table 3-1. Proposed Construction Activities and Related Port Facilities

Port Facility	Project Element	Activity
Baltimore, MD	WTG – Primary	Delivery, storage, pre-assembly and load out to feeder vessel
	Foundation – Primary	Fabrication, assembly of components, load out to feeder vessel
	OSS – Primary	Fabrication, assembly of components, load out to feeder vessel
	Cable – Primary	Storage, load out to installation vessel
	Onshore Cable - Primary	Storage, load out to installation vessel (Indian River Bay crossing)
Hampton Roads, VA	WTG – Alternate	Delivery, storage, pre-assembly and load out to installation or feeder vessel
	Foundation – Alternate	Fabrication, assembly of components, load out to feeder or installation vessel
	Support – Alternate	Large support vessels, assembly of components, load out to feeder vessel
Port of New York/New Jersey	WTG - Alternate	Delivery, storage, pre-assembly and load out to installation or feeder vessel
	Foundations - Alternate	Assembly of components, load out to feeder or installation vessel

[30] US Wind is aware other proposed offshore wind development projects identify Sparrows Point as a potential staging or assembly location.

Table 3-1. Proposed Construction Activities and Related Port Facilities

Port Facility	Project Element	Activity
	Cables - Alternate	Storage, load out to installation vessel
	Support - Alternate	Support services
Charleston, SC	Cables - Alternate	Storage, load out to installation vessel
Delaware River and Bay (e.g., Paulsboro, NJ, Hope Creek, NJ, Wilmington, DE)	Foundations - Alternate	Fabrication, assembly of components, load out to feeder or installation vessel
	Cables - Alternate	Storage, load out to installation vessel
	Support - Alternate	Support services
Gulf of Mexico (e.g., Ingleside, TX, Houma/Harvey, LA)	OSS Foundations - Alternate	Fabrication, assembly of components, load out to feeder or installation vessel
	Met Tower Foundation - Primary	Fabrication, assembly of components, load out to feeder or installation vessel
Brewer, ME	OSS topside – Primary	Fabrication, assembly of components, load out to feeder or installation vessel
Ocean City, MD	Support – Primary	Support services, crew transfer
Port Norris, NJ	Support – Alternate	Support services, crew transfer
Lewes, DE	Support – Alternate	Support services, crew transfer
Cape Charles, VA	Support – Alternate	Assembly of components, load out to feeder vessel

3.2 Construction Project Management

US Wind plans to execute the Project through the management of major EPC contractors that are responsible for their areas of expertise. The major Project work packages are:

- WTG installation
- Foundation installation
- Submarine cable (supply and) installation
- OSS installation
- Onshore substations supply and installation

Individual packages may be split into smaller components or completed by a single contractor.

Health, safety, security, and environmental (HSSE) procedures from the selected contractors will be aligned with the overall Safety Management System (SMS) managed by US Wind through a bridging process described in Appendix I-B. EPC contractors and their subcontractors will be subject to audits by US Wind to ensure proper application of HSSE regulations and procedures. All personnel providing services for the Project will be fully qualified and trained according to applicable safety standards and training requirements. The Project fabrication and construction packages will include the relevant CVA oversight and inspection requirements as provided in the CVA scope of work in Appendix I-D. Work packages will be structured to provide the following information:

- Execution Plan: The Execution Plan defines how the contractor will manage all phases of the package.
- Quality Management Plan: The Quality Management Plan defines a set of planned, systematic actions required to ensure that the works comply with the requirements from the contract, the project quality plans, and any regulatory requirements.
- HSSE Plan: The HSSE Plan defines the overall HSSE management system applicable to the package, taking into account the specific scope of work and package-specific HSSE-related requirements (from US Wind's SMS).
- Transportation and Installation Plan: The Transportation and Installation Plan is a comprehensive, package-specific procedure detailing how the work will be performed during the installation phase and incorporate constraints such as weather and the work of other contractors or seasonal restrictions.
- Inspection and Test Plan (ITP): The ITP will be developed by US Wind and the relevant fabrication and installation contractor(s) for each package. The ITP will define inspections and tests required to confirm that the project meets design, performance, and regulatory requirements as detailed in project documents and contracts.

3.3 Foundations for WTGs

3.3.1 Monopile Foundation Fabrication

US Wind plans a portion of the foundation fabrication and assembly work will be conducted at a location in the Greater Baltimore area, which is anticipated to be at Sparrows Point. This work scope is expected to include the fabrication of secondary steel works which may include concrete access platforms. The major phases of foundation fabrication and installation are as follows:

- Receive foundation components
- Assembly and coating of foundations
- Fabrication of secondary steel components
- Load out to feeder vessel
- Site preparation as required (obstruction removal and leveling)
- Foundation installation

For the first construction campaign, US Wind assumes that subcomponents of the monopile foundations will be supplied from Europe and transported to Sparrows Point for final welding and finishing. For later stages of construction, monopiles are expected to be fabricated and finished at Sparrows Point.

Installation of secondary steel components, including internal platforms and equipment, boat landing and access platforms, and fendering systems, is expected to occur at the staging area prior to transporting the foundation component offshore. Alternatively, in case of extended monopiles, all secondary steel will be installed offshore, either by the main installation vessel or by a smaller crane vessel.

3.3.2 Monopile Foundation Installation

Monopile foundations will be transported offshore to the installation site by self-floating or by using feeder vessels or direct installation vessels. The transport methodology will be determined by the location of the fabrication facility and availability of Jones Act compliant vessels. The tug and barge feeder concept is depicted in Figure 3-1.

The number of feeder vessels employed will be determined based on foundation size and installation rate. US Wind assumes that up to four feeder vessels could be employed to support monopile installation. The feeder vessels may be jack-up vessels or tug and barge units. The feeder vessels may employ anchors for positioning. If anchors are employed, US Wind will utilize mid-line anchor buoys.

The feeder vessels will sail from Baltimore to the Lease area either via the Chesapeake and Delaware Canal and the Delaware Bay, or via the Chesapeake Bay.

Figure 3-1. Tug and Barge Feeder System for Foundation Transportation
Source: Wagenborg.com

During installation of each monopile foundation US Wind plans to confine bottom disturbance, for example the contact from legs of a jack-up vessel, to an area within a 300 m radius from the installation location.

Installation of the monopile foundations offshore will be conducted using either a dynamically positioned crane vessel and/or a jack-up style installation vessel equipped with a hydraulic impact hammer to drive the monopiles into the seabed. Monopile installation from a jack-up foundation installation vessel is depicted in Figure 3-2. An anchored vessel may be used for monopile installation but is not anticipated. If anchors are employed, US Wind will utilize mid-line anchor buoys.

Figure 3-2. Monopile Installation *Source: Globalenergyworld.com*

Prior to or following installation of a monopile into the seabed, the first layer of scour protection rocks will be deployed in a circle around the pile location. This layer of small rocks, the filter layer, will stabilize the sandy seabed, avoiding the development of scour holes. The rocks will be placed by a specialized rock dumping vessel with a layer thickness of up to 0.5 m (2 ft). Once the inter-array cables have been pulled into the monopile, a 1-2 m (2-7 ft) thick second layer of larger rocks, the armor layer, will be placed to stabilize the filter layer.

Typical monopile foundation installation procedures are as follows:

- Foundation location is verified, any obstructions are removed, and leveled, if required.
- Feeder or installation vessel transports foundation to site; alternatively, monopiles are self-floating and towed to site.
- Installation vessel positions itself at foundation location including jacking and preloading as required. The use of anchors may be required in some instances.
- Monopile delivered to installation vessel, lifted from feeder vessel, upended (if necessary) and installed in pile gripper frame or temporary template placed on the seabed.
- Monopile verticality verified and pile allowed to penetrate seabed under its own weight.
- Noise mitigation procedures implemented.
- Pile hammer placed on monopile and soft start process commenced.
- Pile driven to target penetration depth, using as low impact energy as possible and no more than 4,400 kJ.
- In the unlikely event that pile meets refusal prior to the embedment depth, relief drilling of the pile may be required. “Relief drilling” would be conducted using a trailing suction hopper dredger which would suction soils from the area creating sound similar to dredging

operations. Any soils removed during relief drilling will remain at the foundation location and will be placed in the general area where scour protection will be later installed.

- If a TP is included in the foundation design, the TP is lifted from installation vessel or feeder vessel and installed. If a TP-less monopile is used this step would be omitted from the installation procedure.
- For the TP-less monopile installation process, the internal and external platforms and boat landing would be lifted from feeder vessel and installed on monopile.
- If a jack-up vessel is used the installation vessel jacks down and moves to the next foundation position.
- Installation of scour protection as required.

Installation would extend up to 2 days, including approximately 2 to 4 hours of pile driving operations. Pile driving will occur during daylight hours with operations beginning after sunrise and ending before dusk, unless a situation occurs where prematurely ending pile driving may cause a safety hazard or compromise the feasibility of the foundation installation.

US Wind intends to employ both near-field and far-field underwater sound mitigation technologies while the monopile is driven into the seabed. Near-field sound abatement technologies could include AdBm Technologies Noise Mitigation System and using a damper between the hammer and sleeve to prolong the impact pulse. Far-field technologies could include a large double bubble curtain, deployed by a separate vessel mobilized to the installation location. See Volume II, Section 9.3 for discussion of proposed pile driving mitigation measures.

The installation procedures will be refined as the design process continues and installation equipment is selected. Final installation processes will be included in the FDR/FIR process.

3.4 OSS

The OSS consists of the foundation and topside. US Wind’s modular approach to the design of the OSS topside as described in Section 2.3 allows for components to be fabricated at various locations with final assembly and testing completed at a port facility. The OSS topsides are expected to be supplied from either the Gulf of Mexico or Baltimore, or potentially from Europe or Asia depending on availability.

US Wind is evaluating monopile, piled jacket, and jacket on suction bucket foundations. If monopiles are used for OSS foundations, supply and fabrication would be the same as described in Section 3.3.1. Piled jacket or jacket on suction bucket foundations would likely be supplied from Europe or the Gulf of Mexico and transported to the installation site.

3.4.1 OSS Foundation Installation

Foundations under consideration for the OSSs would be installed using varied procedures and installation methods which will be finalized in the FIR process.

Installation of monopile foundations and scour protection for the OSS follows the same sequence as described in Section 3.3.2. Monopile foundations for an OSS have a separate transition piece

(TP) with a number of J-tubes for the installation of inter-array cables and the offshore export cable.

3.4.1.1 Piled Jacket Installation

Jacket foundations are typically installed in two ways: pre-piled (pin piles preinstalled in the seabed using a template) or post-piled (piles driven through jacket skirts). An OSS on a piled jacket foundation is shown in Figure 3-3.

If seabed preparation is needed to provide a level surface for the post-piled jacket or jacket on suction buckets, dredging equipment from a vessel would remove disturbed soil to create a firm and level base in the footprint of the foundation.

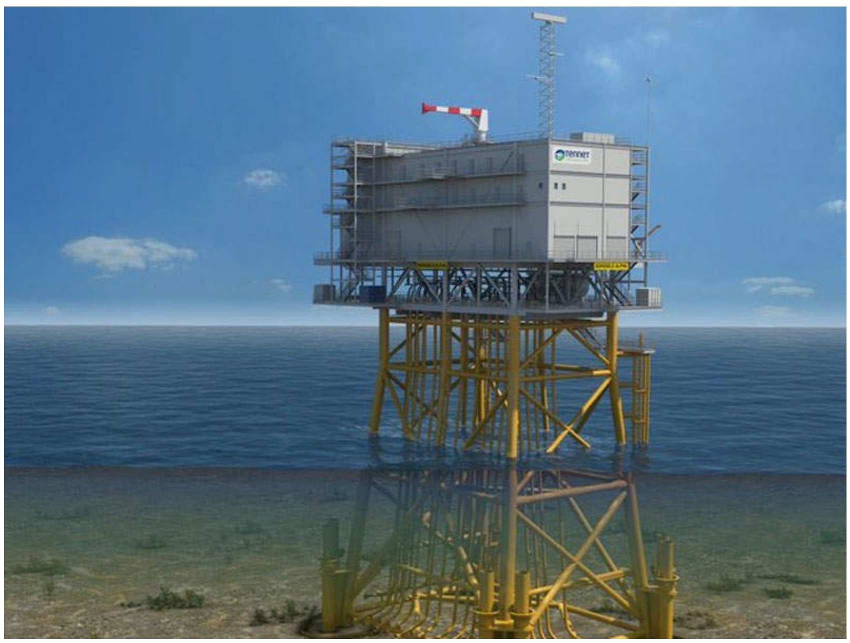


Figure 3-3. Example High-Capacity OSS with Jacket Foundation and Skirt Piles
Source: Tennet.eu, Borssele Alpha OSS

Typical pre-piling installation procedures are as follows:

- Feeder or installation vessel transports foundation to site; if anchors are employed for positioning of vessels these may be installed ahead of vessel arrival.
- Piling template lifted from crane vessel deck and lowered to seabed. The piling template is adjusted using the hydraulically actuated template legs to provide a level frame for pile installation.
- Pile is lifted from the feeder vessel and lowered into the piling frame and pile allowed to penetrate seabed under its own weight.
- Noise mitigation procedures are implemented.
- Pile driven to initial embedment depth with impact pile hammer.

- Remaining piles lowered into piling frame and driven to initial depth.
- All piles driven to target embedment depth.
- In the unlikely event the pile meets refusal prior to the embedment depth, removal of the soil plug or relief drilling of the pile may be required. Any soils removed during relief drilling will remain at the foundation location and will be placed in the general area where scour protection will be later installed.
- Soil plugs removed from piles to ensure adequate depth for jacket stabbing mechanism.
- Pile heights above seabed are verified and piling template removed.

Typical jacket installation procedures are as follows:

- Feeder or installation vessel transports foundation to site, if anchors are employed for positioning of the vessels, these are installed ahead of vessel arrival.
- Pre-installed piles inspected by remote operated vehicle (ROV) to ensure that sufficient soil is removed to allow engagement of jacket stabbing mechanism and cleaned to ensure appropriate bonding surface for grout adhesion.
- Jacket lifted from feeder vessel and lowered onto piling.
- Jacket gripper and leveling system engaged to level and secure jacket, if required.
- Grouting process commenced to permanently attach jacket to piling.

In case of a post-piled jacket, the jacket will be placed on the seabed and piles will be stabbed into the jacket pile guides (skirts). An underwater hammer will be used to drive the piles to target penetration. The jacket will then be leveled, if needed, and the top of the piles rigidly connected to the pile guides of the jacket.

3.4.1.2 Suction Bucket Installation

Typical jacket on suction bucket foundation installation procedures are as follows:

- Feeder or installation vessel transports foundation to site; if anchors are employed for positioning of the vessels, these are installed ahead of vessel arrival (see Figure 3-4).
- Jacket on suction buckets delivered to installation vessel, lifted from feeder vessel, and lowered in the target area on the seabed.
- Verify correct orientation of the jacket.
- Activate and test the suction bucket dewatering pumps. Dewatering process commenced, drawing suction buckets to design embedment depth.
- Jacket verticality monitored during lowering, and suction pressure adjusted per bucket, if needed.
- Once the buckets have reached their target penetration, the suction pumps will be disconnected from the buckets by ROV and recovered to the vessel.
- Deploy scour protection, if applicable.

Figure 3-4. Jacket on Suction Bucket Transport
Source: www.chpv.co.uk

3.4.2 OSS Topside

Final assembly of the OSS topside will be completed at a port facility, potentially Sparrows Point, and loaded onto an appropriate feeder vessel for delivery to the installation location. The OSS topside installation is expected to be conducted in the following general sequence:

- Installation vessel positions itself at OSS foundation location. Anchors may be required in some instances for installation and feeder vessel positioning.
- Foundation is installed at the target location(s) depending on the type (see Section 3.4.1). In case modular substations will be combined, a jacket foundation with pre-installed pin piles, post-installed skirt piles or suction buckets will be used. A module support frame (MSF) may be installed on the jacket to facilitate the installation of multiple topside modules for different phases of the Project.
- OSS topside is lifted from feeder vessel and lowered onto foundation or MSF.
- OSS topside is secured per design, which could include a bolted, grouted or welded connection.

Following installation of the topside, inter-array cable and offshore export cables can be landed and terminated. Alternatively, the offshore export cables can be pulled in prior to topsides installation and temporarily stored on the cable deck of the jacket if jacket foundations are installed. It is expected that OSS commissioning activities will be supported from either a floating hotel (Flotel) or jack-up vessel. Final installation procedures will be provided in the FDR/FIR process.

3.5 Met Tower Installation

The Met Tower structure was fabricated to the original design by Gulf Island Fabrication, Inc. (GIF) in Houma, Louisiana. A table of contents for the original GIF fabrication documentation is attached as Appendix I-K6, with the specific sections available upon request.

Subsequent structural modifications and/or fabrication will be conducted under the supervision of Keystone at an appropriate facility. The candidate fabricators are expected to include, but are not necessarily limited to GIF, Sparrows Point Steel (SPS), Maritime Applied Physics Corporation (MAPC), or another qualified manufacturer that has successfully fabricated similar structures in accordance with accepted engineering practices. Fabrication documentation is planned to be provided in the relevant FIR.

US Wind will use industry standard offshore construction techniques and equipment to install the Met Tower's Braced Caisson foundation, deck, and mast. All installation work will be conducted under US Wind's SMS.

A detailed installation plan will be developed based upon the originally planned installation procedures, which are summarized in part below, and updated based upon any design changes, the final approved Met Tower location, the available installation vessels and equipment, and anticipated installation schedule. US Wind will engage an installation contractor that has successfully installed similar facilities in similar offshore environments in conformance with accepted engineering practices. The Met Tower installation is anticipated to be overseen by the Project Engineer or CVA. The installation is planned to be documented in a Met Tower-specific Installation Report, or collectively with the fabrication documentation in the relevant FIR.

The following subsections summarize the planned sequence of construction and assembly activities and highlight some of the candidate US-based installation and support vessels.

3.5.1 Met Tower Installation Sequence

Offshore installation and construction of the Met Tower is planned to follow this general sequence of activities. The actual sequence of activities is planned to be updated based upon final design, timing of installation, and available vessels and equipment.

- Vessel mobilization at Baltimore or the Met Tower marshalling port
- Transportation of Met Tower foundation and met mast to the installation site
- Installation of Braced Caisson foundation and deck
- Installation of the met mast
- Installation of the sensors and ancillary equipment
- Commissioning of the sensor and communications equipment

Representative Met Tower installation activities are summarized below, based upon installation with a US-flagged lift boat. Actual installation activities and sequencing will be updated based upon final design, timing of installation, and selected vessels and equipment.

- Prior to jacking into position at site, a brief bottom visual survey will be carried out to ensure the area is free of debris or any other impediments to the vessel legs.
- After ensuring the site is clear of debris, the lift-boat will jack up until it is in a secure and correct position to commence operations.

- The main 183-cm (72 in) diameter main Caisson will be lifted into place from the materials barge to a driving template guide on the vessel ready for piling.
- Although the initial penetration of the caisson may be achieved under its own weight, it may be necessary to use a vibratory pile hammer to achieve initial seabed penetration.
- Once the caisson is penetrated in the seabed, it will be driven to its design depth or refusal using either a hydraulic or diesel driven impact hammer rated at approximately 500 Kilojoules (KJ).
- With the main caisson installed, the bracing pile guide will be lifted from the materials barge and set onto the caisson.
- The two bracing piles, each 152 cm (60 in) in diameter, will then be driven to design depth or refusal.
- The steel deck and boat landing appurtenances will then be installed onto the Braced Caisson configuration.
- Once the deck has been checked for level and is secure in place, the met mast and all ancillary equipment shall be installed.

The schedule duration of pile driving is anticipated to span approximately 2 days. Pile driving operations will occur only during daylight hours with a start of operations planned after sunrise. Piling operations will cease at dusk unless a situation occurs where ceasing the pile driving could cause a safety hazard or compromise the integrity of the Met Tower.

3.5.2 Candidate Met Tower Installation Vessels

Installation of the Met Tower will be conducted by a qualified marine construction contractor. US Wind will select the contractor based upon final Met Tower design, installation timing, and vessel availability. Candidate installers include US contractors based in Maryland and the Gulf of Mexico region, as well as US Wind's wind turbine and foundation installation contractor.

Candidate installation and support vessels that may be employed for Met Tower installation are summarized below in Table 3-2.

Table 3-2. Candidate Met Tower Installation Vessels

Candidate Vessel	Representative Dimensions	Comments
WTG Installation Vessel	164 m x 60 m x 8 m (538 ft x 197 ft x 25 ft)	Jack-up vessel employed before or after WTG installation and supplied by barge
Self-Propelled Lift Boat	42 m x 30 m x 2 m (137 ft x 100 ft x 7 ft)	Jack-up style construction vessel with accommodation
Materials Barge	122 m x 30 m x 4 m (400 ft x 100 ft x 12 ft)	Flat top deck barge
Ocean Going Tug	43 m x 12 m x 4 m (140 ft x 40 ft x 13 ft)	Ocean class tug with large horsepower (hp) and high bollard pull. Assists barge and

Table 3-2. Candidate Met Tower Installation Vessels

Candidate Vessel	Representative Dimensions	Comments
		other vessel repositioning as required.
Crew/Supply Boat	18 m x 5 m x 2 m (60 ft x 17 ft x 7 ft)	Crew boat designed for heavy weather. Transport crew to/from work site.
O&M Vessel	8 m x 2 m x 1 m (25 ft x 8 ft x 2 ft)	Fast utility vessel designed to carry 5 personnel and small parts

3.6 Cable Installation

3.6.1 HDD

HDD operations will be employed for the Project to install cable ducts that allow for the installation of the export cables at the transition points between water and land. The Project as proposed includes HDD at up to 3 locations: between the Atlantic and landfall location at 3R's Beach; from 3R's Beach into Indian River Bay; and, from Indian River to the US Wind onshore substations. The HDD work may be conducted simultaneously or in stages depending on the final design of the Project in the FDR/FIR.

The primary HDD drilling equipment will be located on land and will consist of a drilling rig, mud pumps, drilling fluid cleaning systems, pipe handling equipment, excavators, and support equipment such as generators and trucks. Land side operations will be in existing parking areas or other already developed areas such as access roads to avoid impacts to sensitive coastal habitats. The approximate footprint, required for HDD land side HDD operations, is 60 m by 46 m (200 ft by 150 ft). An overview of the landside HDD footprint for the offshore to onshore HDD point is shown in Figure 3-5.

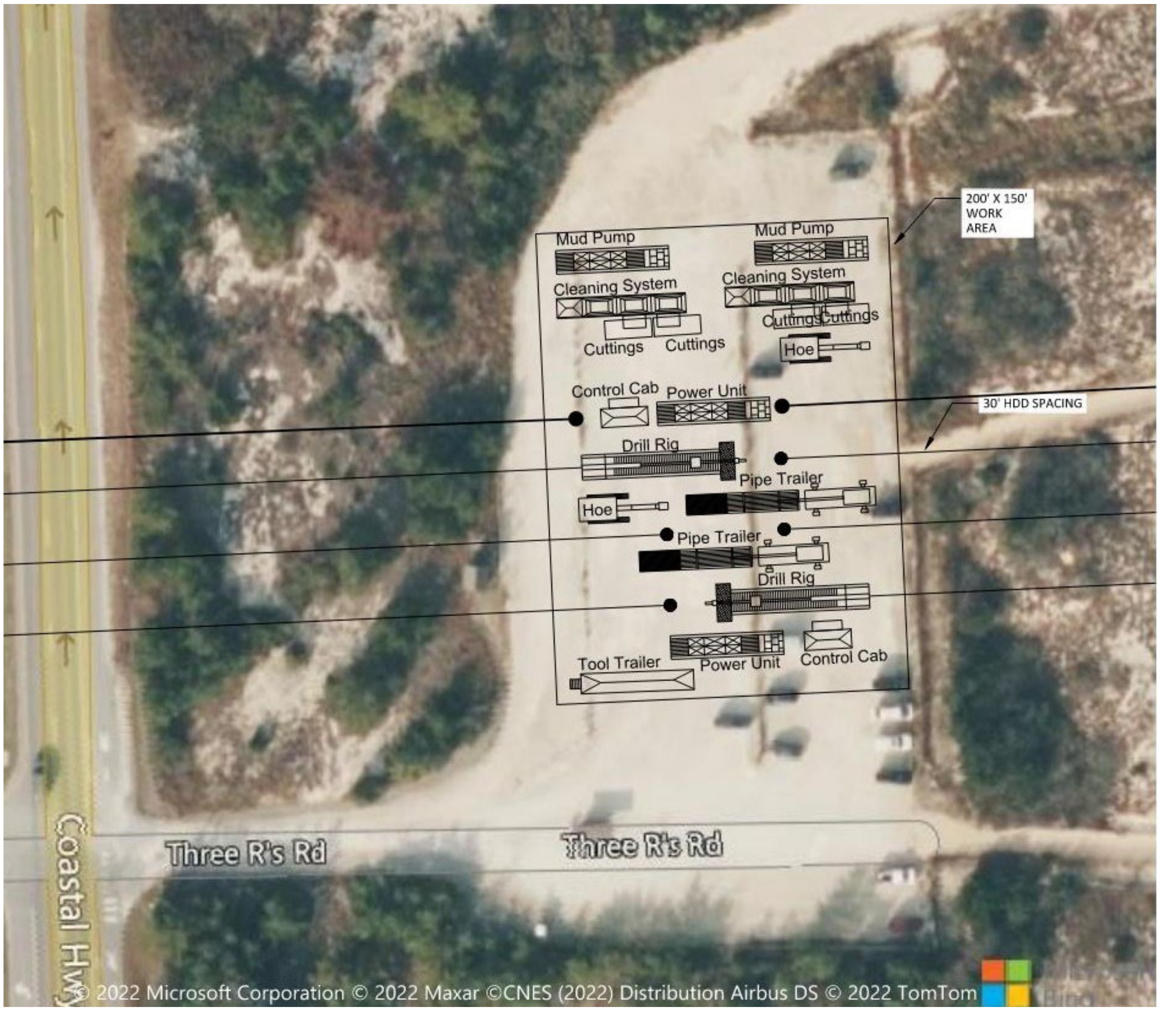


Figure 3-1. Approximate Footprint of HDD Drilling Operations at Landing Location

Water side HDD equipment will vary based on the installation location but will generally consist of a work platform (either a barge or small jack-up) and associated support vessels (such as tugs and small work boats). The work platform will be equipped with a crane, excavator, winches, and auxiliary equipment including generators and lights. The limited water depth in Indian River Bay is expected to require in-water operations to be based on a barge equipped with spuds for positioning. An anchor spread may be employed if required. The offshore (ocean based) HDD works may be supported by either a jack-up or barge depending on the final design and installation requirements in the FDR/FIR process.

HDD works will follow industry practice and will utilize detailed operating procedure including fluids containment plans. Lubrication of the HDD drill bit and sealing of the HDD bore hole will be provided through the use of a non-toxic bentonite water-based drilling mud. During the installation process, temporary excavation pits will be required at the onshore locations and gravity cells may be required at the in-water termination of the HDD bore.

Approximate dimensions of the proposed HDD's are provided in Table 3-3. Final HDD lengths will depend on factors such as soil conductivity, cable design, and available installation methods to minimize disturbance in the shallow areas of the bay close to the landfall locations. Detailed design will be presented in the FDR/FIR.

Table 3-3. Approximate HDD Dimensions

Location	Length of HDD	Depth of Duct Below Grade	Water Depth Exit	Distance from Transition Vault to Shoreline
Atlantic Ocean	488 - 1,600 m (1,600 - 5,300 ft)	2 – 18 m (8 – 60 ft)	9 m (30 ft)	167 m (550 ft)
Old Basin Cove (Indian River Bay)	518 - 2,000 m (1,700 - 6,500 ft)	2 – 15 m (8 – 50 ft)	>1 – 1.5 m (2 – 5 ft)	518 m (1,700 ft)
Deep Hole (Indian River Bay)	487 - 975 m (1,600 - 3,200 ft)	2 – 12 m (8 – 40 ft)	>1 – 1.5 m (2 – 5 ft)	411 m (1,350 ft)

An overview of each of the additional proposed HDDs for Onshore Export Cable Corridor 1 is provided in the following Figures 3-6, 3-7, and 3-8.

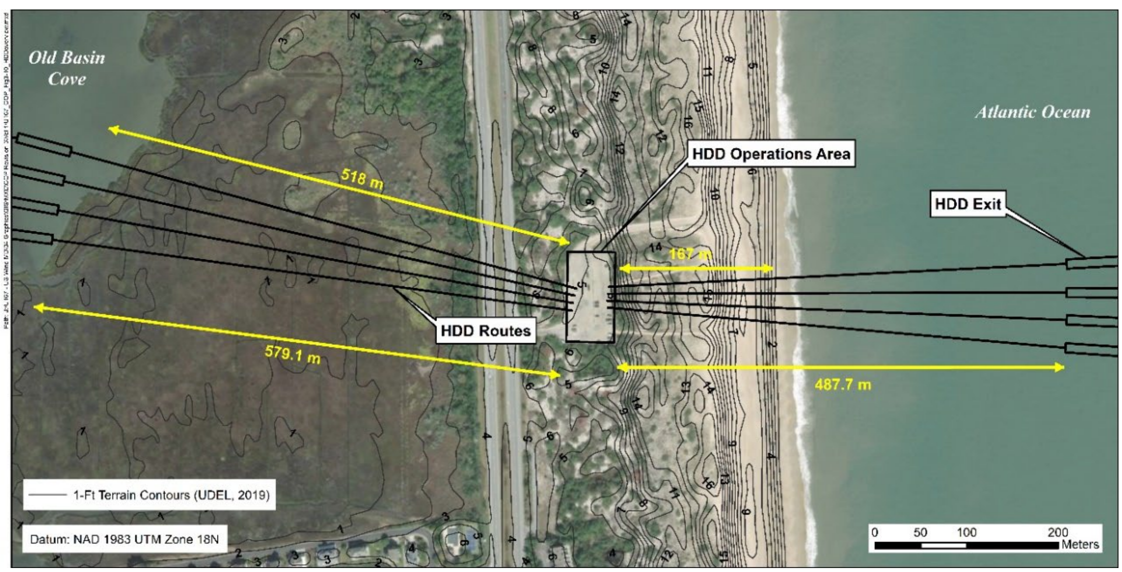


Figure 3-6. Preliminary Onshore Export Cable Corridor 1 Plan: HDD with Offshore/Onshore Transition Vault Connection

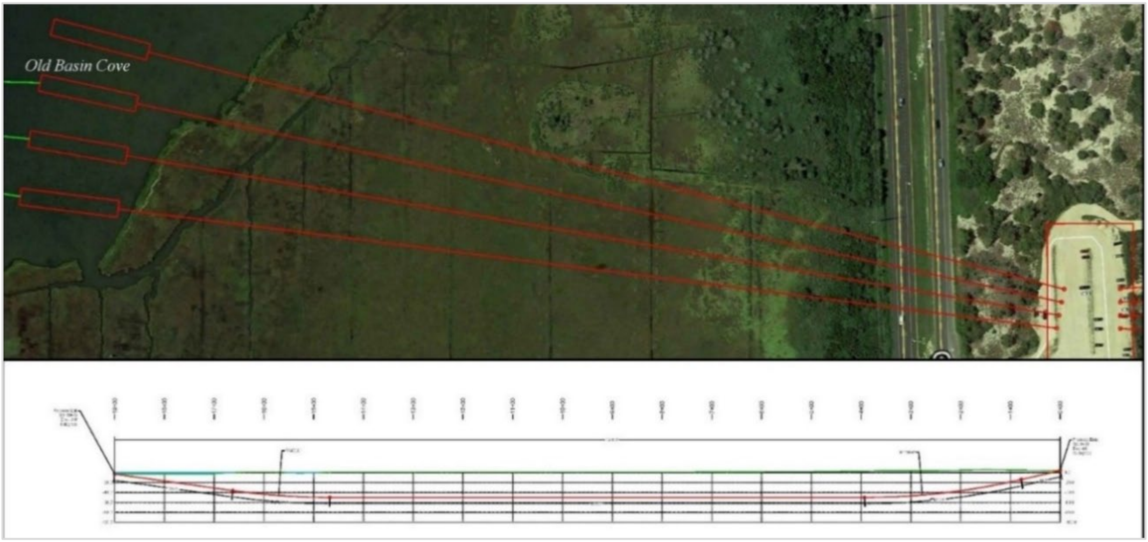


Figure 3-7. HDD Profile Offshore/Onshore Transition Vault to Indian River Bay

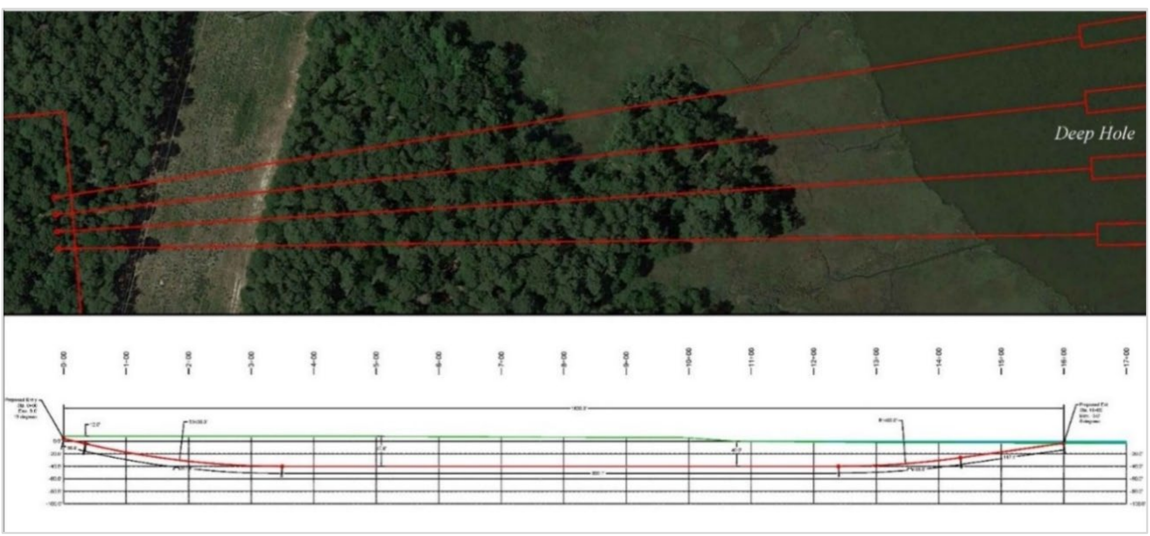


Figure 3-8. HDD Profile Indian River to US Wind Substation Connection

3.6.1.1 Onshore HDD Preparation

Prior to the commencement of drilling operation, a pit, potentially lined with sheet pile if needed for support, will be excavated at the drilling site for each bore. Alternatively, a casing pipe may also be used and installed to help support the overlying soils. If sheet pile is required, it will be constructed of industry standard interlocking sheet piling driven to design depth using a vibratory hammer. The pit will be excavated to the depth required to allow for HDD boring, avoiding bentonite flowing into the water. It is expected that the excavation will be to a depth of approximately 3 m (9.8 ft). Any material from the excavation will be stockpiled in accordance with a storm water management plan and used for backfill or repurposed as required.

3.6.1.2 In Water HDD Preparation

The offshore or in water end of the HDD duct may employ gravity cells, or a casing pipe in order to facilitate the installation of the cables, retain cuttings and drilling fluids, and to ensure that the HDD duct remains free of debris prior to installation of the export cable. The use of cofferdams, which would require vibratory hammers to install sheet piles into the seafloor were considered but not pursued due to increased underwater sound. The requirements for the gravity cells will be determined as the design and sequencing of the Project is finalized. It is expected that the gravity cells for in-water operations would be up to 60 m long and 10 m wide (197 ft long and 33 ft wide). The gravity cells will be designed to minimize the release of drilling cuttings and fluids and would be open on the seaward (outbound) side to facilitate the installation of the export cables.

Indian River Bay

Gravity cells, if employed in Indian River Bay, would remain in place until the onshore export cable is installed in order to prevent silting in the HDD duct. Any structures installed in Indian River Bay will be marked and lighted as required in accordance with safety of navigation regulations. The gravity cell will be removed upon completion of the HDD duct installation. Any material excavated will be reused on site or disposed of at an appropriate offsite location based on the quality of the material. The excavation will be backfilled with the excavated material and/or the appropriate clean fill upon completion of the work.

Offshore

Materials removed from the gravity cell for the installation of the HDD duct will be reused on site or disposed of at an appropriate offsite location based on the quality of the material. The excavation will be backfilled with the excavated material and/or appropriate clean fill upon completion of the work. The gravity cell will be removed upon completion of the HDD duct installation.

Transition Vaults

Upon completion of HDD operations, the transition vaults will be installed. Up to 4 HDD ducts and subterranean transition vaults may be installed at the landfall location. When fully installed the shore end of the HDD ducts will terminate in a transition vault and the water end will be sealed and buried to the installation depth of the offshore export cables. The proposed vaults are each approximately 12 m long, 3 m wide, and 3 m deep (40 ft long, 10 ft wide, and 10 ft deep). The HDD ducts will be connected to the transition vaults and backfilled. The transition vaults when fully installed will be accessed from ground level access points.

3.6.1.3 HDD Drilling Operations

HDD drilling operations commence with a pilot hole that is progressively enlarged by using progressively larger reaming tools.

The HDD drill rig will be set up behind the shore gravity cell and the drill advanced to the offshore exit point. During drilling operations, the drilling mud will be injected to cool the drill bit, provide lubrication and stabilize the bore hole. The drilling fluid (mud) is an inert bentonite slurry and will carry the cuttings back to the shoreside excavation pit for collection/removal of the cuttings and reuse. The HDD operation will include monitoring of the downhole water/bentonite slurry to minimize the potential of drilling fluid breakout. A series of reamers will be added to the drill string as soil conditions allow to progressively increase the size of the bore hole until it is large enough to accept the final export cable duct.

When the required borehole diameter is achieved, a pulling head is attached to the drill string at the in-water end of the bore (Figure 3-9). Prefabricated sections of duct are attached to the drilling head and pulled into the borehole. The duct sections are expected to be fabricated on shore and floated to the barge or jack-up for installation. A duct of approximately 60 cm (24 in) in diameter is planned and final sizing of the duct will be confirmed based on cable sizing and thermal properties of the soils.

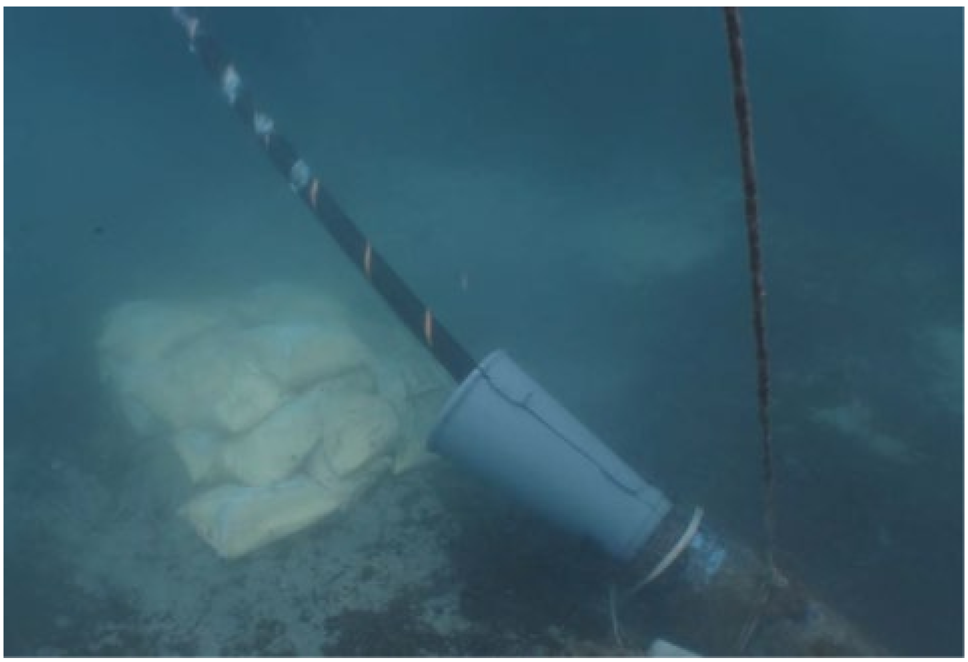


Figure 3-9. Underwater View of Near Shore Cable Pull into HDD Duct
Source: Nexans.com

3.6.2 Offshore Export Cables

US Wind proposes up to four offshore export cables will be employed on the Project. A single offshore export cable will run from each OSS to the transition vault at the landing location where it would continue as an onshore export cable along on onshore export cable corridor to the POI. Cable will be sourced from global suppliers, likely from the United States, Europe, and Asia.

US Wind proposes the offshore export cables will be loaded at the manufacturing facility onto the cable installation vessel. The cable installation vessel will then transit to the installation location. The main elements of the offshore export cable installation are:

- Insertion of gravity cells, if required, and installation of HDD ducts at landfall.
- Route clearance including a pre-installation survey and grapnel run.
- Jet plow installation trial.
- Installation and simultaneous jetting of cable.
- Pull-in of the cables through HDD ducts into jointing/transition vaults.
- Cable pull-in at the OSS.
- Post-lay burial and mattressing, if needed.

Route clearance activities will be conducted prior to offshore export cable installation including a pre-installation survey and grapnel run. The pre-installation survey and grapnel run will be conducted along the Offshore Export Cable Corridor to remove debris such as lost fishing nets or other objects that could impact the cable lay and burial. Collected debris will be recovered and disposed of in appropriate shore side facilities. Pre-installation seabed preparation, such as levelling or pre-trenching, is not currently expected. US Wind would micro-site cables around boulders and would not remove or relocate boulders.

A specialized cable lay vessel such as Nexan's Skagerrak as seen in Figure 3-10 is anticipated to be employed to install the offshore export cable. The cable installation vessel will be supported by smaller vessels as required for activities such as guard duty, pre- and post-lay surveys, access to shallow waters, and support for pulling of the cable into HDD ducts.

Figure 3-10. Nexans Skagerrak
Source: Nexans.com

The installation process will commence with the offshore cable pull in through the HDD duct (see Section 3.6.1 for HDD process) into the cable jointing/transition vault at the landfall location. Upon completion of this phase the cable installation vessel will commence the direct laying of the cable on the seabed along the prescribed route to the OSS. Based on the sandy seabed observed along the Offshore Export Cable Corridors, it is expected that a jet plow will be employed to bury the cable to target depths of approximately 1 to 3 m (3.3 – 9.8 ft), not more than 4 m (13.1 ft). The jet plow uses a combination of high-pressure water to temporarily fluidize the sediment and the cable subsequently settles into the area opened by the jets through a combination of its own weight and a depressor arm. The displaced sediment settles back over the cable effectively burying the cable. If needed, a trenching tool may be employed in areas with harder bottoms. At the offshore end in the Lease area, the cable will be pulled into the OSS, tested, and terminated.

On the basis of an as-buried cable survey, concrete mattresses will be installed at areas with insufficient burial depth if needed. US Wind estimates a maximum of 10 percent of the offshore export cable would require additional protection and is likely to be significantly less. The unburied cable section close to the OSS will run through a cable protection system (CPS), covered by the armor layer of the scour protection as described in Section 3.3.2.

Cable Burial Risk Assessments (CBRAs) have been prepared based on geophysical and geotechnical survey data for the Lease area (Appendix II-K5) and export cables (Appendix II-K7).

The cable installation vessel will employ dynamic positioning, although anchors may be used in shallow waters. If anchors are employed, US Wind will utilize mid-line anchor buoys.

3.6.3 Onshore Export Cable

Onshore export cables would be installed in one or more of the “onshore” export cable corridors described in Section 2.5.3, including proposed Onshore Export Cable South Corridor which would enter Indian River Bay via HDD and traverse the bay to an HDD exit location near the US Wind Substations. Optional cable routes on land would exit the transition vaults and be buried in the previously disturbed ROWs along the designated corridor.

3.6.3.1 Onshore Export Cable South Corridor

For the proposed Onshore Export Cable South Corridor the onshore export cables will be installed between the 3R’s Beach landfall and the US Wind substations adjacent to Indian River Substation. Prior to installation in Indian River Bay, route clearance activities will be conducted including pre-installation survey and debris removal and disposal, as needed.

The cable installation spread will be arranged to maintain a limited draft and may be arranged on multiple barges. A cable storage barge will be equipped with a turntable, loading arm, and cable roller highway towards a cable installation barge. The barges would be suitable for positioning close to the HDD exit points due to the flat bottom and shallow draft. It is expected that the barge will be moved along the cable route using a six-point anchor system, assisted by an anchor handling tug, in combination with spud piles. An example of a barge-based installation can be seen in Figure 3-11.

The cable will be fed to the HDD ducts using small boats and floatation where it will subsequently be pulled through the ducts into the jointing/transition bays. If necessary, a temporary cable roller highway will be pre-installed in shallow water, and cable pulling towards the HDDs will be assisted by a tracked excavator. Images of this process can be seen in Figures 3-11 and 3-12.

The cable barge will lay and bury the cable between the two end points maneuvering along the cable route using its anchoring system and positioned using spuds as required. Based on the sediments observed along Onshore Export Cable South Corridor, US Wind assumes that a barge mounted vertical injector, which fluidizes the soil, will be the primary burial tool for the cable. The use of a cable plough or barge mounted excavator may be required in some areas. In shallow water, a self-driving or towed post-lay cable burial tool may be used.

No cable or pipeline crossings have been identified based on currently available information (see Section 3.6.3.1 and Volume II Section 17.6.1 for additional details). It is anticipated that the cable will be installed in a continuous length, however if operational needs warrant, the cable can be installed in smaller sections and spliced. US Wind will optimize the cable installation and construction methodologies and include the detail in the FDR/FIR process.

With any of the cable burial methods within Onshore Export Cable South Corridor, the trench in the bay bottom would be narrow, about one meter, and would collapse immediately after the cable has been depressed into the trench. The required burial depth will be based on the anticipated long term bay bottom morphology and is expected to be 1 – 2 m (3 – 7 ft). Up to 4 export cables may be laid in Indian River Bay with spacing of 10-30 m (32-98 ft) between the parallel alignments to allow for construction and any future maintenance. Construction disturbance would be confined to an approximately 183 m (600 ft) corridor within the Indian River Bay.

Figure 3-11. Block Island Cable Installation
Source: www.oceannews.com

Figure 3-12. Example of Shallow Water Cable Installation

3.6.3.1.1 Dredging in Indian River Bay

To achieve the target burial depth US Wind and its contractors have determined dredging would necessarily precede cable installation in locations along the cable routes for barge access. Maximum dredging disturbance is assumed to be within a 76 m (249 ft)-wide corridor along certain portions of the route. Proposed dredging would be within the 183-m (600 ft) area of temporary construction disturbance shown in Figure 3-13.

Figure 3-13. Barge Access Dredging Areas within Indian River Bay

Dredging along the routes would be a maximum of 1.8 m (6 ft), varying from 1-6 ft (0.3-1.8 m) depending on location. Much of the route would be 1 m (3 ft) or less. Maximum volume of dredging, assuming all 4 cables installed, would be 73,676 cubic yards over two construction seasons or “campaigns” where one cable would be installed in Campaign 1 and three cables installed in Campaign 2.

Dredging would be conducted using hydraulic means, based on sediment information in Indian River Bay and Indian River.

Hydraulic dredging involves a dredge that floats on the water and pumps the material as a slurry through a temporary pipeline to a barge or coastal location. A hydraulic dredge acts as a floating vacuum removing sediment precisely and is best suited for conditions within Indian River Bay with fine silt, sand, and mud. Hydraulic dredging has a lower percentage of suspended sediment than mechanical dredging although the process may take longer depending on the site.

The dredging material volumes are preliminary and worst-case. The draft of the vessel is assumed to be 1.5 m (5 ft). US Wind continues to work with installation contractors to refine the assumptions based on bay bottom conditions and available vessels. Cable installation operations would be planned, to the greatest extent practicable, during periods of higher water in the shallow portions of Indian River Bay. Construction operations would be paused during low water conditions. By increasing the size of a cable lay barge to distribute weight of the cable and by accepting downtime during construction, US Wind would avoid the need for dredging for barge access in the shallow, southern portions of Indian River Bay. Construction is planned over two construction seasons in Campaign 1 and 2, with the construction and dredging window considered to be October 1-Febuary 28 based on feedback from DNREC’s Environmental Review received December 21, 2023[31], and prior dredging projects in Indian River Bay.

US Wind will continue to work with contractors to optimize installation methods. The dredge volumes assume all dredging would be conducted by US Wind for cable installation and does not account for maintenance dredging projects that may overlap US Wind’s area of construction.

Dredging locations within Onshore Export Cable South Corridor are shown in Figure 3-13. The estimated, worst-case dredging volumes for Campaign 1 and Campaign 2 are shown in Table 3-4.

Table 3-4. Expected Worst Case Dredging Volumes

Dredging volume	Onshore Export Cable South Corridor (cubic yards)
Campaign 1	30,278
Campaign 2	43,398
Total (2 campaigns)	**73,676**

[31] DNREC, Department of Natural Resources and Environmental Control Division of Fish and Wildlife. 2023. US Wind 2023 Maryland Offshore Wind (Environmental Review on Rare, Threatened, and Endangered Species).

3.6.3.1.2 Placement of Dredged Material

Dredged material will be piped via temporary dredge pipeline to a dewatering staging area at the US Wind Substations, within the planned limits of construction disturbance. Dredged materials will be dewatered and placed in trucks for disposal/placement at an upland landfill location within 161 km (100 mi) of the US Wind Substations area. Dewatering will be achieved by a passive method using large geobags which would allow dredged material to dewater over approximately 30-60 days prior to removal and placed into dump trucks. Alternatively, mechanical dewatering using a temporary system of separators (shakers), clarifiers, mixing tanks, and belt presses could be sized to meet target daily dredge production and continuously remove material to one or more upland disposal facilities. A combination of passive and mechanical dewatering methods may be used, pending final design.

US Wind will continue to evaluate the opportunity for beneficial reuse of dredged material at the wetlands around the US Wind Substations site. However, US Wind has not applied for approval of beneficial reuse of dredged material.

3.6.3.2 Optional Onshore Export Cable Corridors

Construction of any of the land-based onshore export cables would occur in previously-disturbed ROWs that may include additional infrastructure such as utility lines. A trench would be excavated in the ROW to install a duct bank approximately 203-267 cm (80-105 in) wide and approximately 76-228 cm (30-90 in) high, depending on the configuration, with an up to 45 cm (18 in) of additional excavation on either side of the duct bank during construction. Up to four cables would be installed in duct banks of cement bound sand in either horizontal or vertical configuration. Preliminary duct bank designs are included in Appendix I-J. The duct banks would be buried such that the top of the bank is a minimum of 91 cm (36 in) below grade. Cable joint bays are anticipated to be installed approximately every 610 m (2,000 ft). Joint bays would be constructed within the disturbed ROW with outside dimensions approximately 8.5 m (28 ft) by 3 m (10 ft) by 3 m (10 ft), pending final design.

A land-based construction crew would install duct banks and transition joint vaults followed by a second construction crew that would pull the cables through the duct banks. Installation of cables in any of the terrestrial routes would include equipment such as excavators, backhoes, skid steer, and air compressors for the duct bank and joint bay work. Equipment for the cable pulling would include flatbed trailers, cube vans, cable pulling machines, and mirk reel carts. The surface disturbance footprint during cable construction in ROWs is assumed to be approximately 15 m (50 ft) when installing a circuit for the excavator, laydown area alongside installation location, and access road alongside to feed materials. Small 2-lane roads would likely need to be closed for construction. Coordination with the Delaware Department of Transportation and Sussex County, among others, would be necessary for road closures, partial road closures, traffic direction, and disruptions to access of businesses, residences, religious facilities, and municipal buildings during multiple years of installation activities.

At water crossings, cables would either be attached to the undersides of existing bridges or installed via HDD under the water body. It is expected that for most water crossings HDD would be necessary using a mini-drill rig or a similar tool. Construction would be within a 15 m (50 ft) footprint of disturbance. However, the details of the location of an HDD at each relevant water crossing have not been planned and are pending final design if any of the land-based cable corridors are selected for construction.

3.6.4 Inter-Array Cables

Inter-array cables for the Project are anticipated to be sourced in the U.S., Europe or Asia and delivered to a staging area in Baltimore for load out to the installation vessel. The main elements of the inter-array cable installation are:

- Route clearance including a pre-installation survey and grapnel run.
- Installation trials as required.
- Cable lay and burial.
- Install cable protection systems.
- Perform pull-in and termination at OSS and WTGs.
- Installation of scour protection around the WTG foundations to avoid the development of cable free spans due to scouring, and to stabilize the cable protection systems (CPS).

A pre-lay grapnel run will be conducted along the cable route to remove debris that could impact the cable lay and burial. Collected debris will be recovered and disposed of in appropriate shore side facilities. While the possibility exists that some seabed levelling or pre-trenching may be required, it is not currently expected. US Wind would micro-site cables around boulders and would not remove or relocate boulders.

Prior to commencing inter-array cable installation activities, testing of the installation equipment is planned within the cable corridors to confirm that the equipment is working as expected. US Wind expects that cable equipment testing will be performed in several cable corridor locations on the site. The test locations will be determined based on the detailed seabed conditions identified during US Wind’s geotechnical survey campaign.

The inter-array cables will be installed from a dynamically positioned cable installation vessel equipped with the required industry standard cable handling equipment as seen in Figure 3-14. US Wind assumes that the inter-array cables will be installed utilizing a towed or self-driving jet plow which allows for the direct installation and burial of the cable. The jet plow uses a combination of high-pressure water to temporarily fluidize the sediment and the cable subsequently settles into the area opened by the jets through a combination of its own weight and a depressor arm. The displaced sediment settles back over the cable effectively burying the cable. If soil conditions do not permit the use of the jet plow, a mechanical cutting/trenching tool or conventional cable plow may be employed. US Wind plans to bury inter-array cables between 1 to 2 m (3.3 - 6.6 ft), but no more than 4 m (13.1 ft).

The cable installation vessel will maneuver as close as possible to the WTGs or OSS as required, the cable will be cut and required cable protection and pulling mechanisms installed. The cable will then be pulled into the WTG to the hang-off platform, or into the OSS through a J-tube, secured, and terminated. Scour protection will be placed over the cable as required.

Post lay burial will be completed as needed. It is anticipated that this will be accomplished by employing a cable installation support vessel and a ROV system. Areas with cable crossings or hard bottoms may require additional protection means such as mattresses, rock placement, or cable protection systems.

Figure 3-14. Dynamically Positioned Cable Installation Vessel
Source: Deutsche Bucht and Van Oord

3.7 Wind Turbines

US Wind anticipates receiving and preassembling WTG components at a staging area at Sparrows Point in the Greater Baltimore area. Delivery of the towers, blades, and nacelles from a European port would be accomplished using a mix of heavy lift and general cargo vessels, a representative vessel can be seen in Figure 3-15. WTG components will be stored and pre-assembled at the staging area and then moved offshore for installation.

Figure 3-15. Tower Sections Onboard the BBC Chartering and Logistic Ship M/V BBC Konan
Source: gcaptain.com

The logistics and pre-assembly conducted at the staging area will depend in part on the WTG model that is selected. The general activities expected include:

- Receive WTG components, towers, nacelles, blades, turbine parts, site parts.
- Pre-assembly of the towers.
- Pre-assembly of nacelle as required.
- Load out to wind turbine installation vessel or feeder vessel.

The Greater Baltimore area has significant marine infrastructure and port facilities to support offshore wind projects. US Wind proposes to receive the WTG components at a staging facility at Sparrows Point. US Wind assumes feeder vessels will be employed to transport the WTG components to the installation location in the Lease area. Multiple feeder vessels are anticipated with the quantity and type to be finalized based on the WTG model selected and the construction schedule. The feeder vessel spread could be a tug and barge unit or jack-up vessel; a mix of commercial and technical factors will determine which vessels are ultimately selected. Tower sections may be pre-staged at a location seaward of any bridges between Greater Baltimore and the Lease area. The feeder barges will sail to the Lease area either via the C&D Canal and Delaware Bay or via the Chesapeake Bay as shown in Figure 3-16. The WTG installation vessel will likely sail to the installation site from Europe[32]. An installation vessel can be seen in Figure 3-17.

[32] US Wind expects that as the offshore wind market develops in the US, US flag installation vessels may become available as the market continues to mature. The availability and specification of a US flag installation vessel would allow for the direct loading of WTG components onto the vessel. US Wind will comply with the Jones Act, as applicable.

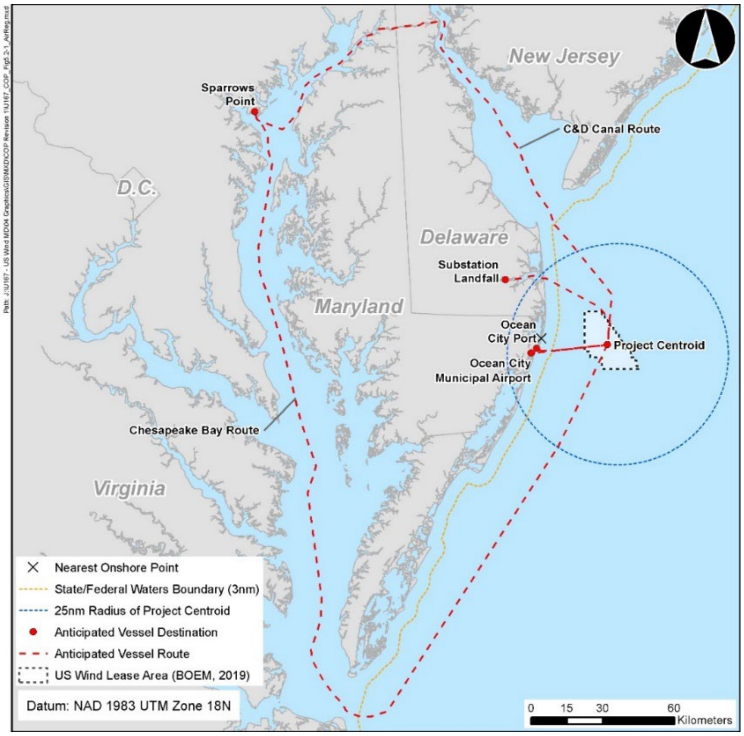


Figure 3-16. Vessel Routes to Installation Site from Sparrows Point Staging Area

Figure 3-17. Offshore WTG Installation Vessel
Source: blockisland.com

Regardless of the methodology employed to transport the WTG components to the site, the installation concept of the WTGs remains as follows:

- Positioning of the jack-up installation vessel, lowering and load testing of the legs, or if a floating installation vessel is used, position using dynamic positioning.
- Positioning of the feeder vessel at the installation site.
- Lifting of the wind turbine components from the feeder vessel onto the deck of the installation vessel.
- Installation of tower sections either individually or as a pre-assembled unit onto the foundation.
- Installation of nacelle.
- Installation of individual blades.
- Commencement of commissioning.

Once the WTG is fully assembled, the commissioning of the WTG commences including the verification of structural and component fasteners and electrical and mechanical system field connections. Upon completion of the field assembly scope, the WTGs will be energized and hot commissioning of systems will commence.

Details of the WTG installation procedures will be provided in the FDR/FIR.

3.8 DPL Substation

The DPL substation expansions at the POI will be governed by the final size of the Project and broader grid requirements. DPL would construct the expansion of the substation.

3.9 US Wind Substations

The proposed US Wind Substations would be constructed adjacent to the Indian River Substation. Typical onshore construction equipment, including cranes and earth moving equipment, will be employed to install the onshore substations. Tree clearing and ground disturbance associated with construction would be limited to the footprint of the substation. Ground disturbance is estimated to extend 4 m (12 ft) below grade. The new substations and access road could disturb up to 10.3 acres based on the initial design information. If feasible, US Wind will use an area already disturbed for construction laydown activities.

US Wind anticipates the substations would be constructed in phases aligned with the respective offshore campaigns, with up to 4 substations built out in approximately 400 MW blocks. At the alternative substation locations, the construction build out would be conducted in a similar manner, aligning with the offshore construction campaign works.

The proposed full build out of the US Wind Substations can be seen in Figure 2-21.

3.10 Project Commissioning

The Project will be commissioned in a sequential approach dictated by the construction activities, regulatory requirements, DPL and PJM Clearances and will be presented in detail in the FDR/FIR. Commissioning activities of the DPL and US Wind Substations will be similar to those of any land based electrical asset. The substations are expected to be the first components of the Project to be commissioned.

Sequential commissioning of the Project will then move to the OSSs, and onshore and offshore export cables, followed by the inter-array cables and WTGs. WTG and inter-array cable commissioning will occur on a per string basis. WTG pre-commissioning activities will commence prior to energization of a WTG string.

In order to conduct offshore commissioning activities in the most efficient manner, US Wind plans to employ a mix of accommodation vessels and service vessels. These vessels are intended to remain at the Project site during commissioning to reduce the time commissioning crews spend transiting from the shore to the site. CTVs will also be used to support movement of personnel to and from shore as needed.

4.0 Construction and Operations Vessels

A number of vessels will be required to support activities carried out during the development, construction, and operation phases of the Project. Specific vessels are required for surveying activities, foundation installation, OSS installation, cable installation, WTG installation, and support activities.

The vessels will vary in size and complexity based on their function on the Project. The vessels employed on the Project will be required to comply with applicable USCG and Jones Act regulations for conducting operations in US waters. All foreign flag vessels employed on the Project will, in addition to USCG and Jones Act requirements, be required to meet International Maritime Organization (IMO) and International Marine Contractors Association (IMCA) requirements.

The majority of the vessels are expected to have conventional propeller- or thruster-based propulsion systems. Smaller vessels designed primarily for crew transfer applications are expected to employ water jet-drive based systems.

An overview of the vessels anticipated to be required and their characteristics is provided in Table 4-1[33].

The specific vessels selected to perform the required tasks during development and construction will be dependent upon availability at the commencement of each activity. US Wind will secure vessel supply in advance to prevent any delays to the construction schedule. Final details regarding vessels will be in the FDR/FIR.

[33] At this point in time, US Wind does not anticipate the use of aircraft during the construction phase of the Project. Should the use of aircraft be required this will be updated in the FDR/FIR stage.

Table 4-1. Vessel Summary

Vessel Class	Vessel Role	Foundation	Cables	OSS	WTG	Support	Operations	Approx. Length	Approx. Displacement	Approx. Crew Size	Est. # of Fuel Tanks	Estimated Max Fuel Storage Capacity
Utility boat, Fishing Vessel	• Marine Mammal Observers • Environmental Monitors • Guard Vessels • Acoustic Monitoring	X		X		X		15 - 25 m (45 - 80 ft)	20 - 250 t	2 - 10	2 - 6	8,000 L (2,110 gal)
Fall Pipe	Installation of scour protection	X		X				120 - 170 m (400 - 550 ft)	15,000 - 25,000 t	20 - 60	10 - 20	260,000-1,800,000 L (68,680-475,510 gal)
Heavy Lift and General Cargo	Delivery of project components from manufacturing location to staging/assembly port	X	X	X	X			120 - 223 m (394 - 735 ft)	15,000 - 200,000 t	15 - 25	10 - 20	260,000-1,800,000 L (68,680-475,510 gal)

Table 4-1. Vessel Summary

Vessel Class	Vessel Role	Foundation	Cables	OSS	WTG	Support	Operations	Approx. Length	Approx. Displacement	Approx. Crew Size	Est. # of Fuel Tanks	Estimated Max Fuel Storage Capacity
Jack-up Crane or Floating Crane	• Installation of project components • Foundation • WTGs • OSS	X		X	X			120 - 225 m (400 - 740 ft)	20,000 - 80,000 t	25 - 220	10 - 20	260,000-1,800,000 L (68,680-475,510 gal)
Multipurpose Offshore Supply	• Supply of materials and consumables • Pre lay grapnel run • Noise Mitigation • Foundation Grouting • Refueling • Cable Burial	X	X	X	X	X		65 - 90 m (210 - 295 ft)	500 - 3,000 t	8 - 25	10 - 20	378,000 L (100,000 gal)
Anchor Handling	Anchor positioning for installation vessels	X		X				20 - 80 m (65 - 262 ft)	50 - 2,500 t	5 - 20	5 - 15	284,000 L (75,000 gal)
Crew Transfer Vessel	Crew Transfer	X	X	X	X	X	X	10 - 30 m (30 - 100 ft)	50 - 1,500 t	2 - 5	3 - 8	8,000 (2,110 gal)

Table 4-1. Vessel Summary

Vessel Class	Vessel Role	Foundation	Cables	OSS	WTG	Support	Operations	Approx. Length	Approx. Displacement	Approx. Crew Size	Est. # of Fuel Tanks	Estimated Max Fuel Storage Capacity
Cargo Barge	Feeder Vessel: Delivering components from staging port to Project site	X		X	X			75 - 120 m (250 - 400 ft)	9,600 - 17,000 t	N/A		N/A
Tugs	Feeder Barge: Movement and general support	X		X	X	X		16 - 35 m (75 - 115 ft)	250 - 2000 t	5 - 10	3 - 8	215,000 L (56,800 gal)
Jack-up or Accommodation vessel	Housing for offshore workers during construction			X	X			55 - 100 m (180 - 328 ft)	750 - 5,000 t	50 - 200	8 - 12	215,000 L (56,800 gal)
Survey	Pre-Installation and Verification Surveys Geophysical and Geotechnical	X	X	X	X			13 - 112 m (45 - 350 ft)	400 - 3,000 t	5 - 70	5 - 12	8,000 – 52,000 L (2,110 – 13,800 gal)
Cable Laying	Cable Installation		X					80 - 150 m (262 - 492 ft)	1,200 - 1,5000 t	15 - 45	10 - 20	120,000 L (31,700 gal)
Rock/ Mattress Placement	Placement of Scour Protection, Concrete Mattresses		X					130 - 170 m	25,000 t	20 - 60	10 - 20	260,000-1,800,000 L

Table 4-1. Vessel Summary

Vessel Class	Vessel Role	Foundation	Cables	OSS	WTG	Support	Operations	Approx. Length	Approx. Displacement	Approx. Crew Size	Est. # of Fuel Tanks	Estimated Max Fuel Storage Capacity
								(427 - 558 ft)				(68,680-475,510 gal)
Dredging	Seabed preparation/ leveling			X				75 - 120 m (250 - 400 ft)	2,000 - 7,000 t	15 - 25	10 - 20	284,000 L (75,000 gal)
Service Operation	Commissioning Activities			X	X			80 m (262 ft)	5,500 t	20 - 50	8 - 12	284,000 L (75,000 gal)
Cable barge	In shore cable installation		X					30.5 m (100 ft)		2 - 4	1	3,785 L (1,000 gal)
Anchor handling tug	In shore cable installation		X					7.6 – 15 m (25 – 50 ft)		1 - 4	1 - 2	3,785 L (1,000 gal)

5.0 Health, Safety, Security, and Environment (HSSE)

US Wind is committed to a safe, secure, and efficient workplace, the protection of the environment, and the health, safety, and well-being of all US Wind employees, contractors, visitors, and the public. US Wind commits to use the best available and safest technology appropriate for the site, best management practices, and properly trained personnel for the construction, operation and decommissioning of the Project.

Every person who works for US Wind, including employees, contractors, vendors, and suppliers has a personal responsibility for ensuring that HSSE principles are followed and managed throughout all phases of the Project. US Wind's goals are to prevent all accidents, injuries, occupational illnesses, ensure the security of personnel and assets, and to protect the environment.

US Wind's HSSE guiding principles are:

- We believe that everyone in the US Wind family has a role to play in well-being, safety, security, and protection of the environment.
- We will take care of each other so we can return home safely.
- We speak up, we never look away, so that we can be **"Safe by Choice, not by Chance."**

US Wind's HSSE policies and requirements are detailed in the SMS (see Appendix I-B Safety Management System). The Project's Oil Spill Response Plan (OSRP) details the procedures that US Wind will implement for the Project during the construction and operation stages (see Appendix I-A, Oil Spill Response Plan). Suppliers and subcontractors who supply products and/or services will be required to comply with the same HSSE requirements by contract and will undergo necessary inspections to confirm compliance.

It is the responsibility of all personnel involved in the Project to comply with and abide by all HSSE requirements and guidelines. US Wind is committed to a continuous HSSE improvement process. To demonstrate our continued commitment to health, safety, security, and the environment US Wind adopted a new HSSE policy in August 2022 that is outlined below and provided in Appendix I-B:

US Wind is committed to:

1. Being a leader in promoting best practices in the offshore wind energy industry.
2. Ensuring HSSE is effectively managed, resourced, and given the same priority as any other role or function.
3. Ensuring the health, safety, security, and welfare of our employees or those engaged in our activities are fully supported.
4. Developing solutions that respect and protect the environment.
5. Utilizing the best and safest technology available to maximize success in our goals.
6. Effectively communicating our HSSE policy, procedures, and objectives to all involved in the Project and encouraging their involvement in decision making processes.

7. Improving our workforce through training, participation, consultation, and effective communication.
8. Focusing on the mental health and wellbeing of employees and those involved in the Project.
9. Complying with all legal and other requirements that relate to US Wind.
10. Seeking Zero harm of personnel and the environment throughout the Project's life cycle.

By adopting this approach, US Wind will:

1. Maintain an effective HSSE management system and adopt a risk management approach during the design process and throughout all operations to mitigate the impact of foreseeable hazards. We will assess any associated HSSE risk to eliminate or reduce them to an acceptable level ensuring that safe working conditions, environmental controls, and practices are followed.
2. Create a proactive HSSE culture with visible leadership from the highest level to raise the awareness of HSSE requirements and demonstrate the demand for positive and proactive responses from our employees and those engaged with our activities. Every person has the right and responsibility to STOP WORK! if they feel it is unsafe, without consequence.
3. Utilize meaningful leading and lagging HSSE performance indicators to improve performance of all our activities.
4. Ensure timely action on HSSE incidents to prevent future recurrence.
5. Consider the historic HSSE performance of our subcontractors when selecting who we will bring into our US Wind family.

Resources (supplies, time, and funds) have been set aside to realize successful implementation of this policy.

5.1 Wastes Generation and Disposal

Solid and liquid wastes generated during Project construction, commissioning, operations, and decommissioning will be collected, transported, and recycled or disposed of in an environmentally compliant manner and in compliance with US Wind's waste management plan. The chemical and waste management plan will be updated as equipment selection is finalized and provided to BOEM as required in support of the ongoing review and refinement of the Project. All vessels and Project facilities will be equipped with appropriate sanitation and waste collection systems (USCG-certified Marine Sanitation Device) and will comply with USCG standards to legally discharge uncontaminated ballast and bilge water, and with 33 CFR § 151.2025 regarding ballast water management requirements on the navigable waters of the United States (inside of 12 nautical miles).

As noted in the Federal Register notification FRL-7127-7 on January 10, 2002, the state of Maryland prohibited the discharge of any treated or untreated vessel sewage into the northern Coastal Bays, which includes Ocean City Inlet, and Ocean City commercial fish harbor. Adequate facilities for the safe and sanitary removal and treatment of sewage from all vessels are reasonably available, and any vessels operating on the Project will comply with this mandate.

Appendix I-G describes potential wastes generated by the Project and the means of storage or discharge. Volumes will be typical of that used in maritime construction activities. Wastes and associated volumes will be refined and updated in the FDR and FIR.

5.2 Chemicals Used

Chemical products used during Project construction, commissioning, operations and decommissioning will be collected, transported, and disposed of in an environmentally compliant manner and in compliance with US Wind's waste management plan included in Appendix I-G. The waste management plan will be updated as design progresses and final equipment selections are made and provided to BOEM in the FDR and FIR. Volumes will be typical of that used in maritime construction activities. Examples of potential chemicals to be used, including quantities and the method for transporting to the site, are provided in Appendix I-H. Project structures will be equipped with oil collection and secondary containment systems to prevent oil from being released into the environment in the event of a leak. See the Oil Spill Response Plan Appendix I-A for more information regarding oil and fluid quantities, and Safety Data Sheets for hazardous fluids in excess of 100 gallons.

6.0 Project Operation

6.1 Operations & Maintenance

As the owner and operator of the Project, US Wind will be responsible for daily operations, which includes planned and unplanned maintenance. US Wind's maintenance strategy assumes an integrated maintenance approach that incorporates the maintenance activities of all Project components in order to minimize the time technicians spend offshore and to minimize downtime.

US Wind's planned O&M Facility is intended to serve as the primary access point for Project maintenance activities. The 24/7 monitoring of the Project will be conducted at both the O&M Facility and at the original equipment manufacturer (OEM's) remote operations center, which will monitor the WTGs and electrical systems and coordinate with the grid operator, PJM.

The O&M Facility will have access to a nearby quayside area that allows for the loading of maintenance crews, replacement components, and consumables onto CTVs (Figure 6-1). The CTVs will transport the maintenance crews to the offshore site on an as needed basis dependent on weather conditions.

Figure 6-1. Quayside at O&M Facility
Source: Marine Industry News

The local operations and maintenance team will have the appropriate training to execute the maintenance scope of the Project including required safety training for marine, WTG, and electrical systems. Personnel will be trained and deemed competent for performance of maintenance operations on the WTGs, OSS, and supporting equipment.

The O&M strategy for the Project will be refined in conjunction with OEMs, EPC contractors, and regulatory agencies as design development, selection of project components, and installation data progresses under the FDR/FIR process.

6.1.1 Routine Operating Procedures

Project maintenance activities are divided into planned and corrective maintenance. Planned maintenance includes proactive repairs or replacements based on the outcome of routine inspections and information collected from the remote monitoring system. Corrective maintenance includes reactive repairs or replacements of failed or damaged components.

Planned maintenance is considered a component of the routine operating procedure. Corrective or unscheduled maintenance is part of the non-routine operating procedures and is discussed in Non-Routine Operating Procedures (Section 6.2).

6.1.2 Routine Operating Procedures for WTGs

WTGs are designed to be operated remotely and only accessed by technicians for routine maintenance and inspections, or in the event of a fault that requires local reset or intervention. The monitoring of the operations will be performed remotely from the O&M Facility and from the remote OEM’s operations center. All operational decisions are managed between the local O&M Facility and the remote operations center, including coordination on marine and aviation safety with USCG and FAA, relevant local authorities, and the grid operator.

- The Project SCADA system allows for the operation and monitoring from both the O&M Facility and the remote operations center. As noted above, the remote operations center will maintain a 24/7 telecommunication protocol with all members and entities required for the operation of the Project including management, technicians, and PJM. The remote operations center will have the ability to start and stop WTGs.
- Perform remote monitoring of the WTGs and corrective actions where appropriate.
- Maintain operational data of the Project and develop daily production forecasts.
- Analyze alarms and develop corrective and troubleshooting actions.
- Reset faults in the WTGs and Project electrical system.
- Perform emergency shutdowns.

6.1.3 Routine Operating Procedures for OSS

The scheduled maintenance of the OSS components will take place at predefined intervals in accordance with the manufacturer’s recommendations. Planned maintenance outage will be scheduled with PJM to avoid peak load periods. Scheduled maintenance will include high voltage protection functional testing, switchgear tests, and detailed transformer inspections. The OSS will be serviced by technicians trained in high voltage equipment.

In addition to the electrical focused scope of work, routine maintenance, and inspection of the OSS structure and support systems will also be conducted, such as structural integrity, corrosion protection, seabed scouring and maintenance of safety systems.

Significant repair operations, such as the replacement of transformers, may require the use of heavy lift vessels and are considered to be non-routine procedures.

6.1.4 Routine Operating Procedures for Onshore Substations

Maintenance of the onshore substations primarily consists of non-intrusive inspections of switchgear, transformers, control systems, conductors and support structures. Similar to the OSS, the scheduled maintenance of the onshore substation components will take place at predefined intervals, in accordance with the manufacturer's recommendations and in coordination with PJM.

6.1.5 Routine Operating Procedures for Power Cables

Subsea cables are exposed to tides or sediment flows and, in extreme cases, experience failure due to anchor strike. US Wind will monitor and survey the offshore export cables and inter-array cables and repairing as needed. Survey work and remedial work will be subcontracted to a specialist service provider.

The routine procedures will include cable surveys, typically required to check the cable burial depths, especially in those locations with sand waves or a high fishing activity that can have impacts on buried cables. Cable surveys are anticipated in year 1, year 3, and then every 5 years after. The frequency of the surveys may be adjusted based on the results of the first survey. The determination of cable burial depths may be derived indirectly from observed bathymetric changes with respect to the as-built situation. The effects of migrating sand waves will be taken into consideration.

In case of insufficient burial or cable exposure, whether attributable to natural or human caused issues, appropriate remedial measures will be taken including reburial or placement of additional protective measures. If a cable failure occurs, an appropriate cable repair spread will be mobilized.

6.1.6 Routine Operating Procedures for Foundations

Planned maintenance operations for foundations include visual inspections of the topside portions of the foundations and ROV supported inspection of the underwater portions of the foundation, including cable protection and cable entry, cathodic protection, and scour systems. During the initial operational period of approximately 2 years, foundations will be inspected visually above and below the waterline at least once. The findings of the initial inspections will inform the frequency of inspections to be completed later in the project life cycle, which is expected to be every 4 or 5 years.

6.1.7 Routine Operating Procedures for Met Tower

The Met Tower is designed for high reliability, redundancy, and remote operations. US Wind's operations team and a third-party contractor will jointly monitor Met Tower operations remotely via the high-speed remote data link and anticipated near real-time data transmission capabilities. Data issues, alarms, and/or other operational anomalies are anticipated to be flagged promptly remote operations and monitoring.

Operational protocols and scheduled maintenance plans for the Met Tower will be built on the final equipment configuration and the associated manufacturers and engineers' recommendations. Annual in-person site visits are planned to conduct instrumentation, data logging, power, safety, and communication systems maintenance, along with above-water structural checks. Unscheduled maintenance will be conducted as necessary, based upon the nature of the issue, as well as related health, safety, environmental and operational parameters.

Met Tower operational decisions are planned to be managed between the O&M Facility and the contractor's remote facility. This process will include coordination on marine and aviation safety with USCG and FAA, as well as engagement with other relevant local authorities and stakeholders (e.g., NOAA) as appropriate.

6.2 Non-Routine Operating Procedures

Non-routine procedures include major repairs and emergencies. Major unscheduled or reactive maintenance is a significant repair or replacement activity that results in an extended shut down or the mobilization of a specialty vessel such as a jack-up or cable installation vessel. While these activities are not routine, plans will be developed in advance to mitigate their impact. Plans for managing non-routine events will include contracts with vessel service providers, strategic spares inventory or supply agreements, combined with procedures and plans to execute. These plans will be developed further as the Project design is finalized in the FDR/FIR process.

Non-routine emergency procedures will be governed by established plans such as the SMS. Specific emergency procedures to curtail or stop Project operations will be developed in conjunction with equipment manufacturer recommendations under the larger SMS. These procedures will be reviewed and finalized with the CVA in the FDR/FIR process.

7.0 Decommissioning Plan

This decommissioning plan is prepared to satisfy 30 CFR 285 Subpart I, decommissioning of renewable energy facilities and the Lease. As part of the COP, US Wind is required to describe the decommissioning plan for removal of the facility after the wind farm is no longer in operation.

Prior to commencing decommissioning activities, US Wind will submit a Decommissioning Application to BSEE for approval per § 285.902(b) followed by required notifications per § 285.908. It should be noted that the plan described in the following section is a general concept intended to provide an overview of the decommissioning procedures.

US Wind will seek approval from BOEM to leave some components in place, such as buried cables and scour protection, to minimize disruption. The plan presented assumes all components will be removed to 5 m (15 ft) below the mudline as required by § 285.910(a) until and unless BSEE approves otherwise.

The decommissioning plan includes all aspects of the Project. For the purposes of this decommissioning plan, the Project is broken down into the following components:

- Onshore export cables.
- Onshore substations.
- Offshore export cables and Inter-array cables.
- OSS.
- WTG.
- WTG towers.
- WTG and OSS foundations.
- Scour systems (for both WTG and OSS foundations).

In general, structures and project elements will be decommissioned in the opposite order as they are installed and with the same or similar equipment. The first wind farms in Europe are just now reaching their design lives and are starting to enter the decommissioning process. As such, it is expected that means and methods will continue to evolve as more projects are decommissioned. An overview of the decommission methods for Project components is provided in the following sections.

7.1 Onshore Components

The decommissioning process for the onshore substations will include powering down a section of the substation and removing the equipment in the opposite order that it was installed. The US Wind substations are anticipated to include perimeter fencing/ access controls, security lighting and up to four circuit breakers and associated disconnect switches, metering, relay, and control panels. Above ground transmission structures will be dismantled and foundations removed as required by regulatory standards or landowner requirements. If underground cables are employed, the cables and associated conduits/duct banks and vaults will be removed. Typical onshore construction equipment, including cranes and earth moving equipment, will be employed to decommission the onshore substations.

7.2 Offshore Export Cables and Inter-Array Cables

The inter-array and offshore export cables will be disconnected from the WTGs and the OSS, and, subject to discussions with the appropriate regulatory agencies on the preferred approach to minimize environmental impacts, either retired in place or removed from the seabed, and recovered onto a barge or suitably equipped vessel. The cable routes will be exposed as needed to dislodge the cables and allow for the cable to be recovered. When the cable has been recovered it will be transported to shore for disposal and/or recycling.

7.3 OSS

The OSSs will be decommissioned in a sequential manner similar to the manner in which they were installed. The equipment on the platforms will be de-energized and made safe for removal. Any cabling connections to the OSS will be removed. Hazardous materials will be removed from the platform(s) and transported to shore in accordance with the OSRP to prevent contamination of the environment.

It is expected that OSS removal will be conducted using a combination of floating crane vessels, jack-up vessels and associated support vessels. The OSS topside can be removed in its entirety or on a component-by-component basis. Foundation piling will be removed to a level below the mudline of the seabed in accordance with the conditions of the Lease.

7.4 WTGs and Towers

The WTGs, including the nacelles, towers, and turbine blades, will be decommissioned using equipment that is similar to the equipment employed for installation. The turbines will be shut down and any oils associated with the turbines will be drained in accordance with the OSRP. A jack-up or floating crane vessel will be utilized to remove the blades, nacelle and tower, and the components will be transported to shore for recycling and/or disposal.

7.5 Foundations

The Project may utilize different types of foundations for WTGs from those used for OSSs. The removal of each foundation type will include the removal of the TP (if applicable) and the subsequent removal of the foundation structure as required, potentially to 5 m (15 ft) below the seabed.

It is expected that foundation removal will be conducted using a combination of floating crane vessels, jack-up vessels, and associated support vessels. Monopile and piled jacket foundations would be removed to a level below the mudline of the seabed in accordance with the conditions of the Lease. In the case of an OSS foundation consisting of a jacket with suction buckets, the buckets would be removed by reversing the installation process, pushing the buckets out of the seabed. Once the foundations are free from the seabed, they will be lifted onto transport vessels for subsequent recycling and/or disposal onshore.

7.6 Scour Systems

US Wind, after consultation with BOEM and other appropriate stakeholders, may propose to leave scour protection systems utilized to protect foundations and cables in place to provide seafloor habitat. If removed, a crane will pick up the material and place it on a barge. The rock utilized in these systems can be reused for other projects and will not require disposal in a landfill. If required, the scour systems will be removed in such a manner that the seabed will be returned to pre-project conditions, with no obstructions remaining to future activities.

7.7 Met Tower

The Met Tower decommissioning process will follow the process described below:

- The true existing sea-bed datum will be generated from the survey data to enable the correct pile removal length.
- All small ancillary equipment, such as communications equipment, environmental sensors etc. will be removed from the Met Tower by an O&M vessel and returned to shore.
- A heavy lift derrick barge will be mobilized to the site to lift the met mast and the heavier ancillary equipment from the Met Tower deck.
- The Met Tower deck will be removed and placed on either the lift barge or a materials barge.
- The Met Tower foundation piles will be cut to a depth of 5 m (15 ft) below the surveyed datum in accordance with 30 CFR 285.910 and removed to the deck of the derrick barge or materials barge.
- Once cut and removed all components will be transported to shore for processing at a licensed recycling facility.

7.8 Inventory

During decommissioning activities, US Wind will log an inventory of Project components, tracking that each component is properly shut down, removed from site, and disposed of or recycled in a facility licensed to take that material. A seabed site clearance survey will be conducted in the Lease area and Offshore Export Cable Corridor. Any materials that are left in place, if approved by BOEM, would be noted with as-built drawings provided to BOEM to confirm location. This process will be detailed in the decommissioning application to BOEM before activities commence.

8.0 Regulatory Framework

The Project is subject to approvals and permit requirements on the federal, state, and local levels. US Wind will secure all permits and approvals needed for development and construction of the Project. A list of agency contacts and coordination is provided in Appendix I-I.

8.1 Permits and Approvals

Table 8-1 includes a list of permits, certifications, or approvals for which US Wind has applied or will apply for from various federal, state, and local entities.

In Section 2.5.3 US Wind considers several Onshore Export Cable Corridors that consist of co-locating cables in existing Delaware Department of Transportation (DelDOT) ROW. DelDOT has the authority to grant the use of its rights-of-way for various purposes, including electric transmission, telecommunications, and pipelines. 26 Del.C. § 901. If any of the land-based Onshore Export Cable Corridors are determined to be necessary for the operation of the Project, US Wind will coordinate closely with DelDOT, the Delaware Public Service Commission, and any other applicable agency or stakeholder to obtain any necessary authorizations or approvals for the use of the state's ROWs.

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
FEDERAL			
Bureau of Ocean Energy Management (BOEM)	Construction and Operation Plan (COP)	Outer Continental Shelf Lands Act (OCSLA) 43 U.S.C. 1337(p) and BOEM Regulations at 30 CFR Part 585	Under these federal regulations, the Lessee must submit a detailed plan for the construction, operation, and conceptual decommissioning of a wind energy project in the commercial lease area, including any easement. BOEM reviews and approves, disapproves, or approves with modifications the Lessee's COP.
	National Environmental Policy (NEPA) – Environmental Impact Statement	NEPA 42 U.S.C. § 4321 *et seq.* and 40 CFR Part 1502	In accordance with NEPA review procedures, BOEM must prepare an Environmental Impact Statement (EIS) to consider the environmental impacts of its actions in decision making, providing full and fair discussion of significant environmental impacts and reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. After completion of the NEPA EIS, BOEM will issue a Record of Decision (RoD) to adopt its final decision on the Lessee's COP. *Notice of Intent to prepare an EIS posted in the Federal Register on June 8, 2022.* *Notice of Availability of a Draft EIS posted in the Federal Register on October 6, 2023.*
	Facility Design Report and Fabrication and Installation Report	30 CFR 585, Subpart G	Under these federal regulations, the Lessee must submit a Facility Design Report and a Fabrication and Installation Report to BOEM before installing facilities described in the approved COP.

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
United States Army Corps of Engineers (USACE)	Individual Permit Section 10 Permit (navigable waters) Section 404 Permit	Rivers and Harbors Act of 1899 33 U.S.C 401 et seq., 33 U.S.C 403 (Section 10) Clean Water Act (CWA) 33 U.S.C. 1251 et seq., 33 U.S.C. 1344 (Section 404)	Section 10 of the Rivers and Harbors Act of 1899 requires that parties seek authorization from USACE for any civils works projects that include the construction of structures in or over any navigable water of the United States. Section 404 of the CWA requires that parties seek authorization from the USACE for the discharge of dredged or fill material into any navigable waters of the United States. Under both the Rivers and Harbors Act and the Clean Water Act, the USACE may issue an Individual Permit or Standard Permit. USACE may not issue its permit until it has received a CWA Section 401 Water Quality Certificate from any applicable state (or EPA) unless certification is waived. In addition, EPA or states with delegated authority (Maryland; Delaware) under Section 402 of the CWA may require NPDES permits if there is a regulated discharge of pollutants into waters of the United States (includes oceans out to 200 miles). Although the construction and operation of an offshore wind energy project would not likely create an ongoing source of water pollution, specific activities during construction may be considered a regulated discharge. *US submitted initial draft application materials in February 2023.* *US Wind will submit permit application materials in August 2023.* *US Wind's permit application deemed complete on September 14, 2023.USACE Publication of Public Notice on October 6, 2023.*
	Section 408 Permit Permission – Civil Works Projects	Rivers and Harbors Act of 1899 33 U.S.C 408 (Section 408)	USACE may grant Section 408 permission for another party to alter a Civil Works project upon a determination that the alteration proposed will not be injurious to the public interest and will not impair the usefulness of the Civil Works project. For example, USACE may grant permission to parties for the use or temporary occupation of designated USACE offshore sand borrow areas, provided such work is not injurious to the public interest of this project to achieves and mining for beach renourishment and highway projects.

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
			US submitted initial draft review request materials in February 2023. *US Wind will submit the 408 Review Request in August 2023.* *US Wind's 408 Review Request deemed complete on September 8, 2023.* *US Wind's 408 Review Request complete application submitted on November 24, 2023.*
National Marine Fisheries Service (NMFS) – NOAA Fisheries	Incidental Harassment Authorization or Letter of Authorization	Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 et. seq.	The MMPA generally prohibits the "take" of marine mammals (includes harassment) but allows for the issuance of incidental "take" permits for negligible impact within a specified geographic region. The "take" largely arises due to activities incidental to planned marine construction activities and vessel transits, such as underwater sound, and may include avoidance of animal harassment or vessel interaction or strikes. *US Wind's MMPA Incidental Take Request deemed complete April 3, 2023.* *Notice of Receipt of Application published in the Federal Register on May 2, 2023.* *Proposed Rule published in the Federal Register on January 4, 2024.*
National Marine Fisheries Service (NMFS) – NOAA Fisheries	Magnuson-Stevens Fishery Conservation and Management Act Consultation	Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 - 1891	Section 305 of the Magnuson-Stevens Fishery Conservation and Management Act requires that BOEM conducts consultation with NMFS regarding an action that may adversely affect Essential Fish Habitat. *See also* Fish and Wildlife Coordination Act, 16 U.S.C. 661-667e. *EFH Consultation Request submitted by BOEM on June 2, 2023.* *EFH Consultation Package deemed completed by NOAA on February 2, 2024.* *NOAA Fisheries issued any conservation recommendations to BOEM May 2, 2024.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
	Section 7 Endangered Species Act (ESA) Consultation	Endangered Species Act, 16 U.S.C. 1531-1544	Section 7 of the ESA requires that the lead federal agency (BOEM and USACE) consult with NMFS to determine whether or not any proposed action or marine construction activities in the Project's specified coastal or ocean area of effect is not likely to jeopardize the continued existence of any endangered/threatened species within NMFS jurisdiction or result in the destruction or adverse modification of critical habitat. *ESA Consultation Request Package submitted by BOEM on June 2, 2023.* *ESA Consultation Package deemed complete on January 3, 2024.* *NMFS Biological Opinion issued June 18, 2024.*
United States Fish and Wildlife Service (USFWS)	MBTA and BGEPA conservation plans	Migratory Bird Treaty Act of 1918, 16 U.S.C. 703 – 712 Bald and Golden Eagle Protection Act of 1940, 16 U.S.C. 668 – 668d	Under the Interior Department's current legal position, the MBTA prohibits the incidental take of migratory birds, which could include take from offshore wind structures. While there is no MBTA permitting regime for offshore wind projects, the USFWS weighs heavily the existence of conservation plans in its administration of the statute. The BGEPA prohibits a person from "knowingly, or with wanton disregard" taking bald and golden eagles without permission. Unlike the MBTA, BGEPA has a take permit program.
	Section 7 Endangered Species Act Consultation	ESA 16 U.S.C. 1531-1541	Section 7 of the ESA requires that the lead federal agency (BOEM and USACE) consult with the FWS to determine if the proposed action in terrestrial, coastal, or offshore areas is not likely to jeopardize the continued existence of any endangered/threatened species or result in the destruction or adverse modification of critical habitat. FWS may issue an incidental take statement with its Biological Opinion where an action is reasonably certain to result in the incidental take of the species, but it is not likely to jeopardize its continued existence. *ESA Consultation Request Package submitted by BOEM on June 2, 2023.* *ESA Consultation Package deemed complete on January 3, 2024.* *USFWS Biological Opinion issued May 31, 2024.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
United States Coast Guard (USCG) – District 5	Local Notice to Mariners (LNTM)	14 U.S.C. 81	USCG requires notification of work within United States waters in order to avoid or mitigate potential marine traffic issues or conflicts that may arise from the operation of privately owned vessels in order to notify local mariners. LNTM’s are frequently issued by the USCG associated with various phases of construction and operations and maintenance vessel activities.
United States Coast Guard (USCG) – District 5	Private Aids to Navigation (PATON)		USCG will review and issue PATON Permits for WTGs, OSSs, and the Met Tower. They will specify and oversee the placement of structure lighting, lighting patterns and intensities, and flash/color characteristics.
Federal Aviation Administration (FAA)	Obstruction Evaluation/ Airport Airspace Analysis (OE/AAA) “Determination of No Hazard”	14 CFR Part 77	FAA jurisdiction extends 12NM from shore and applies to new construction or alteration of structures more than 200 feet above ground level. The FAA study will only assess WTG and OSS locations within their jurisdiction. It is anticipated BOEM will adopt the same obstruction lighting recommendations in their COP and NEPA reviews for the balance of any structure locations outside FAA jurisdiction, thereby encompassing the entire Project. *US Wind received a Determination of No Hazard from the FAA on May 22, 2023, effective July 1, 2023.*
Advisory Council on Historic Preservation, Tribes, and the State Historic Preservation Office (ACHP, THPO, SHPO)	National Historic Preservation Act (NHPA) Section 106 Consultation	54 U.S.C. § 306108; 36 CFR Part 800	Section 106 consultation requires federal agencies to consider the effects of projects they carry out, approve, or fund on historic properties or properties eligible for listing. Section 106 applies to federal “undertakings” that may adversely affect historic property within the Area of Potential Effect. Consulting parties may include the state or tribal historic officer, local government, and other members of a community The ACHP must be given an opportunity to participate. The parties may enter into an agreement to avoid, minimize, or mitigate the adverse effects of the Project. *BOEM initiated consultation June 8, 2022.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Department of Defense (DoD)	Consultation	Public Law 111-383, National Defense Authorization Act (NDAA) DoD Instruction 4180.02	The DoD is authorized to ensure robust development of renewable energy sources. Per 4180.02, the DoD will review all anticipated renewable energy projects on the OCS to address any stipulations on the lease sale agreement. The Military Aviation and Installation Assurance Siting Clearinghouse (The Clearinghouse) works with industry to overcome risks to national security. The DoD engages in a Mission Compatibility Evaluation (MCE) to study any adverse impacts on military operations and readiness and then proposes mitigation strategies to lessen those impacts. US Wind most recently filed an updated informal review request with the Clearinghouse in January 2022. Based on the FAA Determination of No Hazard, US Wind understands that the DoD will not be requiring a mitigation agreement for radar or aviation impacts at this time.

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
STATE OF MARYLAND			
Maryland Department of Environment (MDE) (delegated authority from EPA)	OCS Clean Air Act Permit	COMAR 26.11 Clean Air Act; 42 U.S.C. 7627 40 CFR Part 55	The Clean Air Act (Section 328(a)) requires that OCS sources located within 25 mi (40 km) of States' seaward boundaries (inner sources) submit a Notice of Intent (NOI) and apply for an OCS Air Permit to construct and operate the OCS source in accordance with the requirements of the Corresponding Onshore Area (COA). In addition, Section 328 creates a more comprehensive program for inner sources, stating: "Such requirements shall be the same as would be applicable if the source were located in the corresponding onshore area, and shall include, but not be limited to, State and local requirements for emission controls, emission limitations, offsets, permitting, monitoring, testing, and reporting." *US Wind filed a Notice of Intent to apply for an OCS Air Permit on August 5, 2022.* *Air Dispersion Modelling Protocol submitted to MDE September 16, 2022.* *Revised Air Dispersion Modeling Protocol and Alternative Model Request submitted to MDE March 10, 2023.* *US Wind submitted an OCS Air Permit Application on August 17, 2023.* *Alternative Model Requested approved by MDE on September 11, 2023. OCS Air Permit Application deemed administratively complete on January 4, 2024.*
Maryland Department of Natural Resources	Maryland Coastal Zone Management Consistency (per federal Coastal Zone Management Act)	Section 307 of the Coastal Zone Management Act, 16 U.S.C. 1456	The Coastal Zone Management Act authorizes states to manage the development and use of coastal waters and adjacent lands. The Act authorizes the state to conduct a consistency review of federal actions that may affect Maryland's coastal uses and/or resources. Given that the State of Maryland has not designated a geographic location description outside its coastal zone area, US Wind will proceed voluntarily to engage in the consistency review with the State, per 15 CFR 930.53 & 930.54. *MDNR and US Wind executed a stay of review on July 8, 2022, with second extension executed August 9, 2023. MDNR restarted review February 9, 2024.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Maryland Department of Environment	Tidal Wetlands License	Environment Article Title 16; COMAR 26.24	Any work performed in a tidal wetland or floodplain 5,000 square feet or more of impacts to tidal wetlands requires a Joint Federal/State Application for the Alteration of Any Tidal Wetland in Maryland (JPA). The determination between minor and major projects depends on the impacts to tidal wetlands, not total project area. The type of authorization issued will depend on the amount of impacts and the type of tidal wetland to be impacted (i.e. state or private). US Wind anticipates a Tidal Wetlands License will be necessary for work related to the O&M Facility. *Pre-application meeting June 2023.* *US Wind submitted a JPA on August 30, 2023.* *JPA deemed complete; public notice published February 9, 2024. Public information hearing held on March 25, 2024. The comment period closed on April 9, 2024. The comment period was extended for 30 days on May 7, 2024, concluding June 7, 2024.*
Maryland Department of Environment	Water Quality Certification	Section 401 of the Clean Water Act, and COMAR Title 26, Part 2, Subtitle 08	Applicable to discharge to navigable waters of the State, in this case potential stormwater from the O&M Facility. *Water quality certification request included with February 9, 2024, public notice.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
STATE OF DELAWARE			
Delaware Department of Natural Resources and Environmental Control - Division of Water	Wetlands and Subaqueous Lands Permit Section 401 Water Quality Certification	Delaware Title 7 Natural Resources and Environmental Control: 7500 Wetlands and Subaqueous Lands CWA Section 401	Authorization from the Wetlands and Subaqueous Lands Section is required for construction activities in tidal wetlands or in tidal and non-tidal waters in Delaware. This CWA Section 401 Water Quality Certification will be necessary before USACE can issue its permits. *Pre-filing meeting held July 20, 2023.* *US Wind submitted application February 15, 2024.* *The Wetlands and Subaqueous Lands Permit and Lease applications were revised and re-submitted on March 29, 2024, and deemed administratively complete on April 11, 2024.* *The Water Quality Certification Request was revised and re-submitted on April 15, 2024, and deemed administratively complete on April 22, 2024.* *Public notice published April 28, 2024.* *Public information session held June 5, 2024.*
Delaware Department of Natural Resources and Environmental Control – Division of Water	Subaqueous Lands Lease (renewable on 10-year term)	Delaware Title 7 Natural Resources and Environmental Control: 7500 Wetlands and Subaqueous Lands	A subaqueous lands lease is issued from the Wetlands and Subaqueous Lands Section in conjunction with a permit and conveys a legal interest in public subaqueous lands for a terminate period for the use of the structure. The wetlands and subaqueous lands permit application serves as the instrument through which to obtain a lease. *Pre-application submitted to DNREC on June 16, 2023.* *US Wind submitted application February 15, 2024.* *The Subaqueous Lands Permit and Lease applications were re-submitted on March 29, 2024, and deemed administratively complete on April 11, 2024.* *Public notice published April 28, 2024.* *Public information session held June 5, 2024.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Delaware Coastal Management Program	DE Coastal Zone Management (CZM) Consistency Certification (per federal Coastal Zone Management Act)	Section 307 of the Coastal Zone Management Act 16 U.S.C. 1456 (15 CFR 930 Subpart E – Consistency for Outer Continental Shelf (OCS) Exploration, Development, and Production Activities)	The Coastal Zone Management Act authorizes states to manage the development and use of coastal waters and adjacent lands. The Act authorizes the state to conduct a consistency review of federal actions that may affect Delaware's coastal uses and/or resources. The Delaware federal CZMP is delegated to DNREC for administration and given that US Wind will engage in a consistency review as set forth under 15 CFR 930.53. Subpart E review is to determine the consistency of the COP. *DNREC and US Wind executed a stay of review on July 8, 2022, with second extension executed August 9, 2023. DNREC restarted review February 9, 2024.* *DNREC issued a Public Notice on April 21, 2024.*
Delaware Coastal Management Program	DE Coastal Zone Management (CZM) Consistency Certification (per federal Coastal Zone Management Act)	Section 307 of the Coastal Zone Management Act 16 U.S.C. 1456 (15 CFR 930 Subpart D – Consistency for Activities Requiring a Federal License or Permit)	The Coastal Zone Management Act authorizes states to manage the development and use of coastal waters and adjacent lands. The Act authorizes the state to conduct a consistency review of federal actions that may affect Delaware's coastal uses and/or resources. The Delaware federal CZMP is delegated to DNREC for administration and given that US Wind will engage in a consistency review as set forth under 15 CFR 930.53. Subpart D review is to determine the consistency of the USACE application. *DNREC and US Wind executed a stay of review on July 8, 2022, with second extension executed August 9, 2023. DNREC restarted review February 9, 2024.* *DNREC issued a Public Notice on April 21, 2024.*

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Delaware Department of Natural Resources and Environmental Control - Division of Fish and Wildlife	Environmental Review for Species of Special Concern	Delaware Title 7 Natural Resources and Environmental Control: 3900 Wildlife Section 17.0 Species of Special Concern	Under Title 7, the Division of Fish and Wildlife may designate certain species of fish and wildlife as threatened or endangered. The Species Conservation and Research Program (SCRP) is responsible for the information on listed species. Parties must submit formal requests to the SCRP for information on these species. It is expected that DNREC will administer and coordinate its sister Division's respective input into the Project's overall Joint Permit Application review process which is also coordinated with the USACE under their Individual Permit review process. *US Wind submitted a request for an Environmental Review to DNREC September 11, 2023.* *DNREC provided Environmental Review letter December 21, 2023.*
Delaware Department of Natural Resources and Environmental Control - Division of Watershed Stewardship	Sediment and Stormwater Management Plan	7 Del. Code, Chapter 40, 7 DE Admin. Code 5101, CWA, 33 §§ 1251 et. seq.	Under these state regulations, DNREC has the authority to determine if a project may be granted approval for a standardized Sediment and Stormwater Management Plan if located on a site that has previously been managed for stormwater quantity and quality and will disturb less than 1.0 acre of land. For projects under 1.0 acre of land disturbance and minimal impact on stormwater a standard plan can be used. For all other projects, a detailed sediment and stormwater plan is required. The detailed plans consider stormwater impacts on regional drainage, water quantity and quality. Erosion and sediment control during construction is also more complex under detailed plan (see below). Construction review by DNREC may be required. DNREC may approve plans for disturbance on State Lands; otherwise, to delegated agencies (Sussex Conservation District).
Delaware Department of Natural Resources and Environmental Control - Division of Parks and Recreation	Special Use Permit/Land Use Agreement	7 Del.C. Chapter 47 Public Lands, Parks and Memorials – State Parks	This law authorizes DNREC to grant easements for the purposes of transmission lines and other utilities and charge a fee, This Agreement is required to use and establish underground utility easements and install Project-associated underground utilities through the State Parkland shoreline and barrier beach areas.

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Delaware Department of Natural Resources and Environmental Control	Permit or Letter of Approval	Beach Preservation Act – 7 Del. Code Chapter 68; Title 7 Del. Admin. Code Chapter 5000	This law and regulation requires permits for construction activities impacting beaches, dunes and vegetation along the Atlantic and Delaware Bay coastline and regulates activities seaward of the state-established building line. *Pre-application submitted to DNREC June 16, 2023.* *US Wind submitted application February 15, 2024, and re-submitted the application via e-permitting on February 27, 2024.* *DNREC in a meeting March 15, 2024, indicated that the Application is complete.* *Public notice published April 28, 2024.* *Public information session held June 5, 2024.*
Delaware State Fire Marshall's Office	Site Plan Approval	Title 1: 700 Delaware State Fire Prevention Regulations Chapter 4 Submittal of Plans	Site plans and building plans must be submitted for review
Delaware Department of Transportation	Entrance permit	17 Del.C Chapter 1, Section 146(c); Title 2 Del. Admin Code § 2309-7.2	An entrance permit is required to construct a new entrance or modify an existing entrance based on estimated traffic impacts resulting from site improvements. Modification of the entrances would be temporary. Approval from DelDOT is a condition of Conditional Use approval by Sussex County.
LOCAL			

Table 8-1. Permits and Approvals

Agency	Permit or Approval	Statutory Basis	Project Applicability
Sussex Conservation District	Erosion/Sediment Control and Stormwater Management Plan Approvals	7 Del. Code, Chapter 40, 7 DE Admin. Code 5101; Sussex County Code, Chapter 90	The Sussex Conservation District reviews and approves sediment and stormwater plans as a DNREC delegated agency for DNREC projects located in Sussex County.
Sussex County Planning and Zoning Commission /County Council	Conditional Use and Site Plan	Sussex County, DE Code Chapter 115 9 Del. Code Chapter 68	Sussex County has the authority to regulate the use of land. This jurisdiction relates specifically to the HDD Landfall installations, installation of underground utilities, and construction of the US Wind substations interconnecting with nearby Indian River Substation. *Pre-application meetings December 2023 and February 2024.*
Sussex County Building Code Office	Building Permit	Sussex County Code Chapter 52	County conducts plan reviews, building permit issuance and inspections for commercial, residential projects. Requires site plan and other regulatory approvals.
Worcester County Department of Development, Review and Permitting	Building Permit	Worcester County Code, Title 1 Zoning Regulations § ZS 1-115	Under Worcester County Code O, the County has the authority to uphold the International Building Code and the Building Code of Worcester County through issuance of Building Permits for the planned O&M Facility to be located on the West Ocean City waterfront.
Worcester County Department of the Environment	Shoreline construction permit	Worcester County Code NR 2 -102	Major construction: any work executed 8-ft channelward of mean high water line, or digging/excavation involving an alteration of the shoreline, in this case construction or upgrades related to the O&M Facility Minor construction: any other construction along the shoreline not considered to be major construction.

8.2 Facility Design Report / Fabrication and Installation Report

Offshore wind technologies are rapidly evolving. In this environment, it is essential that there be flexibility in the design, fabrication, and installation of the Project to garner the benefits of industry innovation, supply chain planning, and project efficiencies. To this end, the PDE contains reasonably foreseeable design scenarios that are selected based on existing data and assessment of siting options, with an eye towards future technological advancements and construction schedule realities. As is envisioned with the PDE approach, a certain level of flexibility and adjustment is anticipated in the development of the siting design within the PDE, as well as with regard to the fabrication of components and the construction timeline.

Accordingly, it is anticipated that where necessary, US Wind will submit separate FDR/FIR reports to BSEE for certain components of the project (e.g., WTGs, OSS, cables), which is permitted under regulations. 30 CFR §§ 285.632 & 285.700. US Wind will ensure that such delivery of FDR/FIR report submissions will be performed in close coordination with BSEE and that the necessary CVA certifications are complied with for the fabrication and installation stages. Along with the component- focused FDR/FIR reports and reviews, US Wind may also implement construction “campaigns” for portions of the Project. This construction approach is necessary as a result of various factors, such as varying permitting timelines, manufacturing timelines, supply chain dynamics, technological adjustments, and seasonal restrictions.

Thus, for example, there may be the development of strings or segments of the turbine array on a rolling basis to meet renewable energy demands in a timely fashion, as well as to achieve maximum operational efficiencies for the Project. Other campaigns could include cable installation and offshore substations, where site conditions, burial depths, and technical design assessments will provide a more granular assessment of specific design and installation methodologies. Final design and installation methods for components and campaigns will be determined at the FDR/FIR report, review, and certification stages, based on survey information, engagement with stakeholders and regulators, and assessments by contractors. US Wind also plans to finalize the O&M Plan for the Project as a component of the FDR/FIR report and review process.

This “campaign” approach avoids unnecessary delay, unproductive standstill time, idling of the project, and equipment fatigue. It allows for cascading commercial operation dates after the required CVA certifications are obtained for a given campaign. It may also facilitate the availability of “waivers” under BOEM regulations for use of a CVA, particularly with regard to design and fabrication activities based on prior, proven methods approved by a CVA for earlier segments of US Wind’s construction activities. 30 CFR § 285.705. Likewise, should the Project schedule require earlier BSEE or CVA clearance of FDR/FIR reports, reviews, or certifications, US Wind will submit a request(s) to BSEE to depart from 30 CFR § 285.700(b), as applicable.

It is US Wind’s understanding that a separate FDR/FIR for each component of the Project (e.g., WTGs, foundations, OSS, etc.) is permitted under the regulations, provided coordination and concurrence is received from BSEE on this approach. US Wind also plans to commence fabrication of certain Project components in advance of BOEM approval of the COP and the FDR/FIR process.