Appendix C
Project Design Envelope and Maximum-Case Scenario

This page is intentionally blank.

Table of Contents

List of Tables

Abbreviations and Acronyms

BOEM	Bureau of Ocean Energy Management
cy	cubic yard
EIS	Environmental Impact Statement
ESP	electrical service platform
FAA	Federal Aviation Administration
ft	feet
ft^2	square feet
ft^3	cubic feet
kJ	kilojoule
kV	kilovolt
MLLW	mean lower low water
MW	megawatt
NA	not applicable
NEPA	National Environmental Policy Act
nm	nautical mile
OECC	offshore export cable corridor
PDE	Project design envelope
Project	New England Wind Project
WTG	wind turbine generator

C Project Design Envelope and Maximum-Case Scenario

Park City Wind, LLC (Park City Wind or the applicant) has developed a Project design envelope (PDE). A PDE approach allows Park City Wind to define and bracket proposed characteristics of the New England Wind Project (proposed Project) for environmental review and permitting while maintaining a reasonable degree of flexibility for selection and purchase of proposed Project components, such as wind turbine generators (WTG), foundations, submarine cables, and offshore substations (BOEM 2018).

The Bureau of Ocean Energy Management (BOEM) uses the PDE concept to evaluate sufficiently detailed information within a reasonable range of parameters to analyze a "maximum-case scenario" within those parameters for each affected environmental resource. BOEM identified and verified that the maximum-case scenario for each resource based on the PDE provided by the applicant and analyzed in this Final Environmental Impact Statement (EIS) could reasonably occur, if approved. This approach is intended to provide flexibility for lessees and allow BOEM to analyze environmental impacts in a manner that minimizes the need for subsequent environmental and technical reviews. In addition, the PDE approach enables BOEM to expedite review by beginning National Environmental Policy Act (NEPA) evaluations of Construction and Operations Plans before a lessee has finalized all of its design decisions.

This Final EIS assesses the impacts of the reasonable range of designs that are described in the Construction and Operations Plan for the proposed Project by using the maximum-case scenario process. The maximum-case scenario analyzes the aspects of each design parameter that would result in the greatest impact for each physical, biological, cultural, and socioeconomic resource. This Final EIS considers the interrelationship between aspects of the PDE rather than simply independently viewing each design parameter. This Final EIS also provides the analysis for the impacts of the maximum-case scenario alongside other reasonably foreseeable past, present, and future actions.

Tables C-1 and C-2 provide detailed information on the PDE for Phase 1, and Tables C-3 and C-4 provide detailed information on the PDE for Phase 2. Tables C-5 and C-6 provide detailed information on the PDE maximum-case scenario per resource used as part of the NEPA analysis for each phase.

Table C-1: Proposed Action Design Envelope Parameters—Phase 1

Proposed Project Elements	Minimum	Maximum
Capacity and Arrangement		
Wind facility capacity	Approximately 804 MW[a]	
Area of Phase 1	37,066 acres	57,081 acres
WTGs		
WTG foundation type envelope[b]	Up to 62 WTG foundations; All could be monopiles or jacket foundations	
Number of turbine positions[c]		62
Number of turbines installed	41	62
Total tip height		1,171 ft MLLW[d]
Top of nacelle height[e]		725 ft MLLW[d]
Hub height		702 ft MLLW[d]
Rotor diameter		935 ft MLLW
Tip clearance	89 ft MLLW[d]	
Tower diameter for WTG	20 ft	33 ft
Monopile Foundations		
Diameter (at base)		39 ft
Pile footprint		1,195 ft^2
Penetration		180 ft
Height between seabed and MLLW (water depth)	141 ft	180 ft
Transition piece length for WTG		148 ft
Transition piece length for ESP		131 ft
Transition piece tower diameter		30 ft
Monopile + transition piece/extended monopile length		466 ft
Number of piles/foundation	1	1
Number of piles driven/day within 24 hours[f]	1	2
Time per pile to drive		Less than 6 hours
Hammer size		6,000 kJ
Jacket (Pin Piles) Foundation		
Pile diameter for WTG and ESP (per pile)		13 ft
Pile footprint for WTG and ESP		140 ft^2
Pile penetration for WTG and ESP		279 ft
Pile length for WTG and ESP		295 ft
Distance between legs for WTG		131 ft
Distance between legs for ESP		230 ft
Height between seabed and MLLW (water depth)	141 ft	180 ft
Jacket structure height for WTG and ESP		285 ft
Total height from interface/transition piece to below seafloor for WTG and ESP		564 ft
Transition piece width WTG		82 ft
Number of piles/foundation for WTG	3	4
Number of piles/foundation for ESP	3	12
Number of piles driven/day within 24 Hours[f]	1 (up to 4 pin piles)	
Hammer size for WTG and ESP		3,500 kJ
Scour Protection for Foundations		
Scour protection area at each monopile WTG and ESP		1.0 acres
Scour protection volume at each monopile WTG and ESP		Up to 431,369 ft^3
Scour protection area at each jacket WTG		1.1 acres
Scour protection volume at each jacket WTG		Up to 489,885 ft^3
Scour protection area at each jacket ESP		1.5 acres
Scour protection volume at each jacket ESP		Up to 637,147 ft^3
ESP		
ESP foundation type envelope[g]	Up to 2 ESP foundations Either could be monopile or jacket foundation	
Maximum topside dimensions		328 ft x 197 ft x 125 ft
Number of ESPs	1	2
Foundation type	Monopile	Jacket

Proposed Project Elements	Minimum	Maximum
Number of legs/foundation	1	3 to 6
Number of piles driven/foundation	1	3 to 12
Maximum topside height above MLLW		230 ft MLLW
Inter-array and Inter-link Cable		
Inter-array cable voltage	66 kV	132 kV
Inter-array cable length		121 nm
Inter-link cable voltage	66 kV	275 kV
Inter-link cable length		11 nm
Protection method (total length of both cables) (rock placement, concrete mattresses, gabion rock bags, half-shell)		Up to 2%
Target burial depth	5 ft	8 ft
Export Cable		
Number of export cables within corridor		2
Target burial depth	5 ft	8 ft
Export cables voltage	220 kV	275 kV
Maximum length of export cable (assuming 2 cables)		109 nm
Typical separation distance of export cable (assuming 2 cables)	164 ft	328 ft
Total corridor width for export cable (2 cables)[h]	3,100 ft	5,500 ft
Protection method (rock placement, concrete mattresses, gabion rock bags, half-shell)		Up to 6%
Export cables dredging (width corridor per cable, bottom of trench)		50 ft
Export cables total dredging area		Up to 52 acres
Export cables total dredging volume		176,300 cy
Landfall and Onshore Components		
Landfall sites	Craigville Public Beach	Covell's Beach
Length of onshore cable	4 miles	6.5 miles

cy = cubic yard; EIS = environmental impact statement; ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; ft^2 = square feet; ft^3 = cubic feet; kJ = kilojoule; kV = kilovolt; MLLW = mean lower low water; MW = megawatt; NEPA = National Environmental Policy Act; nm = nautical mile; WTG = wind turbine generator

[a] The Proposed Action for Phase 1 is for an approximately 804 MW offshore wind energy project. This Final EIS provides the evaluation of the potential impacts for a facility up to 804 MW to make sure adequate NEPA analysis for projects potentially constructed with a smaller capacity.

[b] The applicant would determine the number of each foundation type based on a future assessment of foundation feasibility (COP Volume I, Section 3.2.1.2.3; Epsilon 2023).

[c] Additional WTG positions allow for spare turbine locations or additional capacity to account for environmental or engineering challenges.

[d] Elevations relative to mean higher high water are approximately 3 ft lower than those relative to MLLW.

[e] The top of nacelle height dimension includes FAA lights and other appurtenances.

[f] Work would not be concurrently performed. No drilling is anticipated; however, it could be required if a large boulder or refusal is met. If drilling is required, a rotary drilling unit would be mobilized. Similarly, vibratory hammering could be used if deemed appropriate by the installation contractor.

[g] If two ESPs are used for Phase 1, each ESP could occupy one of the 130 WTG/ESP positions in the SWDA, or the two ESPs could be co-located at a single position, with each ESP's monopile foundation located within 250 feet of that position (i.e. the monopiles would be separated by up to 500 feet) (COP Volume I, Section 3.2.1.3; Epsilon 2023). As a result, Phase 1 could include 64 foundations at 62 WTG/ESP positions. However, under the Preferred Alternative, BOEM is disallowing the co-location of ESPs.

[h] This is the corridor width for siting purposes; each trench would be approximately 3.2 ft wide, and there would be an up to 3.3-to 6.6-foot-wide temporary disturbance zone from the tracks or skids of the cable installation.

Table C-2: Design Parameters Consistent for All Phase 1 Scenarios

Proposed Project Element	Description
Orientation	WTGs and ESPs oriented in an east-to-west, north-to-south grid pattern with 1-nm spacing between WTG/ESP positions
Foundation construction method	Pile driving
Foundation and WTG installation vessel type	Jack-up vessel, anchored vessel, vessel on dynamic positioning, feeder barges/vessels
ESP installation vessel type	Jack-up vessel, anchored vessel, vessel on dynamic positioning, feeder barges/vessels
Inter-array and inter-link cable installation method (includes a pre-lay grapnel run and pre-lay survey)	Jet plowing, jet trenching, or mechanical plowing
Inter-array cable installation vessel type	Vessel on dynamic positioning, anchored vessel, self-propelled vessels, or feeder barges/vessels
Export cable corridor width[a]	Approximately 3,100–5,500 ft wide with cables typically being separated from each other and the Vineyard Wind 1 cables by a distance of 164–328 ft, although this distance could be further adjusted pending ongoing routing evaluation
Export cable installation method (includes a pre-lay grapnel run, pre-lay survey, and boulder clearance)	Jet plowing, jet trenching, or mechanical plowing, and possibly with dredging in some locations to achieve burial depth
Export cable installation vessel type	Vessel on dynamic positioning, anchored vessel, self-propelled vessels, or feeder barges/vessels
WTG coloring	RAL 9010 Pure White or RAL 7035 Light Grey
FAA obstruction lighting	Two synchronized L-864 aviation red flashing obstruction lights—WTG nacelle; 30 flashes per minute would be used for air navigation lighting (if the WTG's total tip height is 699 ft or greater, there would be at least three additional low-intensity L-810 flashing red lights at a point approximately midway between the top of the nacelle and sea level)
FAA obstruction lighting method	Aircraft detection lighting system automatically activate all FAA lights (see row above) when aircraft approach; alternatively, the proposed Project could use a system that automatically adjusts lighting intensity in response to visibility conditions
U.S. Coast Guard lighting	Yellow flashing lights on each WTG/ESP foundation visible from all directions
Navigational boating warning tools	Mariner radio activated sound signals and automatic identification system transponders
Landfall transition method	Horizontal directional drilling
Landfall transition	Underground concrete transition vaults
Onshore cable construction protection	Underground duct banks of high-density polyethylene or polyvinyl chloride pipes encased in concrete
Onshore substation	New onshore substation in the Town of Barnstable, Massachusetts would connect to the electric grid at Eversource's existing 345 kV West Barnstable Substation

ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; kV = kilovolt; nm = nautical mile; OECC = offshore export cable corridor; WTG = wind turbine generator

[a] Where the OECC travels through Lease Area OCS-A 0501, the width of the corridor could be narrower than 3,100 ft to avoid possible interference with Vineyard Wind 1's offshore facilities.

Table C-3: Proposed Action Design Envelope Parameters—Phase 2

Proposed Project Elements	Minimum	Maximum
Capacity and Arrangement		
Wind facility capacity	Approximately 1,232-1,725 MW[a]	
Area of Phase 2	54,857 acres	74,873 acres
WTGs		
WTG foundation and base type envelope[b]	Up to 88 foundations; All could be monopiles, jacket, or bottom-frame foundations; All jacket or bottom-frame foundations could use piles or suction bucket bases	
Number of turbine positions[c]		88
Number of turbines installed	64	88
Total tip height		1,171 ft MLLW[d]
Top of nacelle height[e]		725 ft MLLW[d]
Hub height		702 ft MLLW[d]
Rotor diameter		935 ft MLLW
Tip clearance	89 ft MLLW[c]	
Tower diameter for WTG		33 ft
Monopile Foundations		
Diameter (at base)		43 ft
Pile footprint		1,452 ft^2
Penetration		180 ft
Height between seabed and MLLW (water depth)	157 ft	203 ft
Transition piece length WTG		164 ft
Transition piece length ESP		131 ft
Transition piece tower diameter WTG		33 ft
Monopile + transition piece/extended monopile length		482 ft
Number of piles/foundation	1	1
Number of piles driven/day within 24 hours[f]	1	2
Time per pile to drive		Less than 6 hours
Hammer size		6,000 kJ
Jacket Foundation – Pin Piles		
Diameter for WTG and ESP (per pile)		13 ft
Pile footprint for WTG and ESP (per pile)		140 ft^2
Pile penetration for WTG and ESP		279 ft
Pile length for WTG and ESP		295 ft
Distance between legs for WTG		131 ft
Distance between legs for ESP		328 ft
Height between seabed and MLLW (water depth)	157 ft	203 ft
Jacket structure height for WTG and ESP		302 ft
Total height from interface/transition piece to below seafloor for WTG and ESP		581 ft
Transition piece width WTG		82 ft
Number of piles/foundation for WTG	3	4
Number of piles/foundation for ESP	3	12
Number of piles driven/day within 24 hours[f]	1 (up to 4 pin piles)	
Hammer size for WTG and ESP		3,500 kJ
Jacket Foundation – Suction Buckets		
Diameter for WTG and ESP (per suction)		49 ft
Suction footprint for WTG and ESP (per suction)		1,886 ft^2
Suction penetration for WTG and ESP		49 ft
Bucket height for WTG and ESP		66 ft
Distance between legs for WTG		131 ft
Distance between legs for ESP		328 ft
Height between seabed and MLLW (water depth)	157 ft	203 ft
Jacket structure height for WTG and ESP		302 ft

Proposed Project Elements	Minimum	Maximum
Total height from interface/transition piece to below seafloor for WTG and ESP		351 ft
Transition piece width WTG		82 ft
Number of suction buckets/foundation for WTG		3
Number of suction buckets/foundation for ESP	3	6
Bottom-Frame WTG Foundation – Pin Piles		
Diameter per pile		13 ft
Footprint per pile		1,452 ft^2
Penetration per pile		279 ft
Pile length		295 ft
Distance between legs		285 ft
Height between seabed and MLLW (water depth)	157 ft	203 ft
Bottom-frame height		302 ft
Total height from interface/transition piece to below seafloor		581 ft
Transition piece tower diameter		36 ft
Number of piles/foundation		3
Number of piles driven/day within 24 hours[f]	1 (up to 3 pin piles)	
Hammer size for WTG		6,000 kJ
Bottom-Frame WTG Foundation – Suction Buckets		
Diameter per bucket		49 ft
Footprint per bucket		1,886 ft^2
Penetration per bucket		49 ft
Bucket height		66 ft
Distance between legs		285 ft
Height between seabed and MLLW (water depth)	157 ft	203 ft
Bottom-frame height		302 ft
Total height from interface/transition piece to below seafloor		351 ft
Transition piece tower diameter		36 ft
Number of suction buckets/foundation		3
Scour Protection for Foundations		
Area at each monopile WTG		Up to 1.2 acres
Volume at each monopile WTG		Up to 504,424 ft^3
Area at each jacket (pile) WTG		Up to 1.1 acres
Volume at each jacket (pile) WTG		Up to 487,344 ft^3
Area at each jacket (suction bottom) WTG		Up to 1.6 acres
Volume at each jacket (suction bottom) WTG		Up to 514,856 ft^3
Area at each bottom-frame (pile) WTG		Up to 1.7 acres
Volume at bottom-frame (pile) WTG		Up to 557,192 ft^3
Area at each bottom-frame (suction bottom) WTG		Up to 2.4 acres
Volume at each bottom-frame (suction bottom) WTG		Up to 790,742 ft^3
Area at each monopile ESP		Up to 1.2 acres
Volume at each monopile ESP		Up to 528,346 ft^3
Area at each piled jacket ESP		Up to 2.5 acres
Volume at each piled jacket ESP		Up to 1,056,224 ft^3
Area at each suction bucket jackets ESP		Up to 5.3 acres
Volume at each suction bucket jackets ESP		Up to 2,248,521 ft^3
ESP		
ESP foundation type envelope[g]	Up to 3 ESP foundations; Either could be monopile or jacket foundation	
Maximum topside dimensions		328 ft x 197 ft x 125 ft
Number of ESPs	1	3
Foundation type	Monopile	Jacket (pile or suction)
Number of legs/foundation	1	3 to 6
Number of piles driven/foundation (piled jacket)	1	3 to 12
Maximum topside height above MLLW		230 ft MLLW
Inter-array and Inter-link Cable		
Inter-array cable voltage	66 kV	132 kV

Proposed Project Elements	Minimum	Maximum
Inter-array cable length		175 nm
Inter-link cable voltage	66 kV	345 kV
Inter-link cable length		32 nm
Protection method (rock placement, concrete mattresses, gabion rock bags, half-shell)		Up to 2%
Target burial depth	5 ft	8 ft
Export Cable		
Number of export cables within corridor	2	3
Target burial depth	5 ft	8 ft
Export cables voltage	220 kV	345 kV
Maximum length of export cable (assuming 3 cables)		192 nm
Typical separation distance of export cable (assuming 3 cables)	164 ft	328 ft
Total corridor width for export cable (3 cables)[h]	3,100 ft	5,500 ft
Protection method (rock placement, concrete mattresses, gabion rock bags, half-shell)		Up to 6%
Export cables dredging (width corridor per cable)		50 ft
Export cables total dredging area		Up to 67 acres
Export cables total dredging volume		Up to 274,800 cy^3
Landfall and Onshore Components		
Landfall sites utilizing proposed Project OECC/Western Muskeget OECC Variant	Dowses Beach	Wianno Avenue
Length of onshore cable utilizing proposed Project OECC/Western Muskeget OECC Variant		10.6 mile
Landfall sites utilizing South Coast Variant OECC	Not specified	Not specified
Length of onshore cable utilizing South Coast OECC Variant	Not specified	Not specified

cy = cubic yard; EIS = environmental impact statement; ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; ft^2 = square feet; ft^3 = cubic feet; kJ = kilojoule; kV = kilovolt; MLLW = mean lower low water; MW = megawatt; NEPA = National Environmental Policy Act; nm = nautical mile; OECC = offshore export cable corridor; WTG = wind turbine generator

[a] The Proposed Action for Phase 2 is for an offshore wind energy project with generating capacity of at least 1,232 MW. Based on the number of WTG positions available and the assumed output per WTG of approximately 19.6 MW (based on the applicant's Phase 1 commitment to provide up to 804 MW through a minimum of 41 positions), this Final EIS provides the evaluation of the potential impacts for a Phase 2 facility up to 1,725 MW (88 WTGs at 19.6 MW each) to provide adequate NEPA analysis for projects potentially constructed with a smaller capacity.

[b] The applicant would determine the number of each foundation type based on a future assessment of foundation feasibility (COP Volume I, Section 3.2.1.2.3; Epsilon 2023).

[c] Additional WTG positions allow for spare turbine locations or additional capacity to account for environmental or engineering challenges.

[d] Elevations relative to mean higher high water are approximately 3 ft lower than those relative to MLLW.

[e] The top of nacelle height dimension includes FAA lights and other appurtenances.

[f] Work would not be concurrently performed. No drilling is anticipated; however, it could be required if a large boulder or refusal is met. If drilling is required, a rotary drilling unit would be mobilized. Similarly, vibratory hammering could be used if deemed appropriate by the installation contractor.

[g] If two or three ESPs are used for Phase 2, each ESP could occupy one of the 130 WTG/ESP positions in the SWDA, or two of the ESPs could be co-located at a single position, with each ESP's monopile foundation located within 250 feet of that position (i.e. the monopiles would be separated by up to 500 feet; COP Volume I, Section 4.2.1.3; Epsilon 2023). As a result, Phase 2 could include 89 foundations at 88 WTG/ESP positions.

[h] This is the corridor width for siting purposes; each trench would be approximately 3.2 ft wide, and there would be an up to 3.3-to 6.6-ft-wide temporary disturbance zone from the tracks or skids of the cable installation.

Table C-4: Design Parameters Consistent for All Phase 2 Scenarios

Proposed Project Element	Description
Orientation	WTGs and ESPs oriented in an east-to-west, north-to-south grid pattern with 1-nm spacing between WTG/ESP positions
Foundation construction method	Pile driving
Foundation and WTG installation vessel type	Jack-up vessel, anchored vessel, vessel on dynamic positioning, feeder barges/vessels
ESP installation vessel type	Jack-up vessel, anchored vessel, vessel on dynamic positioning, feeder barges/vessels, specialized crane vessel
Inter-array and Inter-link cable installation method (includes a pre-lay grapnel run and pre-lay survey)	Jet plowing, jet trenching, or mechanical plowing
Inter-array cable installation vessel type	Vessel on dynamic positioning, anchored vessel, self-propelled vessels, or feeder barges/vessels
Export cable corridor width[a]	Approximately 3,100–5,500 ft wide with cables typically being separated from each other and the Phase 1 cables by a distance of 164–328 ft, although this distance could be further adjusted pending ongoing routing evaluation
Export cable installation method (includes a pre-lay grapnel run, pre-lay survey, and boulder clearance)	Jet plowing, jet trenching, or mechanical plowing, and possibly with dredging in some locations to achieve burial depth
Export cable installation vessel type	Vessel on dynamic positioning, anchored vessel, self-propelled vessels, or feeder barges/vessels
WTG coloring	RAL 9010 Pure White or RAL 7035 Light Grey
FAA obstruction lighting	One or two levels of L-864 aviation red flashing obstruction lights—WTG nacelle; flashes per minute would be determined in consultation with BOEM once Phase 2 proceeds (if the WTG's total tip height is 699 ft or greater, there would be at least three additional low-intensity L-810 flashing red lights at a point approximately midway between the top of the nacelle and sea level)
FAA obstruction lighting method	Aircraft detection lighting system automatically activate all FAA lights (see row above) when aircraft approach; alternatively, the proposed Project could use a system that automatically adjusts lighting intensity in response to visibility conditions
U.S. Coast Guard lighting	Yellow flashing lights on each WTG/ESP foundation visible from all directions
Navigational boating warning tools	Mariner radio activated sound signals and automatic identification system transponders
Landfall transition method	Horizontal directional drilling or open trenching
Landfall transition	Underground concrete transition vaults (one per export cable)
Onshore cable construction protection	Underground duct banks of high-density polyethylene or polyvinyl chloride pipes encased in concrete
Onshore substation	New onshore substation in the Town of Barnstable, Massachusetts would connect to the electric grid at Eversource's existing 345 kV West Barnstable Substation

BOEM = Bureau of Ocean Energy Management; ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; kV = kilovolt; nm = nautical mile; OECC = offshore export cable corridor; WTG = wind turbine generator

[a] Where the OECC travels through Lease Area OCS-A 0501, the width of the corridor could be narrower than 3,100 ft to avoid possible interference with Vineyard Wind 1's offshore facilities.

Table C-5: Proposed Project Design Envelope Maximum-Case Scenario per Resource for Phase 1

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Wind facility capacity (MW)[a]	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804	804
WTG foundation arrangement envelope	NA	Evaluate both scenarios	Evaluate both scenarios	Evaluate both scenarios	Evaluate both scenarios	NA	Evaluate both scenarios	Evaluate both scenarios	Evaluate both scenarios	Evaluate both scenarios	Evaluate both scenarios	NA	NA	Evaluate both scenarios	NA	NA	Evaluate both scenarios
WTGs and Foundation																	
Number of turbine positions[b]	62 due to total number of trips required for construction	62 due to total potential sediment disturbance, spills	62 due to the total potential subsurface disturbance	62 due to more potential for collision and more air space being occupied	62 due to more potential for collision and more air space being occupied	NA	62 due to more potential for loss of area and change of habitat	62 due to more potential for noise and loss of area	62 due to more potential for surface and subsurface disturbance	62 due to more potential for collision and loss of area	62 due to more potential effects on resources due to disturbance[c]	62 due to more potential for noise and loss of area	NA	62 due to more potential for collision/ allisions	62 due to total number of potential hazards	62 due to more potential for loss of area and change of habitat	41 due to the total potential visual impact
Number of turbines installed	62	62	62	62	62	NA	62	62	62	62	62	62	NA	62	62[c]	62	62
Tip height (MLLW)[d]	NA	NA	NA	1,171 ft	1, 171 ft	NA	NA	NA	NA	1,171 ft	1 171 ft	1,171 ft	NA	1,171 ft	1,171 ft	1,171 ft	1,171 ft
Nacelle height (MLLW)[d, e]	NA	NA	NA	725 ft	725 ft	NA	NA	NA	NA	725 ft	725 ft	725 ft	NA	725 ft	725 ft	725 ft	725 ft
Hub height (MLLW)[d]	NA	NA	NA	702 ft	702 ft	NA	NA	NA	NA	702 ft	702 ft	702 ft	NA	702 ft	702 ft	702 ft	702 ft
Rotor diameter	NA	NA	NA	935 ft	935 ft	NA	NA	NA	NA	935 ft	935 ft	935 ft	NA	935 ft	935 ft	935 ft	935 ft
Tip clearance (MLLW)[d]	NA	NA	NA	89 ft	89 ft	NA	NA	NA	NA	89 ft	89 ft	89 ft	NA	89 ft	89 ft	89 ft	89 ft
Tower diameter for WTG	NA	30 ft	NA	NA	NA	NA	NA	NA	NA	30 ft	30 ft	NA	NA	30 ft	30 ft	30 ft	NA
Monopile Foundation																	
Diameter	NA	39 ft	39 ft	39 ft	39 ft	NA	39 ft	39 ft	39 ft	39 ft	39 ft	NA	NA	39 ft	39 ft	39 ft	39 ft
Pile footprint	NA	1,195 ft^2	1,195 ft^2	1,195 ft^2	1,195 ft^2	NA	1,195 ft^2	1,195 ft^2	1,195 ft^2	1,195 ft^2	1,195 ft^2	NA	NA	1,195 ft^2	1,195 ft^2	1,195 ft^2	NA
Penetration	NA	180 ft	180 ft	NA	NA	NA	180 ft	180 ft	NA	180 ft	180 ft	NA	NA	180 ft	180 ft	NA	NA
Height between seabed and MLLW (water depth)	NA	180 ft	NA	180 ft	NA	NA	NA	NA	180 ft	141 ft	180 ft	NA	NA	141 ft	180 ft	141 ft	180 ft
Transition piece length WTG	NA	148 ft	NA	148 ft	NA	NA	NA	NA	148 ft	148 ft	148 ft	NA	NA	148 ft	148 ft	148 ft	148 ft
Transition piece length ESP	NA	131 ft	NA	131 ft	NA	NA	NA	NA	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	131 ft	131 ft
Transition piece tower diameter	NA	30 ft	NA	NA	NA	NA	NA	NA	NA	30 ft	30 ft	NA	NA	30 ft	30 ft	30 ft	NA
Monopile + transition piece/extended monopile length	NA	466 ft	NA	466 ft	466 ft	NA	NA	NA	466 ft	466 ft	466 ft	NA	NA	466 ft	466 ft	466 ft	466 ft
Number of piles/foundation	NA	1	1	NA	NA	NA	1	1	1	1	1	NA	NA	1	1	1	1
Number of piles driven/day within 24 hours[f]	NA	2	2	NA	NA	NA	2	2	2	2	2	NA	NA	2	2	2	2
Hammer size for monopile foundation	NA	NA	6,000 kJ	6,000 kJ	NA	NA	6,000 kJ	6,000 kJ	NA	6,000 kJ	NA	NA	NA	6,000 kJ	6,000 kJ	6,000 kJ	NA
Scour protection area at each monopile WTG and ESP	NA	1 acre	1 acre	1 acre	NA	NA	1 acre	1 acre	1 acre	1 acre	1 acre	NA	NA	1 acre	1 acre	1 acre	NA
Scour protection volume at each monopile WTG and ESP	NA	Up to 431,369 ft^3	Up to 431,369 ft^3	Up to 431,369 ft^3	NA	NA	Up to 431,369 ft^3	Up to 431,369 ft^3	Up to 431,369 ft^3	Up to 431,369 ft^3	Up to 431,369 ft^3	NA	NA	Up to 431,369 ft^3	Up to 431,369 ft^3	Up to 431,369 ft^3	NA

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Jacket (Pin Pile) Foundation																	
Diameter for WTG and ESP	NA	13 ft	13 ft	13 ft	13 ft	NA	13 ft	13 ft	13 ft	13 ft	13 ft	NA	NA	13 ft	13 ft	13 ft	13 ft
Pile footprint for WTG and ESP	NA	140 ft^2	140 ft^2	140 ft^2	NA	NA	140 ft^2	140 ft^2	140 ft^2	140 ft^2	140 ft^2	NA	NA	140 ft^2	140 ft^2	NA	NA
Pile penetration for WTG and ESP	NA	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	NA	NA
Pile length for WTG and ESP	NA	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	NA	NA
Distance between legs for WTG	NA	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	NA	NA
Distance between legs for ESP	NA	230 ft	230 ft	230 ft	NA	NA	230 ft	230 ft	230 ft	230 ft	230 ft	NA	NA	230 ft	230 ft	NA	NA
Height between seabed and MLLW	NA	180 ft	NA	180 ft	NA	NA	NA	NA	180 ft	141 ft	180 ft	NA	NA	141 ft	180 ft	141 ft	180 ft
Jacket structure height for WTG and ESP	NA	285 ft	NA	285 ft	285 ft	NA	NA	NA	285 ft	285 ft	285 ft	NA	NA	285 ft	285 ft	285 ft	285 ft
Total height from interface/transition piece to below seafloor for WTG and ESP	NA	564 ft	NA	564 ft	564 ft	NA	NA	NA	564 ft	564 ft	564 ft	NA	NA	564 ft	564 ft	564 ft	564 ft
Number of piles/foundation WTG	NA	3 to 4	3 to 4	3 to 4	NA	NA	3 to 4	3 to 4	3 to 4	3 to 4	3 to 4	NA	NA	3 to 4	3 to 4	3 to 4	3 to 4
Number of piles/foundation ESP	NA	3 to 12	3 to 12	3 to 12	NA	NA	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	NA	NA	3 to 12	3 to 12	3 to 12	3 to 12
Number of piles driven/day within 24 hours[f]	NA	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	NA	NA	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	NA	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	NA	NA	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)	2 monopiles (up to 4 pin piles)
Hammer size for jacket foundation	NA	NA	3,500 kJ	3,500 kJ	NA	NA	3,500 kJ	3,500 kJ	NA	3,500 kJ	NA	NA	NA	3,500 kJ	3,500 kJ	3,500 kJ	NA
Scour protection area at each jacket WTG	NA	1.1 acres	1.1 acres	1.1 acres	NA	NA	1.1 acres	1.1 acres	1.1 acres	1.1 acres	1.1 acres	NA	NA	1.1 acres	1.1 acres	1.1 acres	NA
Scour protection volume at each jacket WTG	NA	Up to 489,885 ft^3	Up to 489,885 ft^3	Up to 489,885 ft^3	NA	NA	Up to 489,885 ft^3	Up to 489,885 ft^3	Up to 489,885 ft^3	Up to 489,885 ft^3	Up to 489,885 ft^3	NA	NA	Up to 489,885 ft^3	Up to 489,885 ft^3	Up to 489,885 ft^3	NA
Scour protection area at each jacket ESP	NA	1.5 acres	1.5 acres	1.5 acres	NA	NA	1.5 acres	1.5 acres	1.5 acres	1.5 acres	1.5 acres	NA	NA	1.5 acres	1.5 acres	1.5 acres	NA
Scour protection volume at each jacket ESP	NA	Up to 637,147 ft^3	Up to 637,147 ft^3	Up to 637,147 ft^3	NA	NA	Up to 637,147 ft^3	Up to 637,147 ft^3	Up to 637,147 ft^3	Up to 637,147 ft^3	Up to 637,147 ft^3	NA	NA	Up to 637,147 ft^3	Up to 637,147 ft^3	Up to 637,147 ft^3	NA
ESP																	
Maximum topside dimensions	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft
Number of ESPs	2 ESPs due to total number of trips required for construction	2 ESPs due to total potential sediment disturbance, spills	2 ESPs due to total potential bottom disturbance	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	NA	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying surface area	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	NA	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area	2 ESPs due to more facilities occupying air and surface area
ESP foundation type	NA	Jacket	Jacket	Jacket	Jacket	NA	Jacket	Jacket	Jacket	Jacket	Jacket	Jacket	NA	Jacket	Jacket	Jacket	Jacket

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
ESP number of piles/foundation	NA	3 to 12	3 to 12	3 to 12	3 to 12	NA	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	NA	3 to 12	3 to 12	3 to 12	3 to 12
ESP maximum height (MLLW)[d]	NA	NA	NA	230 ft	230 ft	NA	NA	NA	NA	NA	NA	NA	NA	NA	230 ft	NA	230 ft
Inter-Array and Inter-link Cable																	
Inter-array cable length	121 nm	121 nm	121 nm	121 nm	NA	121 nm	121 nm	121 nm	121 nm	121 nm	121 nm	121 nm	NA	121 nm	121 nm	121 nm	NA
Inter-link cable length	11 nm	11 nm	11 nm	11 nm	NA	11 nm	11 nm	11 nm	11 nm	11 nm	11 nm	11 nm	NA	11 nm	11 nm	11 nm	NA
Minimum target burial depth	NA	5 ft	5 ft	NA	NA	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	NA
Protection method	NA	Up to 2%	Up to 2%	Up to 2%	NA	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	NA	Up to 2%	Up to 2%	Up to 2%	NA
Export Cable																	
Number of export cables	NA	2	2	NA	NA	2	2	2	2	2	2	2	2	2	2	2	NA
Minimum burial depth	NA	5 ft	5 ft	NA	NA	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	NA
Maximum length of export cable (assuming 2 cables)	109 nm	109 nm	109 nm	NA	NA	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	109 nm	NA
Typical separation distance of export cable (assuming 2 cables)	NA	328 ft	328 ft	328 ft	NA	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	NA
Total corridor width for export cable (assuming 2 cables)[g]	NA	5,500 ft	5,500 ft	NA	NA	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	NA
Export cables dredging (width corridor per cable)	NA	50 ft	50 ft	50 ft	NA	50 ft	50 ft	50 ft	50 ft	50 ft	50 ft	NA	50 ft	50 ft	50 ft	NA	NA
Export cables total dredging area	NA	Up to 67 acres	Up to 67 acres	Up to 67 acres	NA	Up to 67 acres	Up to 67 acres	Up to 67 acres	Up to 67 acres	Up to 67 acres	Up to 67 acres	NA	Up to 67 acres	Up to 67 acres	Up to 67 acres	NA	NA
Export cables total dredging volume	NA	176,300 cy	176,300 cy	176,300 cy	NA	176,300 cy	176,300 cy	176,300 cy	176,300 cy	176,300 cy	176,300 cy	NA	176,300 cy	176,300 cy	176,300 cy	NA	NA
Protection amount	NA	Up to 6%	Up to 6%	Up to 6%	NA	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	NA

cy = cubic yard; EIS = environmental impact statement; ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; ft^2 = square feet; ft^3 = cubic feet; kJ = kilojoule; km = kilometer; MLLW = mean lower low water; MW = megawatt; NA = not applicable; NEPA = National Environmental Policy Act; nm = nautical mile; WTG = wind turbine generator

[a] The Proposed Action for Phase 1 is for an approximately 804 MW offshore wind energy project. This Final EIS provides the evaluation for the potential impacts for a facility up to 804 MW to make sure adequate NEPA analysis for projects potentially constructed with a smaller capacity.

[b] Additional WTG positions allow for spare turbine locations or additional capacity to account for environmental or engineering challenges.

[c] For visual effects on cultural resources, as well as effects on aviation (Other Uses), the maximum-case scenario includes 41 of the tallest WTGs.

[d] Elevations relative to mean higher high water are approximately 3 ft lower than those relative to MLLW.

[e] The top of nacelle height dimension includes FAA lights and other appurtenances.

[f] Work would not be concurrently performed. No drilling is anticipated; however, it could be required if a large boulder or refusal is met. If drilling is required, a rotary drilling unit would be mobilized, or vibratory hammering would be used. Similarly, vibratory hammering could be used if deemed appropriate by the installation contractor.

[g] This is the corridor width for siting purposes; each trench would be approximately 3.2 feet wide, and there would be an up to 3.3- to 6.6-foot-wide temporary disturbance zone from the tracks or skids of the cable installation.

This page is intentionally blank.

Table C-6: Proposed Project Design Envelope Maximum-Case Scenario per Resource for Phase 2

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Wind facility capacity (MW)[a]	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796	1,796
WTG foundation arrangement envelope	NA	NA	Evaluate all scenarios	Evaluate all scenarios	Evaluate all scenarios	NA	Evaluate all scenarios	Evaluate all scenarios	Evaluate all scenarios	Evaluate all scenarios	Evaluate all scenarios	NA	NA	Evaluate all scenarios	NA	NA	Evaluate all scenarios
WTGs and Foundation																	
Number of turbine positions[b]	88 due to total number of trips required for construction	88 due to total potential sediment disturbance, spills	88 due to the total potential subsurface disturbance	88 due to more potential for collision and more air space being occupied	88 due to more potential for collision and more air space being occupied	NA	88 due to more potential for loss of area and change of habitat	88 due to more potential for noise and loss of area	88 due to more potential for surface and subsurface disturbance	88 due to more potential for collision and loss of area	88 due to more potential effects on resources due to disturbance[c]	88 due to more potential for noise and loss of area	NA	88 due to more potential for collision/ allisions	88 due to total number of potential hazards	88 due to more potential for loss of area and change of habitat	41 due to the total potential visual impact
Number of turbines installed	88	88	88	88	88	NA	88	88	88	88	88	88	NA	88	88[c]	88	88
Tip height (MLLW)[d]	NA	NA	NA	1,171 ft	1, 171 ft	NA	NA	NA	NA	1,171 ft	1,171 ft	1,171 ft	NA	1,171 ft	1,171 ft	1,171 ft	1,171 ft
Nacelle height (MLLW)[d, e]	NA	NA	NA	725 ft	725 ft	NA	NA	NA	NA	725 ft	725 ft	725 ft	NA	725 ft	725 ft	725 ft	725 ft
Hub height (MLLW)[d]	NA	NA	NA	702 ft	702 ft	NA	NA	NA	NA	702 ft	702 ft	702 ft	NA	702 ft	702 ft	702 ft	702 ft
Rotor diameter	NA	NA	NA	935 ft	935 ft	NA	NA	NA	NA	935 ft	935 ft	935 ft	NA	935 ft	935 ft	935 ft	935 ft
Tip clearance (MLLW)[d]	NA	NA	NA	89 ft	89 ft	NA	NA	NA	NA	89 ft	89 ft	89 ft	NA	89 ft	89 ft	89 ft	89 ft
Tower diameter for WTG	NA	30 ft	NA	NA	NA	NA	NA	NA	NA	30 ft	30 ft	NA	NA	30 ft	30 ft	30 ft	NA
Monopile Foundation																	
Diameter	NA	43 ft	43 ft	43 ft	43 ft	NA	43 ft	43 ft	43 ft	43 ft	43 ft	NA	NA	43 ft	43 ft	43 ft	39 ft
Pile footprint	NA	1,452 ft^2	1,452 ft^2	1,452 ft^2	1,452 ft^2	NA	1,452 ft^2	1,452 ft^2	1,452 ft^2	1,452 ft^2	1,452 ft^2	NA	NA	1,452 ft^2	1,452 ft^2	1,452 ft^2	NA
Penetration	NA	180 ft	180 ft	NA	NA	NA	180 ft	180 ft	180 ft	180 ft	180 ft	NA	NA	180 ft	180 ft	NA	NA
Height between seabed and MLLW (water depth)	NA	203 ft	NA	203 ft	NA	NA	NA	NA	203 ft	157 ft	203 ft	NA	NA	157 ft	203 ft	157 ft	203 ft
Transition piece length WTG	NA	164 ft	NA	164 ft	NA	NA	NA	NA	164 ft	164 ft	164 ft	NA	NA	164 ft	164 ft	164 ft	164 ft
Transition piece length ESP	NA	131 ft	NA	131 ft	NA	NA	NA	NA	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	131 ft	131 ft
Transition piece tower diameter	NA	33 ft	NA	NA	NA	NA	NA	NA	NA	33 ft	33 ft	NA	NA	33 ft	33 ft	33 ft	NA
Monopile + transition piece/extended monopile length	NA	482 ft	NA	482 ft	482 ft	NA	NA	NA	482 ft	482 ft	482 ft	NA	NA	482 ft	482 ft	482 ft	482 ft
Number of piles/foundation	NA	1	1	NA	NA	NA	1	1	1	1	1	NA	NA	1	1	1	1
Number of piles driven/day within 24 hours[f]	NA	2	2	NA	NA	NA	2	2	2	2	2	NA	NA	2	2	2	2
Hammer size for monopile foundation	NA	NA	6,000 kJ	6,000 kJ	NA	NA	6,000 kJ	6,000 kJ	NA	6,000 kJ	NA	NA	NA	6,000 kJ	6,000 kJ	6,000 kJ	NA
Scour protection area at each monopile WTG and ESP	NA	Up to 1.2 acres	Up to 1.2 acres	Up to 1.2 acres	NA	NA	Up to 1.2 acres	Up to 1.2 acres	Up to 1.2 acres	Up to 1.2 acres	Up to 1.2 acres	NA	NA	Up to 1.2 acres	Up to 1.2 acres	Up to 1.2 acres	NA
Scour protection volume at each monopile WTG and ESP	NA	Up to 504,424 ft^3	Up to 504,424 ft^3	Up to 504,424 ft^3	NA	NA	Up to 504,424 ft^3	Up to 504,424 ft^3	Up to 504,424 ft^3	Up to 504,424 ft^3	Up to 504,424 ft^3	NA	NA	Up to 504,424 ft^3	Up to 504,424 ft^3	Up to 504,424 ft^3	NA

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Jacket (Pin Pile) Foundation																	
Diameter for WTG and ESP	NA	13 ft	13 ft	13 ft	13 ft	NA	13 ft	13 ft	13 ft	13 ft	13 ft	NA	NA	13 ft	13 ft	13 ft	13 ft
Pile footprint for WTG and ESP	NA	140 ft^2	140 ft^2	140 ft^2	NA	NA	140 ft^2	140 ft^2	140 ft^2	140 ft^2	140 ft^2	NA	NA	140 ft^2	140 ft^2	NA	NA
Pile penetration for WTG and ESP	NA	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	NA	NA
Pile length for WTG and ESP	NA	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	NA	NA
Distance between legs for WTG	NA	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	NA	NA
Distance between legs for ESP	NA	328 ft	328 ft	328 ft	NA	NA	328 ft	328 ft	328 ft	328 ft	328 ft	NA	NA	230 ft	230 ft	NA	NA
Height between seabed and MLLW	NA	203 ft	NA	203 ft	NA	NA	NA	NA	203 ft	157 ft	203 ft	NA	NA	157 ft	203 ft	157 ft	203 ft
Jacket structure height for WTG and ESP	NA	302 ft	NA	302 ft	302 ft	NA	NA	NA	302 ft	302 ft	302 ft	NA	NA	302 ft	302 ft	302 ft	302 ft
Total height from interface/transition piece to below seafloor for WTG and ESP	NA	581 ft	NA	581 ft	581 ft	NA	NA	NA	581 ft	581 ft	581 ft	NA	NA	581 ft	581 ft	581 ft	581 ft
Number of piles/foundation WTG	NA	3 to 4	3 to 4	3 to 4	NA	NA	3 to 4	3 to 4	3 to 4	3 to 4	3 to 4	NA	NA	3 to 4	3 to 4	3 to 4	3 to 4
Number of piles/foundation ESP	NA	3 to 12	3 to 12	3 to 12	NA	NA	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	NA	NA	3 to 12	3 to 12	3 to 12	3 to 12
Number of piles driven/day within 24 hours[f]	NA	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)	NA	NA	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)	NA	NA	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)	1 (up to 4 pin piles)
Hammer size for jacket foundation	NA	NA	3,500 kJ	3,500 kJ	NA	NA	3,500 kJ	3,500 kJ	NA	3,500 kJ	NA	NA	NA	3,500 kJ	3,500 kJ	3,500 kJ	NA
Scour protection area at each jacket WTG	NA	Up to 1.1 acres	Up to 1.1 acres	Up to 1.1 acres	NA	NA	Up to 1.1 acres	Up to 1.1 acres	Up to 1.1 acres	Up to 1.1 acres	Up to 1.1 acres	NA	NA	Up to 1.1 acres	Up to 1.1 acres	Up to 1.1 acres	NA
Scour protection volume at each jacket WTG	NA	Up to 487,344 ft^3	Up to 487,344 ft^3	Up to 487,344 ft^3	NA	NA	Up to 487,344 ft^3	Up to 487,344 ft^3	Up to 487,344 ft^3	Up to 487,344 ft^3	Up to 487,344 ft^3	NA	NA	Up to 487,344 ft^3	Up to 487,344 ft^3	Up to 487,344 ft^3	NA
Scour protection area at each jacket ESP	NA	Up to 2.5 acres	Up to 2.5 acres	Up to 2.5 acres	NA	NA	Up to 2.5 acres	Up to 2.5 acres	Up to 2.5 acres	Up to 2.5 acres	Up to 2.5 acres	NA	NA	Up to 2.5 acres	Up to 2.5 acres	Up to 2.5 acres	NA
Scour protection volume at each jacket ESP	NA	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	NA	NA	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	NA	NA	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	Up to 1,056,224 ft^3	NA
Jacket Foundation – Suction Buckets																	
Diameter for WTG and ESP (per suction)	NA	49 ft	49 ft	49 ft	49 ft	NA	49 ft	49 ft	49 ft	49 ft	49 ft	NA	NA	49 ft	NA	49 ft	49 ft
Suction footprint for WTG and ESP (per suction)	NA	1,886 ft^2	1,886 ft^2	1,886 ft^2	NA	NA	1,886 ft^2	1,886 ft^2	1,886 ft^2	1,886 ft^2	1,886 ft^2	NA	NA	1,886 ft^2	1,886 ft^2	NA	NA
Suction penetration for WTG and ESP	NA	49 ft	49 ft	49 ft	NA	NA	49 ft	49 ft	49 ft	49 ft	49 ft	NA	NA	49 ft	49 ft	NA	NA
Bucket height for WTG and ESP	NA	66 ft	66 ft	66 ft	NA	NA	66 ft	66 ft	66 ft	66 ft	66 ft	NA	NA	66 ft	66 ft	NA	NA
Distance between legs for WTG	NA	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	131 ft	131 ft	131 ft	NA	NA	131 ft	131 ft	NA	NA
Distance between legs for ESP	NA	328 ft	328 ft	328 ft	NA	NA	328 ft	328 ft	328 ft	328 ft	328 ft	NA	NA	328 ft	328 ft	NA	NA
Height between seabed and MLLW	NA	203 ft	NA	203 ft	NA	NA	NA	NA	203 ft	157 ft	203 ft	NA	NA	157 ft	203 ft	157 ft	203 ft

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Jacket structure height for WTG and ESP	NA	302 ft	NA	302 ft	302 ft	NA	NA	NA	302 ft	302 ft	302 ft	NA	NA	302 ft	302 ft	302 ft	302 ft
Total height from interface/transition piece to below seafloor for WTG and ESP	NA	351 ft	NA	351 ft	351 ft	NA	NA	NA	351 ft	351 ft	351 ft	NA	NA	351 ft	351 ft	351 ft	351 ft
Number of suction buckets/foundation for WTG	NA	3	3	3	NA	NA	3	3	3	3	3	NA	NA	3	3	3	3
Number of suction buckets/foundation for ESP	NA	3 to 6	3 to 6	3 to 6	NA	NA	3 to 6	3 to 6	3 to 6	3 to 6	3 to 6	NA	NA	3 to 6	3 to 6	3 to 6	3 to 6
Scour protection area at each jacket (suction bottom) WTG	NA	Up to 1.6 acres	Up to 1.6 acres	Up to 1.6 acres	NA	NA	Up to 1.6 acres	Up to 1.6 acres	Up to 1.6 acres	Up to 1.6 acres	Up to 1.6 acres	NA	NA	Up to 1.6 acres	Up to 1.6 acres	Up to 1.6 acres	NA
Scour protection volume at each jacket (suction bottom) WTG	NA	Up to 514,856 ft^3	Up to 514,856 ft^3	Up to 514,856 ft^3	NA	NA	Up to 514,856 ft^3	Up to 514,856 ft^3	Up to 514,856 ft^3	Up to 514,856 ft^3	Up to 514,856 ft^3	NA	NA	Up to 514,856 ft^3	Up to 514,856 ft^3	Up to 514,856 ft^3	NA
Scour protection area at each suction bucket jackets ESP	NA	Up to 5.3 acres	Up to 5.3 acres	Up to 5.3 acres	NA	NA	Up to 5.3 acres	Up to 5.3 acres	Up to 5.3 acres	Up to 5.3 acres	Up to 5.3 acres	NA	NA	Up to 5.3 acres	Up to 5.3 acres	Up to 5.3 acres	NA
Scour protection volume at each suction bucket jackets ESP	NA	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	NA	NA	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	NA	NA	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	Up to 2,248,521 ft^3	NA
Bottom-Frame WTG Foundation – Pin Piles																	
Diameter per pile	NA	13 ft	13 ft	13 ft	13 ft	NA	13 ft	13 ft	13 ft	13 ft	13 ft	NA	NA	13 ft	13 ft	13 ft	13 ft
Footprint per pile	NA	1,452 ft^2	1,452 ft^2	1,452 ft^2	NA	NA	1,452 ft^2	1,452 ft^2	1,452 ft^2	1,452 ft^2	1,452 ft^2	NA	NA	1,452 ft^2	1,452 ft^2	NA	NA
Penetration per pile	NA	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	279 ft	279 ft	279 ft	NA	NA	279 ft	279 ft	NA	NA
Pile length	NA	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	295 ft	295 ft	295 ft	NA	NA	295 ft	295 ft	NA	NA
Distance between legs	NA	285 ft	285 ft	285 ft	NA	NA	285 ft	285 ft	285 ft	285 ft	285 ft	NA	NA	285 ft	285 ft	NA	NA
Height between seabed and MLLW	NA	203 ft	NA	203 ft	NA	NA	NA	NA	203 ft	157 ft	203 ft	NA	NA	157 ft	203 ft	157 ft	203 ft
Bottom-frame height	NA	302 ft	NA	302 ft	302 ft	NA	NA	NA	302 ft	302 ft	302 ft	NA	NA	302 ft	302 ft	302 ft	302 ft
Total height from interface/transition piece to below seafloor	NA	581 ft	NA	581 ft	581 ft	NA	NA	NA	581 ft	581 ft	581 ft	NA	NA	581 ft	581 ft	581 ft	581 ft
Number of piles/foundation	NA	3	3	3	NA	NA	3	3	3	3	3	NA	NA	3	3	3	3
Number of piles driven/day within 24 hours[f]	NA	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)	NA	NA	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)	NA	NA	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)	1 (up to 3 pin piles)
Hammer size for WTG	NA	NA	6,000 kJ	6,000 kJ	NA	NA	6,000 kJ	6,000 kJ	NA	6,000 kJ	NA	NA	NA	6,000 kJ	6,000 kJ	6,000 kJ	NA
Scour protection area at each bottom-frame (pile) WTG	NA	Up to 1.7 acres	Up to 1.7 acres	Up to 1.7 acres	NA	NA	Up to 1.7 acres	Up to 1.7 acres	Up to 1.7 acres	Up to 1.7 acres	Up to 1.7 acres	NA	NA	Up to 1.7 acres	Up to 1.7 acres	Up to 1.7 acres	NA
Scour protection volume at each bottom-frame (pile) WTG	NA	Up to 557,192 ft^3	Up to 557,192 ft^3	Up to 557,192 ft^3	NA	NA	Up to 557,192 ft^3	Up to 557,192 ft^3	Up to 557,192 ft^3	Up to 557,192 ft^3	Up to 557,192 ft^3	NA	NA	Up to 557,192 ft^3	Up to 557,192 ft^3	Up to 557,192 ft^3	NA
Bottom-Frame WTG Foundation – Suction Buckets																	
Diameter per bucket	NA	49 ft	49 ft	49 ft	49 ft	NA	49 ft	49 ft	49 ft	49 ft	49 ft	NA	NA	49 ft	49 ft	49 ft	49 ft
Footprint per bucket	NA	1,886 ft^2	1,886 ft^2	1,886 ft^2	NA	NA	1,886 ft^2	1,886 ft^2	1,886 ft^2	1,886 ft^2	1,886 ft^2	NA	NA	1,886 ft^2	1,886 ft^2	NA	NA
Penetration per bucket	NA	49 ft	49 ft	49 ft	NA	NA	49 ft	49 ft	49 ft	49 ft	49 ft	NA	NA	49 ft	49 ft	NA	NA
Bucket height	NA	66 ft	66 ft	66 ft	NA	NA	66 ft	66 ft	66 ft	66 ft	66 ft	NA	NA	66 ft	66 ft	NA	NA

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Distance between legs	NA	285 ft	285 ft	285 ft	NA	NA	285 ft	285 ft	285 ft	285 ft	285 ft	NA	NA	285 ft	285 ft	NA	NA
Height between seabed and MLLW	NA	203 ft	NA	203 ft	NA	NA	NA	NA	203 ft	157 ft	203 ft	NA	NA	157 ft	157 ft	157 ft	203 ft
Bottom-frame height	NA	302 ft	NA	302 ft	302 ft	NA	NA	NA	302 ft	302 ft	302 ft	NA	NA	302 ft	302 ft	302 ft	302 ft
Total height from interface/transition piece to below seafloor	NA	351 ft	NA	351 ft	351 ft	NA	NA	NA	351 ft	351 ft	351 ft	NA	NA	351 ft	351 ft	351 ft	351 ft
Number of suction buckets/foundation	NA	3	3	3	NA	NA	3	3	3	3	3	NA	NA	3	3	3	3
Scour protection area at each bottom-frame (suction bottom) WTG	NA	Up to 2.4 acres	Up to 2.4 acres	Up to 2.4 acres	NA	NA	Up to 2.4 acres	Up to 2.4 acres	Up to 2.4 acres	Up to 2.4 acres	Up to 2.4 acres	NA	NA	Up to 2.4 acres	Up to 2.4 acres	Up to 2.4 acres	NA
Scour protection volume at each bottom-frame (suction bottom) WTG	NA	Up to 790,742 ft^3	Up to 790,742 ft^3	Up to 790,742 ft^3	NA	NA	Up to 790,742 ft^3	Up to 790,742 ft^3	Up to 790,742 ft^3	Up to 790,742 ft^3	Up to 790,742 ft^3	NA	NA	Up to 790,742 ft^3	Up to 790,742 ft^3	Up to 790,742 ft^3	NA
ESP																	
Maximum topside dimensions	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	NA	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft	328 ft x 197 ft x 125 ft
Number of ESPs	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	NA	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area	NA	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupyin g air and surface area	3 ESPs due to more facilities occupying air and surface area	3 ESPs due to more facilities occupying air and surface area
ESP foundation type	NA	Jacket	Jacket	Jacket	Jacket	NA	Jacket	Jacket	Jacket	Jacket	Jacket	Jacket	NA	Jacket	Jacket	Jacket	Jacket
ESP number of piles/foundation	NA	3 to 12	3 to 12	3 to 12	3 to 12	NA	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	3 to 12	NA	3 to 12	3 to 12	3 to 12	3 to 12
ESP maximum height (MLLW)[c]	NA	NA	NA	230 ft	230 ft	NA	NA	NA	NA	NA	NA	NA	NA	NA	230 ft	NA	230 ft
Inter-Array and Inter-link Cable																	
Inter-array cable length	NA	175 nm	175 nm	175 nm	NA	175 nm	175 nm	175 nm	175 nm	175 nm	175 nm	175 nm	NA	175 nm	175 nm	175 nm	NA
Inter-link cable length	NA	32 nm	32 nm	32 nm	NA	32 nm	32 nm	32 nm	32 nm	32 nm	32 nm	32 nm	NA	32 nm	32 nm	32 nm	NA
Target burial depth	NA	5 ft	5 ft	NA	NA	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	NA
Protection amount	NA	Up to 2%	Up to 2%	Up to 2%	NA	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	Up to 2%	NA	Up to 2%	Up to 2%	Up to 2%	NA
Export Cable																	
Number of export cables	NA	3	3	NA	NA	3	3	3	3	3	3	3	3	3	3	3	NA
Burial depth	NA	5 ft	5 ft	NA	NA	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	5 ft	NA
Maximum length of export cable (assuming 2 cables)	NA	196 nm	196 nm	NA	NA	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	196 nm	NA
Typical separation distance of export cable (assuming 2 cables)	NA	328 ft	328 ft	328 ft	NA	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	328 ft	NA
Total corridor width for export cable (assuming 2 cables)[g]	NA	5,500 ft	5,500 ft	NA	NA	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	5,500 ft	NA
Export cables dredging (width corridor per cable)	NA	50 ft	50 ft	50 ft	NA	50 ft	50 ft	50 ft	50 ft	50 ft	50 ft	NA	50 ft	50 ft	50 ft	NA	NA

Design Parameter	Air Quality	Water Quality	Benthic Resources	Birds	Bats	Coastal Habitats and Fauna	Finfish, Invertebrates, and Essential Fish Habitat	Marine Mammals and Sea Turtles	Non-Tidal Waters and Wetlands	Commercial Fisheries and For-Hire Recreational Fishing	Cultural Resources	Demographics, Employment, Economics and Environmental Justice	Land Use and Coastal Infrastructure	Navigation and Vessel Traffic	Other Uses	Recreation and Tourism	Scenic and Visual Resources
Export cables total dredging area	NA	Up to 73 acres	Up to 73 acres	Up to 73 acres	NA	Up to 73 acres	Up to 73 acres	Up to 73 acres	Up to 73 acres	Up to 73 acres	Up to 73 acres	NA	Up to 73 acres	Up to 73 acres	Up to 73 acres	NA	NA
Export cables total dredging volume	NA	274,800 cy	274,800 cy	274,800 cy	NA	274,800 cy	274,800 cy	274,800 cy	274,800 cy	274,800 cy	274,800 cy	NA	274,800 cy	274,800 cy	274,800 cy	NA	NA
Protection amount	NA	Up to 6%	Up to 6%	Up to 6%	NA	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	Up to 6%	NA

cy = cubic yard; EIS = environmental impact statement; ESP = electrical service platform; FAA = Federal Aviation Administration; ft = feet; ft^2 = square feet; ft^3 = cubic feet; kJ = kilojoule; MLLW = mean lower low water; MW = megawatt; NA = not applicable; NEPA = National Environmental Policy Act; nm = nautical mile; WTG = wind turbine generator

[a] The Proposed Action for Phase 2 is for an approximately 1,200-1,500 MW offshore wind energy project. This Final EIS provides the evaluation for the potential impacts for a facility up to 1,500 MW to make sure adequate NEPA analysis for projects potentially constructed with a smaller capacity.

[b] Additional WTG positions allow for spare turbine locations or additional capacity to account for environmental or engineering challenges.

[c] For visual effects on cultural resources, as well as effects on aviation (Other Uses), the maximum-case scenario includes 41 of the tallest WTGs.

[d] Elevations relative to mean higher high water are approximately 3 ft lower than those relative to MLLW.

[e] The top of nacelle height dimension includes FAA lights and other appurtenances.

[f] Work would not be concurrently performed. No drilling is anticipated; however, it may be required if a large boulder or refusal is met. If drilling is required, a rotary drilling unit would be mobilized. Similarly, vibratory hammering could be used if deemed appropriate by the installation contractor.

[g] This is the corridor width for siting purposes; each trench would be approximately 3.2 feet wide and there would be an up to 3.3- to 6.6-foot-wide temporary disturbance zone from the tracks or skids of the cable installation.

This page is intentionally blank.

C.1 References

BOEM (Bureau of Ocean Energy Management). 2018. *Draft Guidance Regarding the Use of a Project Design Envelope in a Construction and Operations Plan.* January 12, 2018. Accessed: July 2023. Retrieved from: https://www.boem.gov/sites/default/files/renewable-energy-program/Draft-Design-Envelope-Guidance.pdf

Epsilon (Epsilon Associates, Inc.). 2023. *Draft New England Wind Construction and Operations Plan for Lease Area OCS-A 0534*. New England Wind Project. Retrieved from: https://www.boem.gov/renewable-energy/state-activities/new-england-wind-ocs-0534-construction-and-operations-plan

This page is intentionally blank.