Site Assessment Plan
Empire Wind Offshore Wind Farm Project

Prepared for:

Equinor Wind US, LLC
120 Long Ridge Road #3E01
Stamford, Connecticut 06902

Prepared by:

160 Federal Street, 3rd Floor
Boston, Massachusetts 02110

Submitted June 2018; Amended July 2018, August 2018, and October 2018

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
BMPs	best management practices
BOEM	Bureau of Ocean Energy Management
CD	Coastal Zone Consistency Determination
CFR	Code of Federal Regulations
CMECS	Coastal and Marine Ecological Classification Standard
CM/CT Mooring	a subsurface current meter mooring equipped with three CM-04 Acoustic Current Meters and 3 Seabird SBE37 conductivity and temperature CT loggers
CO	carbon monoxide
COP	Construction and Operations Plan
CVA	Certified Verification Agent
DoD	Department of Defense
EA	See: New York Offshore EA
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act of 1973
FCP	Fisheries Communication Plan
FLiDAR	Floating Light Detection and Ranging
ft	feet
GHG	greenhouse gas
ha	hectare
HAP	hazardous air pollutant
HRG	High Resolution Geophysical
HSE	health, safety, and environmental
Installation Areas	Official Protraction Diagram New York NK18-12, Blocks 6657 and 6760
kg	kilogram
km	kilometer
knot	nautical miles per hour
lb	pound
Lease	Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0512)
LiDAR	light detection and ranging
m	meter
mm	millimeter
Metocean Facilities	Two RPS FLiDAR Buoys, an RPS Wave and Met Buoy, and a CM/CT Mooring.
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act of 1972
MPDC	Mandatory Project Design Criteria
NAAQS	National Ambient Air Quality Standard

NHPA	National Historic Preservation Act of 1966
NMFS	National Oceanic and Atmospheric Administration, National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NTL	Notice to Lessees
O_3	ozone
Offshore New York EA	BOEM's 2016 Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York
OCS	Outer Continental Shelf
PATON	Private Aids to Navigation
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PSO	Protected Species Observer
RPS	RPS Group, Inc.
SAP	Site Assessment Plan
SO_2	sulfur dioxide
SOC	Standard Operating Conditions
U.S.C.	United States Code
USCG	United States Coast Guard
USFF	United States Fleet Forces
VOC	volatile organic compounds
WEA	Wind Energy Area

1. INTRODUCTION

Equinor Wind US LLC has prepared this Site Assessment Plan (SAP) in support of the installation and operation of two floating light detection and ranging buoys (FLiDARs), one metocean buoy, and one subsurface current meter mooring to be located within Official Protraction Diagram New York NK18-12, Blocks 6657 and 6760 (Installation Areas; see Figure 1-1). Equinor Wind US LLC has selected the RPS Group Inc. (RPS) to provide two FLiDAR Buoys, an RPS Wave and Met Buoy, and a subsurface current meter mooring equipped with three CM-04 Acoustic Current Meters and three Seabird SBE37 conductivity and temperature CT loggers (CM/CT Mooring [collectively referred to as the Metocean Facilities]) as the proposed meteorological and metocean data collection technologies, respectively. Although other suppliers and metocean systems are feasible and impacts can be mitigated to within acceptable limits, the selected Metocean Facilities and concept are deemed to have the following mitigating benefits over traditional concepts that include:

- Moored floating systems as opposed to traditional fixed Meteorological Masts, removing the need for percussion pile driving and jack up operations;
- Buoy power systems with 100% renewable charging sources, avoiding backup generators and subsequent emissions and potential for fuel spills;
- Power supply, data storage and mooring integrity that reduces service visit frequency and disturbance to marine life and other users of the marine environment;
- Mooring designs that are fully recoverable, using techniques that reduce the footprint of anchors and remove dynamic heavy chains in contact with the seabed; and
- Subsurface acoustic mooring recovery systems that reduce the risk of entanglement of marine life.

The Installation Areas are contained within the Lease Area[1] as defined under the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0512) (Lease) taking into consideration the required buffer of 1NM from Traffic Separation Schemes (TSS). The Lease was issued to Statoil Wind US on March 10, 2017, with an effective date of April 1, 2017. On May 16, 2018, Statoil Wind US LLC changed its name to Equinor Wind US LLC, and is in the process of updating the name with BOEM in accordance with the agency's requirements. While this name change is still pending with BOEM, the SAP and associated attachments refer to Equinor Wind US LLC, based upon an expectation that the Lease and associated documentation will be updated.

On October 10, 2017, Statoil Wind US LLC requested a 12-month extension of the Preliminary Term of the Lease from the Bureau of Ocean Energy Management (BOEM), which was approved on November 13, 2017, extending the Preliminary Term from April 1, 2018 to April 1, 2019 (see Appendix A).

This SAP has been prepared in accordance with 30 Code of Federal Regulations (CFR) §§ 585.606, 610, and 611 (see Table 1-1), the Guidelines for Information Requirements for a Renewable Energy SAP issued by BOEM on February 24, 2016, and the stipulations of the Lease (see Table 2-2).

[1] The Lease Area is defined by *Addendum A of BOEM Lease No. OCS-A 0512, Section II. Description of the Lease Area*. The total acreage of the Lease Area is approximately 79,350 acres. The Lease Area is depicted in its entirety on Figure 1-1 of this SAP.

Prior to installation of the Metocean Facilities, Equinor Wind US LLC will obtain all required permits and approvals from various jurisdictional agencies as identified in Table 1-2. Equinor Wind US LLC will include copies of the final agency authorizations as part of the SAP (see Appendix A). Copies of agency authorizations will also be provided to BOEM prior to the initiation of SAP activities to begin no earlier than September 1, 2018. All installation, operation, and decommissioning activities will be conducted in compliance with any additional requirements stipulated in the final permits to be issued by other regulatory agencies.

The Metocean Facilities described in this SAP will collect wind resource and metocean data to support development of the Lease Area.

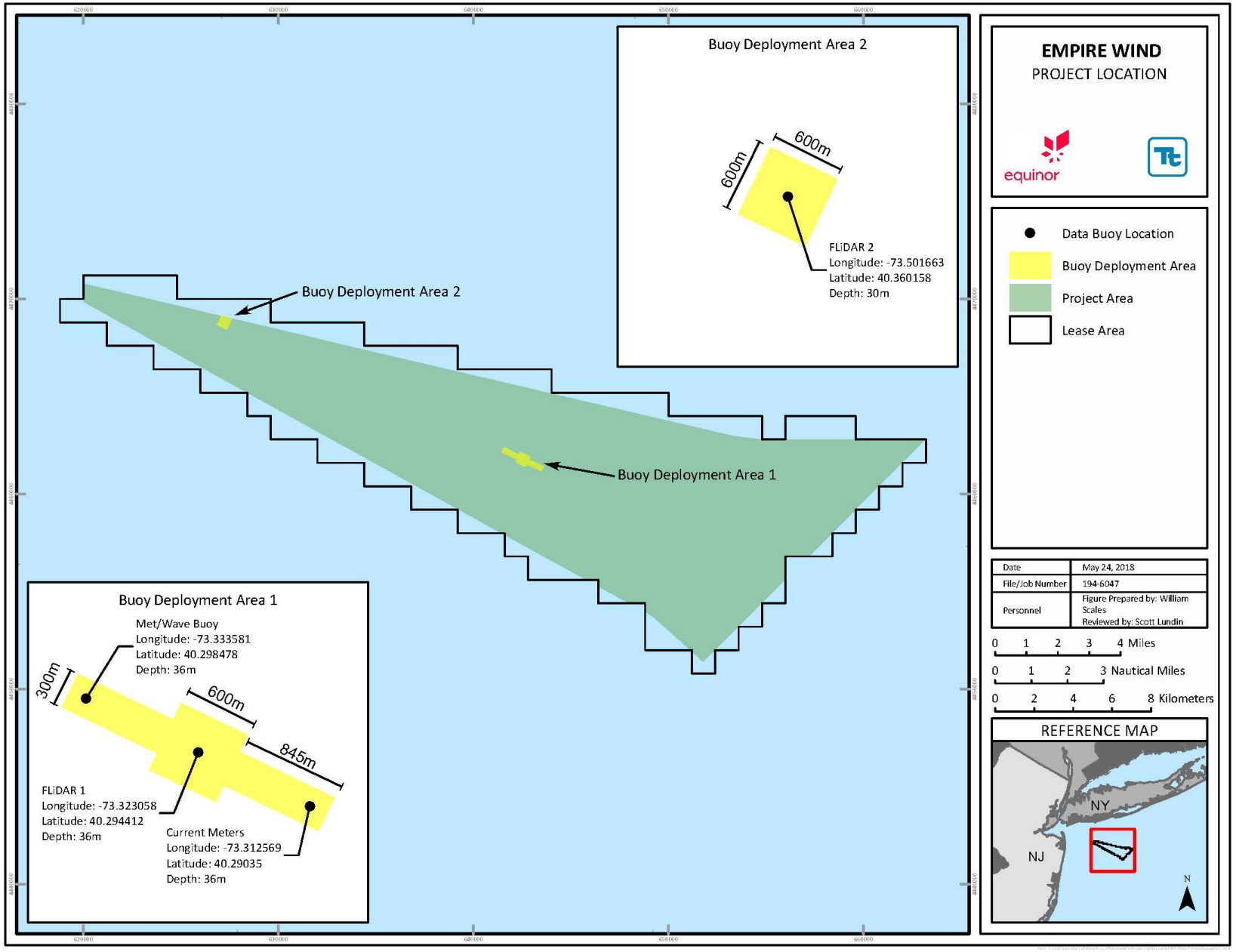


Figure 1-1 Site Assessment Plan Buoy Deployment Areas

1.1 Authorized Representative and Designated Operator

As the lease holder, Equinor Wind US LLC, by default, is also the lease operator. Equinor Wind US LLC proposes to have RPS serve as the contracted operator for the Metocean Facilities. The contact information for RPS's Authorized Representative is as follows:

Name of Authorized Representative	Kevin Redman
Title	Sr. Oceanographer / Regional Manager
Phone Number	+1 206 526 5622 office; +1 206 819 4966 cell
Email	Kevin.Redman@RPSGroup.com
Address	4608 Union Bay Pl. N.E. Seattle, WA 98372

1.2 Certified Verification Agent Waiver Request

Pursuant to 30 CFR § 585.610(a)(9), BOEM may require a Certified Verification Agent (CVA) to certify to BOEM that the Metocean Facilities are designed to withstand the environmental and functional load conditions for the intended life of the Metocean Facilities in the Installation Areas. Equinor Wind US LLC requests a waiver of the CVA requirement per 30 CFR § 585.705(c) because the selected Metocean Facilities are a commercially available technology that have been successfully deployed on many occasions in similar conditions by the selected supplier. Equinor Wind US LLC has had a Measurements Engineer from RPS perform the duties similar to those of a CVA. The Measurements Engineer will also inspect the equipment prior to installation, witness the installation, and prepare an installation report as described in Section 0.

Table 1-1 Site Assessment Plan Requirements for Commercial Leases Pursuant to §585.105(a), 606(a), 610(a) and (b), and 611(a) and (b)

Requirement	Compliance Statement
§ 585.105(a)	
1) The design of the environmental monitoring buoy and conduct of planned activities ensures safety and will not cause undue harm or damage to natural resources and will take measures to prevent unauthorized discharge of pollutants into the offshore environment.	Equinor Wind US LLC will comply with this requirement, as evidenced in this SAP.
§ 585.606(a)	
1) The Project will conform to all applicable laws, regulations, and lease provisions.	Equinor Wind US LLC will comply with this requirement. See Table 1-2, Table 1-3, Table 2-1, Table 2-2, and Appendix A.
2) The Project will be safe.	Equinor Wind US LLC will comply with this requirement. Specifically, see Section 4.8.
3) The Project will not unreasonably interfere with other uses of the Outer Continental Shelf (OCS), including national security or defense.	Equinor Wind US LLC will comply with this requirement. See Table 2-2 for specific activities to ensure compliance.
4) The Project will not cause undue harm or damage to natural resources; life; property; the marine, coastal, or human environment; or historical or archeological resources.	See Section 0 for an analysis of site characteristics and for avoidance and mitigation measures.
5) The Project will use best available and safest technology.	Equinor Wind US LLC will comply with this requirement. See Section 3.1 and Appendix B for a description and technical specifications on the selected Metocean Facilities.
6) The Project will use best management practices.	Equinor Wind US LLC will comply with this requirement. Best management practices are described in Table 1-3, Sections 0, 0, 0, and 0.
7) The Project will use properly trained personnel.	Equinor Wind US LLC will ensure that all personnel meet the company's standard technical as well as health, safety, and environmental (HSE) standards for the work being conducted.

Table 1-1 Site Assessment Plan Requirements for Commercial Leases Pursuant to §585.105(a), 606(a), 610(a) and (b), and 611(a) and (b)

Requirement	Compliance Statement
§ 585.610(a)	
1) Contact Information	Martin Goff Environmental & Permitting Manager +1 202 813 7444 MGOF@equinor.com 120 Long Ridge Road, Suite 3EO1, Stamford, CT 06902
2) Site assessment concept	Meteorological, metocean, and biological data collection using two RPS FLiDAR Buoys, one RPS Wave and Met Buoy, and one RPS Current Meter Mooring consisting of 3 CM-04 Acoustic Current Meters and 3 Seabird SBE37 conductivity and temperature CT loggers.
3) Designation of operator	Not applicable. See Section 1.1
4) Commercial lease stipulations and compliance	See Table 2-2.
5) A location plat	See Figure 1-1.
6) General structural and project design, fabrication and installation information	See Sections 0, 0, and 0.
7) Deployment activities	See Section 0.
8) Measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	This SAP has been prepared in accordance with the Commercial Wind Lease Issuance and Revised Environmental Assessment for Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York, and Stipulations in the Commercial Lease. Specific efforts to avoid, minimize, reduce, eliminate, or monitor environmental impacts can be found in Sections 0 and 0. Conformance with the Offshore New York EA is detailed in Section 2.
9) Certified Verification Agent nomination	Not applicable. See Section 1.2.
10) Reference information	See Section 0.
11) Decommissioning and site clearance procedures	See Section 0.
12) Air quality information	See Section 7.8 and Appendix H.
13) A listing of all federal, state, and local authorizations or approvals required to conduct site assessment activities on your lease	See Table 1-2.
14) 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	See Appendix A.
15) Financial assurance information	Activities and facilities proposed herein will be covered by an appropriate bond or other approved security.
§585.610(b)	
Geotechnical	
(i) A description of all relevant seabed and engineering data and information to allow for the design of the foundation for that facility	Section 7.1, Appendix C
Shallow Hazards	
(i) Shallow faults;	Section 7.1
(ii) Gas seeps or shallow gas;	Section 7.1
(iii) Slump blocks or slump sediments;	Section 7.1
(iv) Hydrates; or	Section 7.1
(v) Ice scour of seabed sediments.	Section 7.1
Archaeological Resources	
(i) A description of the results and data from the archaeological survey;	Section 7.1, Appendix D

Table 1-1 Site Assessment Plan Requirements for Commercial Leases Pursuant to §585.105(a), 606(a), 610(a) and (b), and 611(a) and (b)

Requirement	Compliance Statement
(ii) A description of the historic and prehistoric archaeological resources, as required by the National Historic Preservation Act of 1966 (NHPA), as amended.	Section 7.1, Appendix D
Geological Survey	
(i) Seismic activity at your proposed site;	Section 7.1
(ii) Fault zones;	Section 7.1
(iii) The possibility and effects of seabed subsidence; and	Section 7.1
(iv) The extent and geometry of faulting attenuation effects of geologic conditions near your site.	Section 7.1
Biological	
(i) Live bottoms	Sections 7.1 and 7.4
(ii) Hard bottoms	Sections 7.1 and 7.4
(iii) Topographic features; and	Sections 7.1 and 7.4
(iv) Surveys of other marine resources such as fish populations (including migratory populations), marine mammals, sea turtles, and sea birds.	Sections 7.1 and 7.4
§ 585.611(a) and (b) Requirements	
Hazard information	Section 7.1
Water quality	Section 7.7
Biological resources	
(i) Benthic communities	Section 7.3
(ii) Marine mammals	Section 7.5
(iii) Sea turtles	Section 7.5
(iv) Coastal and marine birds	Section 7.6
(v) Fish and shellfish	Sections 7.3 and 7.4
(vi) plankton and seagrasses, and	Sections 7.3
(vii) plant life	Sections 7.3
Threatened or endangered species	Sections 7.5 and 7.6
Sensitive biological resources or habitats	Sections 7.3
Archaeological resources	Section 7.1, Appendix D
Socioeconomic resources	Section 7.9
Coastal and marine uses	Section 7.10
Consistency Certification	Table 1-2
Other Resources, conditions, and activities	Not Applicable.

Table 1-2 Permit Matrix

Permitting Agency	Applicable Permit or Approval	Statutory Basis	Regulations	Applicant Requirements
National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS)	Endangered Species Act (ESA) Section 7 Consultation	16 United States Code (U.S.C.) 1536	50 CFR 402	These consultations were completed prior to the issuance of the Lease. However, pursuant to its obligations under Section 7 of the ESA, BOEM is required to consult with NMFS prior to approval of any site assessment activities that may affect ESA-listed species that occur within the Lease Area.
	Magnuson-Stevens Fishery Conservation and Management Act Section 305(b) Consultation	16 U.S.C. 1801	50 CFR 600	No action required. BOEM will consult with NMFS to complete the essential fish habitat assessment and determination based on details provided herein.
	Incidental Take Authorization	Marine Mammal Protection Act of 1972 (MMPA)	16 U.S.C. §§ 1361 *et seq.*	No action required. As detailed in Sections 0, 0, and 0, installation, operation, and decommissioning of the Metocean Facilities will not result in the harassment of marine mammals protected under the MMPA. In addition, as demonstrated in Section 2.2, Equinor Wind US LLC will comply with Lease stipulations. The Lease stipulations are based on the Standard Operating Conditions (SOCs) included in Appendix B of the Offshore New York EA which are consistent with Incidental Take Statement of the NMFS Biological Opinion issued in March 10, 2013 (Revised April 10, 2013). Additionally, Equinor Wind US LLC received an Incidental Harassment Authorization to support its geophysical and preliminary geotechnical survey campaign on April 24, 2018.
U.S. Army Corps of Engineers, New York District	Nationwide Permit 5 – Scientific Measurement Devices	Clean Water Act 33 U.S.C. 134	33 CFR 320 *et seq*.	Equinor Wind US LLC confirmed with the United States Army Corps of Engineers on March 15, 2018 that the installation, operation, and decommissioning of the Metocean Facilities are authorized and in conformance with the terms of Nationwide Permit # 5.
United States Coast Guard (USCG)	Approval for Private Aids to Navigation	14 U.S.C. 81	33 CFR Part 66	Equinor Wind US LLC will submit an application to the USCG for a Private Aids to Navigation (PATON) prior to the installation of the Metocean Facilities. Equinor Wind US LLC will submit a copy of the approved PATON to BOEM prior to buoy deployment.
U.S. Department of Interior, BOEM	NHPA Section 106 Consultation	NHPA 16 U.S.C. 470	36 CFR Part 60, Part 800	No action required. BOEM has executed a Programmatic Agreement that establishes procedures for consultations for site assessment activities in the New York Wind Energy Area (WEA) and under NHPA Stipulations for the identification and protection of cultural resources are included in the Lease.
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 Consultation	16 U.S.C. 1536	50 CFR 402	No action required. These consultations were completed prior to the issuance of the Lease.
New York Department of State, Division of Coastal Resources	Coastal Management Program Consistency Certification	Coastal Zone Management Act	15 CFR 930 Subpart C	No action required. A final Coastal Zone Consistency Determination (CD) was issued by BOEM for SAP activities in the New York WEA in June 2016. In August 2016, New Jersey provided conditional concurrence and New York provided concurrence with BOEM's CD. See Appendix A for a copy of the concurrence letters from the New York State Department of State and New Jersey Department of Environmental Protection.

1.3 Best Management Practices

Best management practices (BMPs) are described in Sections 1.3, 0, and 0. Equinor Wind US LLC will use its standard internal project execution structure to manage activities described in the SAP. As stated in Section 4.8, SAP activities will be supported by a detailed HSE Plan, which is included as Appendix F.

In addition, Equinor Wind US LLC will use many of the BMPs identified in the *Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan* (BOEM 2016a) and *Establishment of an OCS Alternative Energy and Alternate Use Program*, Record of Decision, December 2007 (BOEM 2007). See Table 1-3 for a summary of these BMPs (numbering in Table 1-3 corresponds to the format of the noted SAP Guidelines).

Table 1-3 Best Management Practices

Best Management Practices	Location in SAP Document
1. Minimize the area disturbed by installation	Section 3.3
2. Contact and consult with the appropriate affected Federal, state, and local agencies early in the planning process	Table 2-2 and Section 4.1
5. Conduct seafloor surveys to ensure that the project is sighted to avoid or minimize impacts associated with seafloor instability and other hazards	Section 3.3
7. Avoid known sensitive seafloor habitats	Section 7.3
8. Avoid anchoring on sensitive seafloor habitats	Section 7.3
10. Routine inspection of the buoys to monitor scouring and ensure structural integrity	Section 5.2
11. Avoid the use of explosives that may impact fish or benthic organisms	No explosives will be used for activities proposed in the SAP.
14, 15, 16, 17, and 21 related to minimizing/avoiding vessel impacts to marine mammals and sea turtles.	Section 4.4
18. Use existing data to identify important, sensitive, and unique marine habitats in the vicinity of the project and design the deployment to avoid adverse impacts to these habitats	Section 0
19. Minimize construction activities in areas containing anadromous fish during migration periods	Section 7.4
20. Minimize seafloor disturbance during installation of the buoys	Section 4.1
25. Minimize perching opportunities	Section 7.6
27. Comply with USCG lighting and marking requirements while using lighting technology that minimizes impacts to avian species	Table 1-2 and Section 7.6
31 and 32. Minimize potential conflicts with commercial and recreational fishing interests by working with commercial/recreational fishing entities and reviewing planned activities with potentially affected parties	Section 7.4
33. Use practices and operating procedures that reduce the likelihood of vessel accidents and fuel spills	Section 0
34. Avoid impacts to the commercial fishing industry by marking the buoy(s) with USCG-approved marking and lighting to ensure safe vessel operation	Table 1-2 and Section 7.9
36. Avoid hard-bottom habitats, including seagrass communities and kelp beds	Section 7.3
50. Prepare an oil spill response plan	The Metocean Facilities will not require a backup generator or any other fuel dependent equipment. As such, no Oil Spill Response Plan or Oil Spill Response Measures will be required.

2. CONFORMITY WITH PRIOR BOEM ACTIONS REGARDING SAP ACTIVITIES

2.1 Offshore New York Environmental Assessment

On October 21, 2016, BOEM issued a Finding of No Significant Impact based on a comprehensive Environmental Assessment (referred to herein as the "Offshore New York EA") (BOEM 2016b). The Offshore New York EA analyzed the foreseeable consequences associated with issuing commercial leases within the New York WEA, which is inclusive of the Lease Area (Figure 1-1), as well as the site assessment activities including the installation of Metocean Facilities. The Metocean Facilities and proposed activities described herein are consistent with Section 3.2.2.2 of the Offshore New York EA, with the selected concept demonstrating lower impacts than some worst case, but acceptable concepts within the EA. Table 2-1 below provides a comparison of the information assessed in the Offshore New York EA and the relevant detail being proposed by Equinor Wind US LLC herein.

Table 2-1 Comparison of Offshore New York EA and SAP Elements

Project Component	Assessed in EA	Proposed in SAP	Summary
# of Buoys	Max 2 buoys per lease area and an additional small tethered buoy	2 RPS FLiDAR buoys, 1 RPS Wave and Met Buoy, 1 RPS Current Meter Mooring consisting of 3 CM-04 Acoustic Current Meters, and 3 Seabird SBE37 conductivity and temperature CT loggers.	The number of buoys proposed in this SAP are consistent with what was assessed in the EA.
Meteorological Buoy Specifications	Specific to hull type, discus-shaped (33 to 40 ft [10 to 12 m] in diameter), boat-shaped (20 ft (6 m), and spar buoys	RPS FLiDAR Buoy: 15.2 feet (ft, 4.6 meters [m]) diameter, weighing 9480 pounds (4.3 metric tons)	The Metocean Facilities proposed in this SAP are smaller and weigh less that what was assessed in the EA. The direct consequence is a reduction in the anchor requirement and subsequent footprint, and heavy mooring chain in dynamic contact with the seabed.
Meteorological Buoy Hull Type	NOMAD, COLOS	RPS FLiDAR: toroidal shape dodecagon steel hull with aluminum superstructure	Equinor Wind US LLC is proposing to use a hull type that is consistent with what was assessed in the EA.
Meteorological Buoy Height above ocean surface	30-40 ft (9-12 m)	RPS FLiDAR: 10.8 ft (3.3 m)	The Metocean Facilities proposed in this SAP are less than half the height that what was assessed in the EA
Meteorological Buoy Mooring Design	Specific to buoy type, all chain or a combination of chain, nylon, and buoyant polypropylene materials with 6,000- to 8,000-pound (2,721.5 to 3,628.7 kg) anchors, 6 ft^2 footprint, 370,260 ft^2 anchor sweep.	U-shaped mooring, with a combination of chain, polypropylene materials, wire rope, trawl floats, viny floats, amsteel rope dispensers and rubber cords with 2,645.5 lb and 661.4 lb (1,200 kg and 300 kg) steel chain clump weights or steel constructed wagon wheel weights no larger than 6 ft^2 resting on seafloor. Total area of mooring on seafloor, inclusive of both clump weights, chains, and wire ropes, is 67.8 ft^2 (6.3 m^2).	The weight and area of anchor resting on the sea floor is generally consistent with what was assessed in the EA. However, due to the mooring design, there is not expected to be an anchor sweep associated with the mooring proposed by Equinor Wind US LLC. Polypropylene rope will only be used where essential for mooring integrity and safe deployment/recovery operations and will be under tension, removing the risk of entanglement with marine life.
Small Tethered Buoy size	10 ft (3 m) in diameter or less	8.5 ft (2.6 m)	The proposed wave and met buoy is consistent with what was assessed in the EA.

Table 2-1 Comparison of Offshore New York EA and SAP Elements

Project Component	Assessed in EA	Proposed in SAP	Summary
Data Transmission	Transmit operational status and data to receiver on shore	Transmit operational status and data to shore via satellite or cellular telemetry	The data transmission protocols proposed by Equinor Wind US LLC are consistent with what was assessed in the EA.
Maintenance	Monthly or quarterly	Every 6 months	The maintenance schedule proposed in this SAP is less frequent than what was proposed in the EA, which is expected to result in lower impacts through reduced disturbance to marine life and other maritime users.
Installation and decommissioning process	Carried or towed by vessel, lower or place buoy over final location, drop mooring anchor, decommissioning is reverse of installation	Towed by vessel, deploy mooring system, lower anchor over final location, decommissioning is reverse of installation	The installation and decommissioning processes proposed by Equinor Wind US LLC are consistent with what was assessed in the EA.
Installation and decommissioning timeframe	Installation 1 day per buoy, Decommissioning 1 day per buoy	Installation up to seven days for all Metocean Facilities over three separate vessel trips including transit, decommissioning up to seven days for all Metocean Facilities, including transit. Subject to weather.	The installation and decommissioning timeframes proposed by Equinor Wind US LLC are consistent with what was assessed in the EA.
Power supply	Solar, Wind, Backup Diesel Generator	RPS FLiDAR: Solar and Wind RPS Wave and Met Buoy: Solar	The power supply proposed by Equinor Wind US LLC are consistent with what was assessed in the EA. However, unlike similar buoys that have been proposed and deployed on the Atlantic OCS, the RPS FLiDAR and Met/Wave Buoys do not have a backup diesel generator, and, as such, minimizes potential environmental impacts associated with fuel spills and emissions.

2.2 Lease OCS-A 0512

The Bureau of Ocean Energy Management (BOEM) identified mitigation measures or Standard Operating Conditions (SOC) in the Offshore New York EA for buoy installation, operation, and decommissioning. The SOCs were developed by BOEM in consultation with other federal and state agencies to reduce or eliminate the potential environmental risks to, or conflicts with, individual environmental and socioeconomic resources upon issuance of a commercial lease for site assessment and characterization activities. BOEM has issued the mitigation measures for Equinor Wind US LLC's lease-specific site characterization activities and site assessment activities in the Lease based upon these SOCs. Equinor Wind US LLC will implement these Lease specific measures as described in more detail in Table 2-2 and Section 0 of this SAP.

Table 2-2 Conformance with the Commercial Renewable Energy Lease Number OCS-A 0512 Stipulations

Addendum "C" Stipulation	Description	SAP Document
3 National Security and Military Operations		
3.2.4 Lessee Point-of-Contact for Evacuation/Suspension Notifications	The Lessee must inform the Lessor of the persons/offices to be notified to implement the terms of 3.2.2 and 3.2.3.	Martin Goff Environmental & Permitting Manager +1 (202) 813-7444 mgof@equinor.com 120 Long Ridge Road, Suite 3EO1 Stamford, CT 06902
3.2.5 Coordination with Command Headquarters	The Lessee must establish and maintain early contact and coordination with the appropriate command headquarters, in order to avoid or minimize the potential to conflict with and minimize the potential effects of conflicts with military operations.	Equinor Wind US LLC will establish contact with the United States Fleet Forces (USFF) N46 at 1562 Mitscher Avenue, Suite 250, in Norfolk, Virginia ([757]836-6206), as provided in the Commercial Lease.
3.3 Electromagnetic Emissions	Prior to entry into any designated defense operating area, warning area, or water test area for the purpose of commencing survey activities undertaken to support plan submittal, the Lessee must enter into an agreement with the commander of the appropriate command to coordinate the electromagnetic emissions associated with such survey activities. The Lessee must ensure that all electromagnetic emissions associated with such survey activities are controlled as directed by the commander of the appropriate command headquarters.	Equinor Wind US LLC will provide the frequencies the Metocean Facilities will use to transmit data to confirm electromagnetic emissions from the SAP activities will not conflict with military operations.
4 Standard Operating Conditions		
4.1.1 Briefing	Prior to the start of operations, the Lessee must hold a briefing to establish responsibilities of each involved party, define the chains of command, discuss communication procedures, provide an overview of monitoring procedures, and review operational procedures. This briefing must include all relevant personnel, crew members, and Protected Species Observers (PSOs). New personnel must be briefed as they join the work in progress.	See Section 4.3, Pre-Installation Briefing.
4.1.2	The Lessee must ensure that all vessel operators and crew members, including PSO's, are familiar with, and understand, the requirements specified in Addendum C.	See Section 4.3, Pre-Installation Briefing.
4.1.3	The Lessee must ensure that a copy of the standard operating conditions (Addendum C) is made available on every project-related vessel.	See Section 4.3, Pre-Installation Briefing.
4.1.4 Marine Trash and Debris Prevention	The Lessee must ensure that vessel operators, employees and contractors actively engaged in activities in support of plan (i.e., SAP and/or Construction and Operations Plan [COP]) submittal are briefed on marine trash and debris awareness and elimination, as described in the Bureau of Safety and Environmental Enforcement Notice to Lessees (NTL) No. 2015-G03 ("Marine Trash and Debris Awareness and Elimination") or any NTL that supersedes this NTL, except that the Lessor will not require the Lessee, vessel operators, employees and contractors to undergo formal training or post placards. The Lessee must ensure that vessel operator employees, and contractors are made aware of the environmental and socioeconomic impacts associated with marine trash and debris and their responsibilities for ensuring that trash and debris are not intentionally or accidentally discharged into the marine environment. The above-referenced NTL provides information the Lessee may use for this awareness briefing.	Equinor Wind US LLC will comply with this stipulation, except that formal training will not be conducted and placards will not be posted. Vessel Operators, employees, and contractors will be briefed prior to boarding the vessel.

Table 2-2 Conformance with the Commercial Renewable Energy Lease Number OCS-A 0512 Stipulations

Addendum "C" Stipulation	Description	SAP Document
4.1.5 Fisheries Communications Plan (FCP) and Fisheries Liaison	The Lessee must develop a publicly available FCP that describes the strategies that the Lessee intends to use for communicating with fisheries stakeholders prior to and during activities in support of the submission of a plan. The FCP must include the contact information for an individual retained by the Lessee as its primary point of contact with fisheries stakeholders (i.e. Fisheries Liaison). If the Lessee develops a project website, the FCP must be posted on the Lessee's project website. If the Lessee does not develop a project website, the FCP must be made available to the Lessor and the public upon request.	Equinor Wind US LLC will comply with this stipulation. A draft FCP has been posted to the project website, and a Fisheries Liaison has been selected.
4.2.1 Vessel Strike Avoidance Measures	The Lessee must ensure that all vessels conducting activities in support of the plan submittal, including those transiting to and from local ports and the lease area, comply with the vessel-strike avoidance measures specified in stipulations 4.2., except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk.	See Section 4.4, Protected Species Avoidance
4.3.6 No Impact without Approval	The Lessee must not knowingly impact a potential archaeological resource without the Lessor's prior approval.	See Section Archaeological Resources Archaeological Resources and Appendix D. Marine Archaeological Resource Assessment Report
4.3.7 Post-Review Discovery Clauses	If the Lessee, while conducting site characterization activities in support of a plan submittal, discovers a potential archaeological resource, such as the presence of a shipwreck (e.g., a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of historic objects, piles of ballast rock) or pre-contact archaeological site (e.g., stone tools, pottery) within the project area, the Lessee must:	Appendix D. Marine Archaeological Resource Assessment Report
4.3.7.1	Immediately halt seafloor/bottom-disturbing activities within the area of discovery;	Appendix D. Marine Archaeological Resource Assessment Report
4.3.7.2	Notify the Lessor within 24 hours of discovery;	Appendix D. Marine Archaeological Resource Assessment Report
4.3.7.3	Notify the Lessor in writing via report to the Lessor within 72 hours of its discovery;	Appendix D. Marine Archaeological Resource Assessment Report
4.3.7.4	Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the Lessor conducts an evaluation and instructs the applicant on how to proceed; and,	Appendix D. Marine Archaeological Resource Assessment Report
4.3.7.5	Conduct any additional investigations as directed by the Lessor to determine if the resource is eligible for listing in the National Register of Historic Places (30 CFR 585.802(b)). The Lessor will direct the Lessee to conduct such investigations if: (1) the site has been impacted by the Lessee's project activities; or (2) impacts to the site or to the area of potential effect cannot be avoided. If investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will tell the Lessee how to protect the resource or how to mitigate adverse effects to the site. If the Lessor incurs costs in protecting the resource, under Section 110(g) of the National Historic Preservation Act, the Lessor may charge the Lessee reasonable costs for carrying out preservation responsibilities under the OCS Lands Act (30 CFR 585.802(c-d)).	Appendix D. Marine Archaeological Resource Assessment Report

Table 2-2 Conformance with the Commercial Renewable Energy Lease Number OCS-A 0512 Stipulations

Addendum "C" Stipulation	Description	SAP Document
4.5.2. Reporting Injured or Dead Protected Species	The Lessee must ensure that sightings of any injured or dead protected species (e.g., marine mammals, sea turtles, or sturgeon) are reported to the NMFS and the NMFS Greater Atlantic (Northeast) Region's Stranding Hotline (866-755-6622 or current) within 24 hours of sighting, regardless of whether the injury or death is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee must notify the Lessor of the strike within 24 hours. The Lessee must use the form provided in Appendix A to Addendum C to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure that the vessel assist in any salvage effort as requested by NMFS.	See Section 4.4

3. PROJECT DESCRIPTION AND OBJECTIVES

3.1 Project Description and Objectives

Equinor Wind US LLC will collect and analyze meteorological data, inclusive of wind speed and direction at multiple heights, and information on other meteorological and metocean conditions as part of the site assessment activities of the Project within the Lease Area. As stated previously, Equinor Wind US LLC has proposed that the collection of this data will be performed using two RPS FLiDAR Buoys, one RPS Met and Wave Buoy, and one subsea Current Meter mooring. The proposed Metocean Facilities represent state-of-the-art equipment that incorporates the best available technologies, mooring components and mooring designs to ensure reliable, quality data collection, robust mooring integrity, safety and minimal environmental impacts. Design drawings of the technology proposed are provided in Appendix B.

The RPS FLiDAR Buoy will consist of instrumentation and supporting systems atop a floating moored buoy platform (Figure 3-1). Each floating platform consists of the toroidal shaped, dodecagon hull, mooring chain, clump weight anchors, floats and a pendant marker buoy. The hull consists of hot rolled HA1-grade steel with 10-millimeter (mm), 350-grade steel dividing plates. The hull is powder coated and has 12 zinc anodes installed to protect each hull segment from corrosion. The 5005-grade H34 aluminum superstructure is powder coated and measures 15.2 feet (ft) (4.63 meters [m]) in diameter. The vertical profile of RPS FLiDAR including instrumentation, will be approximately 15.8 ft (4.8 m) from the sea surface to the top of the D400 wind generators. The weight of the entire buoy including all electronics and keel is 9,480 pounds (lbs) (4,300kilograms [kg]) (4.3 metric tons).The submerged portion of the hull would measure approximately 13.8 ft (4.2 m) below the sea surface from the water line to the bottom of the buoy. The superstructure has also been designed with consideration for avian species. Landing areas have been minimized and anti-perching devices will be installed on the lights and mast. In addition, consideration has been given to potential icing issues and horizontal surfaces have been minimized to limit the potential ice/snow build up.

Figure 3-1 RPS FLiDAR Buoy

The RPS Wave and Met Buoy is a 8.5 ft (2.6 m) round buoy that measures directional waves, metoerological conditions at sensor height and sea water temperature (Figure 3-2). Similar to the RPS FLiDAR, the buoy hull and superstructure are constructed from hot rolled HA1-grade steel and 5005-grade H34 aluminum, respectively. The Wave and Met Buoy is attached to the seabed using a U-shape mooring design. The vertical profile of the Wave and Met Buoy will be approximately 7.9 ft (2.4 m) from the sea surface to the top of the buoy. The submerged portion of the buoy hull would measure approximately 7.9 ft (2.4 m) below the sea surface from the waterline to the bottom of the buoy. The Wave and Met Buoy weighs 4,409 lbs (2,000 kg).

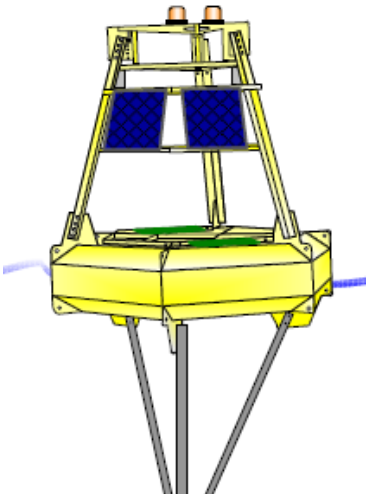


Figure 3-2 RPS Wave and Met Buoy

The CT/CM Mooring will be a subsurface inline mooring consisting of CM-04 Acoustic Current Meters and Seabird SBE37 CT loggers. The CM-04 Acoustic Current Meter, which measures approximately 45 inches (1155 millimeters [mm]) long by 8 inches (195 mm) wide, is a self-contained instrument that can be moored to record ocean currents and water temperature. CM-04 Acoustic Current Meter is constructed from Type 2 Titanium. The CM-04 Acoustic Current Meter will be incorporated into the subsea mooring at 9.8 ft (3 m), 55.8 ft (17 m), and 88.6 ft (27 m) above the seabed. The Seabird SBE37 CT logger, which measures 22.2 inches (563.9 mm) long by 4 in (102.9 mm) wide, is a high-accuracy conductivity and temperature recorder with internal battery and memory. The Seabird SBE37 CT logger is constructed from titanium and other non-corroding materials and has been designed for moorings and other long duration, fixed-site deployments.). The Seabird SBE37 CT loggers will be attached to the subsurface portion of the mooring line via plastic clamps and cables at 4.9 ft (1.5 m), 62.3 ft (19 m), and 95 ft (29 m) above the seafloor.

Figure 3-3 CM-04 Acoustic Current Meter (Left) and Seabird SBE37 CT Logger (Right)

Equinor Wind US LLC plans to deploy the Metocean Facilities no earlier than September 1, 2018, but as soon as all permits are in place thereafter. Equinor Wind US LLC requires a period of wind profile measurements data from the FLiDARs as early as possible to help inform development concepts for bids into upcoming competitive state power offtake solicitations. The two RPS FLiDAR Buoys are scheduled to be decommissioned at the end of their two-year operational life, and the Met and Wave Buoy and the CM/CT mooring will be decommissioned at the end of four years. The Metocean Facilities will be decommissioned at the end of the operational life as described in Section 0.

3.2 Site Location

The location of the proposed Metocean Facilities will fall within two sites that were surveyed and evaluated by Equinor Wind US LLC in spring 2018 (see Section 0 and Appendices C, D, and E). These sites are collectively referred to as the Installation Areas (Figure 1-1). For the purpose of the discussion in this SAP, the two Installation Areas where the Metocean Facilities are proposed to be located have been given unique identifiers. The RPS FLiDAR 1 Buoy, the RPS Wave and Met Buoy, and CM/CT Mooring to be located in the center of the Lease Area are referenced as FLiDAR 1, Wave and Met Buoy, and Current Meters, respectively, and will be deployed within Buoy Deployment Area 1. The RPS FLiDAR 2 Buoy to be installed in the western side of the Lease Area is referenced as FLiDAR 2 and will be deployed within Buoy Deployment Area 2. The coordinates for these locations are provided in Table 3-1 and depicted on Figure 1-1.

The Metocean Facilities will be deployed within the proposed Installation Areas at the coordinates listed in Table 3-1.

Table 3-1 Location of the Metocean Facilities

Platform	Northing (UTM 18N 2011 NAD83)	Easting (UTM 18N 2011 NAD83)	NAVD88 Water Depth	OCS Lease Block	Aliquot
FLiDAR 1	4461784	642530	36 Meters	6760	G
Wave and Met Buoy	4461350	643430	36 Meters	6760	F
Current Meters	4462217	641627	36 Meters	6760	L
FLiDAR 2	4468810	627225	30 Meters	6657	O

3.3 Mooring Designs, Power Supply, and Instrumentation

The location for the Installation Areas of the proposed Metocean Facilities as presented in Table 3-1 was based on a review of existing data, information collected during 2018 high resolution geophysical (HRG) surveys conducted within the Lease Area (See Appendix C), the most likely development scenarios for the lease area and the best available technologies. The following sections provide detailed descriptions of the proposed Metocean Facilities as well as their associated mooring designs, power supply, and instrumentation.

RPS carried out rigorous mooring design and modeling for the FLiDAR, Met and Wave Buoy and the Current Meter CM/CT using their decades of first-hand experience designing and deploying metocean moorings and utilizing the latest mooring technology and modelling software, ORCAFLEX. The FLiDAR, Met and Wave Buoy and the Current Meter CM/CT Mooring designs and testing processes were independent of each other due to differences in surface buoy characteristics and data measurement requirements. Mooring designs went through multiple design iterations and model runs until modelling results returned acceptable and safe values when run at extreme local metocean condition thresholds. Values used in models were 60 knots (30.1meters per second [m/s]) wind speed, 2 knots (1.0m/s) currents, and 27.9 ft (8.5 m) Hs at 13.1 seconds Tp. The

FLiDAR, Met and Wave Buoy, and Current Meter CM/CT moorings were designed with the following objectives:

- the surface FLiDAR buoy and Met and Wave Buoy remain secure on the sea surface without risk of detachment, submersions, significant overtopping from waves and within satisfactory limits of tilt for sensors;
- the mooring components are rated to a good level of safety factor when under tension to minimize risk of mooring failure during operational life and lifting operations;
- the mooring components can survive benign conditions without the risk of tangling or rubbing and causing self-wear;
- mooring components are of a material and length with 'stopping off points' that allow for safe deployment and recovery on a range of vessels; and
- where feasible, mooring designs use components and materials that minimize risk to marine life and other marine users.

The mooring designs have been selected to be consistent with other similar moorings deployed in the lease area including 25 BOEM funded Atlantic Sturgeon acoustic detection moorings made up of a combination of anchor weights, chain and rope with floats. The recovery section of the moorings are deemed to avoid the risk of entanglement for the following reasons:

- Unlike static fishing gear with rope recovery lines that extend to surface marker buoys that can go slack and have the ability to loop, the 32.8 ft (10m) of polypropylene rope on the FLiDAR and Met and Wave Buoy recovery section is under constant tension, provided by the 198 lbs (90kg) of positive buoyancy. This removes the risk of looping sections of rope and available slack.
- The upper 9.8 ft (3m) of polypropylene rope on the recovery sections are fed through the three viny floats, exposing approximately 5 ft (1.5m) of rope, which is not considered to be long enough to cause an entanglement risk. This section of rope is also under constant tension from the 198 lbs (90kg) of positive buoyancy produced by the viny floats.
- Unlike long, loose sections of rope on fishing gear, the combination of three subsurface viny floats, a rope dispenser and an acoustic release would provide an adequate target to produce a return signal from marine mammals using echo location, therefore it is expected that there is an ability to detect and avoid this section of mooring.

The final FLiDAR and Met and Wave Buoy mooring designs utilize a combination of rubber cords and chain from the buoy to the primary anchor weight to allow the buoy to ride the waves, with the rubber cords acting to absorb the tension and reduce a tugging/snatching action on the buoy and mooring. The lower section of rubber cord is held clear of the seabed by a float with 110 lb (50kg) buoyancy to remove the risk of the non-buoyant rubber cord wearing on the seabed or anchor. Modelling results demonstrated that the FLiDAR buoy and mooring system responds better to wave motion when the mooring line is secured to the side of the buoy hull as opposed to the underside of the buoy hull. The Met and Wave buoy mooring system is attached to the bottom of the buoy. The upper section of rubber cord is attached to the buoys via a section of heavy chain to ensure the upper section of rubber cord cannot rub and wear against the side of the FLiDAR or the underside of the Met and Wave Buoy hull. Extensive modelling demonstrated that the most effective means of ensuring

mooring integrity through strength and an ability to respond to wave and current action was a section of mooring line between the upper and lower rubber cord sections, also acting as a means to separate the two sections of rubber cord and to give sufficient mooring line length. The use of chain or wire rope was not deemed to be feasible in this section as it introduces non-buoyant material that would act to pull the two rubber cord sections towards each other. These materials also introduce the risk of wear to and therefore failure of the rubber cords should they come into regular contact.

A section of wire rope ground line extends from the primary anchor weight with a length and material strength to allow for safe recovery of the primary anchor weight to the vessel during mooring recovery operations. The ground line is attached to a smaller secondary anchor weight, which serves both to secure the ground line to the seabed and to anchor the mooring recovery system.

For the mooring recovery system, a rope dispenser concept on an acoustic release positioned inline above the secondary anchor weight on a combination of polypropylene rope, chain and floatation has been selected. When the acoustic release is activated, the amsteel rope dispensers release high strength Spectra rope that floats to the surface on the three viny floats. The U-mooring design facilitates recovery of the Wave and Met Buoy in higher sea state conditions by allowing the mooring to be recovered and the Wave and Met Buoy to be towed without the need for lifting the buoy at sea.

The available rope dispensers house 131 ft (40m) of recovery line. To ensure there is adequate slack on the recovery line when activated during recovery operations, the rope dispenser needs to be raised off the seabed. This slack is required to ensure personnel on the recovery vessel have sufficient rope to secure on to with a recovery boat hook or grappling line and to have enough rope section to get onboard the vessel to secure it to a winch to then haul in the mooring. In addition to the slack required, the 32.8 ft (10m) section of mooring line from the secondary anchor weight to the acoustic release and rope dispenser is required to allow for safe deployment, as it allows the floats, acoustic release and rope dispenser to float clear of the vessel stern before the anchor weight is released to the seabed. Polypropylene rope has been used in this section of the mooring to allow for a semi-buoyant material during deployment, as alternative materials such as chain and wire rope introduce non-buoyant sections that would restrict the ability of the floats, acoustic release and rope dispenser to float clear of the vessel stern prior to releasing the anchor weight. In addition, this section of mooring is planned to be deployed by hand and therefore polypropylene rope is deemed the safest material to handle as opposed to chain or wire rope.

3.3.1 RPS FLiDAR Buoy

3.3.1.1 Mooring Design

The RPS FLiDAR Buoy will be attached to the seafloor by means of a U-shaped mooring design which is comprised of chain, polypropylene rope, wire rope, trawl floats, an amsteel rope dispenser with acoustic release and rubber cords that connect the RPS FLiDAR Buoy to both a primary and secondary clump anchor on the sea floor as well as three underwater viny floats that sit approximately 55.8 ft (17 m) above the seabed as part of the mooring recovery system. (Figure 3-4).

The primary and secondary clump weights would weigh approximately 4,409 lbs (2,000 kg) and 660 lbs (300 kg), respectively and sit on the seabed for a total area of up to 21.5 ft^2 (2 m^2) per clump weight. The chain would be attached to the side of the FLiDAR hull via the 12T bow shackle. Due to the use of rubber cords in the mooring design, there will be no anchor chain sweep associated with the long-term operation of the RPS FLiDAR Buoy. Total area of mooring resting on the seafloor, inclusive of both clump weights, chains and wire ropes, would be approximately 67.8 ft^2 (6.3 m^2). Vertical penetration of the primary and secondary clump

weights into the seabed is anticipated to be approximately 1.6 ft and 0.7 ft (0.5 m to 0.2 m), respectively. All clump weights will be fully recovered.

3.3.1.2 Power Supply

The RPS FLiDAR Buoy instrumentation will be powered by 30 x 110 Amp-hour Victron Gel batteries, charged by 12 x 335-Watt solar panels and 4 x D200 wind generators. Five regulators protect the batteries from being damaged by possible overcharging. Equinor has selected a concept that has avoided the use of backup generators using traditional fuels in an attempt to mitigate the risk of oil spills and reduce emissions. The acoustic release is powered by an alkaline or lithium battery pack.

In the event of failure of the key power supply systems, the RPS FLiDAR Buoy instrumentation would be capable of operating at full capacity on battery power alone for up to ten days. The life of the acoustic release battery pack is over a year.

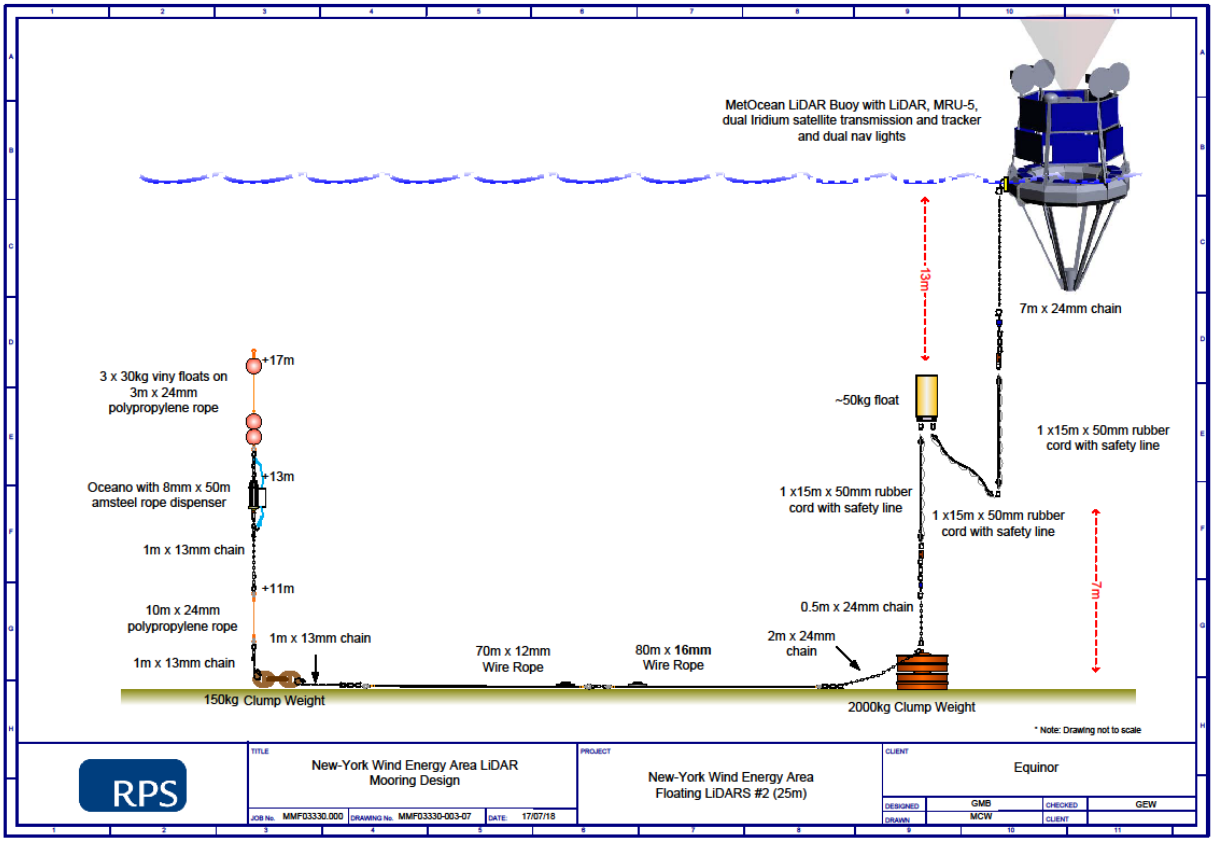


Figure 3-4 RPS FLiDAR Buoy U-Mooring Design

3.3.1.3 Instrumentation Equipment

A ZephIR300M light detection and ranging (LiDAR) and KONGSBERG MRU-5 motion reference unit, will be installed atop the RPS FLiDAR Buoy. The ZephIR300M unit is a wind profiling device capable of remotely measuring and collecting wind speeds and directions up 656 ft (200 m). The KONGSBERG MRU-5 motion reference unit collects high accuracy roll, pitch and heave measurements. The RPS FLiDAR Buoy would also contain the following equipment:

Table 3-2 provides a list of the parameters measured by the RPS FLiDAR Buoy, the associated instrumentation, as well as the range and accuracy of the measurements.

Table 3-2 Parameters Measured and Recorded by the RPS FLiDAR Buoys

Parameter	Instrumentation	Range	Accuracy
Wind Speed	ZephIR 300 LiDAR	<1 m/s to 70 m/s	0.1 m/s
Wind Direction		0 to 360°	<0.5°
Temperature		-40 + 50° C	
Orientation	KONGSBERG MRU-5	+180°	0.02° RMS
Gyro		+149°/s	0.08% RMS
Acceleration		+30 m/s^2	0.1 m/s^2 RMS
Heave		+50m	0.01 m/s RMS

The RPS FLiDAR Buoys will store data using a combination of the M200 data loggers and the Zephir LiDAR 300m instrument.

The M200 data logger is latest version of data loggers constructed by RPS. Custom firmware is written for the M200, thus allowing maximum control of communication options and data transmission protocols. The M200 logger has the ability to integrate various sensors via analogue, digital, serial and Ethernet inputs. Each RPS FLiDAR Buoy has two M200 data loggers installed to allow redundancy in data logging and transmission. The M200 Data Logger has a 64-gigabyte flashcard installed, which allows for years of data logging without the need for erasing.

Both M200s (System A and B) on the buoy will be connected to the LiDAR via Ethernet. The LiDAR 10 minute data will be retrieved via Modbus polling of the LiDAR, logged and transmitted by each M200 in an Iridium Short Burst Data message.

The M200 Data Logger will also receive 1 Hertz continuous data from the GPS compass, KVH compass and MRU. All of this data will be stored in daily files which will be retrieved once per day via 4G or Iridium Broadband (should 4G coverage not be available). The GPS compass is used to correct the M200 clock to GPS time once per day at midnight UTC.

The Zephir LiDAR 300M will log the 10 minute averaged LiDAR data as well as the raw data in daily files. The raw LiDAR data will be retrieved once per day via 4G or Iridium Broadband (should 4G coverage not be available).

The following supporting systems for navigational aids, position tracking, and remote monitoring will also be installed on the RPS FLiDAR Buoy:

- Buoy tracking system;
- V104S GNSS Compass;
- Two KVH Compass;
- Two M200 Logger units; and
- Two self-contained Global Star tracker units.

Using the maintenance plan described in Section 5.2, equipment on the RPS FLiDAR Buoy will have a minimum two-year operational lifespan.

3.3.2 Wave and Met Buoy

3.3.2.1 Mooring Design

The Wave and Met Buoy mooring design will also consist of the U-shaped mooring design. The Wave and Met Buoy will be attached to the seafloor by means of a U-mooring design which is comprised of a chain, polypropylene rope, wire rope trawl floats, and amsteel rope dispenser with acoustic release and rubber cord that connects the RPS Wave and Met Buoy to both a primary and secondary clump anchor on the sea floor as well as 3 underwater viny floats that sit approximately 55.8 ft (17 m) above the seabed (Figure 3-45).

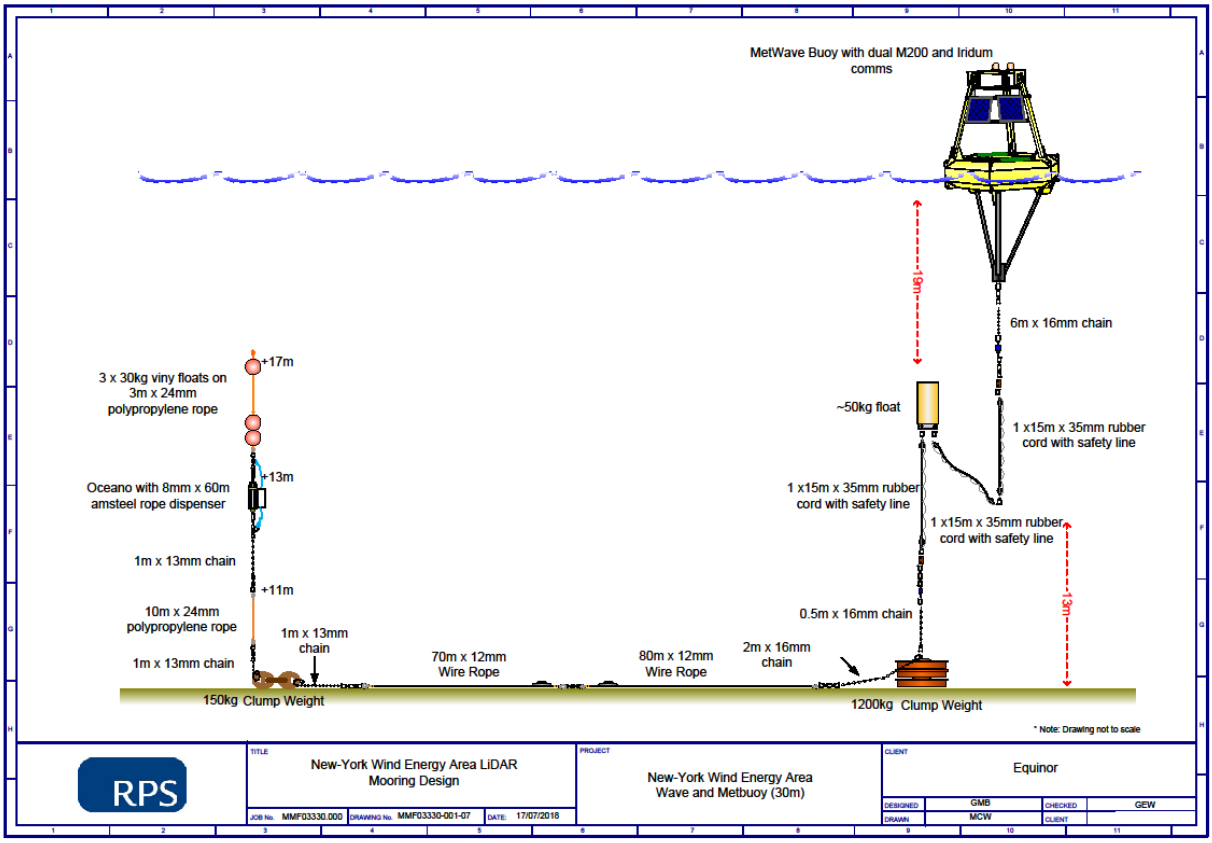


Figure 3-5 Wave and Met Buoy U-Mooring Design

The primary and secondary clump weights would weigh approximately 2646 lbs (1,200 kg) and 661 lbs (300 kg), respectively, and will rest on the seafloor for an area of approximately 21.5 ft² (2 m²) per clump weight. The chain would be attached to the underside of the hull. Due to the mooring design, which includes a rubber cord section, there will be no anchor chain sweep associated with the long-term operation of the Wave and Met Buoy. Total area of mooring resting on the seafloor, inclusive of both clump weights, chains and wire ropes, would be approximately 62.4 ft² (5.8 m²). Vertical penetration of the primary and secondary anchor chain for the Wave and Met Buoy into the seabed is anticipated to be approximately 1.5 ft and 0.5 ft (0.5 m to 0.2 m), respectively. The discrepancy between water depths reported in Table 3-1 and those presented on Figure 3-5 is negligible in light of the mooring design configuration. All clump weights will be fully recovered.

3.3.2.2 Power Supply

The Wave and Met Buoy instrumentation will be powered by 6 x 110 Amp-hour Victron Gel batteries, charged by 6 x 100 Watt solar panels. A regulator in the Power Management Unit protects the batteries from being damaged by overcharging. When fully charged the batteries have enough reserve capacity to power the buoy in a standard sampling routine for up to two months without being charged. The acoustic release is powered by an alkaline or lithium battery pack that has a life of at least a year.

3.3.2.3 Instrumentation Equipment

The Wave and Met Buoy is instrumented with the following sensors to provide in-situ monitoring and analysis of wave and meteorological activity:

- Datawell MOSE-G Waves Sensor;
- WindSonic Wind Sensor;
- A Gill WindObservor II Wind Sensor;
- Pyrosales RTD Air Temperature Sensor;
- A Vaisala HMP 155 Relative Humidity Sensor; and
- A Vaisala PTB110 Barometric Pressure Sensor.

Table 3-3 provides a list of the parameters measured by the Wave and Met Buoy, as well as the resolution and accuracy of the measurements.

Table 3-3 Parameters Measured and Recorded by the Wave and Met Buoy

Parameter	Instrumentation	Range	Resolution	Accuracy
Wind Speed	WindSonic	0 to 60 m s^{-1}	0.01 m s^{-1}	±4%
Wind Direction	WindSonic	0 to 360˚	1˚	±3˚
Wind Speed	WindObserver II	0 to 65 m s^{-1}	0.01 m s^{-1}	±2%
Wind Direction	WindObserver II	0 to 360˚	1˚	±2˚
Air Temperature	Pyrosales RTD	-200 to 600 ˚C	0.1 ˚C	±0.05 ˚C
Relative Humidity	Vaisala HMP-155	0 to 100%	0.025 % RH	±1.0% at 20 °C
Barometric Pressure	Vaisala PTB-110A	800 to 1060 hPa	0.1 hPa	±0.3 hPa at 20 ˚C
Waves	Datawell MOSE-G	1 – 100s period	1mm	2cm

The data acquisition system will acquire and store data using the dual M200 loggers with 64 Gigabyte flashcards. Wave and met parameters, including 30 minute wave spectrum and 3 x 10 minute met parameter data, will be transmitted from both M200 units via Iridium/Short Burst Data every 30 minutes.

The following supporting systems for navigational aids, position tracking, and remote monitoring will also be installed on the Wave and Met Buoy:

- Two Global Star Tracking Beacons;
- Iridium moderns; and
- MOSE-G sensor.

Using the maintenance plan described in Section 5.2, equipment on the Wave and Met Buoy will have a minimum four-year operational lifespan.

3.3.3 Current Meter CM/CT Mooring

3.3.3.1 Mooring Design

The CM/CT mooring design will consist of a subsurface mooring design. The CM-04 Acoustic Current Meters/Seabird SBE37 CT loggers will be deployed as part of the subsea mooring. The CM-04 Acoustic Current Meters will be incorporated into the subsurface portion of the mooring line at 9.8 ft (3 m), 55.8 ft (17 m), and 88.6 ft (27 m) above the seafloor via chain and 10 mm galv wire segments on the top and bottom of the meters that connect to the mooring line (Figure 3-6). The CT loggers will be attached to the subsurface portion of the mooring line via plastic clamps at 4.9 ft (1.5 m), 62.3 ft (19m), and 95.1 ft (29 m) above the seafloor. The remainder of the mooring is comprised of chain, wire rope, two amsteel rope dispensers with acoustic release and shackles and load rings that connects the subsurface portion of the mooring to a clump anchor on the sea floor as well as a pendant buoy that will sit approximately 16.4 ft (5 m) below the sea surface (Figure 3-6). When the acoustic release is activated, the amsteel rope dispensers release high strength Spectra rope that floats to the surface on the viny floats. The mooring has been designed to withstand the prevailing conditions and facilitates safe recovery of the CM/CT mooring.

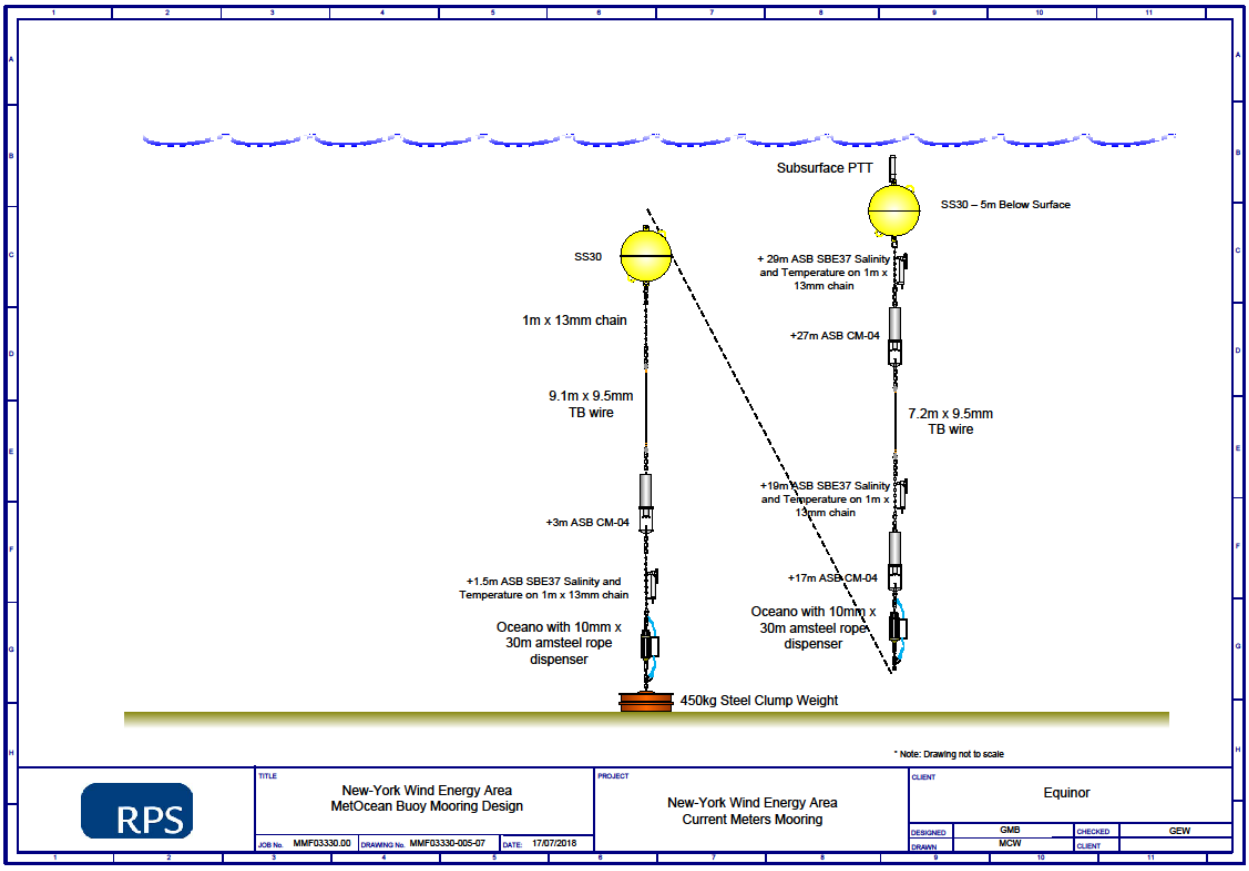


Figure 3-6 CM/CT Mooring Design

The clump weight would weigh approximately 992 lbs (450 kg), and will rest on the seafloor for an area of approximately 21.5 ft² (2 m²). Vertical penetration of the anchor chain for the Current Meter mooring into the seabed is anticipated to be approximately 0.5 ft to 1.5 ft (0.2 m to 0.5 m). The discrepancy between water depths

reported in Table 3-1 and those presented on Figure 3-6 is negligible in light of the mooring design configuration. All clump weights will be fully recovered.

3.3.3.2 Power Supply

Each CM-04 Acoustic Current Meter and Seabird SBE37 CT logger is powered by 28 Amp-hour alkaline battery packs and 12 AA lithium batteries, respectively. The current meter batteries can last over a year, but would be replaced during the 6-month maintenance trip (Section 5.2). The acoustic release is powered by an alkaline or lithium battery pack that has a life of at least a year.

3.3.3.3 Instrumentation Equipment

The CM-04 Acoustic Current Meter is a self-contained instrument that can be moored to record ocean currents and water temperature. The CM-04 Acoustic Current Meter consists of four piezoelectric transducers, an acoustic mirror positioned to measure velocities in two axes, a flux-gate compass unit, and a temperature sensor. Recording intervals range from 0.5 second to 10 minutes. On this project, the data will be measured in 1-minute averages of the continuous 30 Hertz current data. Data is stored on an internal flash card and will be downloaded during 6-month maintenance trips.

The Seabird SBE37 CT logger is a high-accuracy conductivity and temperature recorder with internal battery and memory. The Seabird SBE37 CT logger's internal field conductivity cell, which measures conductivity, is unaffected by external fouling which ensures stability. The aged and pressure protected thermistor, used to measure temperature, has a long history of accuracy and stability. There are several user selectable sampling rates that range from 5-second to 9.1-hour intervals, polled sampling, or serial line sync. On this project, the conductivity and temperature sampling data will be measured at 5-minute intervals. Data is stored on an internal non-volatile FLASH memory card and will be downloaded during 6-month maintenance trips.

Table 3-4 Parameters Measured and Recorded by the CM-04 Meter and CT Recorder

Parameter	Instrumentation	Range	Resolution	Accuracy
Current Speed	CM-04	0 to ±400 cms^{-1}	0.01 mms^{-1}	±1 cms^{-1} or ±1%
Current Direction	CM-04	0 to 360˚	1˚	±1˚
Water Temperature	CM-04	-3˚C to +37˚C	±0.01˚C	±0.2˚C
Water Conductivity	CT Logger	0 – 7 S/m	0.00001 S/m	0.0003 S/m
Water Temperature	CT Logger	-5˚C to +38˚C	0.0001 ˚C	0.002 ˚C

The CM-04 Acoustic Current Meter and Seabird SBE37 CT Logger will store data internally. Data will be downloaded every 6 months during maintenance of the equipment.

The CM/CT Mooring would also be equipped with a subsurface satellite transmitter PTT which would activate and send an alarm in the event that the subsea mooring has surfaced.

Using the maintenance plan described in Section 5.2, equipment on the CM/CT Mooring will have a minimum four-year operational lifespan.

4. DEPLOYMENT/INSTALLATION

Installation of the Metocean Facilities may take up to seven days over three separate vessel trips including transit, barring weather delays. It is anticipated that the deployment activities will be staged out of Millers Launch, Pier 7 ½, in Staten Island, New York.

4.1 Overview of Installation and Deployment Activities

Equinor Wind US LLC will notify BOEM, United States Fleet Forces (USFF) N46, the United States Army Corps of Engineers, and the United States Coast Guard (USCG) prior to mobilization to deploy the Metocean Facilities. Written notice via email will be provided to the appropriate contact at Fleet Forces Command prior to mobilization in order to avoid potential conflicts with military operations. Equinor Wind US LLC will update Fleet Forces Command on the installation schedule following approval of the SAP and detailed planning.

Equinor Wind US LLC will notify mariners, fisherman, and other users of the area by submitting a request to the USCG for publication of a Local Notice to Mariners at least two weeks prior to the start of the in-water work. This notice will include the contact names for the installation vessels, local fisheries liaison officer, channels of communication, and the duration of the work. Copies of all USCG communications will be provided to BOEM as required. Additionally, in accordance with standard maritime practices, the vessel captain(s) will broadcast via VHF radio on Marine Channel 16 notification to mariners of their position and limited mobility during installation activities and submit an application to the USCG for a Private Aids To Navigation (PATON) for the Metocean Facilities (see Table 1-2). Equinor Wind US LLC will submit a copy of the approved PATON to BOEM prior to buoy deployment.

Within 30 days of completing the installation of the Metocean Facilities, Equinor Wind US LLC will prepare an Installation Report and provide a copy to BOEM to fulfill the requirements of 30 CFR 585.615(a). This report will include a description of the equipment and the installation, including final coordinates of the installation site and photo documentation of the equipment deployed, the results of all commissioning tests, the plans and schedule for upcoming inspections and maintenance, and any noted problems or issues to be addressed.

Equinor Wind US LLC will provide written notification to BOEM and the DoD of any proposal to add new sensors to the data collection buoy(s). Equinor Wind US LLC will include the technical specifications (manufacturer, model, spectrum requirements, etc.) for any proposed new sensors, specifically seismometers and hydrophones, in the notification. The notification will be provided to the contacts listed in the Lease, or updated contact information as provided by BOEM.

4.1.1 RPS FLiDAR, Wave and Met Buoy, and CM/CT Mooring Deployment

One workboat, up to approximately 150 ft (46 m) in length, will be used for installation of the Metocean Facilities. The Installation of the Metocean Facilities will require three separate round trips over a 6-to 7-day period. FLiDAR 1 will be deployed following SAP approval. FLiDAR 2 will be deployed either concurrently with deployment of FLiDAR 1 or during the first 6-month service visit.

Installation of FLiDAR 1 will happen over a two-day period. The first day, the vessel will be loaded and prepared for deployment, and FLiDAR 1 will be secured for towing. The mooring system for FLiDAR 1 will also be loaded and stored on the deck of the vessel for transit. The vessel will transit out to the deployment location overnight. On arrival at the FLiDAR 1 deployment location the following day (day 2), the chain will be laid out on the deck of the vessel in a manner that will prevent tangling or twisting while it is let out into the water. The mooring system will then be prepared for connection on the deck of the vessel. The tow rope would

then be pulled in so that the rubber cords on the mooring can be shackled to the mooring chain that is connected to FLiDAR 1. A quick release would be attached to the mooring chain, which would then be secured on deck, and the tow rope will be removed. The mooring chain for FLiDAR 1 will then be deployed. The mooring systems for the Metocean Facilities, inclusive of clump weights, chains, ropes, rope dispenser, acoustic release and lines, will be deployed from the work vessel by a crane.

Following deployment of FLiDAR 1, the vessel will return to shore, and the Wave and Met Buoy, the CM/CT Mooring, and the Wave and Met Buoy mooring system will be secured to the deck. The vessel will then transit to the Wave and Met Buoy deployment location, which will be located 3,279 ft (1,000 m) northwest from FLiDAR 1. The Wave and Met Buoy mooring chain will be laid out on the deck of the vessel in a manner that will prevent tangling or twisting while it is let out into the water. The Wave and Met Buoy will then be connected to the mooring system, the mooring will be streamed out, and the clump weight anchor will be released. Following deployment of the Wave and Met Buoy, the vessel will transit back to port.

Finally, the vessel will transit to the CM/CT Mooring deployment location, which will be located approximately 3,280 ft (1,000 m) southeast from FLiDAR 1. The CM/CT mooring chain will be laid out on the deck of the vessel in a manner that will prevent tangling or twisting while it is let out into the water. The CM/CT Mooring system, inclusive of clump weights, chains, ropes and lines, will be deployed from the work vessel by a crane. Following deployment of the CM/CT Mooring, the vessel will transit back to port. (NOTE: Final deployment procedures may be modified depending on the deployment vessel configuration). No vessel anchoring will take place during installation.

FLiDAR 2 will be deployed either concurrently with deployment of FLiDAR 1 or during the first 6-month service visit. Once secured for towing the FLiDAR 2 mooring will be secured to deck for transport to the deployment location overnight. On arrival at the FLiDAR 2 deployment location the following day (day 2) FLiDAR 2 will be deployed in the same manner as FLiDAR 1 described above. Following deployment of the FLiDAR 2, the vessel will transit to the CM/CT Mooring deployment location, and begin the scheduled service visit.

All personnel participating in the installation will attend a pre-installation briefing prior to mobilization (See Section 4.3).

4.2 Vessels

Equinor Wind US LLC will employ RPS to transport and deploy the Metocean Facilities.

It is anticipated that the deployment of the Metocean Facilities will require the support of a single work boat. Equinor Wind US LLC is currently proposing to use the Rana Miller or a similar vessel as the work boat. The Rana Miller is a multi-purpose offshore utility vessel with two Cummins KTA-38 main engines rated at 850 horsepower each. The Rana Miller measures 150 ft (46 m) in length with a 36 ft (11 m) beam and 11.5 ft (4 m) draft. See Appendix G for vessel specifications.

4.3 Pre-Installation Briefing

All personnel will attend a pre-installation briefing as required by Lease stipulation 4.1.1. The pre-installation briefing will be performed prior to departure from the RPS office in Perth Australia, and again, on the vessel prior to the installation of the Metocean Facilities. The pre-installation briefing will include a Tool-Box Talk (Appendix E) as well as HSE and hazard identification presentations. The briefing will occur prior to commissioning and again prior to boarding the vessel. The purpose of this briefing will be to review the HSE requirements and associated emergency response requirements for the proposed work, identify the

responsibilities of each person, define the chains of command, discuss communication procedures, and provide an overview of planned installation activities. Additional topics for the briefing will include protected species avoidance, marine trash and debris awareness, and oil spill response procedures.

The Equinor Wind US LLC onsite representative will have the authority to stop or delay any of the installation activities, if deemed necessary. If change in personnel is required during installation activities, the new personnel will be briefed as they join the work in progress.

4.4 Protected Species Avoidance

All whales, dolphins, and porpoises in the northeast region are federally protected by the Marine Mammal Protection Act of 1972. In addition, many large whales in the area, as well as sea turtles, are further protected under the Endangered Species Act of 1973 (ESA).

The Lease contains specific stipulations to minimize risk to marine species that must be followed. Installation of the Metocean Facilities will not require pile-driving; accordingly, mitigations to reduce adverse impacts on protected species from pile driving do not apply to this installation. The Lease stipulations summarized in Table 4-1 apply to activities associated with installation, operation and decommissioning of the Metocean Facilities and must be adhered to.

Table 4-1 Standard Operating Conditions in the Lease Area

Addendum "C" Stipulation	Vessel Operations Conditions
4.2 Vessel Strike Avoidance Measures	
4.2.1	The Lessee must ensure that vessels conducting activity in support of a plan submittal, including those transiting to and from local ports and the lease area, comply with the vessel-strike avoidance measures specified in stipulations 4.2, except under extraordinary circumstances where complying with these requirements would put the safety of the vessel or crew at risk.
4.2.2	The Lessee must ensure that vessel operators and crews maintain a vigilant watch for cetaceans, pinnipeds, and sea turtles and slow down or stop their vessels to avoid striking these protected species.
4.2.3	The Lessee must ensure that all vessel operators comply with 10 nautical miles per hour (knot, <18. kilometers per hour [km/hr]) speed restrictions in any Dynamic Management Area[1].
4.2.4	The Lessee must ensure that vessels 65 ft (19.8 m) in length or greater, operating from November 1 through April 30, operate at speeds of 10 knots (<18.5 km/hr) or less.
4.2.5	The Lessee must ensure that all vessel operators reduce speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observer near an underway vessel.
4.2.6 North Atlantic Right Whales	
4.2.6.1	The Lessee must ensure all survey vessels maintain a separation distance of 1,640 ft (500 m) or greater from any sighted North Atlantic right whale.
4.2.6.2	The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 1,640 ft (500 m) of any North Atlantic right whale:
4.2.6.2.1	If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/h) or less until the 1,640 ft (500 m) minimum separation distance has been established (except as provided in stipulation 4.2.6.2.2).
4.2.6.2.2	If a North Atlantic right whale is sighted within 328 ft (100 m) of an underway vessel, the vessel operator must immediately reduce speed and promptly shift the engine to neutral. The vessel operator must not engage engines until the North Atlantic right whale has moved outside of the vessel's path and beyond 328 ft (100 m), at which point the Lessee must comply with 4.2.6.2.1.
4.2.6.2.3	If a vessel is stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 328 ft (100 m), at which point the Lessee must comply with stipulation 4.2.6.2.1.
4.2.7 Non-Delphinoid Cetaceans other than the North Atlantic Right Whale.	
4.2.7.1	The Lessee must ensure all vessels maintain a separation distance of 328 ft (100 m) or greater from any sighted non-delphinoid cetacean.

Table 4-1 Standard Operating Conditions in the Lease Area

Addendum "C" Stipulation	Vessel Operations Conditions
4.2.7.2	The Lessee must ensure that the following avoidance measures are taken if a vessel comes within 328 ft (100 m) of any non-delphinoid cetacean:
4.2.7.2.1	If any non-delphinoid cetacean is sighted, the vessel underway must reduce speed and shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved beyond 328 ft (100 m).
4.2.7.2.2	If a vessel is stationary, the vessel will not engage engines until the sighted non-delphinoid cetacean has moved beyond 328 ft (100 m).
4.2.8 Delphinoid Cetaceans and Pinnipeds	
4.2.8.1	The Lessee must ensure that all vessels underway do not divert to approach any delphinoid cetacean and/or pinniped.
4.2.8.2	The Lessee must ensure that if a delphinoid cetacean and/or pinniped approaches any vessel underway, the vessel underway must avoid excessive speed or abrupt changes in direction to avoid injury to the delphinoid cetacean and/or pinniped.
4.2.9 Sea Turtles	
4.1.1.6.1	The Lessee must ensure all vessels maintain a separation distance of 164 ft (50 m) or greater from any sighted sea turtle.
Note: 1. A Dynamic Management Area is defined in Section 1.2 of the Lease. Vessel operators may send a blank email to ne.rw.sightings@noaa.gov for an automatic response listing all current Dynamic Management Areas.	

In addition to the Lease stipulations, between November 1 and July 1, vessel operators will monitor National Marine Fisheries Service (NMFS) North Atlantic Right Whale reporting systems (e.g., the Early Warning System, Sighting Advisory System, and Mandatory Ship Reporting System) for the presence of North Atlantic Right Whales.

4.4.1 Reporting of Injured or Dead Protected Species

During all phases of marine activities, sightings of any injured or dead protected species (sea turtles and marine mammals) will be reported within 24 hours, regardless of whether the injury or death was caused by a vessel as specified in Stipulation 4.5.2 of the Lease. All marine activities will be suspended immediately and the circumstances reported as specified below if a dead or injured right whale is found in any of the Installation Areas. The Lease stipulations summarized in Table 4-2 below apply and must also be adhered to.

Table 4-2 Protected Species Reporting Requirements in the Lease Area

Addendum "C" Stipulation	Lease Requirement
4.5.2 Reporting Injured or Dead Protected Species	The Lessee must ensure that sightings of any injured or dead protected species (e.g., marine mammals, sea turtles or sturgeon) are reported to the Lessor, NMFS and the NMFS Greater Atlantic (Northeast) Region's Stranding Hotline (866-755-6622 or current) within 24 hours of sighting, regardless of whether the injury or death is caused by a vessel. In addition, if the injury or death was caused by a collision with a project-related vessel, the Lessee must notify the Lessor of the strike within 24 hours. The Lessee must use the form provided in Appendix A to Addendum "C" to report the sighting or incident. If the Lessee's activity is responsible for the injury or death, the Lessee must ensure that the vessel assist in any salvage effort as requested by NMFS.
4.5.3 Reporting Observed Impacts to Protected Species	
4.5.3.1	The Lessee must report any observed takes (as defined in 1.13) of listed marine mammals, sea turtles or sturgeon resulting in injury or mortality within 24 hours to the Lessor and NMFS.
4.5.3.2	The Lessee must report any observations concerning any impacts to Endangered Species listed marine mammals, sea turtles, or sturgeon to the Lessor and NMFS Northeast Region's Stranding Hotline within 48 hours.
4.5.3.3	The Lessee must record injuries or mortalities using the form included as Appendix A to Addendum "C".

Table 4-2 Protected Species Reporting Requirements in the Lease Area

Addendum "C" Stipulation	Lease Requirement
4.5.4 Protected Species Observer Reports	The Lessee must ensure that the PSO record all observations of protected species using standard marine mammal PSO data collection protocols. The list of required data elements for these reports is provided in Appendix B to Addendum "C."

4.5 Avian and Bat Protection

Equinor Wind US LLC will provide an annual report to the to BOEM and U.S. Fish and Wildlife Service using the contact information listed in the Lease, or updated contact information as provided by BOEM, by January 31 of each year of the site assessment term. This report will document dead or injured birds or bats found on vessels and the meteorological buoy during construction, operations, and decommissioning of the meteorological buoy. Each report will contain the following information: the name of species, date found, location, a picture to confirm species identity (if possible) and any other relevant information. In addition to submitting the annual report, Equinor Wind US LLC will report carcasses with Federal or research bands to the United States Geological Survey Bird Band Laboratory within 30 calendar days of discovery using the following website: https://www.pwrc.usgs.gov/bbl/, or updated contact information as provided by BOEM.

4.6 Marine Trash and Debris Awareness and Elimination

Equinor Wind US LLC will comply with and ensure that all employees and contractors are briefed on marine trash and debris awareness elimination, as required in Addendum C, Section 4.1.4 of the Lease and as described in the Bureau of Safety and Environmental Enforcement NTL No. 2015-G03 or any NTL that supersedes NTL 2015-G03.

4.7 Oil Spill Response

The RPS FLiDAR Buoys, Wave and Met Buoy and CM/CT Mooring will not require a backup generator or any other fuel dependent equipment. As such, no Oil Spill Response Plan or Oil Spill Response Measures will be required.

4.8 Health and Safety

Equinor Wind US LLC will implement a project-specific HSE Plan to ensure the health and safety of all personnel involved in the installation, operation, and maintenance, and decommissioning of the Metocean Facilities. The project-specific plan will be prepared in accordance with Equinor's standard corporate HSE policies and procedures. The HSE Plan will also address emergency response and reporting requirements. The HSE plan is included as Appendix F to this SAP.

5. OPERATIONS AND MAINTENANCE

5.1 Data Collection and Operations for Wind and Metocean Data

As stated in Sections 0 and 0 the Metocean Facilities will remain moored in position and transmit wind data and metocean measurements autonomously via Iridium Broadband, or 4G, if available. The RPS FLiDAR Buoys will transmit motion reference data, heading data and charge/discharge once a day, and 10-minute average wind speed and direction profiles, as well as system voltage information and charge discharge rates will be transmitted every 10 minutes The Wave and Met Buoy will transmit wave and met parameters, including 30-minute wave spectrum and 3 x 10-minute met parameter data, every 30 minutes. Equipment on the CM/CT Mooring will store data internally to be downloaded every six months during maintenance trips.

5.2 Maintenance Activities

5.2.1 RPS FLiDAR Buoy

Planned on-site maintenance for the RPS FLiDAR Buoys is scheduled at 6-month intervals and will be completed by a vessel comparable to the work boat used for installation (see Section 4.2). Planned maintenance activities will include service of sensors, data retrieval, inspection of mooring components and replacement where appropriate, and cleaning of solar panels and wind turbines. A detailed service, which will include all 6-month activities, as well as replacement of the mooring system, will be performed at 12-month intervals.

5.2.2 Wave and Met Buoy

Planned on-site maintenance for the Wave and Met Buoy is scheduled every 6 months and will be completed by a vessel comparable to the work boat used for installation (see Section 4.2). Planned maintenance activities at the first 6-month interval would include cleaning of the buoy dome and hull if necessary, as well as visual inspection of the mooring system and replacement of parts where appropriate. At 12 months the mooring will be recovered to deck and replaced.

5.2.3 CM/CT Mooring

Planned on-site maintenance for the CM/CT Mooring is scheduled every 6 months and will be completed by a vessel comparable to the work boat used for installation (see Section 4.2). Planned maintenance activities include changing out batteries, downloading data, and visual inspection of the mooring system. At 12 months the mooring will be replaced. Equinor Wind US LLC will incorporate planned maintenance activities into a comprehensive annual Self-Inspection Plan pursuant to 30 CFR 585.824(a).

5.2.4 Unscheduled Visits

In addition to the planned 6-month maintenance activities, in exceptional circumstances an unscheduled visit to a deployment location may be required if there is evidence of damage (such as partial or total loss of data transmissions), or if transmitted GPS data indicated that a buoy had drifted significantly outside the "watch circle," which allows for buoy movement inside a roughly 100-meter radius from the recorded deployment coordinates. Examples of events that could cause such damage or buoy displacement include, but are not limited to, hurricane-strength tropical or "nor'easter" storms, heavy snow accumulation, or heavy icing in the event of extremely low temperatures. It has been assumed that up to one unscheduled round trip per year may be needed to visit a buoy site, and potential emissions for unscheduled visits have been based on the round-trip distance to the farthest deployment location from Miller's Launch, which is FLiDAR 1.

5.3 Reporting

Per Lease stipulation 2.2.1, Equinor Wind US LLC will submit a semi-annual progress report to BOEM every six months for the duration of the site assessment term. The semi-annual progress report will provide a brief narrative of overall progress since the previous semi-annual progress report (or since the effective date for the first semi-annual progress report). The progress report will include updated survey plans to account for modifications in schedule, as necessary. In addition to the semi-annual progress reports, Equinor Wind US LLC will prepare and submit a Self-Inspection Report, an Annual Report, and a Certification of Compliance to BOEM no later than November 1 of each year for the duration of the site assessment term. See Table 5-1 for a description of the content of each report and the associated regulatory citation.

Table 5-1 Reporting Requirements

Report Name	Content	Regulatory Citation
Self-Inspection Report	The Self-Inspection Report will be based on the comprehensive Self-Inspection Plan that Equinor Wind US LLC will develop pursuant to 30 CFR 585.824(a).	30 CFR 585.824(b)
Annual Report	The Annual Report will provide a summary of site assessment activities and the results of those activities.	30 CFR 585.615(b)
Certification of Compliance	Together with the certification, Equinor Wind US LLC will submit: • Summary reports that demonstrate compliance with the terms and conditions that require certification; and • A statement identifying and describing any mitigation measures and monitoring methods that have been taken, as well as their effectiveness. If Equinor Wind US LLC identifies measures that are not effective, we will make recommendations for substitute mitigations measures and monitoring methods, and explain why we believe they would be effective.	30 CFR 585.615(c)

5.4 Potential Faults or Failures

The Metocean Facilities will be remotely monitored for the duration of operations. This monitoring will include a range of key indicators such as power level, buoy location, and data quality to provide an insight to the 'health' of the buoy and payload. Unplanned maintenance activities may be required in the event of a power supply failure, buoy drift outside of designated area, mooring component failure, or other such event. If any of these problems are suspected, a technical service crew would be promptly dispatched to investigate and repair the issue. The RPS FLiDAR Buoys are capable of operating at full capacity without renewable power supply to the batteries for up to seven days. The RPS Wave and Met Buoy has enough reserve power to operate in a standard sampling routine for up to three months without being recharged.

6. DECOMMISSIONING

BOEM requires decommissioning of facilities described in the SAP in accordance with § 585.901. Equinor Wind US LLC will submit a decommissioning application to BOEM as required by § 585.902(b) prior to decommissioning of the Metocean Facilities. Following BOEM approval of the decommissioning application, Equinor Wind US LLC will submit a decommissioning notice to BOEM at least 60 days prior to vessel deployment as required by § 585.90(a).

6.1 Overview of Decommissioning Activities

Upon completion of SAP activities, the Metocean Facilities will be decommissioned. The decommissioning process will be similar to the installation process but in reverse. Similar types and numbers of vessels used for the installation of the Metocean Facilities would be used for decommissioning. The work vessel would position itself on-site to attach the chain to the crane or A-frame of the work vessel and the mooring would be recovered to deck. The Buoys would then be detached from the mooring and attached to the work vessel. The Metocean Facilities would then be towed off site.

6.2 Site Clearance

The operation of the Metocean Facilities is not expected to result in any trash or bottom debris. However, Equinor Wind US LLC will ensure that the seafloor has been cleared of all obstructions created by activities on the Lease as required in § 585.902(a)(2). This will be accomplished via photo documentation of all deployed and retrieved equipment. As stated in Section 4.1, Equinor Wind US LLC will provide an Installation Report that will contain the final coordinates and photo documentation of the equipment that was deployed. At the completion of decommissioning, similar documentation will be provided to BOEM to confirm that all equipment was retrieved from the site.

6.3 Reporting

As specified in the Lease, Addendum C, Section 2.2, Equinor Wind US LLC will submit semi-annual progress reports to BOEM throughout the duration of activities covered by the SAP. At the conclusion of the site assessment activities a Decommissioning Report will be prepared in accordance with §§ 585.900-913 and provided to BOEM with the semi-annual progress reports, or upon request. This report will include a description of the process and equipment used for decommissioning the Metocean Facilities and confirmation of site clearance.

7. AFFECTED ENVIRONMENT, POTENTIAL IMPACTS, AND MITIGATION MEASURES

The following sections describe the affected environment, impacts and proposed mitigation measures for benthic resources, archaeological resources, and geophysical conditions which have been developed through site surveys and analysis that were conducted in March and April 2018 in support of the SAP. Site surveys and analysis followed a detailed SAP Survey Plan which included protocols, methods, and/or used data that represented the state of industry techniques and knowledge at the time of the study. The SAP Survey Plan, detailing the SAP survey approach, timing, identified surveys, and reporting, was accepted by BOEM on February 27, 2018.

The analysis focuses on the maximum area of potential disturbance associated with the installation, operation, and decommissioning of the Metocean Facilities (site assessment activities): approximately 151.8 ft^2 (14.1 m^2) for Buoy Deployment Area 1 and 67.8 ft^2 (6.3 m^2) for Buoy Deployment Area 2.

As stated in Section 3.2, the two Buoy Deployment Areas where the Metocean Facilities are proposed to be located have been given unique identifiers. The Buoy Deployment Area 1 will have a RPS FLiDAR Buoy, a RPS Wave and Met Buoy, and a CM/CT Mooring, located at positions FLiDAR 1, Wave and Met Buoy, and Current Meters, as indicated in Table 3-1. The Buoy Deployment Area 2 will have a RPS FLiDAR Buoy at location FLiDAR 2, per Table 3-1. The coordinates for these locations are provided in Table 3-1 and depicted on Figure 1-1.

7.1 Geological Conditions

The following section summarizes results of the HRG survey that was conducted in March to April of 2018. The survey was conducted in accordance with the SAP Survey Plan, as approved by BOEM on February 27, 2018. The full site characterization report is provided in Appendix C.

The HRG survey and sampling program involved acquisition of the following data:

- **Multibeam echosounder bathymetry**– acoustic swath mapping to determine water depths and topographic features on the seabed and initial review of surficial sediment;
- **Side scan sonar imagery** – acoustic seabed imagery used to map surficial sediment distributions and bedforms, as well as detect possible natural and anthropogenic hazards on the seabed such as boulders, debris, and shipwrecks;
- **Sub-bottom profiler** – acoustic reflection profiling subsurface investigation using a shallow and a medium penetration sub-bottom profiler (high-frequency CHIRP and single channel sparker) to investigate shallow (up to 66 ft [20 m]) sediment stratigraphy;
- **Gradiometer** –magnetic field anomaly mapping to detect ferrous items on the seabed that could be potential hazards or cultural deposits, included debris and shipwrecks;
- **Sediment grab samples** – acquisition of physical samples of the surficial seabed to ground-truth interpretation of the geophysical data; and
- **Underwater video imagery** – visual imagery of the seabed collected using a remotely operated camera to identify natural and human-caused obstructions, as well as aid in benthic habitat assessment.

Data from the HRG and sampling program, along with information from publicly-available databases, were compiled and reviewed to describe the surface and subsurface geologic conditions in the Buoy Deployment Areas. Table 7-1 summarizes the water depth, surficial seafloor sediment, and side scan features or magnetometer contacts related to seafloor hazards identified within the Buoy Deployment Areas.

Table 7-1 Seafloor and Sub-Seafloor Hazards

Hazard	Definition	Identification and Description
Seafloor		
Scarp	An exposed face of soil above the head of a landslide.	None identified on bathymetry or side scan sonar data.
Channels	The deepest portion of a body of water through which the main volume or current of water flows.	None identified on bathymetry or side scan sonar data.
Ridges	A relatively narrow elevation which is prominent on account of steep angle at which it rises.	None identified on bathymetry or side scan sonar data.
Bedforms	Features that develop due to the movement of sediment by the interaction of flowing water; critical angle and forces required for movement are dependent upon many factors.	Low-relief bedforms are noted, which suggesting minor continuous or episodic seabed currents, but are not anticipated to present a hazard.
Exposed Rocky Area	Surface expression of bedrock outcropping on seafloor.	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Boulders	Glacial erratics (boulders) greater than 12 inches in diameter; outcropping coarse till/drift or lag deposit.	Occasionally identified at seabed on bathymetry or side scan sonar data, often correlating to areas of coarser seabed sediments. Sizes and distances to installation locations indicate that the boulders will not be a hazard to mooring deployment, operation, or recovery.
Buried Boulders	Glacial erratics (boulders) greater than 12 inches in diameter; subsurface coarse till/drift or lag deposits.	None identified on the sub-bottom profiler datasets.
Pock Marks / Depressions	Craters in the seabed caused by fluids (gas and liquids) erupting /streaming through the seabed sediments.	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Seabed Scars / Ice Scour / Drag Marks	Incisions or cuts into the seafloor may be associated with glacial advances/retreats or bottom fishing activity.	None identified on bathymetry or side scan sonar data.
Buried Channels	Former fluvial drainage pathways during sea level low stands, usually only deepest portion of the waterway in-filled and preserved. Mark ancestral patterns of glacier meltwater runoff.	Channeling events are interpreted within the Pleistocene sediments, but as these features occur deeper than 65.6 ft (20 m) below the seabed, there is no hazard posed to the mooring systems.
Submarine Canyons	Steep-sided valley cut into the seafloor of the continental slope, sometimes extending well onto the continental shelf.	None identified on bathymetry data.
River Channel	Outline of a path of relatively shallow and narrow body of fluid	None identified on bathymetry or side scan sonar data.
Exposed Hardbottom Surfaces	Any semi-lithified to solid rock strata exposed at the seafloor; in this area, may include bedrock or a nearly continuous pavement of fragmented rock or boulders.	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Shallow Gas	Subsurface concentration of material in gaseous form that has accumulated by the process of decomposition of carbon-based materials (former living organisms).	None identified on the sub-bottom profiler datasets.
Gas Hydrates	Subsurface gas deposits that were formed at or near the seafloor in association with hydrocarbon seeps.	None identified on the sub-bottom profiler datasets.
Gas/Fluid Expulsion Features	Upward movement of gas/fluid via low resistance pathways through sediments onto the seafloor; may be related to other hazards diapirs, faults, shallow water flows).	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Diapiric Structure Expressions	The extrusion of more mobile and ductile-deformable material forced onto the seafloor from pressure below.	None identified on the sub-bottom profiler datasets.
Karst Areas	Landscape formed from the dissolution of soluble rocks.	None identified on the sub-bottom profiler datasets.
Faults, Faulting Expression, Fault Activity	Physiographic feature (surface expression) related to a fracture, fault, or fracture zone along which there has been displacement of the sides relative to one another.	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Slumping, Sliding Seafloor Features	Large scale structures that result from the downslope movement of sediments due to instability and gravity. In the	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.

Table 7-1 Seafloor and Sub-Seafloor Hazards

Hazard	Definition	Identification and Description
	submarine environment these structures are often found in slope environments along coastal margins.	
Steep/Unstable Seafloor Slopes	Large scale feature/stretch of ground forming a natural or artificial incline, with a slope that approaches the angle of repose (maximum angle at which the material remains stable).	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.
Scour/Erosion Features	Erosion of material due to water flow. Often associated with erosion adjacent to larger natural and man-made structures.	No significant scour-related features are identified on the seabed or near interpreted boulder features.
Sensitive Benthic Habitats (chemosynthetic communities, submerged aquatic vegetation)	Shallow water habitats of submerged aquatic vegetation including macroalgae and sea grasses	None identified on bathymetry, side scan sonar, or sub-bottom profiler datasets.

7.1.1 Buoy Deployment Area 1

Water depths across Buoy Deployment Area 1 range between 110 ft (33.6 m) and 124 ft (37.8 m) NAVD88. Water depth at the proposed FLiDAR 1, Wave and Met Buoy, and Current Meters Locations is 118 ft (36.0 m), 118 ft (35.9 m), and 119 ft (36.3 m) NAVD88 respectively. The seafloor is generally flat across the entire area, with slight shoaling in the west, displaying gradients of less than 1°. In Buoy Deployment Area 1 ripples are noted across much of the area, orientated from west-southwest to east-northeast with 0.3 ft (0.1 m) height and 20-33 ft (6-10 m) wavelength. Chart 11179.102 in Appendix C presents bathymetry contours for Buoy Deployment Area 1.

The seabed throughout Buoy Deployment Area 1 is characterized as predominantly sand with occasional shell fragments. Areas of higher reflectivity in the side scan sonar dataset map across the area and correlate to bathymetric lows. Environmental sampling and bottom photos show these areas to contain a higher proportion of coarser gravels. The seabed interpretation identifies three seabed types: sand with occasional shell fragments, slightly gravelly sand, and sandy gravel.

Seabed features and the side scan sonar mosaic for the Buoy Deployment Area 1 are presented as Chart 11179.103 and Chart 11179.104, respectively, in Appendix C. Two sonar contacts are present in the side scan sonar data within Buoy Deployment Area 1, with one target interpreted as a boulder with a height of 0.3 ft (0.1 m) and the other interpreted as linear debris with a length of 103 ft (31.5 m).

The residual (anomalous) magnetic field contours for Buoy Deployment Area 1 are presented as Chart 11179.107 in Appendix C. Thirteen (13) magnetic anomalies occur within Buoy Deployment Area 1 (see Appendix C). None of these anomalies are associated with either of the identified side scan sonar targets.

Shallow soils interpretation was based on both the shallow seismic chirp system as well as the medium penetration sparker seismic data. Horizons were predominantly digitized from the sparker data due to the limited penetration of the chirp system into the sandy sediments within the survey area. The elevation of the base of the Holocene Marine Deposits is mapped and presented on Chart 11179.106. The thickness of this unit is contoured as isopachs on Chart 11179.105. The base of these sediments below seabed at the FLiDAR 1, Wave and Met Buoy, and Current Meters Locations are 13.4 ft (4.1 m), 8.9 ft (2.7 m), and 13.1 ft (4.0 m), respectively. The Holocene deposits generally thicken slightly towards the East. Pleistocene sediments underlie the Holocene sediments, with unconformities present. The base of these deposits reaches a maximum depth below seabed of 128 ft (39 m) in a north-south trending channel feature in the east of the survey area.

7.1.2 Buoy Deployment Area 2

Water depths across Buoy Deployment Area 2 range between 92 ft (28.1 m) and 101 ft (30.8 m) NAVD88. Water depth at the proposed FLiDAR 2 location is 29.6 m NAVD88. The seafloor is characterized as generally flat lying, with low relief bedforms noted across much of the area. Seafloor gradients across the site are generally less than 1°. Bathymetry contours for the Buoy Deployment Area 2 are presented as Chart 11179.202 in Appendix C.

Environmental sampling show seabed sediments across the FLiDAR 2 survey area to predominantly comprise sand with occasional shell fragments. Areas of higher reflectivity side scan sonar data are noted across the site; which generally correlate with bathymetric lows. Environmental sampling and imagery show these areas to contain a higher proportion of gravels.

Seabed features and a side scan sonar mosaic for the Buoy Deployment Area 2 are presented as Chart 11179.203 and Chart 11179.204 in Appendix C respectively. Fifteen side scan sonar contacts are present within Buoy Deployment Area 2. Fourteen of these contacts are interpreted as boulders and occur within the locations of the gravelly sediments. One contact is interpreted as an item of debris. The boulders range in interpreted size from 0.3 ft (0.1 m) to 1.6 ft (0.5 m) in height.

Chart 11179.207 in Appendix C presents the residual (anomalous) magnetic field contours for Buoy Deployment Area 2. Twenty-one (21) magnetic anomalies occur within Buoy Deployment Area 2 (see Appendix C). None of these anomalies are associated with side scan sonar targets. Two larger magnetic anomalies of 23 nanotesla and 20 nanotesla were identified 1351.7 ft (412 m) and 662.7 ft (202 m) from the FLiDAR 2 location respectively. The other anomalies are not interpreted a hazard to mooring due to their distance from the location and small magnitude, as well as the absence of any features at or below seabed to confirm the presence of a hazard.

Shallow soils interpretation was based on both the shallow seismic chirp system as well as the medium penetration sparker seismic data. Horizons were predominantly digitized from the sparker data due to the limited penetration of the chirp system into the sandy sediments within Buoy Deployment Area 2. The base of the Holocene Marine Deposits is mapped and presented on Chart 11179.206. The base of these sediments below seabed at the FLiDAR 2 location is 6.2 ft (1.9 m). The thickness of this unit is contoured as isopachs on Chart 11179.205. The Holocene deposits generally thicken slightly towards the west. Pleistocene sediments underlie the Holocene sediments, with a number of unconformities present.

7.1.3 Natural Seafloor and Sub-Seafloor Hazards

The HRG datasets were analyzed for seafloor and sub-seafloor hazards, which could pose a potential risk to the installation, operation, and maintenance of the Metocean facilities.

The HRG datasets were used to determine the presence or absence of additional geological hazards (see Table 7-1). The side scan sonar, multibeam bathymetry, and sub-bottom profiler datasets were reviewed and do not provide any evidence of seismic activity, such as extensive or regional faulting or slump and mass wasting features. Additionally, no fault zones, nor any other faulting activity, are identified either from seabed data or from the sub-bottom profiler records, as would typically be indicated by offset sedimentary bedding planes in the sub-bottom profiles or linear fault-related features on the seabed. No faults or other sedimentary features indicative of differential compaction or localized seabed subsidence have been identified. As there has been no faulting identified, there has also been no evidence of faulting attenuation effects observed in the geophysical datasets. These results are consistent with the expected nature of the passive continental margin of the New York Bight.

No areas of acoustic whiteouts or other significant amplitude anomalies were observed in the sub-bottom profiler data, as would be anticipated for any significant accumulation of shallow gas. The sub-bottom profiler records do not contain any bottom simulating reflectors, which are a typical indication of the presence of hydrates. The interpretation of the side-scan sonar, multibeam bathymetry, and sub-bottom profile datasets provide no evidence of ice scour, such as seabed gouging by either icebergs or sea ice pressure ridges. Additionally, no craters or other seabed evidence of strudel scours were noted in any of the datasets.

Based on the Geophysical Site Investigation Site Characterization Reports for Site Acquisition Plan (Appendix C), the site conditions are suitable for the installation of the Metocean Facilities and associated mooring equipment in each of the two Buoy Deployment Areas. No notable hazards are identified which would preclude installation at these locations. The low-relief bedforms on areas of the seabed may indicate minor seabed currents, but no larger scour-related features, such as deep moats, nor evidence of large-scale migrating bedforms are present in the seabed and shallow subsurface datasets. Due to the absence of these more significant features, seabed currents are inferred to be modest and seabed scour due to bottom currents is not anticipated to be an issue for the mooring systems. The boulders identified within the Deployment Areas are generally small, with lower relief (1.6 ft [0.5 m] or less) and do not represent a significant hazard to the installation, operations, maintenance, or recovery of the mooring systems. While buried channels are identified within the Pleistocene sediments, these sub-seafloor features do not represent a hazard to the mooring systems.

7.2 Archaeological Resources

The following section summarizes the analysis and findings described in the Marine Archaeological Resource Assessment Report (Appendix D).

7.2.1 Affected Environment

Installation of the Metocean Facilities has the potential to affect submerged archaeological resources.

The New York Lease Area is located roughly 25 miles (40 km) from the mouth of New York Harbor at its closest point, which suggests a high potential for both historic and prehistoric archaeological sites. This high potential designation is based on the historic maritime activity of the area and prehistoric occupation on the once exposed continental shelf. The preservation potential for archaeological resources within the New York Lease Area, however is low. The low preservation potential results from two related factors: marine transgression and seafloor sedimentation. Sedimentation rates have been low along the continental margin within the last 10,000 years, and the seafloor has been exposed to erosional forces associated with both marine transgression and seabed currents. Consequently, relict channels of major rivers have the potential to be recognized in marine remote sensing datasets, but the identification of small-scale sites and landforms is limited.

SEARCH, Inc. conducted an archaeological assessment of the HRG survey data acquired in 2018 for the Project (described in Section 7.1). To support this effort, SEARCH maritime archaeologists, submerged paleoarchaeologists, and historians created a prehistoric and historic context for the region, assembled a geologic and environmental background, reviewed previous archaeological investigations conducted in the vicinity, and identified submerged cultural resources reported in the vicinity of the New York Lease Area to supplement and guide data analysis. This information, a discussion of survey and data processing technologies and methodologies, and the archaeological findings and recommendations are presented as the Marine Archaeological Resource Assessment Report for the Empire Wind SAP survey (Appendix D).

The HRG survey utilized numerous remote survey methods including: marine gradiometer, side scan sonar, subbottom profiler, and multibeam echosounder. Archaeological review of the survey data focused on the entire Buoy Deployment Areas, although bottom disturbing activity will be limited to the footprint of the clump

weight anchors and mooring chain resting on the seafloor. The Area of Potential Effect (APE) is defined as the area of seabed disturbance associated with the metocean facilities.

The qualified marine archaeologist from SEARCH identified no magnetic anomalies and no side scan sonar contacts representing submerged cultural resources within the two Buoy Deployment Areas. Sub-bottom profiler data was collected and analyzed to identify paleolandscape features. This data indicated that no prominent seismic reflectors indicative of paleo-landforms are present that may preserve inundated archaeological sites.

7.2.1.1 Buoy Deployment Area 1

SEARCH identified twenty-two magnetic anomalies (meeting the 5-gamma threshold), five acoustic contacts, and forty unique acoustic reflectors (representing eleven total reflective features) in Buoy Deployment Area 1 (Appendix D, Appendix A-1 to A-4). These reflectors do not exhibit characteristics of a submerged paleolandscape potentially used for occupation but instead likely represent a geographically wide-spread, natural, geologic feature.

7.2.1.2 Buoy Deployment Area 2

SEARCH identified six magnetic anomalies, ten acoustic contacts, and six unique buried reflectors (representing six total reflective features) in the Buoy Deployment Area 2 APE (Appendix D, Appendix A-5 to A-8). These targets do not exhibit characteristics of verified shipwrecks.

The anomalies, contacts, and reflectors observed in the data records for the Buoy Deployment Area 1 and Buoy Deployment Area 2 likely relate to modern debris and non-cultural geological features. Given that no remote-sensing targets exhibit characteristics of verified shipwrecks or paleolandscapes, no features of cultural significance have been identified for both Buoy Deployment Area 1 and Buoy Deployment Area 2.

7.2.2 Potential Impacts and Proposed Mitigation Measures

Based upon the results of the 2018 marine archaeological assessment (Appendix D), no potential submerged cultural or archaeological resources were identified within Buoy Deployment Areas, and as such, the installation and operation of the proposed Metocean Facilities would result in no impacts to marine archaeological resources. Due to the height of the FLiDAR (13.5 ft [4.1 m]) from the sea surface to the top of the hull mast) and the distance from shore, the installation and operation of the Metocean Facilities will not result in any visual impacts.

7.3 Benthic Resources

The following section summarizes results of the benthic habitat assessment that was conducted in March to April 2018. The survey was conducted in accordance with the plan, approved by BOEM on February 27, 2018. The full benthic habitat assessment report is provided in Appendix E.

Benthic samples were collected at five locations using a stainless-steel 0.1-m² Day grab (Figure 7-1). The grab carried extra weights where appropriate to induce better penetration on impact and an extended bucket lip to reduce sediment washout. Storm feet and elastic straps were used to reduce the likelihood of the instrument pre-triggering in the water column during deployment. An attached, protective enclosure held a SubSea 1Cam HD digital camera with a dedicated video lamp. Pre-grab still photographs were taken at each station. Sediment grab samples were in general concordance with the remote imagery, confirming a predominance of sand occasionally mixed with gravel.

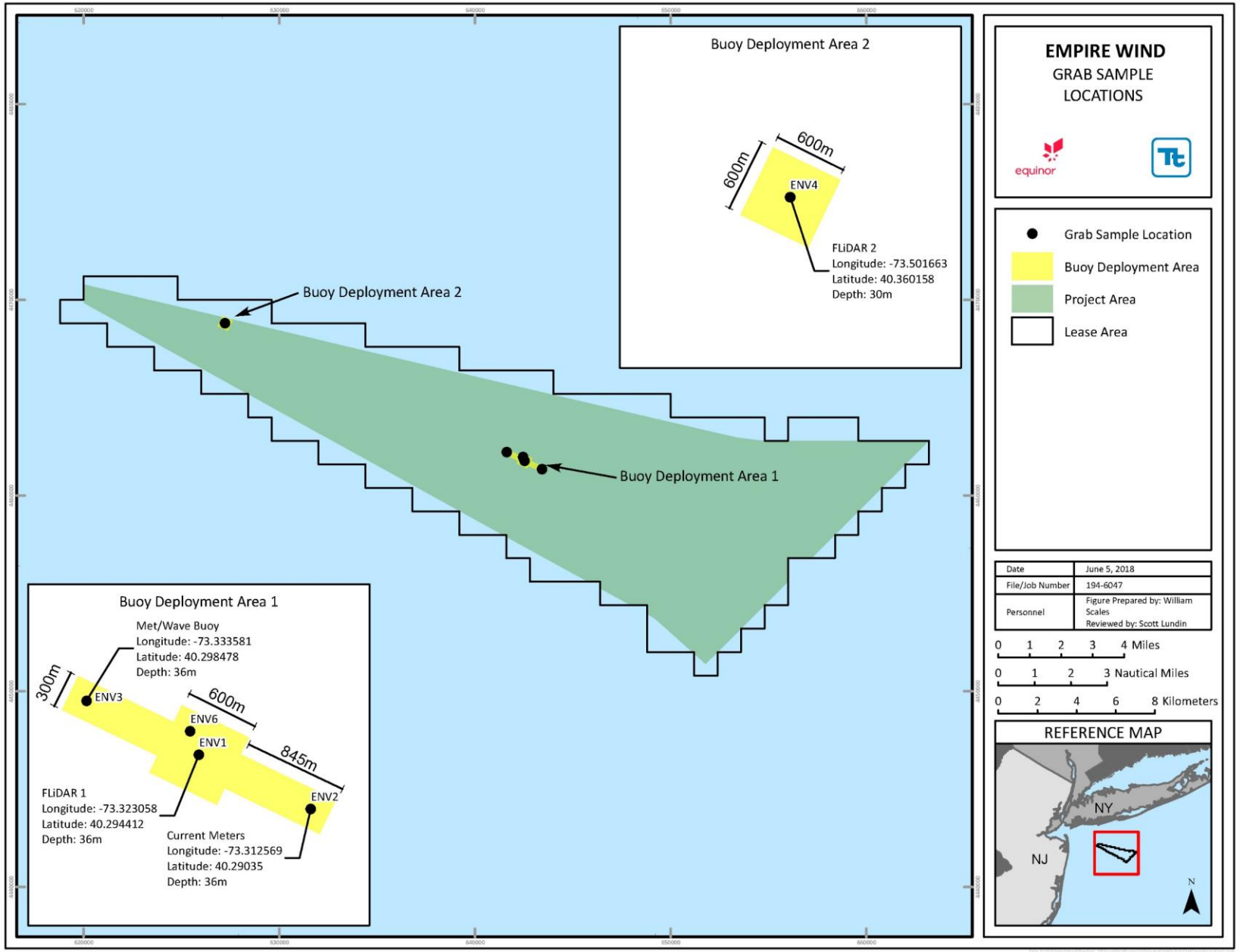


Figure 7-1 Grab Sample Locations

No evidence of protected or unique habitats was indicated by the seabed imagery or grab sampling in either Buoy Deployment Area. No benthic species listed under the ESA occur in the Lease Area. No protected fish species were observed during the survey.

7.3.1 Buoy Deployment Area 1

The side scan sonar imagery in the Buoy Deployment Area 1 indicated a generally flat bottom with a range of reflectivities. The substrate was dominated by slightly gravelly fine to medium sand with occasional shell fragments at Stations ENV1, ENV2, and ENV3. Station ENV6, which was added to represent an area of medium reflectivity near the FLiDAR 1 location, had larger grain sizes, identified as coarse sand. Total organic content was low at all stations, ranging from 0.2 to 0.4 percent. Water depths ranged between 108.3 ft (33.0 m) and 124.0 ft (37.8 m) NAVD88.

Infaunal organisms in grab samples from the four stations associated with Buoy Deployment Area 1 varied in taxonomic diversity and overall abundance of organisms. Station ENV2, which was farthest offshore and in the deepest water, had the fewest individuals (44 of 529) and the smallest number of distinct taxa (8 of 60). Species distribution was patchy among the four stations, as shown by the Coastal and Marine Ecological Classification Standard (CMECS). All four stations were classified as Benthic Biota: Faunal Bed: Soft Sediment Fauna, then diverged as shown in Table 7-2. Stations are presented in order of distance from shore.

Table 7-2 Buoy Deployment Area 1 Grab Samples

Station	Biotic Group	Biotic Community
ST18904-ENV3	Sand Dollar Bed	*Echinarachnius parma* Bed
ST18904-ENV6	Small Surface- Burrowing Fauna	Lumbrinerid Bed
ST18904-ENV1	Diverse Soft Sediment Epifauna	Sand Dollar/ Sea Pansy/ Mobile Mollusk Bed (Large Megafauna)
ST18904-ENV2	Sand Dollar Bed	*Echinarachnius parma* Bed

7.3.2 Buoy Deployment Area 2

The Buoy Deployment Area 2 was characterized as generally flat but traversed by a broad depression about 6.6 ft (2 m) deep running northwest to southeast. Thirteen boulders and one debris item were identified in the side scan sonar imagery. Only one station (ENV4) was sampled in this area.

Seabed imagery indicated that the low reflectivity seabed consisted of medium sand with occasional shell fragments. The grab was described as slightly gravelly silty sand with a very slight anoxic odor.

The single FLiDAR 2 location (ENV4) had notably higher species diversity and abundance than the four sampling locations associated with FLiDAR 1. Forty-five percent of the individuals and 42 percent of the taxa collected from grab samples were from this station. The Buoy Deployment Area 2 location also had relatively higher percent TOC (0.07) and finer grain size than the stations to the east. Water depths ranged between 92.2 ft (28.1 m) and 101.1 ft (30.8 m) NAVD88 in the Buoy Deployment Area 2.

The benthic community at ENV4 was characterized as Larger Tube-Building Fauna: Robust Ampelisca Bed; the infauna was dominated by polychaetes and amphipods. Epibenthic organisms observed in the imagery included cariid shrimp, bivalves, and gastropod snails. A solitary tube-dwelling anemone (Ceriantharia) was the only anthozoan observed in grab samples. Hydractinia symbiolongicarpu was observed in benthic imagery. Neither of these species form biogenic reefs. These species are not considered indicative of sensitive benthic habitat.

7.4 Fisheries

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Section 4.4.2.7 of the revised EA describes the affected environment and potential impacts to fisheries that may result from site assessment activity. The information in BOEM (2016) is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.2) regarding fisheries in and near the project area and has determined that no new substantive information has become available that warrants revision of the analysis in BOEM (2016). While stock assessments for the Mid-Atlantic fisheries resources are regularly updated, the description of species assemblages in the Revised Offshore New York EA are considered representative of current conditions.

Critical habitat for the Atlantic sturgeon was designated in August 2017, after the Revised Offshore New York EA was released. However, no critical habitat was designated within the Lease Area (NOAA 2017a), (82 FR 39160). BOEM's analysis is applicable and the determination that the proposed site assessment activity would not likely to adversely affect Atlantic sturgeon is appropriate. The oceanic whitetip shark (*Carcharhinus longimanus*) and the manta ray (*Manta birostris*) were proposed for listing as threatened under the ESA after the Revised Offshore New York EA was released (NMFS 2017 and 2018). These large mobile elasmobranchs will be assumed present in the Lease Area; they are expected to behave much like other more common sharks, skates, and rays by avoiding areas of human activity and noise. BMPs implemented for other fish, including Atlantic and shortnose sturgeon, would be protective of the whitetip shark and manta ray. The proposed site assessment activity would not adversely affect these proposed threatened species.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include implementing BMPs during installation, operation, and decommissioning of the Metocean Facilities to minimize impacts on fisheries, including species protected under the ESA. Lease Stipulation 4.1.5 requires that Equinor Wind US LLC develop a publicly available Fisheries Communications Plan that describes the strategies that Equinor Wind US LLC intends to use for communicating with fisheries stakeholders prior to and during activities in support of the submission of a plan. The Fisheries Communications Plan presents Equinor Wind US LLC's proposed approach to outreach with the fishing industry in relation to the development of the Project. The draft Fisheries Liaison & Outline Coexistence Plan for survey activities is available online at https://www.equinor.com/en/what-we-do/empirewind.html. Additionally, Equinor Wind US LLC has contracted with Sea Risk Solutions LLC to provide Fisheries Liaison Officer(s) to the Project. Sea Risk Solutions leverages experience, technology, innovation, and people skills to mitigate risks and serve as a bridge among marine sectors. The lead Fisheries Liaison Officer for the Project will be:

Stephen Drew
Sea Risk Solutions LLC
sdrew@searisksolutions.com
Tel +1 908 339 7439

Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.5 Marine Mammals and Sea Turtles

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Sections 4.4.2.5 and 4.4.2.6 of the EA provide details on the species and seasonal occurrence of marine mammals and

sea turtles that may be present during the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed publicly available literature and data published since the Offshore New York EA and Finding of No Significant Impact were issued (see Section 8.3). There is no substantive new information that would change BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant or population-level effects to marine mammals or sea turtles.

BOEM's EA references NMFS biological opinion on assessment activities in the [Empire Wind Lease Area] (NMFS, 2013a), and states that, 'The potential for marine mammals to interact with the buoy and become entangled in the buoy or mooring system is extremely unlikely given the low probability of a marine mammal encountering one buoy or mooring system within the [Empire Wind Lease Area], and the high tension of the chain which further reduces risk of entanglement". Appreciating the biological opinion relates to an all chain mooring, the key points to note are the extremely unlikely possibility of that contact occurring, in addition to the reduced risk from a line under tension, which would be applicable to the polypropylene line under tension.

As stated above, the use of polypropylene rope in a taught and vertical section of the moorings is not deemed to be a significant entanglement risk, and alternative material such as chain or wire rope add risk to the safe and effective deployment and recovery procedures, while not necessarily adding any proportional value to mitigating extremely unlikely events. Other mitigation such as coating the rope section in plastic tubing have been explored, but have also been deemed to add risk through potential wear and failure of the rope section, again at little or no proportional mitigating value.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for interactions with or impacts on marine wildlife. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

Pile driving activity is not required for met buoy installation and therefore there will be no acoustic harassment associated with met buoy installation and mitigation measures are not applicable.

7.6 Avian and Bat Resources

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Sections 4.4.2.1 and 4.4.2.2 of the EA provide details on the species and seasonal occurrence of avian and bat resources that may be present during the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.4) regarding avian and bat resources in the Mid-Atlantic off the coast of New York and has determined that there is no substantive new information that would change BOEM's analysis. The results of the EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant or population-level effects to avian and bat resources is applicable.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for interactions with or impacts on avian and bat resources. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.7 Water Quality

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Section 4.4.1.2 of the EA provide details on the potential impacts to water quality that result from the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.5) regarding water quality in the Mid-Atlantic off the coast of New York and has determined that there is no substantive new information that would change BOEM's analysis. The results of the EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant impact to water quality is applicable.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for impacts on water quality. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.8 Air Quality

The closest points of land to the proposed site assessment activity are located in Nassau County, New York. In addition, vessels traveling from Miller's Launch to service the Project will transit through waters located in Richmond County, NY (Staten Island) and potentially also in Kings County, NY (Brooklyn). All three of these counties have been designated as moderate nonattainment for the 1997 8-hour ozone (O_3) standard in the revised National Ambient Air Quality Standards (NAAQS); as marginal nonattainment for the 2008 8-hour O_3 standard; as maintenance areas for the 1971 8-hour and 1-hour carbon monoxide [CO] standards; and as maintenance areas for the 1997 annual and 2006 24-hour $PM_{2.5}$ standards. In addition, the U.S. Environmental Protection Agency (EPA) has designated New York as an unclassifiable/attainment area for the new one-hour NO_2 NAAQS, which was promulgated in 2010, pending the collection of additional monitoring data. A similar designation is expected for the one-hour sulfur dioxide (SO_2) NAAQS. New York is designated as unclassifiable or attainment for all other NAAQS. Finally, all of New York is within the Northeast Ozone Transport Region as designated by the Clean Air Act.

7.8.1 Potential Impacts and Proposed Mitigation Measures

The proposed site assessment activity has the potential to impact local air quality. Potential emission sources would however be limited to a single work boat and a support vessel. The vessel associated with these activities would emit criteria air pollutants (NO_x, CO, SO_2, particulate matter less than 10 microns in diameter [PM_{10}], particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), and volatile organic compounds [VOCs]), hazardous air pollutants (HAPs) and greenhouse gasses [GHGs]). The vessel would emit pollutants both in state and federal waters while traveling to and from the Installation Areas throughout the operational lifecycle of the proposed buoys. Impacts from pollutant emissions associated with this vessel would likely be localized within the immediate vicinity of the site assessment activity.

It is anticipated that the installation and decommissioning of the buoys would each be completed over a period of up to seven over three separate vessel trips. During the operations phase, Equinor Wind US LLC has assumed one separate round trip every six months to each of the four deployment sites (FLiDAR 1, FLiDAR 2, wave and met buoy, and CM/CT mooring) for a single work boat during the operational period. After accounting for the 2-year operational life of the FLiDAR buoys and the 4-year operational life of the wave and met buoy and the CM/CT mooring, this results in a total of 20 round trips during the operations phase. A

summary of the air emission estimates is presented in Table 7-3, and the detailed emission calculations and assumptions are presented in Appendix H.

Table 7-3 Equinor Metocean Facilities Air Emissions Summary

Metocean Facilities Activity	VOC tons	NO_X tons	CO tons	PM/PM_{10} tons	$PM_{2.5}$ tons	SO_2 tons	HAPs tons	GHG tons CO_2e
Deployment Activities (Yr. 1)	0.015	0.53	0.27	0.014	0.014	7.08E-05	0.003	38.0
Maintenance Activities (Yrs. 1-2)	0.034	1.25	0.64	0.033	0.032	1.66E-04	0.007	89.0
Maintenance Activities (Yrs. 3-4)	0.018	0.64	0.32	0.017	0.016	8.45E-05	0.004	45.4
Unscheduled Visits (up to 1 per yr.)	0.002	0.08	0.04	0.002	0.002	1.06E-05	0.000	5.7
Decommissioning Activities (end of Yr. 2)	0.010	0.35	0.18	0.009	0.009	4.92E-05	0.002	26.4
Decommissioning Activities (end of Yr. 4)	0.005	0.18	0.09	0.005	0.005	2.44E-05	0.001	13.0
Maximum Annual Emissions (tons) [1]	**0.051**	**1.86**	**0.95**	**0.049**	**0.048**	**2.47E-04**	**0.011**	**132.7**
Total Project Lifetime Emissions (tons)	**0.12**	**4.53**	**2.31**	**0.12**	**0.12**	**6.04E-04**	**0.026**	**324.3**

Note:
1. The maximum annual emissions occur for Year 1 of the project, and include the initial deployment activities, two rounds of 6-month inspections, and up to one unscheduled visit.

Emissions associated with the site assessment activity would be minor based on the estimate of less than 50 tons per year of NO_X and VOCs, 100 tons per year of the other criteria air pollutants, and 25 tons per year of HAPs or 10 tons per year of any individual HAP. The majority of these emissions would occur within Installation Areas and therefore would not affect local onshore air quality in New York. Additionally, since the buoys would not be considered an OCS source and the project emissions are associated with mobile sources, an OCS air permit for these activities will not be required.

7.9 Socioeconomic Resources

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Section 4.4.3 of the EA provide details on the affected environment and potential impacts to socioeconomic resources that may result from the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.7) regarding socioeconomic resources in the Mid-Atlantic off the coast of New York and has determined that there is no substantive new information that would change BOEM's analysis. The results of the EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant impact to socioeconomic resources is applicable.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for impacts on social and economic resources. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.10 Coastal and Marine Uses

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Sections 4.3.3, 4.4.2., and 4.4.3 of the EA provide details on the affected environment and potential impacts to coastal and marine uses that may result from the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.8) regarding coastal and marine uses off the coast of New York and determined that there is no substantive new information that would change BOEM's analysis. The results of the EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant impact to coastal and marine uses is applicable.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for impacts on coastal and marine uses. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

7.11 Meteorological and Oceanographic Hazards

As demonstrated in Section 2, the equipment and methodologies proposed herein by Equinor Wind US LLC are consistent with the activity considered by BOEM in the Offshore New York EA (BOEM 2016b). Sections 4.3.2 of the EA provide details on the affected environment and potential impacts to meteorological and oceanographic hazards that may result from the proposed site assessment activity and is incorporated by reference and not repeated.

Equinor Wind US LLC has reviewed currently available literature and data (see Section 8.9) regarding coastal and marine uses off the coast of New York and has determined that there is no substantive new information that would change BOEM's analysis. The results of the EA and BOEM's analysis and conclusion that the proposed activity is not anticipated to result in any significant impact to meteorological and oceanographic hazards is applicable.

Equinor Wind US LLC has committed to implementing all applicable lease conditions, which include BMPs for the installation, operation, and decommissioning of the Metocean Facilities in order to further reduce the potential for impacts on meteorological and oceanographic hazards. Equinor Wind US LLC will comply with any additional stipulations as set forth in permits or approvals in support of the proposed site assessment activity.

8. REFERENCES

8.1 General

BOEM (Bureau of Ocean Energy Management) Office of Renewable Energy Programs. 2007. Establishment of an OCS Alternative Energy and Alternate Use Program, Record of Decision, December 2007. Available online at https://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Regulatory_Information/OCS_PEIS_ROD.pdf.

BOEM. 2012. Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New Jersey, Delaware, Maryland, and Virginia. Final Environmental Assessment. January 2012. Available online at: http://www.boem.gov/uploadedFiles/BOEM/Renewable_Energy_Program/Smart_from_the_Start/Mid-Atlantic_Final_EA_012012.pdf.

BOEM. 2016a. Guidelines for Information Requirements for a Renewable Energy Site Assessment Plan. Available online at https://www.boem.gov/Final-SAP-Guidelines/.

BOEM. 2016b. Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York. https://www.boem.gov/NY-EA-FONSI-2016/.

NYSERDA (New York State Energy Research and Development Authority). 2017a. NYS Offshore Wind Master Plan: Studies and Surveys. Available online at https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/New-York-Offshore-Wind-Master-Plan/Studies-and-Surveys.

8.2 Fisheries

77 FR 5880, February 6, 2012 pp 5879-5912

77 FR 5913, February 6, 2012 pp 5913-5982

NMFS. 2017. 82 FR 3694: 3694-3715 (22 pages) 12-Month Finding on a Petition to List Giant and Reef Manta Rays as Threatened or Endangered Under the Endangered Species Act.

NMFS. 2018. 83 FR 4153: 4153-4165 (13 pages). Endangered and Threatened Wildlife and Plants; Listing the Oceanic Whitetip Shark as Threatened Under the Endangered Species Act (ESA).

NOAA (National Oceanic and Atmospheric Administration). 2017a. Endangered and Threatened Species; Designation of Critical Habitat for the Endangered New York Bight, Chesapeake Bay, Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon and the Threatened Gulf of Maine Distinct Population Segment of Atlantic Sturgeon https://www.gpo.gov/fdsys/pkg/FR-2017-08-17/pdf/2017-17207.pdf) 82 FR 39160 [Aug 17, 2017]: 39160-39274

Northeast Fisheries Science Center. 2013a. 56th Northeast Regional Stock Assessment Workshop (56th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-10; 868 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Northeast Fisheries Science Center. 2013b. 57th Northeast Regional Stock Assessment Workshop (57th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 13-16; 967 p. Available from:

National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/

Northeast Fisheries Science Center. 2014. 58th Northeast Regional Stock Assessment Workshop (58th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 14-04; 784 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://nefsc.noaa.gov/publications/

Northeast Fisheries Science Center. 2015. 60th Northeast Regional Stock Assessment Workshop (60th SAW) Assessment Report. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 15-08; 870 p. doi: 10.7289/V5W37T9T

Terceiro M. 2012. Stock assessment of scup (Stenotomus chrysops) for 2012. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 12-25; 104 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

8.3 Marine Mammals and Sea Turtles

BOEM. 2017. Rhode Island, Connecticut, New York, and New Jersey ESI: M_MAMPT (Marine Mammal Points). Available online at: https://catalog.data.gov/dataset/rhode-island-connecticut-new-york-and-new-jersey-esi-m-mampt-marine-mammal-points.

BOEM. 2018. Summary Report: Best Management Practices Workshop for Atlantic Offshore Wind Facilities and Marine Protected Species. Available online at: https://www.boem.gov/Final-Summary-Report-for-BMP-Workshop-BOEM/

NOAA. 2015. Biologically Important Areas for Cetaceans within U.S. Waters – East Coast Region. Available online at http://www.aquaticmammalsjournal.org/images/files/AM_41.1_Complete_Issue.pdf; http://www.aquaticmammalsjournal.org/images/files/AM_41.1_Supplemental_Tables.pdf.

NOAA. 2016. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2016. Available online at http://www.nmfs.noaa.gov/pr/sars/pdf/2016_atlantic_sars_final.pdf.

NOAA. 2017b. NOAA CetMap. Available online at http://cetsound.noaa.gov/important.

8.4 Avian and Bat Resources

Burger, J. and L. Niles. 2017 Shorebirds, Stakeholders, and Competing Claims to the Beach and intertidal habitat in Delaware Bay, New Jersey, USA. Natural Science: V9(6) pp. 181-205.

Desorbo, C. R., Gray, R. B., Tash, J., Gray, C. E., Williams, K. A., & Riordan, D. 2015. Offshore migration of Peregrine Falcons (Falco peregrinus) along the Atlantic Flyway. *Wildlife Densities and Habitat Use Across Temporal and Spatial Scales on the Mid-Atlantic Outer Continental Shelf: Final Report to the Department of Energy EERE Wind & Water Power Technologies Office. Williams KA, Connelly EE, Johnson SM, Stenhouse IJ (eds.) Award Number: DE-EE0005362. Report BRI*, *11*.

Goodale, M. W., and Stenhouse, I.J. 2016. A conceptual model to determine vulnerability of wildlife populations to offshore wind energy development. *Human-Wildlife Interactions*, *10*(1), 53.

Goyert, H. F., Gardner, B., Sollmann, R., Veit, R. R., Gilbert, A. T., Connelly, E. E., & Williams, K. A. 2016. Predicting the offshore distribution and abundance of marine birds with a hierarchical community distance sampling model. *Ecological Applications*, *26*(6), 1797-1815.

Kinlan, B.P., C. Menza, and F. Huettmann. 2012. Predictive Modeling of Seabird Distribution Patterns in the New York Bight. Chapter 6 in "A biogeographic assessment of seabirds, deep sea corals and ocean habitats of the New York Bight: science to support offshore spatial planning." NOAA Technical Memorandum NOS NCCOS 141 (2012).

Kinlan, B.P., A.J. Winship, T.P. White, and J. Christensen. 2016. Modeling At-Sea Occurrence and Abundance of Marine Birds to Support Atlantic Marine Renewable Energy Planning: Phase I Report. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Sterling, VA. OCS Study BOEM 2016-039. xvii+113 pp. Available at https://www.data.boem.gov/PI/PDFImages/ESPIS/5/5512.pdf.

NiSource 2013. NiSource Multi-Species Habitat Conservation Plan. Available online at: https://www.fws.gov/midwest/Endangered/permits/hcp/nisource/2013NOA/NiSourceHCPfinalJune2013.html. Accessed July 14, 2017.

NYSERDA. 2010. Pre-development of avian species for the proposed Long Island – New York City Offshore Wind Project Area. Final Report prepared for the New York State Energy Research and Development Authority. October 2010.

NYSERDA. 2017b. Data Review and Gap Analysis. Available at: https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/New-York-Offshore-Wind-Master-Plan/Studies-and-Surveys

Peterson, T. 2016. Long-term Bat Monitoring on Islands, Offshore Structures, and Coastal Sites in the Gulf of Maine, mid-Atlantic, and Great Lakes- Final Report. Report by Stantec Consulting Inc. pp 171.

United States Fish and Wildlife Service. 2015. Northeast Region – Rufa Red Knot. Available online at: https://www.fws.gov/northeast/redknot/.

United States Fish and Wildlife Service. 2017a. Northeast Region – Endangered Species. Available online at: https://www.fws.gov/northeast/ecologicalservices/endangeredspecies.html.

United States Fish and Wildlife Service. 2017b. Midwest Region – Northern Long-eared bat (*Myotis septentrionalis*) Status: Threatened with 4(d) Rule. Available online at: https://www.fws.gov/midwest/endangered/mammals/nleb/index.html.

Williams, K., Stenhouse, I., Adams, E., Connelly, E., Gilbert, A., and Duron, M. 2015. Integrating novel and historical survey methods: a comparison of standardized boat-based and digital video aerial surveys for marine wildlife in the United States. *Wildlife Densities and Habitat Use Across Temporal and Spatial Scales on the Mid-Atlantic Outer Continental Shelf: Final Report to the Department of Energy EERE Wind & Water Power Technologies Office*.

Winiarski, K. J., Burt, M. L., Rexstad, E., Miller, D. L., Trocki, C. L., Paton, P. W., and McWilliams, S. R. 2014. Integrating aerial and ship surveys of marine birds into a combined density surface model: A case study of wintering Common Loons. *The Condor*, *116*(2), 149-161.

Zipkin, E. F., Kinlan, B. P., Sussman, A., Rypkema, D., Wimer, M., and O'Connell, A. F. 2015. Statistical guidelines for assessing marine avian hotspots and coldspots: A case study on wind energy development in the US Atlantic Ocean. *Biological Conservation*, *191*, 216-223.

8.5 Water Quality

U.S. Environmental Protection Agency (U.S. EPA). 2012. National Coastal Condition Report IV, Chapter 3: Northeast Coast Coastal Condition. September 2012. Available at: https://www.epa.gov/sites/production/files/2014-10/documents/0_nccr_4_report_508_bookmarks.pdf

Mid-Atlantic Regional Ocean Assessment. Accessed August 14, 2017. Available online at: http://roa.midatlanticocean.org/

8.6 Air Quality

The Climate Registry. 2008. "General Reporting Protocol." Version 1.1.

ICF International. 2009. "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories."

U.S. EPA. 2010. "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition." EPA420-R-10-018/NR-009d.

U.S. EPA. 2008. "Climate Leaders Greenhouse Gas Inventory Protocol Core Module Guidance: Direct Emissions from Mobile Combustion Sources." EPA430-K-08-004.

U.S. EPA. 2016. "2014 National Emissions Inventory, version 1, Technical Support Document." Draft, December 2016. Available from: https://www.epa.gov/sites/production/files/2016-12/documents/nei2014v1_tsd.pdf.

8.7 Socioeconomic Resources

MarineCadastre.gov. Data Registry.

National Oceanic and Atmospheric Administration - Greater Atlantic Regional Fisheries Office (GARFO). 2017. Vessel Reporting. Available online at: https://www.greateratlantic.fisheries.noaa.gov/aps/evtr/index.html

Northeast Ocean Council. 2015. Northeast Ocean Data Viewer. Available online at: http://northeastoceanviewer.org/#.

National Ocean Economic Program. 2015. Available online at: http://www.oceaneconomics.org/Market/coastal/coastalEcon.asp.

U.S. Census Data. 2016. Available online at: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

8.8 Coastal and Marine Uses

American Association of Port Authorities. 2017. Resources by Topic, Available online at http://www.aapa-ports.org/topic.aspx?ItemNumber=21264. Last accessed 06/15/2018.

Mid-Atlantic Regional Council on the Ocean. 2016. Mid-Atlantic Regional Ocean Assessment. Available online at http://roa.midatlanticocean.org/. Last accessed 06/15/2018.

Mid-Atlantic Regional Planning Body. 2016. Mid-Atlantic Regional Ocean Action Plan. Available online at https://www.boem.gov/Mid-Atlantic-Regional-Ocean-Action-Plan/. Last accessed 06/15/2018.

NOAA Office for Coastal Management. 2018. New York. Available online at https://coast.noaa.gov/states/new-york.html. Last accessed 06/15/2018.

NYSERDA. 2017c. Marine Recreational Uses. Available at: https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/17-25m-Marine-Recreational-Uses-Study.pdf

World Port Service. 2018. USA Ports by State and Port Index, New York. Available online at http://www.worldportsource.com/ports/index/USA_NY.php. Last accessed 06/15/2018.

8.9 Meteorological and Oceanographic Hazards

Climate Central. 2014. New York and The Surging Sea, A vulnerability assessment with Projections for Sea Level Rise and Coastal Flood Risk. Available online at https://riskfinder.climatecentral.org/api/reports/state/new-york.us/state-report?lang=en

Earth Observatory. Irene's Sediment in New York Harbor. 2011. Available online at https://earthobservatory.nasa.gov/NaturalHazards/view.php?id=51975 Last accessed June 15, 2018.

NOAA. 2018. Physical Oceanographic Real-Time System - New York/New Jersey Harbor. Available online at https://www.co-ops.nos.noaa.gov/ports/index.html?port=ny. Last accessed 15 June 2018.

Surging Seas. 2018. Risk Finder, New York, USA. Available online at https://riskfinder.climatecentral.org/state/new-york.us?comparisonType=county&forecastType=NOAA2017_int_p50&level=6&unit=ft Last accessed 15 June 2018.

This page intentionally left blank

Appendix A
Permits and Consultations

This page intentionally left blank

Agency & Tribe Outreach Summary Table

Agency	Key Contacts	Meetings
Bureau of Ocean Energy Management (BOEM)	Luke Feinberg, Brian Hooker, Brian Krevor, Josh Gange, Michelle Morin, Kyle Baker, Dave O'Connell, Amy Stillings, David Bigger	May 2017, July 2017, August 2017, October 2017, November 2017, December 2017, January 2018, February 2018, April 2018, June 2017
Environmental Protection Agency	Suilin Chan, Viorica Petriman, Sarah Froiken (SF)	December 2017, March 2018
National Oceanographic and Atmospheric Administration National Marine Fisheries Service	Sue Tuxbury, Doug Christel	November 2017, December 2017, January 2018, February 2018, March 2018
U.S. Army Corps of Engineers, New York District	Naomi Handell, Peter Kuglstatter	September 2017, December 2017, March 2018
U.S. Coast Guard	Michelle DesAutels, Ed LeBlanc, Julia Lewis, Doug Simpson, Chris Scraba, Jeff Yunker, Shannon Andrew, George Detweiler	October 2017, December 2017
U.S. Department of the Interior	Josh Kaplowitz	May 2017, February 2018, December 2017
U.S. Fish and Wildlife Service	Steve Papa, Tim Sullivan	December 2017, February 2018
Massachusetts Department of Marine Fisheries	Cate O'Keefe, Kathryn Ford	August 2017
Rhode Island Department of Environmental Management	Julia Livermore, Nicole Lengyel, Jay MacNamee	August 2017
New York Department of Environmental Conservation	Karen Chytalo, Karen Gaidasz, Sherryl Jones, Kim McKown, Morgan Brunbauer, Emily Runnells	August 2017, February 2018, March 2018
New Jersey Department of Environmental Protection		*Meeting scheduled for July 3, 2018*
New England Habitat Management Council	Michelle Bachmann	March 2018
Shinnecock Tribe	Don Collins, Randy King, Chivon Smith, Kelsey Leonard, Terrell Terry, Reverend Mike Smith	January 2018

Environmental NGOs – Roundtable in June 2017 and February 2018:

- ACENY
- All Our Energy
- Citizens Campaign for the Environment
- National Wildlife Federation
- Natural Resources Defense Council
- NY Audubon
- Operation Splash
- Renewable Long Island
- Sane Energy
- Seatuck Environmental
- Sierra Club
- Surfriders
- Sustainability Institute at Molloy College
- The Nature Conservancy
- Wildlife Conservation Society

This page intentionally left blank

United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

JUN 15 2016

Mr. Matthew P. Maraglio
New York Department of State
Consistency Review Unit
Office of Planning & Development
One Commerce Plaza
99 Washington Avenue, Suite 1010
Albany, New York 12231

Dear Mr. Maraglio:

This document provides the State of New York with the Bureau of Ocean Energy Management's (BOEM) Consistency Determination (CD) for the Wind Energy Area offshore of New York under the Coastal Zone Management Act Section 307(c)(1) and 15 CFR Part 930 Subpart C. The information in this CD is provided pursuant to 15 CFR 930.36(a) and 930.39. The CD takes into consideration the reasonably foreseeable coastal effects of the proposed action and its consistency with the enforceable policies identified by New York's Coastal Zone Management Program. The proposed action includes:

- Lease issuance (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys); and

- Site assessment activities (including reasonably foreseeable consequences associated with the installation and operation of a meteorological tower and/or meteorological buoys) as indicated in the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Environmental Assessment* (EA).

BOEM's analysis of the effects of the proposed action on land and water uses and/or natural resources can be found in the enclosed EA. The New York Coastal Zone Management Program's applicable enforceable policies and reasonably foreseeable coastal effects are included in Table 6 (enclosed) for your review.

Based upon the above referenced information, data and analysis, BOEM finds the proposed action consistent to the maximum extent practicable with the enforceable policies of the New York Coastal Zone Management Program.

Pursuant to 15 CFR 930.41, the New York Coastal Zone Management Program has sixty (60) days from the receipt of this letter in which to concur with or object to this CD, or request an extension under 15 CFR 930.41(b). New York's concurrence will be presumed if its response is not received by BOEM within sixty (60) days of receipt of this determination.

The state's response should be sent to:

Bureau of Ocean Energy Management
Office of Renewable Energy Programs
45600 Woodland Road, VAM-OREP
Sterling, Virginia 20166

We appreciate having a cooperative working relationship with the State of New York as we move forward with our review of potential offshore renewable energy activities.

Sincerely,

James F. Bennett
Program Manager
Office of Renewable Energy Programs

Enclosures

U.S. Department of the Interior
Bureau of Ocean Energy Management

Coastal Zone Management Act, Consistency Determination (15 CFR 930.36(a))

Wind Energy Area Offshore the States of New York and New Jersey

The purpose of this Consistency Determination (CD) is to determine whether issuing a commercial wind energy lease and approving site assessment activities (including the installation, operation, and decommissioning of a meteorological tower and/or buoys) within the Wind Energy Area (WEA) offshore New York and New Jersey (*see* Figure 1) is consistent to the maximum extent practicable with the enforceable policies of the New York and New Jersey Coastal Management Programs (CMPs). This document is provided pursuant to the requirements of 15 CFR 930.39(a) of the Coastal Zone Management Act (CZMA) federal consistency regulations.

Section 307(c)(1) of the CZMA, as amended, requires that Federal agency activities affecting any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of federally-approved state management programs.

The States of New York and New Jersey share common coastal management issues and have similar enforceable policies as identified by their respective CMPs. Due to the proximity of the WEA to both states (*see* Figure 1), and their shared impacts on environmental and socioeconomic resources and uses, the Bureau of Ocean Energy Management (BOEM) has prepared a single CD for the WEA.

BOEM is proposing to issue a commercial wind energy lease within the WEA (as illustrated in Figure 1 and described below) and approve site assessment activities that would determine whether the lease is suitable for, and would support, commercial-scale wind energy production. The lease, by itself, would not authorize the lessee to construct or operate any wind energy project on the Outer Continental Shelf (OCS).

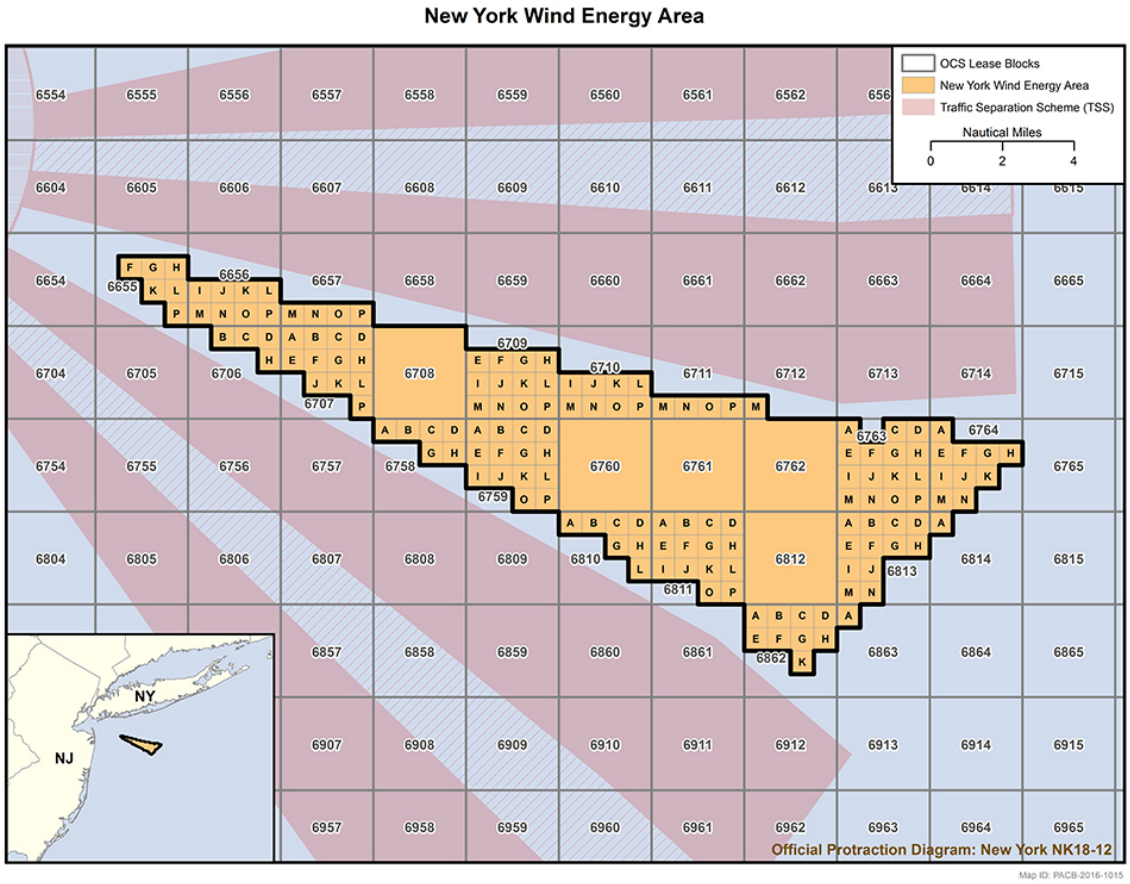


Figure 1: Wind Energy Area

In September 2011, BOEM received an unsolicited request for a commercial lease offshore New York from the New York Power Authority (NYPA). NYPA worked together with the Long Island Power Authority and Consolidated Edison to propose a 350-700 megawatts offshore wind power project south of Long Island, New York, approximately 13 miles (mi) (21 kilometers [km]) off Rockaway Peninsula.

On January 4, 2013, BOEM published a Request for Interest (RFI) in the *Federal Register* (Docket ID: BOEM-2012-0083; 78 FR 760-764) to assess whether there were other parties interested in developing commercial wind facilities in the same area proposed by NYPA. In addition to inquiring about competitive interest, BOEM also sought public comment on the NYPA proposal, its potential environmental consequences, and the use of the area in which the proposed project would be located. BOEM received indications of interest from Fishermen's Energy, LLC, and Energy Management, Inc. BOEM reviewed the nominations received in response to the RFI and determined that competitive interest in the area proposed by NYPA exists. Therefore, BOEM stopped processing NYPA's unsolicited lease application and initiated the competitive leasing process pursuant to 30 CFR 585.211.

On May 28, 2014, BOEM published in the *Federal Register* (Docket ID: BOEM-2013-0087; 79 FR 30645-30651) a Call for Information and Nominations offshore New York to seek additional

nominations from companies interested in obtaining commercial wind energy leases within the Call Area.

On March 16, 2016, BOEM released the Announcement of Area Identification (*see* http://www.boem.gov/NY-Area-ID-Announcement/). The WEA begins about 11 nautical miles (nm) (20 km) south of Long Beach, New York and extends approximately 26 nm (48 km) southeast along its longest portion. The WEA contains five whole OCS blocks and 148 sub-blocks (127 square miles [mi^2] [329 square kilometers (km^2)] or 81,130 acres (ac) [32,830 hectares (ha)]). The WEA is shown in Figure 1 and described in Table 1 below.

Table 1
Wind Energy Area

Wind Energy Area (WEA)	Official Protraction Diagram	Size (sq nautical miles (nm^2))	Distance to Shore (nm)	Minimum Water Depth (feet [ft])	Maximum Water Depth (ft)
New York	New York NK18-12	96	11	61	137

Activities that may occur over the site assessment period of the lease (i.e., up to five years) include site characterization survey activities and site assessment activities involving the construction, operation, maintenance, and decommissioning of a meteorological tower and/or buoys. Site characterization surveys would inform a lessee about the site specifics of the lease area in order to prepare for submission of a site assessment plan (SAP) and, potentially, a construction and operations plan (COP). The projected site characterization and site assessment activities within the WEA are discussed in detail in Section 2 and summarized in Table 2 (below).

Table 2
Projected Site Characterization & Assessment Activities in the WEA

Potential Leaseholds	Site Characterization Activities			Site Assessment Activities	
	High Resolution Geophysical (HRG) Surveys (Total Trips)	Sub-bottom Sampling (Total Trips)	Avian and Fish Surveys	Installation of Met Towers (max)	Installation of Met Buoys (max)
1	167	247	116-128	1	2

1. BACKGROUND

BOEM is authorized to issue leases on the OCS for the purposes of wind energy development pursuant to Section 388 of the Energy Policy Act of 2005 (EPAct). On April 22, 2009, BOEM promulgated regulations implementing this authority at 30 CFR Part 585. The regulations establish a program to grant leases, easements, and rights-of-way for orderly, safe, and environmentally responsible renewable energy development activities, such as the siting and construction of offshore wind facilities on the OCS, as well as other forms of renewable energy

such as marine hydrokinetic (i.e., wave and current). The Minerals Management Service (MMS) prepared a programmatic Environmental Impact Statement (EIS) to evaluate the impact of establishing of a comprehensive, nationwide MMS Alternative Energy Program on the OCS (*Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf, Final Programmatic Environmental Impact Statement*, October, 2007) (Programmatic EIS.) The final rule and the Programmatic EIS can be reviewed for reference on the BOEM website at: http://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Index.aspx and http://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Guide-To-EIS.aspx. In addition, BOEM published the *Atlantic Geological and Geophysical Activities Programmatic Final Environmental Impact Statement* (G&G Final PEIS). The G&G PEIS can be viewed at: http://www.boem.gov/Atlantic-G-G-PEIS/.

On June 2, 2016, BOEM released the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Environmental Assessment* (EA), which is available online at: http://www.boem.gov/New-York/. The EA analyzes the reasonably foreseeable consequences associated with two distinct BOEM actions in the WEA:

(1) Lease issuance (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys); and

(2) SAP approval (including reasonably foreseeable consequences associated with the installation and operation of a meteorological tower and/or meteorological buoys).

BOEM does not issue permits for shallow hazards, geological, geotechnical, archaeological resource, or biological surveys. However, since BOEM regulations require that a lessee include the results of these surveys in its application for SAP and COP approval, the EA treats the environmental consequences of these surveys as reasonably foreseeable consequences of issuing a lease.

2. PROPOSED ACTION DESCRIPTION

Offshore Site Characterization Surveys

BOEM regulations require that a lessee provide the results of a number of surveys with both a SAP and a COP, including: a shallow hazards survey, a geological survey, biological surveys, a geotechnical survey, and an archaeological resource survey (30 CFR 585.626(a)(1) to (a)(5), respectively). BOEM refers to these surveys as "site characterization" activities. Site characterization activities (e.g., locating shallow hazards, cultural resources, and hard-bottom areas; evaluating installation feasibility; assisting in the selection of appropriate foundation system designs; and determining the variability of subsurface sediments) would necessitate using high-resolution geophysical (HRG) surveys and geotechnical exploration. The purpose of the HRG survey would be to acquire geophysical shallow hazards data and information pertaining to the presence or absence of archaeological resources and to conduct bathymetric charting. The purpose of geotechnical exploration would be to assess the suitability of shallow foundation soils for supporting a structure or transmission cable under any operational and environmental conditions that might be encountered (including extreme events), and to document soil characteristics necessary for the design and installation of all structures and

cables. The results of geotechnical exploration allow for a thorough investigation of the stratigraphic and geo-engineering properties of the sediment that may affect the foundations or anchoring systems of a meteorological tower or buoy, which would be necessary for BOEM to consider in a SAP, or later a COP, for a given lease.

Site characterization activities would also necessitate vessel and/or aerial surveys to characterize three primary biological resource categories: (1) benthic habitats; (2) avian resources; and (3) marine fauna. BOEM does not anticipate the lessee needing to conduct separate surveys to characterize the benthic habitats which could be affected by their potential future leasehold activities because the geological and geotechnical surveys would provide enough detailed information for BOEM to adequately assess potential impacts on benthic habitats in the area. For the lessee to describe the state of the avian and marine fauna resources, resource surveys would generally involve simple visual observation, either from a vessel or aircraft. For avian and marine fauna surveys, multi-year assessment periods may be necessary to capture natural seasonal and inter-annual variability of marine fauna within the WEA and immediate surroundings if current data available is not sufficient to determine spatial and temporal distribution of species. It is generally envisioned that the fish, marine mammal, sea turtle, and bird aerial and shipboard surveys could be conducted simultaneously.

It is assumed that the site of a meteorological tower and/or buoys would be surveyed first, to meet the similar data requirements for a lessee's SAP (30 CFR 585.610 and 585.611), and the site of a meteorological tower or buoy would not be resurveyed when the remainder of the leasehold is surveyed to meet the data requirements for a lessee's COP (30 CFR 585.626(a)). However, a lessee could conduct all of their surveys at the same time (to support both a SAP and a COP).

Meteorological Tower and Buoys

A typical meteorological tower consists of a mast mounted on a foundation, anchored to the seafloor. The mast may be either a monopole or a lattice (similar to a radio tower). The mast and data collection devices would likely be mounted on a fixed or pile-supported platform (monopile, jackets, or gravity bases) or floating platform (spar, semi-submersible, or tension-leg). Total installation time for one meteorological tower would be eight days to ten weeks, depending on the type of structure installed and the weather and ocean conditions.

Different types of foundations include tripod, monopile, or steel jacket. Characteristics of these foundation types are summarized in Table 3 below. The final foundation selection would be included in a detailed SAP submitted to BOEM for its review and approval, along with the results of SAP-related site characterization surveys.

Table 3
Meteorological Tower Foundations

	Number of Foundation Piles	Diameter of Foundation Piles (ft)	Area of Bottom Covered[1] (square feet [ft^2])	Depth Driven below Seafloor (ft)	Height above Mean Sea Level (ft)
Tripod	3	10	1,500	25 to 100	295 to 393
Monopile	1	10	200	25 to 100	295 to 393
Steel Jacket	3 to 4	3	2,000	25 to 100	295 to 393

[1]Foundations may be surrounded by a scour system placed at the base of the structure that would cover up to 2 acres (0.81 hectares) of ocean bottom

While a meteorological tower has been the traditional device for characterizing wind conditions, several companies have expressed their interest in installing one or two meteorological buoys instead. Meteorological buoys can be used as an alternative to or in combination with a meteorological tower for collecting wind, wave, and current data in the offshore environment. The EA assumes that, should a lessee choose to employ buoys instead of meteorological towers, it would install a maximum of two buoys. These meteorological buoys would be anchored at fixed locations and would regularly collect observations from many different atmospheric and oceanographic sensors. There are three primary types of buoys BOEM anticipates could be used for meteorological resource data collection on the lease: discus-shaped hull buoys; boat-shaped hull buoys; and spar-type buoys. Discus-shaped and boat-shaped buoys are typically towed or carried aboard a vessel to the installation location. A discus-type buoy would use a combination of chain, nylon, and buoyant polypropylene materials, while a boat-shaped buoy would be moored using an all-chain mooring. Once at the installation site, the buoy would be either lowered to the surface from the deck of the transport vessel and the mooring anchor dropped. Transport and installation vessel anchoring would typically require one day for these types of buoys. The total area of bottom disturbance for boat-shaped and discus shaped buoys would be approximately 6 ft^2 (.55 square meters [m^2]) for the actual footprint and 370,260 ft^2 (34,398 m^2) for the anchor sweep. A spar-type buoy would require two distinct phases for installation, with typically a total of 2 to 3 days for installation. The total area of bottom disturbance associated with a spar-type buoy and installation vessel anchors would be roughly 784 ft^2 (73 m^2). See Section 3.2.2.2 of the EA for more information on meteorological buoys and their anchor systems.

To obtain meteorological data, scientific measurement devices consisting of anemometers, vanes, barometers, and temperature transmitters would be mounted either directly on a tower, buoy, or on instrument support arms. A meteorological tower or buoy also could accommodate environmental monitoring equipment, such as avian monitoring equipment (e.g., radar units or thermal imaging cameras), acoustic monitoring for marine mammals, data-logging computers, power supplies, visibility sensors, water measurements (e.g., temperature or salinity), communications equipment, material hoist, and storage containers.

To measure the speed and direction of ocean currents, Acoustic Doppler Current Profilers (ADCPs) would likely be installed on or near a meteorological tower or buoy. An ADCP is a remote-sensing technology which transmits sound waves at a constant frequency and measures the ricochet of the sound wave off fine particles or zooplanktons suspended in the water column. The ADCPs may be mounted independently on the seafloor, to the legs of the platform, or attached to a buoy. A typical ADCP is about 1 to 2 ft tall (approximately 0.3 to 0.6 meters) and 1 to 2 ft wide (approximately 0.3 to 0.6 meters).

A SAP describes the activities (e.g., installation of meteorological towers and/or buoys) a lessee plans to perform for the assessment of the wind resources and ocean conditions at its commercial lease (30 CFR 585.605). No site assessment activities may take place on a lease until BOEM has approved a lessee's SAP (30 CFR 585.600(a)). Once approved, the site assessment term for a commercial lease is five years from the date of SAP approval (30 CFR 585.235(a)(2)). It is assumed that the lessee would install a data-collection device (e.g., meteorological tower, buoy, or both) on its lease area to assess the wind resources and ocean conditions of the leasehold. This information would allow the lessee to determine whether the lease is suitable for wind energy development, where on the lease it would propose development, and what form of development to propose in a COP.

A lessee must submit a COP at least six months before the end of the site assessment term if the lessee intends to continue to the lease's operations term (30 CFR 585.601(c)). If the COP describes continued use of existing facilities, such as a meteorological tower or buoy approved in the SAP, a lessee may keep such facilities in place on their lease during BOEM's review of the COP (30 CFR 585.618(a)), which may take up to two years. If, after the technical and environmental review of a submitted COP, BOEM determines that such facilities may not remain in place throughout the operations term, a lessee must initiate the decommissioning process (30 CFR 585.618(c)). BOEM anticipates that a meteorological tower could be present for up to five years before the agency decides whether to allow the tower to remain in place for the lease's operations term, or whether the tower must be decommissioned immediately.

Coastal Activity

A lessee will likely determine specific ports used for site assessment and survey activities based primarily on proximity to the lease blocks, capacity to handle the proposed activities, and/or established business relationships between port facilities and the lessee. Existing ports or industrial areas in New York and New Jersey are adequate to support proposed action activities. BOEM therefore does not anticipate expansion of port facilities to meet lessee needs, and considers only existing facilities which can currently accommodate proposed site characterization and site assessment activities.

Installation of a meteorological tower and/or two buoys would require port facilities with the following requirements:

- Deep-water vessel access (greater than 15 ft [4.6 m]) to accommodate large vessels;
- Landing and unloading facilities in close proximity to fabrication yards for staging, assembly, and temporary materials storage; and
- Located within a reasonable travel distance to the WEA, which BOEM assumes to be 40

miles from the WEA boundary to the port.

BOEM has identified the following ports as potential staging ports for the WEA:

- Staten Island, NY
- Erie Basin, NY
- Brooklyn, NY
- Bayonne, NJ
- Newark, NJ
- Elizabeth, NJ
- Perth Amboy, NJ

Surveying and operations and maintenance activities could be supported by smaller ports because these types of activities can use smaller vessels and don't need access to fabrication and storage yards for large infrastructure that would be required for installation of a meteorological tower and/or buoys. Vessels used for these activities are anticipated to be approximately 65 to 100 ft (20 to 30 meters) in length. These smaller ports would serve as staging areas and crew/cargo launch sites for the survey, and operations and maintenance vessels. While a variety of ports could be used for the survey, operations and maintenance activities, including some of the staging ports listed above, BOEM has identified the following ports as likely to support these activities associated with the WEA:

- Staten Island, NY;
- Kismet Harbor, NY;
- Ocean Beach Harbor, NY;
- Perth Amboy, NJ;
- Shark River, NJ; and
- Manasquan, NJ.

Vessel Traffic

Approximately 574 to 1010 total vessel round trips are anticipated to occur as a result of the proposed action over a five-year period (*see* Table 4). Approximately 530 to 542 of these vessel trips (round trips) would be associated with all site characterization surveys as a result of the proposed action over five years, from 2017 to 2022. The total vessel traffic estimated as a result of the installation, decommissioning, and routine maintenance of the meteorological towers and/or meteorological buoys that could be reasonably anticipated in connection with the proposed action would range from 44 to 468 round trips over a five-year period.

Table 4
Total Vessel Round Trips

HRG Surveys	Cable surveys	Geotechnical Sampling Surveys	Avian Surveys	Fish Surveys	Met Buoys	Met Tower	Total
157	10	247	24-36	92	44-128	100-340	574-1010

The total vessel traffic estimated as a result of the HRG surveys and geotechnical exploration work that could be reasonably anticipated in connection with the proposed action would be approximately 167 round trips over five years, and spread over existing and available port facilities in New York and New Jersey. In addition, BOEM presumes 116 to 128 extra independent surveys conducted to characterize avian and fish resources under the proposed action.

Should the lessee decide to install a meteorological tower on its leasehold, a total of 40 round trips are estimated for construction (*see* Table 5). These vessel trips may be spread over multiple construction seasons as a result of weather and sea state conditions, the time to assess suitable site(s), the time to acquire the necessary permits, and the availability of vessels, workers, and tower components. Because the decommissioning process would basically be the reverse of construction, vessel usage during decommissioning would be similar to vessel usage during construction, so another 40 round trips are estimated for decommissioning of the tower. Meteorological buoys would typically take 1 to 2 days to install by one vessel, and 1 to 2 days to decommission by one vessel. Maintenance trips to each meteorological tower may occur weekly to quarterly, and monthly to quarterly for each buoy. However, to provide for a conservative scenario, total maintenance vessel trip calculations are based on weekly trips for towers and monthly trips for buoys over the entire 5-year period (*see* Table 5).

Table 5
Vessel Traffic for Meteorological Buoys and Tower Construction, Maintenance, and Decommissioning

Site Assessment Activity	Round Trips	Formula
Meteorological Buoys		
Meteorological Buoy Installation	2-4	1-2 round trips x 2 buoys
Meteorological Buoy Maintenance – Quarterly/Monthly	40-120	4 quarters x 2 buoys x 5 years 12 months x 2 buoys x 5 years
Meteorological Buoy Decommissioning	2-4	1-2 round trips x 2 buoys
Total Buoy Trips Over 5-year period	**44-128**	
Meteorological Tower		
Meteorological Tower Construction	40	40 round trips x 1 tower
Meteorological Tower Maintenance – Quarterly/Weekly	20-260	4 quarters x 1 tower x 5 years 52 weeks x 1 towers x 5 years
Meteorological Tower Decommissioning	40	40 round trips x 1 tower
Total Tower Trips Over 5-year Period	**100-340**	
Total Trips for a Tower and Two Buoys	**144-468**	

3. STATE ENFORCEABLE POLICIES

As part of this CD, BOEM has evaluated and documented in the enclosed table (*see* Table 6), policies identified by New York and New Jersey as enforceable, applicable offshore and coastal resources or uses, and CZMA "reasonably foreseeable coastal effects" that might be expected for activities conducted under the proposed action. While reviewing and making these determinations on the policies the states have identified as enforceable in this CD, BOEM has considered the common enforceable policies identified by each of the two states as enforceable in their CMP, as listed in Table 6.

4. CONSISTENCY DETERMINATION

BOEM has evaluated all applicable enforceable policies of New York and New Jersey, and the potential activities resulting from the proposed action. This CD has examined whether the proposed action described in Section 1 is consistent to the maximum extent practicable with the policies and provisions identified as enforceable by the CMPs of New York and New Jersey (*see* Table 6). Based on the preceding information and analyses, and the incorporated-by-reference Programmatic EIS, G&G Final PEIS, and EA, BOEM has determined the proposed action will be consistent to the maximum extent practicable with the policies that New York and New Jersey have identified as enforceable.

Table 6: Applicable Enforceable Policies for the Coastal Management Programs of New York and New Jersey		
CATEGORY	**ENFORCEABLE POLICIES: APPLICABLE COASTAL ZONE MANAGEMENT RULES**	**REASONABLY FORESEEABLE COASTAL EFFECTS (CZMA COASTAL EFFECTS)**
Coastal Habitats and Wetlands	Policy 44 (NY) 7:7E-3.6 Submerged vegetation habitat (NJ) 7:7E-3.16 Dunes (NJ) 7:7E-3.18 Coastal high hazard areas (NJ) 7:7E-3.22 Beaches (NJ) 7:7E-3.27 Wetlands (NJ)	No dunes, beaches, submerged vegetation habitat, or wetlands will be altered as a result of the proposed action. No direct impacts on wetlands or other coastal habitats would occur from routine activities in the Wind Energy Area (WEA) due to the distance of the WEA from shore. No cables would be installed to shore to support the meteorological tower or buoys. Additionally, existing ports or industrial areas in New York and New Jersey are expected to be used in support of the proposed activities. No expansion of existing facilities is expected to occur as a result of the proposed action. Indirect impacts from routine activities may occur from wake erosion and associated added sediment caused by increased traffic in support of the proposed action. Given the volume and nature of existing vessel traffic in the area, a negligible increase of wake-induced erosion may occur. Existing channels could accommodate the vessels anticipated to be used, and no additional dredging would be required to accommodate different vessel size(s). For more information on ports and navigation, see the Ports, Navigation, and Waterfront section below. Should an incidental diesel fuel spill occur as a result of the proposed action, the impacts on coastal habitats, including dunes, beaches, and wetlands, are expected to be negligible. See Section 4.4.2.4 of the *Environmental Assessment for Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York* (EA) for additional information on potential impacts to coastal habitats.
Ports, Navigation, and Waterfront	Policy 2 (NY) Policy 3 (NY)	Ports that could serve as potential staging areas include: Staten Island, NY; Erie Basin, NY; Brooklyn, NY; Bayonne, NJ; Newark, NJ; Elizabeth, NJ; and Perth Amboy, NJ. While a variety of ports could be used for the survey, operations, and maintenance activities, including some of the staging ports listed above, the Bureau of Ocean Energy Management (BOEM) has identified the following ports as likely to support these

	Policy 4 (NY) Policy 5 (NY) Policy 24 (NY) Policy 25 (NY) Policy 35 (NY) 7:7E-3.7 Navigation channels (NJ) 7:7E-3.11 Ports (NJ) 7:7E-3.41 Special hazard areas (NJ) 7:7E-7.5 Transportation use rule (NJ) 7:7E-7.7 Industry use rule (NJ) 7:7E-7.9 Port use rule (NJ) 7:7E-7.10 Commercial facility use rule (NJ) 7:7E-8.14 Traffic (NJ)	activities associated with the WEA: Staten Island, NY; Kismet Harbor, NY; Ocean Beach Harbor, NY; Perth Amboy, NJ; Shark River, NJ; and Manasquan, NJ. Wake erosion and sedimentation effects would be limited to approach channels and the coastal areas near ports and bays used to conduct activities. Given the existing amount and nature of vessel traffic, there would be a negligible, if any, increase to wake-induced erosion of associated channels based on the relatively small size and number of vessels associated with the proposed action. Moreover, all approach channels to these ports are armored, and speed limits would be enforced, which also helps to prevent most erosion. Several existing fabrication sites, staging areas, and ports in New York and New Jersey could support site characterization surveys and the construction, operation, and decommissioning of the meteorological tower and buoys. No expansion of these existing onshore areas is anticipated. Existing channels could accommodate the vessels anticipated to be used, and no additional dredging would be required to accommodate different vessel size(s). In addition, no cables would be installed to shore to support the meteorological tower or buoys. The meteorological tower platform would likely be constructed onshore at an existing fabrication yard near one of the ports. The meteorological tower could also be fabricated at various facilities, or at inland facilities in sections, and then shipped by truck or rail to the port staging area. Project related vessels traveling to or from the ports for survey activities, installation, maintenance, and decommissioning of the meteorological tower and buoys could experience spills within a channel or bay that could potentially reach shoreline areas. The impacts on coastal habitats would depend on the type of material spilled, the size and location of the spill, the meteorological conditions at the time, and the speed with which cleanup plans and equipment could be employed. These impacts are expected to be minimal because vessels are expected to comply with the United States Coast Guard regulations at 33 CFR Part 151, relating to the prevention and control of oil spills. Based on the distance from shore where proposed action activities would occur, and the rapid evaporation and dissipation of diesel fuel, a spill occurring in the WEA would likely not contact shore. Collisions between vessels and allisions between vessels and the meteorological tower and buoys are unlikely. However, if a vessel collision or allision was to occur, and in the unlikely event that a spill would result, the most likely pollutant to be discharged into the environment would be diesel fuel. Diesel dissipates very rapidly in the

		water column, then evaporates and biodegrades within a few days, resulting in negligible, if detectable, impacts on the area of the spill. For the proposed action, approximately 574-1,010 vessel trips from site characterization and assessment activities are projected to occur over a 5-year period if the entire WEA was leased and the maximum number of site characterization surveys were conducted in the lease area (*see* Table 4 for vessel traffic calculations). For more information on ports, see Section 3.2.3 of the EA. For more information on vessel traffic and navigation see Sections 3.2.4 and 4.4.2.10 of the EA.
Energy Facilities	Policy 12 (NY) Policy 14 (NY) Policy 17 (NY) Policy 27 (NY) Policy 29 (NY) 7:7E-7.4 Energy facility use rule (NJ)	This analysis is limited to the effects of lease issuance, conducting site characterization activities (i.e., surveys of the lease area), and approval of site assessment activities (i.e., construction and operation of a meteorological tower and/or two buoys) within the WEA. This analysis does not consider construction and operation of any commercial wind power facilities, which would be evaluated later in the process during the review of a construction and operations plan (COP). BOEM takes this approach based on several factors. First, BOEM does not consider the issuance of a lease to constitute an irreversible and irretrievable commitment of agency resources toward the authorization of a commercial wind power facility. Section 1.1.1 of the EA describes BOEM's phased planning and authorization process for offshore wind development. Under this process, the issuance of a lease only grants the lessee the exclusive right to use the leasehold to (1) gather resource and site characterization information, (2) develop its plans, and (3) subsequently seek BOEM approval of its plans for the development of the leasehold. The purpose of conducting the surveys and installing meteorological measurement devices is to assess the wind resources in the lease area and to characterize the environmental and socioeconomic resources and conditions. A lessee must collect this information to determine whether the site is suitable for commercial development and, if so, submit a COP with its project-specific design parameters, for BOEM's review. Should a lessee submit a COP, BOEM would consider its merits; perform the necessary consultations with the appropriate state, federal, local, and tribal entities; solicit input from the public and the Task Force; and perform an independent, comprehensive, site- and project specific National Environmental Protection Act (NEPA) analysis. This separate

		site- and project-specific NEPA analysis may take the form of an environmental impact statement (EIS) and would provide additional opportunities for public involvement pursuant to NEPA and the CEQ regulations at 40 CFR Parts 1500–1508. BOEM would use this information to evaluate the potential environmental and socioeconomic consequences associated with the lessee-proposed project, when considering whether to approve, approve with modification, or disapprove a lessee's COP pursuant to 30 CFR 585.628. After lease issuance, but prior to COP approval, BOEM retains the authority to prevent the environmental impacts of a commercial wind power facility from occurring. Secondly, BOEM does not consider development of a commercial wind power facility within the WEA, and its attendant environmental impacts, to be reasonably foreseeable at this time. Based on the experiences of the offshore wind industry in northern Europe, the project design and the resulting environmental impacts are often geographically and design specific, and it would, therefore, be premature to analyze environmental impacts related to the potential approval of any future COP at this time. There are a number of design parameters that would be identified in a project proposal, including foundation type, project layout, installation methods, and associated onshore facilities. However, the development of these parameters would be determined by information collected during site characterization and assessment activities conducted by the lessee after lease issuance. Each design parameter, or combination of parameters, would have varying environmental effects. Therefore, additional analyses under NEPA would be required before any future decision is made regarding construction of wind energy facilities on the OCS. Additionally, while BOEM has issued 11 commercial wind energy leases offshore, only one lessee has submitted a COP to date. Construction of a commercial wind power facility on the Outer Continental Shelf (OCS) has yet to commence. Given the nascent nature of the offshore wind industry and market uncertainties, it is speculative at this time whether projects will actually be proposed within these areas.
Protected Species	Policy 7 (NY) Policy 8 (NY) 7:7E-3.38 Endangered or	<u>Marine Mammals</u> More information on potential impacts to marine mammals can be found in Section 4.4.2.5 of the EA. There are 31 species of marine mammals that occur in the New York Bight. These 31 species include the following:

	threatened wildlife or plant species habitats (NJ) 7:7E-3.39 Critical wildlife habitats (NJ)	• six mysticetes (baleen whales; five federally endangered); • 21 odontocetes (toothed whales, including: dolphins, a porpoise, beaked whales, dwarf and pygmy sperm whales, and federally endangered sperm whales); and • four pinnipeds (seals). The Endangered Species Act (ESA)-listed marine mammal species that occur in the New York Bight include six large whale species (fin, sei, humpback, North Atlantic right, blue, and sperm whales) (*see* Table 4-6 of the EA). Sperm, blue, and sei whales that are sighted in the New York Bight are generally found farther offshore and/or near the shelf edge. Thus, these species are not expected to occur in the action area. Three listed species, all endangered, are likely to occur in the action area: fin, humpback, and North Atlantic right whales. However, National Marine Fisheries Service (NMFS) is currently proposing to establish 14 distinct population segments (DPS) for humpback whales, two of which will be listed as endangered and two will be listed and threatened. The West Indies DPS covers all humpbacks along the Atlantic, and this DPS will be de-listed (80 FR 22303). Sightings per unit effort (SPUE) results for the three species combined indicate that while these species are not particularly common (*see* Figure 4-11 of the EA), they could occur in the action area at any time during the year (*see* Table 4-6 of the EA). Marine mammals listed as federally endangered or threatened under the ESA (i.e., listed) and marine mammals protected under the Marine Mammal Protection Act (i.e., non-listed) are discussed together because the potential impact mechanisms are the same for all marine mammals. **Site Characterization** Impacts on marine mammals from site characterization were analyzed in the *Atlantic Geological and Geophysical Activities Final Programmatic Environmental Impact Statement* (G&G Final PEIS) and are incorporated herein by reference and summarized below. Although the geographic boundary in the G&G Final PEIS was outside of the WEA (it included BOEM's Mid-Atlantic and South Atlantic planning areas: Delaware to Florida), many of the same species occur in the New York Bight area, and the conclusions

		on impact levels are applicable. The following conclusions for site characterization that were made in the G&G Final PEIS for BOEM's Mid-Atlantic and South Atlantic planning areas are expected to be the same in the WEA: • Impacts from High Resolution Geophysical (HRG) survey sound sources are expected to be minor because acoustic signals from electromechanical survey equipment are within the hearing range for marine mammals, and may cause Level B harassment. However, standard operating conditions (SOCs) implemented to minimize acoustic impacts would include monitoring by a protected species observer (PSO) of a 1,640 ft (500 m) exclusion zone for North Atlantic right whales and a 656 ft (200 m) exclusion zone for all other marine mammals, clearance of the exclusion zone 60 minutes prior to equipment start-up, "ramp up" of equipment, and immediate shut down if a non-delphinoid cetacean (large whale) is sighted at or within the exclusion zone (*see* Appendix B of the EA). If a delphinoid cetacean (dolphin or porpoise) or pinniped (seal) is sighted at or within the exclusion zone, the survey equipment must be powered down to the lowest power output feasible until the exclusion zone is clear; • Impacts from vessel and equipment noise, including geotechnical sampling (e.g., coring) are expected to be negligible to minor. BOEM based this finding on our conclusion that vessel and equipment source levels can be high enough to exceed threshold criteria for behavioral disturbance and undetected marine mammals may occur in the ensonified area during sampling activities. The following SOCs would minimize acoustic impacts: monitoring of the 656 ft (200 m) exclusion zone by a PSO, clearance of the 656 ft (200 m) exclusion zone 60 minutes prior to activity, and immediate shut down if a non-delphinoid cetacean is sighted at or within the exclusion zone. Subsequent restart of geotechnical survey equipment may only follow clearance of exclusion zone for at least 60 minutes for all marine mammals (*see* Appendix B of the EA); and • Impacts from project-related vessel traffic are expected to be negligible because SOCs require that all vessel operators and crew maintain a vigilant watch for marine mammals, separation of 1,640 ft (500 m) from a sighted North Atlantic right whale, and 328 ft (100 m) from all other non-delphinoid cetaceans (*see* Appendix B of the EA). Additional vessel strike avoidance measures for North

		Atlantic right whales apply from November 1 to July 31. SOCs also require that all vessels underway do not divert to approach a delphinoid cetacean or pinniped. **Site Assessment** Impacts on marine mammals from site assessment activities are divided into two categories: underwater noise impacts and non-acoustic impacts. Impacts are assessed by relative potential of overlap, both spatially and temporally, between marine mammal species and impact-producing factor. **Underwater Noise Impacts** Marine mammals use sound for vital biological functions, including socialization, foraging, responding to predators, and orientation. It has been documented that some anthropogenic noise can negatively impact the biological activities of marine mammals in some instances. The response of marine mammals to sound depends on a range of factors, including (1) the sound presser level; frequency, duration, and novelty of the sound; (2) the physical and behavioral state of the animal at the time of perception; and (3) the ambient acoustic features of the environment. Noise can cause behavioral disturbance, including changes in feeding, vocalization, and dive patterns, or avoidance of the ensonified area (i.e., the area filled with sound). Auditory masking, defined as the obscuring of sounds of interest by interfering sounds, generally at the same or similar frequency, may also cause important behavioral changes to marine mammals exposed to sound. In addition to behavioral disturbance, underwater noise can result in two levels of potential injury to marine mammal hearing: (1) Temporary Threshold Shift (TTS), a non-permanent decrease in hearing sensitivity, and (2) Permanent Threshold Shift (PTS), a physical injury that results in a permanent decrease in hearing sensitivity. Detailed discussions on underwater sound and its importance to marine mammals and their hearing capabilities can be found in the G&G Final PEIS and the *Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Massachusetts Revised Environmental Assessment*. NMFS interim threshold criteria, based on received levels of sound for marine mammals during acoustic activities, are defined as follows:

		• 120 decibels (dB) re 1 µPa root mean square (RMS) for the potential onset of behavioral disturbance or harassment (Level B) from a *continuous* source of sound (e.g., vessel noise, geotechnical drilling, or vibratory pile driving); • 160 dB re 1 µPa RMS for the potential onset of behavioral disturbance (Level B) from a *non-continuous* source (e.g., impact pile driving, HRG surveys); and • Potential injury (Level A) from received levels of 180 dB re 1 µPa RMS for cetaceans, and 190 dB re 1 µPa RMS for pinnipeds. Although distinct exposure thresholds can be determined for injury, behavioral reactions follow a wider spectrum of variable responses, some which may be negligible, while others can have more severe consequences. The traditional threshold level to predict behavioral reactions are 160 dB RMS for impulsive noise and 120 dB (RMS) for continuous noise where only animals exposed to levels above the threshold have the potential to be disturbed. An increasing number of studies indicate that the effect of underwater sound on marine mammal behavior is quite variable between species, individuals, life history stage, and behavioral state. Additionally, some species (e.g., beaked whales and porpoises, or migrating baleen whales) or animals in certain behavioral states may be more sensitive to disturbance, while other species may be more tolerant to environmental noise. **Pile Driving** Among all acoustic activities during site assessment, pile driving has the potential to produce the highest noise levels. Sound levels from pile driving are highly variable depending on site location, type of pile, type and size of hammer, water depth, and bottom type. There are two methods of pile driving that may be used in the WEA, vibratory pile driving and impact pile driving, and each has different potential impacts. BOEM anticipates that pile driving would occur for 3 to 8 hours per day for up to 3 consecutive days, and that pile diameters would be approximately 3 ft (1 m) to 10 ft (3 m) depending on the structural design of the meteorological tower. Under BOEM's SOCs (*see* Appendix B, Section B.4 of the EA), which require that pile driving be conducted from May 1 to October 31, a monitoring zone of 3,280 feet (ft) (1,000 meters [m]), and implementation of "soft start", no marine mammals are expected to experience Level A noise (>180 dB re 1 µPa). However, measurements from

		Illingworth and Rodkin, Inc. (2013) indicate that source levels above Level B harassment (120 dB RMS) could occur from 6,824 to 31,053 ft (2,080 to 9,465 m) from the source at a 33 ft (10 m) water depth, and from 10,745 to 37,730 ft (3,275 to 11,500 m) at a 66 to 98 ft (20 to 30 m) water depth. Therefore, because marine mammals may occur in or near the WEA during times of the year when pile driving may take place, behavioral impacts may occur. The requirements under BOEM's SOCs are expected to reduce the potential impacts to marine mammals from vibratory pile driving activities. Nonetheless, the potential for behavioral impacts remains. Overall, impacts from vibratory pile driving activities are expected to be minor to moderate for both non-ESA-listed marine mammals and for ESA-listed fin, humpback, and North Atlantic right whales that could occur in the WEA. The three ESA-listed threatened and endangered mysticete species that are most likely to occur in the WEA are fin, humpback, and North Atlantic right whales. The only other non-listed mysticete that may occur in the New York Bight area, and thus the action area, is the minke whale. Pile-driving activities are expected to be minor for minke whales because SPUE data suggest that these whales do not typically occur within 25 nautical miles (nm) (40 kilometers [km]) of the WEA. BOEM's SOCs (*see* Appendix B, Section B.4 of the EA), which require a lessee to limit pile driving between May 1 and October 31, a monitoring zone of 3,281 ft (1,000 m), and the implementation of "soft start", are expected to minimize Level A noise (>180 dB re 1 µPa) exposures to ESA-listed marine mammals. However, it is possible that some endangered whales may experience Level A or Level B harassment. For example, recent acoustic data indicate the possible presence of North Atlantic right whales in the New York Bight at any time during the year (Whitt et al., 2013). Large whales engaged in migration are known to be more sensitive to relatively low levels of noise (lower than Level B harassment threshold levels), and this sensitivity may cause them to avoid the area. Considering the short duration of impact pile driving activities (anticipated to be approximately 3 to 8 hours per day for up to 3 consecutive days), impacts from impact pile driving on fin, humpback, and North Atlantic right whales are expected to be minor to moderate.

		Considering the short duration of impact pile driving activities (anticipated to be approximately 3 to 8 hours per day for up to 3 consecutive days), impacts from impact pile-driving activities are expected to be minor for harbor, harp, hooded, and gray seals, and negligible for ringed seals. **Vessel Strike** Potential impacts to marine mammals include strikes from vessels used during the construction, operation, and decommissioning phases of the tower and/or buoy installation. BOEM anticipates that between approximately 44 to 468 round trips of various vessel types may occur during site assessment activities (*see* Table 5). While the number of vessel trips anticipated is relatively low compared to the existing level of vessel traffic in the area, it is possible that underwater noise (e.g., pile driving) may cause behavioral changes for some whale species that could increase the chances for a collision between a marine mammal and a vessel. This is especially important for endangered whales (North Atlantic right, fin, and humpback whales) due to vessel strikes being a major cause of mortality, which indicate that the behavioral response of some whale species to noise may secondarily increase the risk of vessel strike to large whales (e.g., changes in ascent behavior and rapid acceleration away from the source). Recent studies have also indicated that some whale species are more sensitive to sound during migration than during feeding and may show avoidance responses at greater distances if the noise can be heard by the animal. These studies suggest that North Atlantic right whales, known to migrate through the New York Bight could be susceptible to such behavioral reactions from project-related noise. However, considering the existing levels of vessel traffic noise generated in the general area of the WEA (between the two traffic separation schemes surrounding the WEA), it is unlikely that noise related to the construction, operation, or decommissioning phases of a meteorological tower or buoy would be detected at levels or durations that might result in an increase in risk of vessel strike to North Atlantic right whales. BOEM's SOCs were designed to minimize potential vessel strikes to marine mammals (*see* Appendix B, Section B.1.1 of the EA). NMFS concluded that during site assessment activities, the potential for construction- and maintenance-related vessel strike to marine mammals is extremely low. Potential impacts to marine mammals from vessel strikes

		during site assessment activities are, therefore, expected to be negligible because of the low probability of such an event. Nonetheless, if vessel strikes did occur they could result in minor to moderate impacts to ESA-listed marine mammal species. Impacts from trash and debris are expected to be negligible. Potential impacts on marine mammals from fuel spills are expected to range from negligible (if the fuel does not contact individual marine mammals) to minor (if individual marine mammals encounter the slick). Overall, impacts to marine mammals are expected to be moderate due to potential acoustic impacts during site assessment activities that involve pile driving; however, potential impacts covering site characterization and other site assessment activities would range from negligible to minor**,** depending on the activity being conducted. Vessel strike and noise are two of the most important factors that may affect marine mammals. Implementing the vessel strike avoidance measures in the SOCs (*see* Appendix B, Section B.1.1 of the EA) would minimize the potential for vessel strikes. BOEM's SOCs related to site characterization surveys (*see* Appendix B, Section B.3 of the EA) and site assessment (*see* Appendix B, Section B.4 of the EA) would minimize the potential for noise impacts to marine mammals. <u>Sea Turtles</u> More information on potential impacts to sea turtles can be found in Section 4.4.2.6 of the EA. Four species of sea turtles occur in the New York Bight: loggerhead, green, Kemp's ridley, and leatherback. All four species are listed as threatened or endangered under the ESA. Of the four species, loggerhead turtles are sighted more frequently than any other sea turtle species in the vicinity of the WEA (*see* Appendix E of the EA). Impact-producing factors associated with the proposed action that could have potential impacts on Kemp's ridley, loggerhead, leatherback, and green sea turtles include vessel traffic, vessel noise, HRG active acoustic sources, equipment noise, seafloor disturbance, pile driving noise, dynamic positioning thruster use during vessel positioning, release of

		trash and debris, and accidental fuel spill. BOEM has developed SOCs for sea turtles that are designed to prevent or reduce any possible impacts during both site characterization and site assessment activities. These SOCs are described in detail in Appendix B of the EA. Potential impacts to sea turtles would range from negligible to moderate depending on the activity being conducted during site characterization and site assessment. Vessel strike and noise are two of the most important factors that may affect sea turtles. However, implementing the vessel strike avoidance measures in the SOCs (*see* Appendix B, Section B.1.1 of the EA) would minimize the potential for vessel strikes and adverse impacts on sea turtles. There are large data gaps regarding behavioral and physiological responses of sea turtles to sound, and recommendations for future studies include the potential physiological (critical ratios, TTS, and PTS) and behavioral effects of exposure to sound sources. Although implementation of the SOCs is expected to minimize the potential of hearing injury impacts and disruption the behavior of sea turtles, pile driving from May 1 to October 31 (*see* Appendix B, Section B.4 of the EA) coincides with the time of year that sea turtles are known to occur in the WEA. However, pile driving of one meteorological tower would take a relatively short time (approximately 3 to 8 hours per day for up to 3 days), which would limit the turtles' exposure to the sound to periodic disruptions over a 1-day to 3-day period. Sea turtles that avoid the area are expected to successfully forage in nearby habitats with similar prey availability. There are no critical or otherwise important foraging habitats known to occur in the area of the WEA. <u>Protected Fish Species</u> For information on protected fish species, see the Fisheries Management section below.

Fisheries Management	Policy 9 (NY) Policy 10 (NY) 7:7E-3.2 Shellfish habitat (NJ) 7:7E-3.3 Surf clam areas (NJ) 7:7E-3.4 Prime fishing areas (NJ) 7:7E-3.5 Finfish migratory pathways (NJ) 7:7E-8.2 Marine fish and fisheries (NJ)	<u>Commercial and Recreational Fisheries</u> In 2012, BOEM contracted with NMFS to characterize the commercial fishing industry in the New York Call Area (the WEA is identical to the New York Call Area). NMFS developed a statistical model to predict the spatial footprint of a fishing trip by merging vessel trip reports with data collected by at-sea fisheries observers. NMFS then linked these locations to seafood dealer reports to create revenue-intensity maps as a visual representation of the fishing harvest. According to the NMFS fishing revenue study *Socio-Economic Impact on Outer Continental Shelf Wind Energy Development on Fishing in the U.S. Atlantic. Draft* (Kirkpatrick et al. 2015), commercial fishermen sourced an average of $3.59 million annually from the New York Call Area from 2007 to 2012. Based on analysis of NMFS data, input derived from outreach efforts with the fishing industry, and public comments, BOEM determined that the fisheries that use the area the most, based on a percentage of total revenue, are the Atlantic sea scallop, and the squid, mackerel, and butterfish (SMB) fisheries. Other species of commercial importance with distributions that overlap the WEA include monkfish, Atlantic herring, black sea bass, summer flounder, and scup. The average annual scallop revenue represents more than 90 percent of the total fishing revenue sourced from the New York Call Area (*see* Figure 4-1 in the EA). During the six-year study period, the scallop revenue from the New York Call Area ranged from $494,326 to $6 million. The average annual scallop revenue from the New York Call Area was $3.26 million, which represents 0.8 percent of the total Atlantic sea scallop revenue from the Atlantic seaboard. Much of the total scallop revenue is from regulated access areas farther offshore, such as on Georges Bank, Hudson Canyon, and the Delmarva access areas. The New York Call Area's annual SMB fishery revenue ranged from $71,673 to $319,686. These values equate to 0.2 and 0.7 percent of the total squid value landed from the Atlantic in those low and high years, respectively (Kirkpatrick et al., 2015). The squid fishery operates in and around the New York Call Area primarily between June and September. The fishery is highly variable regarding where the squid will occur and where they will be caught. Although the entire New York Call Area is used as a squid fishery, the primary

		area fished by the squid fleet is in waters less than 16 fathoms (30 m) closer to Cholera Banks Waters off New York and New Jersey are home to substantial recreational fishing activities. The WEA is adjacent to, and overlaps with, some reported recreational fishing ground. The major recreational fishing areas along the south coast of Long Island are roughly 10 to 25 nm (19 to 46 km) from the WEA. NMFS described the recreational fishery as lightly overlapping the New York Call Area (Kirkpatrick et al., 2015). Site characterization and site assessment activities would result in underwater noise from survey activity and the installation of piles to support the meteorological tower. The direct impact of these noise sources on fish is analyzed in Section 4.4.2.7 of the EA. The analysis in that section concludes that impacts of low frequency sound on fish and fish populations, including SOCs such as the "soft-start" provision for pile driving, is anticipated to be negligible. BOEM does not anticipate adverse impacts from noise associated with installation of piles on fish populations that are targeted by commercial and recreational fishing groups. However, noise generated from low frequency sound, like pile driving and some survey equipment, may result in decreased catch rates of fish while the noise producing activity is occurring. Decreased catch rates may be most acute in hook and line fisheries, since behavioral changes may reduce the availability of the fish to be captured in the fishery. The increase in vessel traffic associated with installation, maintenance, and decommissioning of a meteorological tower and/or buoys could potentially deter commercial and recreational fishermen from using the area around the tower or buoys while work-related vessels are in the area. To avoid collisions and gear entanglement with vessels, commercial and recreational fishermen may temporarily move to other locations. The tower and buoys could provide previously unavailable habitat for species that prefer structured and hardbottom habitats, creating a temporary increase in these types of fish in the area of the tower or buoy while the structure is in place. This could have a temporary beneficial effect to commercial and recreational fisheries, depending on the species of interest and the fishing gear used. Commercial fisheries in areas adjacent to the WEA are more productive than the commercial fisheries in the WEA (Kirkpatrick et al., 2015), so the temporary increased vessel traffic associated with site assessment is expected to be minor. Similarly, most coastal recreational fishing for New York and New Jersey takes

		place away from the WEA, and impacts of increased vessel traffic are anticipated to be negligible. Mollusks, such as scallops, would likely be adversely affected in the immediate area of the tower foundations and/or buoy moorings, and suffer from suspended sediment during the construction process. Exclusion zones are typically established around large and/or slow work-related vessels (referred to as "source vessels"; e.g., barges and tow vessels) to maintain safe passage of the source vessel, and by keeping it clear of other vessel traffic. Temporary adverse impacts expected to result from vessel traffic and/or vessel exclusion zones could be avoided by recreational anglers because these user groups tend to use smaller boats that are more maneuverable; therefore, avoidance of survey vessels could be achieved as needed. Impacts would be limited geographically to the vessel exclusion zone and would be temporary at any given location since the exclusion area would move along with the movement of the vessel. Temporary exclusion zones would also be established around the meteorological tower during construction and decommissioning. During construction/ decommissioning, BOEM anticipates that the typical temporary vessel exclusion zone around a 377 ft- (115 m-) meteorological tower would be approximately 162 acres (ac) (66 hectares [ha]). Impacts on recreational fishing could be greater if the exclusion zone is established over a popular and/or critical sport fishing location, such as one that may coincide with the migration route of a target fishing species. Impacts on recreational boating and fishing from temporary vessel exclusion zones are expected to be negligible, and impacts on recreational boating and fishing from temporary exclusion zones are expected to be minor. Accidental oil spills from damaged gear or machinery (e.g., vessels, generators, or pile-driving hammers) associated with site assessment could directly affect commercial and recreational fisheries by contaminating fish and gear, and interfering during cleanup and recovery operations, or indirectly affect fisheries by temporarily degrading fishing habitat. Spills could result from severe weather damage to vessels or the tower/buoys, from vessel collisions/allisions, or during generator refueling. However, the impact of a spill on commercial and recreational fishing activity would largely depend on the size of the spill. The effects would be detrimental to commercial and recreational fisheries if they led to

		declines in target species. While such spills are hard to predict, based on the structures and vessels associated with the activities, the potential for oil spills, the size of these spills, and the impact to commercial recreational fisheries from non-routine events is expected to be negligible. Overall, impacts to commercial and recreational fisheries under the proposed action would be minor. Impacts would range from negligible to minor depending on the fishery and proposed action activity. Minor impacts are expected based on the low level of vessel traffic activity associated with site characterization and site assessment activities, the fact that one meteorological tower and/or two buoys would be installed over a relatively large geographic area, the level and duration of sound produced from routine activities and events, and the low likelihood of potential impacts from disturbances and pollution. See Section 4.4.4.5 of the EA for more information on potential impacts to commercial and recreational fisheries. <u>Finfish, Shellfish, and Essential Fish Habitat</u> Essential Fish Habitat (EFH) has been designated for 37 species in the WEA. No Habitat Areas of Potential Concern (HAPCs) have been designated in the WEA. EFH descriptions for several of the designated species in the WEA are provided in the G&G Final PEIS. EFH descriptions for species and lifestages that were not discussed in the G&G Final PEIS are summarized in Table 4-14 of the EA. Surf clam concentrations in the WEA appear to be moderate or secondary (<1 bushel) concentrations. The NEFSC 2011 clam dredge survey data showed low catch rates (0 and 1 to 50 clams per tow) of total surf clams and prerecruits in the WEA. The *PEIS for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf, Final Environmental Impact Statement* identified potential impacts to fish resources and EFH that could occur in OCS WEAs in the Atlantic region during site characterization, including: G&G surveys; vessel and equipment noise; and meteorological tower/buoy installation, operation, and decommissioning.

		The potential impacts of renewable energy site characterization on finfish resources and EFH have been analyzed in the G&G Final PEIS and were incorporated into the EA by reference. Although the geographic boundary in the G&G Final PEIS is outside of this WEA (it included BOEM's Mid-Atlantic and South Atlantic planning areas: Delaware to Florida), many species occur in both areas, and the conclusions on impact levels are applicable. The following conclusions for site characterization that were made in the G&G Final PEIS are expected to be the same in the WEA: • Impacts from acoustic sound sources from HRG surveys and geotechnical exploration are expected to be negligible. A boomer sub-bottom profiler is the only sound source expected to produce sounds within finfish and invertebrate hearing ranges; • Impacts from vessel and equipment noise are expected to be negligible**;** and • Impacts from seafloor disturbances are expected to be negligible**.** The G&G Final PEIS assessment of impacts on fish and EFH from acoustic sound sources, vessel and equipment noise, seafloor disturbance, and discharge of waste materials and accidental fuel releases was for G&G-related site characterization activities only. While the number of vessel trips and area of seafloor disturbance for activities covered in the EA differ from those in the G&G Final PEIS, the overall types of impacts to finfish, shellfish, and EFH —and the impact levels and conclusions—are anticipated to be the same. The SOCs required by BOEM (*see* Appendix B, Section B.4 of the EA) to reduce the potential for adverse impacts to marine mammals and sea turtles are expected to also benefit fish. With the "soft start" procedure for pile driving, it is anticipated that the majority of fish would flee the area during the tower installation period and return to the area and resume normal activity after construction. Fish that do not flee the area during pile driving could be exposed to noise levels that result in temporary hearing threshold shifts, injuries, or mortality. Thus, the noise associated with pile driving would cause avoidance or other adverse effects resulting in minor impacts to adult finfish. Demersal eggs and larvae may also be vulnerable to pile driving-generated vibrations, and could experience some adverse effects near pile installation resulting in minor impacts on finfish

		populations. Underwater noise impacts (from all sources) to finfish and shellfish populations, and EFH, are expected to be negligible to minor. Installation of piles or anchor systems associated with a tower and/or buoys may cause an increase in local suspended sediments. These impacts would be limited to the immediate area surrounding the piles or anchors, and of short duration. Depending on the currents, the suspended sediment is expected to disperse and settle on the surrounding seafloor, potentially coating or burying some benthic organisms. Effects on finfish and shellfish populations, and EFH, from suspended sediments would be negligible because these activities would be localized and of short duration. The installation of a meteorological tower foundation and/or buoy anchor systems and associated scour control systems may result in the direct mortality of benthic invertebrates, the loss of benthic habitat, and the displacement of water column (pelagic) habitat. Sessile marine invertebrates, including molluscan shellfish (including surf clams), would be lost (buried or crushed) in the footprint (200 square ft to two ac [19 square m to 0.8 ha]) of the tower foundations/moorings and scour control systems. Although sea scallops are mobile molluscan shellfish, it is a conservative assumption that they would not be able to avoid sudden deployment of an anchor or foundation/mooring system, and for these analyses are considered to be sessile. The amount of habitat temporarily displaced or lost in the area is small compared to the amount of habitat available in the surrounding area. Overall, impacts from site characterization and site assessment activities to finfish and shellfish populations, and EFH, in the WEA would be minor. However, impacts would range from negligible to minor depending on the activity. A meteorological tower foundation and/or buoy anchor systems installation and decommissioning would produce noise that could disturb normal fish behaviors. Fish are expected to avoid or flee from the noise source. Fish that do not flee the immediate action area during pile driving could be exposed to injurious or lethal noise levels that may result in adverse effects. The short duration (3 to 8 hours per day over 3 days) and the use of mitigation measures required by the SOCs (Appendix B of the EA) would minimize the possible exposure to injurious and lethal noise levels, resulting in minor effects to finfish and shellfish populations, and EFH. The increases in suspended sediments, loss of benthic

		habitat, and displacement or alteration of water column habitat due to meteorological tower installation, operation, and decommissioning, and/or installation and operation of buoy anchor systems are expected to be small compared to the available habitat in the surrounding areas, and would, therefore, result in negligible effects to finfish and shellfish populations, and EFH. The potential increase in vessel collisions and allisions that could result in accidental fuel spills due to a meteorological tower and/or buoys is expected to be minimal. The overall impact on finfish and shellfish populations and EFH from a fuel spill that could result from such an occurrence is expected to be minimal and temporary, and would; therefore, be considered minor. See Section 4.4.2.7 of the EA for more information on potential impacts to finfish, shellfish, and essential fish habitat.
Public Access	Policy 19 (NY) 7:7E-8.11 Public Access (NJ)	Short-term limitations on public access within the WEA may occur during certain activities under the proposed action. Exclusion zones are typically established around large and/or slow work-related vessels (referred to as "source vessels"; e.g., barges and tow vessels) to maintain safe passage of the source vessel and keep it clear of other vessel traffic. Recreational anglers can avoid temporary adverse impacts expected to result from vessel traffic and/or vessel exclusion zones because they tend to use smaller boats that are more maneuverable; therefore, avoidance of survey vessels could be achieved as needed. Impacts would be limited geographically to the vessel exclusion zone, and would be temporary at any given location since the exclusion area would move along with the movement of the vessel. Temporary exclusion zones would also be established around the meteorological tower during construction and decommissioning. During construction/ decommissioning, BOEM anticipates that the typical temporary vessel exclusion zone around a 377 ft- (115 m-) meteorological tower would be approximately 162 ac (66 ha). Impacts on recreational fishing could be greater if the exclusion zone is established over a popular and/or critical sport fishing location, such as one that may coincide with the migration route of a target fishing species. Although recreational fishing and boating access may be limited by temporary exclusion zones, impacts on recreational boating and fishing from temporary vessel exclusion zones are expected to be negligible. In addition, impacts on recreational boating and fishing from temporary construction or decommissioning exclusion zones are expected to be minor.

		See Section 4.4.3.4 of the EA for more information on potential impacts to recreational fishing. Impacts to recreation and tourism resulting from routine and non-routine activities would be minor. Impacts would result primarily from vessel traffic restrictions in exclusion zones, potential for small scale spills, and from vessel traffic associated with installation of a meteorological tower and/or buoys. For more information on recreation and tourism, see the Recreation and Tourism section below.
Water Quality	Policy 30 (NY) Policy 33 (NY) Policy 34 (NY) Policy 36 (NY) Policy 37 (NY) 7:7E-8.4 Water Quality (NJ)	The routine activities associated with the proposed action, which would impact coastal and marine water quality, include mechanical disturbance of the seafloor and discharge of bilge water, ballast water, or sanitary/domestic wastewater, as well as non-routine events such as accidental spills of fuel and maintenance materials, such as lubricants and solid debris. Additional information on water quality and impacts to coastal and marine water quality can be found in Section 4.4.1.2 of the EA. Routine activities that have the potential to adversely affect water quality include discharges from survey vessels and vessels servicing the tower and/or buoys (i.e., bilge water, ballast water, sanitary waste, and debris). Bilge and ballast water discharges may contain small amounts of petroleum-based products and metals, and as such, are prohibited within 13 nm (24 km) of the shore. Any vessels conducting surveys or servicing a tower and/or buoys are likely to be equipped with holding tanks for sanitary waste and would not discharge untreated sanitary waste within state or federal waters. The regulations governing the relevant discharges are discussed in the EA, Section 3.2.1.5, *Operational Waste Associated with Site Characterization*. The instrumentation used for site characterization is self-contained, so there should be no discharges from instruments aboard the survey vessels that would impact water quality. Impacts to water quality would occur during construction and decommissioning, with water quality returning to its original state both during operation of the tower and/or buoys and after decommissioning. The seabed would be disturbed locally during construction of a meteorological tower and/or buoys as a byproduct of anchoring, pile driving, and placement of scour protection devices. The resulting mobilization of sediments would

		produce minor, transient impacts to water quality in the immediate vicinity of the disturbance in the form of increased turbidity. Releases/spills (oils, lubricants, trash, debris, fuel) due to non-routine events are likely to be small and result in minor, transient impacts on water quality over a localized area in the immediate vicinity of the release/spill. Overall, activities associated with proposed action would have a minor impact on water quality, with any changes being small in magnitude, highly localized, and transient. Any operational discharges from vessels during surveying or servicing of buoys and a tower would be small and have a minor adverse effect. Seabed disturbances during construction, deployment, and decommissioning of buoys or a tower would result in minor, localized impacts on water quality in the area immediately adjacent to the structure or disturbance.
Air Quality	Policy 41 (NY) Policy 42 (NY) Policy 43 (NY) 7:7E-8.10 Air Quality (NJ)	Air quality impacts that could result from site characterization activities under the proposed action were evaluated in the G&G Final PEIS and found to be negligible. Section 4.4.1.1 of the EA includes an area-specific evaluation of air quality impacts associated with G&G activities, along with an evaluation of air quality impacts associated with site assessment activities. Increased vessel traffic associated with site characterization surveys would add to current vessel traffic levels associated with the ports used by the vessel operators. The additional vessel activity associated with the proposed action is anticipated to be relatively small when compared with existing and future vessel traffic levels in the area. Impacts from pollutant emissions associated with these vessels would likely be localized within the WEA and in the vicinity of vessel activity. Appendix C of the EA provides further information on the anticipated numbers of project-related vessel trips and associated emission calculations. The onshore areas that are closest to the WEA are classified as nonattainment areas for O_3. Hudson, Queens, Kings, Nassau, and Richmond Counties are classified as maintenance areas for CO (*see* Table 4-1 of the EA). Nonattainment and maintenance areas are subject to the EPA General Conformity Rule (40 CFR 93, Subpart B). The rule establishes emissions thresholds, or *de minimis* levels, for use in evaluating a project's conformity with the applicable State Implementation Plan. If the net air pollutant emissions exceed

		these thresholds, a formal conformity determination may be required. If a submitted site assessment plan (SAP) indicates that project-related activities in the non-attainment and maintenance areas would emit more than the thresholds, then a General Conformity analysis would be performed. The *de minimis* levels for consideration in the project's conformity analysis are: • 100 tons/year (90.7 metric tons/year) of NO_x (O_3 precursor); • 50 tons/year (45.5 metric tons/year) VOCs (O_3 precursor); and • 100 tons/year (90.7 metric tons/year) CO. If the net increases in emissions due to a project are lower than the *de minimis* levels, the project is presumed to conform, and no further conformity evaluation is necessary. Based on the emissions sources and assumptions listed above, estimated annual emissions associated with the proposed action for NO_x, VOCs, and CO were below *de minimis* levels; therefore, no further conformity evaluation is needed. Emissions associated with buoy deployment would be less than those associated with tower installation because buoys would be towed or carried aboard a vessel and then anchored to the seafloor. No drilling equipment would be required to install meteorological buoys. Although unlikely, a spill could occur in the event of vessel collision while in route to and from the WEA, or during surveys. Spills occurring in these areas, including harbor and coastal areas, are not anticipated to have significant impacts on onshore air quality due to the small estimated size and short duration of the spill. A diesel spill in the WEA would not be expected to have impacts on onshore air quality because of the estimated size of the spill, prevailing atmospheric conditions over the WEA, and distance from shore. Although the emissions estimates from site characterization and site assessment activities are measurable, they would not be distinguishable from other air emissions onshore or offshore; therefore, emissions associated with the proposed action would be negligible. As shown in Table 4-1 of the EA, air pollutant concentrations due to emissions from the

		proposed action are not expected to lead to any violation of the National Ambient Air Quality Standards.
Recreation and Tourism	Policy 21 (NY) Policy 22 (NY) 7:7E-7.3 Resort/Recreational Use (NJ)	More information on recreation and tourism can be found in Section 4.4.3.4 of the EA. The coastal areas of New York and New Jersey are characterized by an abundance of coastal recreation and tourism opportunities. Coastal counties that may depend on their coastal setting for tourism and recreation include Monmouth and Kings Counties in New Jersey, and Nassau, Suffolk, and Queens Counties in New York. The following impact-producing factors from both site characterization and assessment have the potential to impact recreation and tourism opportunities: • Vessel traffic during site characterization and site assessment; • Vessel exclusion zones surrounding the meteorological tower and/or buoys during deployment (no exclusion zones once a tower and/or buoys are operational); • Trash and debris from vessels; • Viewshed-related impacts associated with site characterization and site assessment from additional vessels, and nighttime lighting on the vessels that could be seen both from shore and from recreational boaters; • Viewshed-related impacts from the meteorological tower, including nighttime lighting; and • Fuel spills. Information on potential exclusion zones can be found in the Public Access section above. The primary impact-producing factor for recreation and tourism associated with vessels used in support of the proposed action would be the potential for generation of trash and debris. Trash and debris, if accidentally released, could wash up on beaches and into harbors, bays, and coastal marshes, and other recreation and tourism destinations. Presence of trash/debris could adversely affect the aesthetic quality of the setting and alter the perception of affected areas, particularly for those areas valued for beach and near

		shore recreation (e.g., Gateway National Recreation Area, and Jones Beach State Park), or those considered pristine wilderness. However, because of restrictions that prohibit the release of trash and debris provided by existing regulations (MARPOL 73/78 Annex V) impacts to recreation and tourism resulting from trash and debris are expected to be negligible. Potential impacts to recreation and tourism settings resulting from the visual contrast of the meteorological tower and/or buoys and associated nighttime lighting would be minor, as described in Section 4.4.4.6 of the EA. As noted in the G&G Final PEIS, potential impacts to recreation and tourism from a fuel spill would depend on the location of a spill, meteorological conditions at the time of the spill, and the speed with which cleanup occurred. Should a spill occur, access to recreation and tourism destinations could be temporarily limited by cleanup and response vessel activity. However, a spill would likely be relatively small in size (88 gallons [333 liters]) so a large-scale spill response involving multiple cleanup vessels is not expected. Therefore, impacts on recreational resources from a small diesel fuel spill are expected to be minor. Impacts to recreation and tourism resulting from routine and non-routine activities would be minor**.** Impacts would result primarily from vessel traffic restrictions in exclusion zones, potential for small scale spills, and from vessel traffic associated with installation of a meteorological tower and/or buoys.
Historic, Cultural, and Subaqueous Areas Management	Policy 23 (NY) Policy 26 (NY) 7:7E-3.36 Historic and archaeological resources (NJ) 7:7E-3.6 Submerged vegetation habitat (NJ)	Historic properties are defined as any pre-contact or historic period districts, sites, buildings, structures, or objects included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Historic properties that could experience impacts from site characterization (i.e., HRG surveys and geotechnical sampling) and/or site assessment activities (i.e., installation of a meteorological tower and/or buoys) include: • Offshore historic properties on or below the seafloor within portions of the WEA or cable routes to shore that could be affected by seafloor disturbing activities; and • Onshore historic properties within the viewshed of survey activities, construction activities, or a meteorological tower and/or buoys.

	7:7E-3.12 Submerged infrastructure (NJ) 7:7E-4.14 Submerged pipelines (NJ) 7:7E-4.20 Submerged cables (NJ) 7:7E-4.21 Artificial reefs (NJ) 7:7E-4.22 Miscellaneous Water Area uses (NJ) 7:7E-8.12 Scenic Resources and Design (NJ)	For more information on cultural, historical, and archaeological resources in the effected environment, see Section 4.4.3.1 of the EA. <u>Offshore Historic Properties</u> Due to historic sea level rise, the WEA has a high potential for the presence of submerged archaeological sites dating from the Paleoindian through Early Archaic periods, but very low to no potential for the presence of submerged archaeological sites more recent than the end of the Early Archaic (*see* Table 4-18 of the EA). There are nine shipwrecks reported for the WEA, two of which have dates for sinking; the remaining seven do not have dates associated with them (*see* Table 4-21 of the EA). One of the nine is simply identified as an unknown vessel and has no further data to suggest construction, rig, or purpose. Additionally, the precision of the hull locations of the nine vessels is medium to low, and the hulls may be up to 3 mi (4.8 km) from the plotted positions. These vessels potentially meet several of the criteria for eligibility on the NRHP. The types of historic properties expected within the onshore affected environment include districts, sites, buildings, structures, or objects within the viewshed of site characterization and site assessment activities. There are 40 known NRHP-listed and potentially eligible properties within the analysis area that are considered in the EA (*see* Figure 4-19 of the EA). Site characterization activities include both HRG survey (e.g., shallow hazard, geological, and archaeological surveys) and geotechnical sampling techniques. Geophysical surveys do not come in contact with the seafloor and, therefore, have no ability to impact offshore historic properties, submerged infrastructure, pipelines, or cables. Geotechnical sampling activities, when conducted to inform the design and installation of renewable energy structures or cables, disturb the seafloor and, therefore, have the potential to impact historic properties located on or below the seafloor. Coring, sediment grab sampling, and other direct sampling techniques (e.g., cone penetrometer tests and deep borings), in addition to anchoring, anchor chain sweep from moored or anchored support vessels, use of jack-up barges, or other equipment used in conducting geotechnical sampling, all have the

		potential for damaging or destroying historic properties, submerged infrastructure, pipelines, or cables located on or under the seafloor. These potential impacts can be reduced to negligible through the completion of geophysical surveys in the WEA consistent with BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585*. Geophysical surveys, in part, serve to identify offshore historic properties. If geophysical surveys are completed by a lessee prior to conducting geotechnical/sediment sampling, historic properties (and other obstructions) can be identified and bottom disturbing activities can be located in areas where historic properties are not present. Therefore, BOEM would require a lessee to conduct geophysical surveys consistent with the *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* prior to conducting geotechnical sampling, and if a potential offshore historic property is identified, the lessee would be required to avoid it. The following elements, designed to avoid impacts to offshore historic properties from site characterization activities, would be included in a commercial lease issued for the WEA: • The lessee may only conduct geotechnical exploration activities, including geotechnical sampling or other direct sampling or investigation techniques, which are performed in support of plan (i.e., SAP and/or COP) submittal, in areas in which an archaeological analysis of the results of geophysical surveys has been completed for that area; • The analysis must be completed by a qualified marine archaeologist who both meets the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738–44739) and has experience analyzing marine geophysical data; • The qualified marine archaeologist's analysis of the geophysical data must include a determination of whether any potential archaeological resources are present in the area of geotechnical sampling, including consideration of both pre-contact and historic period archaeological resources; • If present in the area, the lessee's geotechnical sampling activities must avoid any potential archaeological resources by a minimum of 164 ft (50 m). The avoidance

		distance must be calculated by the qualified marine archaeologist from the maximum discernible extent of the archaeological resource; • The qualified marine archaeologist must certify in the lessee's archaeological reports, included with a SAP or COP, that geotechnical exploration activities did not affect potential historic properties identified as a result of the HRG surveys; and • In no case may the lessee's actions affect a potential archaeological resource without BOEM's prior approval. In addition, BOEM would require that the lessee observe the unanticipated finds requirements at 30 CFR 585.802. The following requirements would also be included in a commercial lease issued within the WEA: • If the lessee, while conducting site characterization activities in support of plan (i.e., SAP and/or COP) submittal, discovers a potential archaeological resource such as the presence of a shipwreck or pre-contact archaeological site within the project area, the lessee must: o Immediate halt of seafloor-disturbing activities in the area of discovery; o Notify the lessor within 24 hours of discovery; o Notify the lessor in writing by report within 72 hours of its discovery; o Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the lessor has made an evaluation and instructs the applicant on how to proceed; and o Conduct any additional investigations as directed by the lessor to determine if the resource is eligible for listing in the NRHP (30 CFR 585.802(b)). The lessor will direct the lessee to conduct such investigations if: (1) the site has been affected by the lessee's project activities; or (2) impacts on the site or on the area of potential effect cannot be avoided. If investigations indicate that the resource is potentially eligible for listing in the NRHP, the lessor will tell the lessee how to protect the resource or how to mitigate adverse effects on the site. If the lessor incurs costs in protecting the resource, under Section 110(g) of the National Historic Preservation Act (NHPA), the lessor may charge the lessee

		reasonable costs for carrying out preservation responsibilities under the OCS Lands Act (30 CFR 585.802(c-d)). Because a lessee would be required to conduct geophysical surveys prior to conducting geotechnical sampling, and would be required to follow the lease stipulations regarding avoidance and unanticipated discovery protocols for submerged historic properties, impacts from site characterization on offshore historic properties, submerged infrastructure, pipelines, and cables are expected to be negligible. In some cases, geotechnical testing methods may also provide a useful strategy of confirming the presence or absence of features of archaeological interest and for gathering information that informs the archaeological interpretation of HRG data. If a lessee intends to impact a potential offshore historic property for the purpose of historic property identification or National Register testing and evaluation, the lessee would be required to provide written notification describing these activities to BOEM for approval under the elements of lease issuance outlined above. BOEM would review this information under Section 106 of the NHPA and the stipulations of the Programmatic Agreement, discussed below. Impacts to submerged historic properties from vibracores or other direct samples collected, by or under the supervision of a Qualified Marine Archaeologist, for the purposes—at least in part—of historic property identification or National Register eligibility testing and evaluation, are expected to be negligible**.** Although installation of a meteorological tower and/or buoys would affect the seafloor, the lessee's SAP must be approved by BOEM prior to installation. To assist BOEM in complying with the NHPA and other relevant laws (30 CFR 585.611(a) and 30 CFR 585.611(b)(6)), the SAP must contain a description of the historic properties that could be affected by the activities proposed in the plan. Under its Programmatic Agreement, BOEM will consult with the New York and New Jersey State Historic Preservation Officers and other appropriate parties prior to approval of a SAP to ensure potential effects on historic properties are avoided, minimized, or mitigated under Section 106 of the NHPA. The seafloor impacts associated with installation of a meteorological tower and/or buoys include: disturbance resulting from foundation installation; dropping and dragging anchors from construction vessels; and mooring chain sweeping.

		Impacts on archaeological resources in these activity areas could result in destruction of all or part of the historic properties, or loss of their archaeological context. Should the archaeological surveys reveal the possible presence of an archaeological site in an area that may be affected by activities proposed in a SAP, BOEM would likely require the lessee to avoid the potential site or to demonstrate through additional investigations that an archaeological resource either does not exist, or would not be adversely affected by the seafloor/bottom-disturbing activities. If avoidance of the historic property is not possible, BOEM would continue Section 106 consultation under the Programmatic Agreement to resolve adverse effects. Although site assessment activities have the potential to affect historic properties either on or below the seabed, existing regulatory measures, coupled with the information generated for a lessee's initial site characterization activities and presented in the lessee's SAP, make the potential for bottom-disturbing activities to damage historic properties low. Therefore, impacts on offshore historic properties from site assessment activities are expected to be negligible. In addition, installation of a meteorological tower and/or buoys would affect the seafloor and could impact submerged infrastructure, pipelines, cables, and artificial reefs. Should survey results reveal the presence of submerged infrastructure, pipelines, cables, or artificial reefs, BOEM would likely require the lessee to avoid impacting the existing submerged infrastructure. Therefore, impacts on submerged infrastructure, pipelines, cables, and artificial reefs from site assessment activities are expected to be negligible. <u>Onshore Historic Properties</u> Vessel traffic from site characterization activities could be visible from onshore historic properties and scenic resources. As noted in Section 4.4.3.2 of the EA, BOEM anticipates that there would be one to three vessels at any given time in the WEA and between the shore and the WEA associated with the proposed action. Survey vessels in the WEA would appear small in scale or would fall below the horizon, thereby reducing the likelihood that vessels are seen from onshore locations. Similarly, lighting associated with survey vessels operating under night conditions would appear small in scale and isolated, consistent with existing nautical lighting visible on the horizon. However, the increased ocean vessel traffic from these survey activities would be indistinguishable from existing ocean vessel traffic, and these impacts would be temporary and minimal. Based on the distance of survey activities from any onshore historic properties, the impacts to the

		characteristics of these properties that contributed to their eligibility for listing in the NRHP are expected to be negligible. Additionally the distance of survey activities from scenic resources would make any impacts to these resources negligible. Because of the distance of the WEA from shore, it is anticipated that meteorological buoys would not be visible from onshore areas and would have no impact on onshore historic properties or scenic resources. Under daytime conditions, if a lessee installed a meteorological tower at the closest point of the WEA that is available for structure placement to the shoreline (at the western tip of the 1 nm [1.9 km] buffer), approximately 13.5 nm (25 km) from the shoreline, the tower may be visible, although it would be difficult to detect by the casual observer when viewed from onshore historic properties or scenic resources. Assuming no daytime avoidance lighting on the meteorological tower (*see* discussion of avoidance lighting per FAA [2015] in Section 4.4.4.6 of the EA), if the tower was detected by an observer on the shore, it would appear small in scale relative to the broad horizon of the seascape, and visual contrast would be weak. During nighttime conditions, avoidance lighting on the tower could be visible from onshore historic properties and scenic resources; however, lighting would be discrete and isolated and appear consistent with existing nautical lighting on the horizon. Lighting would appear similar to lights visible from existing vessel traffic. Visibility of the meteorological tower, and related viewshed impacts, would attenuate with distance due to the influence of atmospheric haze and the reduction in scale of the tower relative to the surrounding seascape. No portion of the structure or lighting would be visible if the tower was placed beyond 23.5 nm (44 km), because the entire tower would fall below the horizon when viewed from the shore. Consequently, visual impacts to onshore historic properties and scenic resources resulting from the proposed action would be minor**.** <u>Conclusion</u> Overall, impacts to cultural, historical, archaeological, and scenic resources would be minor.

		Impacts to submerged historic properties, infrastructure, pipelines, cables, and artificial reefs from site characterization activities are expected to be negligible given the geophysical surveying requirements and lease conditions discussed above. Impacts to submerged historic properties, infrastructure, pipelines, cables, and artificial reefs, from installation of a meteorological tower and/or buoys are expected to be negligible as avoidance would likely be required by BOEM. If avoidance of potential historic properties is not feasible, BOEM will continue its Section 106 consultation to resolve adverse effects. Vessel traffic associated with survey activities would be indistinguishable from existing vessel traffic and short-term. Therefore, impacts to onshore historic properties and scenic resources from site characterization activities are expected to be negligible. A meteorological tower is not expected to be detected by the casual observer when viewed from onshore historic properties under daytime conditions. Nighttime lighting would be discrete and isolated and appear consistent with existing nautical lighting on the horizon and is not expected to adversely impact the character of onshore historic properties or scenic resources. Therefore, overall impacts on onshore historic properties and scenic resources from installation of a meteorological tower are expected to be minor. For more information on visual resources, see Section 4.4.3.6 of the EA. For more information on BOEM's compliance with the NHPA, see Section 5.3.4 of the EA.

This page intentionally left blank

RECEIVED
AUG 04 2016
Office of Renewable Energy Programs

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Land Use Regulation
Mail Code 501-02A
P.O. Box 420
Trenton, New Jersey 08625-0420
www.state.nj.us/dep/landuse

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

JUL 29 2016

CERTIFIED MAIL

Mr. James F. Bennett
Program Manager
Department of the Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs
45600 Woodland Road VAM-OREP
Sterling, VA 20166

RE: Federal Consistency Determination
DLUR File No. 0000-13-0021.1CDT160001
Bureau of Ocean Energy Management (BOEM)
Proposed Lease Issuance and Site Assessment Activities
New York Wind Energy Area (WEA)
Atlantic Continental Shelf Offshore New York

Dear Mr. Bennett:

The New Jersey Department of Environmental Protection, Division of Land Use Regulation, acting under Section 307 of the Federal Coastal Zone Management Act (P.L. 92-583) as amended, agrees with the certification that the above referenced project is consistent with the approved New Jersey Coastal Management Program. The Division has determined that the project is conditionally consistent with New Jersey's Rules on Coastal Zone Management N.J.A.C. 7:7-1.1 et seq., as amended on July 6, 2015, with the implementation of the below.

The proposed activities include:

- Lease issuance for the New York Wind Energy Area (including reasonably foreseeable consequences associated with shallow hazards, geological, geotechnical, archaeological resources, and biological surveys). The Wind Energy Area is approximately 11 nautical miles south of Long Beach, NY and extends 26 nautical miles southeast. The lease issuance grants the lessee the right to use the leasehold to 1) gather resource and site characterization information, 2) develop its plan, 3) subsequently seek BOEM approval of its plans for the development of the leasehold. This analysis does not consider construction and operation of any commercial wind power facilities, which would be evaluated later in the process during the review of a construction and operations plan.

- Site Assessment Plan approval (including reasonably foreseeable consequences associated with the installation of a meteorological tower and meteorological buoys).

The purpose of conducting the surveys and installing meteorological measurement devices is to assess the wind resources in the lease area and to characterize the environmental and socioeconomic resources and conditions. A lessee must collect this information to determine whether the site is suitable for a commercial wind development. In the event that it is determined that the lease area is suitable for development, the lessee will submit for BOEM's review, a construction and operations plan with its project-specific design parameters.

The Division has determined that the project is consistent with New Jersey's Rules on Coastal Zone Management N.J.A.C. 7:7-1.1 et seq., as amended on July 6, 2015.

Conditional Compliance:

To ensure consistency with the New Jersey Coastal Management Program, the following conditions must be met:

1. The Bureau of Ocean Energy Management (BOEM) and the New Jersey Department of Environmental Protection's Historic Preservation Office have executed a Programmatic Agreement to cover all cultural resource issues as they are related to Outer Continental Shelf Renewable Energy Activities Offshore New Jersey and New York. The BOEM and any lessee to the WEA, shall adhere to said Programmatic Agreement.

2. This Federal Consistency Determination shall not affect any future review by the NJ Department of Environmental Protection of any commercial wind power facility nor should this Federal Consistency Determination be construed as an endorsement of any future facility.

This Federal Consistency is authorized pursuant to all parties following the guidelines set forth, and agreed upon, for the construction of the proposed structures.

Pursuant to 15 CFR 930.44, the Division reserves the right to object and request remedial action if the proposal is conducted in a manner, or is having an effect on, the coastal zone that is substantially different than originally proposed.

Thank you for your attention to and cooperation with New Jersey's Coastal Zone Management Program. If you have any questions regarding this determination, please do not hesitate to call Cathryn Schaffer of our staff at (609) 633-2289.

Sincerely,

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
Division of Land Use Regulation

7/29/16
Date

C: Elizabeth Semple, Division of Coastal and Land Use Planning

STATE OF NEW YORK
DEPARTMENT OF STATE
ONE COMMERCE PLAZA
99 WASHINGTON AVENUE
ALBANY, NY 12231-0001
WWW.DOS.NY.GOV

ANDREW M. CUOMO
GOVERNOR

ROSSANA ROSADO
SECRETARY OF STATE

August 15, 2016

Mr. James F. Bennett
Bureau of Ocean Energy Management
Office of Renewable Energy Programs
45600 Woodland Rd. VAM-OREP
Sterling, VA 20166

RE: F-2016-0510 (DA)
Lease Issuance and Site Assessment Activities for the Wind Energy Area offshore of NY.
New York Bight
Concurrence with Consistency Determination

Dear Mr. Bennett:

The Department of State (DOS) received the Bureau of Ocean Energy Management's (BOEM) consistency determination (CD) on June 17, 2016 prepared in accordance with the Coastal Zone Management Act (16 U.S.C. § 1451 et seq.) and pursuant to 15 CFR part 930 subpart C, for the above referenced project.

BOEM's proposed actions include a lease issuance for a delineated wind lease area (WEA), and subsequent site assessment activities to be conducted by the lessee post lease issuance, as indicated in the *Draft Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Environmental Assessment (EA)*, which was appended to the CD. The site assessment activities would determine whether the lease is suitable for, and would support, commercial-scale wind energy production. BOEM's identification and evaluation of the impacts of site assessment activities on New York's coastal resources and uses are included in the EA. DOS concurs with BOEM's CD for lease issuance and site assessment activities as they are evaluated and assessed in the EA. We note that the lease, by itself, does not authorize a lessee to construct or operate any wind energy project on the Outer Continental Shelf.

As described in BOEM's CZMA consistency determination analysis accompanying its June 17, 2016 letter to DOS, following the award of a lease issuance for the WEA, the lessee will be required to prepare a Site Assessment Plan (SAP) enumerating the site assessment activities that it will be conducting within the WEA. Prior to BOEM approval of the lessee's SAP, DOS will make a determination as to whether the SAP contains site activities which will cause an effect on any New York State coastal use or resource substantially different that those addressed within the CD. If effects on the state's coastal uses and resources are found to be substantially different, then the lessee will be required to submit a consistency certification in accordance with 15 CFR part 930 subpart D. To facilitate this review, DOS will make itself available to consult with the lessee while the SAP is developed.

NEW YORK STATE OF OPPORTUNITY | Department of State

Please feel free to discuss any additional comments or concerns with Jeffrey Zappieri (Jeffrey.Zappieri@dos.ny.gov) or Matthew Maraglio (Matthew.Maraglio@dos.ny.gov) of my staff.

Sincerely,

Gregory Capobianco
Office of Planning and Development

Cc: NOAA- David Kaiser
USCG – Captain Michael Day
– Jeff Yunker
– Michele E. DesAutels
NYSDEC – William Little
NYSDPS – Andrew Davis

Our reference
OCS-A- 512 SAP

October 10, 2017

Attn.: Lucas Feinberg, Program Manager
Office of Renewable Energy Programs
Bureau of Ocean Energy Management
45600 Woodland Road (VAM-OREP)
Sterling, Virginia 20166

[Submitted via email to lucas.feinberg@boem.gov and by mail to the above address]

RE: Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf, OCS-A 512 – Request for Extension of Preliminary Term

Dear Mr. Bennett,

In accordance with 30 CFR Part 585.235(a), Statoil Wind US LLC (Statoil) is required to submit a Site Assessment Plan (SAP) within 12 months of executing the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf: Lease No. OCS-A 0512 (the Lease). This preliminary term is currently scheduled to expire on April 1, 2018. Pursuant to 30 CFR 585.235(b), Statoil is requesting a 12-month extension of the preliminary term to April 1, 2019.

In preparation for site investigations (SAP pre-surveys) of the Lease area, and the subsequent submittal of a SAP, Statoil has engaged with the Bureau of Ocean Energy Management (BOEM) regarding the SAP, survey plans, requirements and expectations, in a workshop on May 30, 2017. Statoil has also begun discussions with relevant organizations and stakeholders, which will be an ongoing process.

Statoil has been actively maturing the project survey plans and technical scope towards SAP submission. A geological desktop study was commissioned and completed, providing the information necessary to effectively plan SAP survey activities. Work has been carried out in consultation with the supply chain, regarding the appropriate concept to use for site characterization (wind resource and metocean), which in turn informs the SAP survey requirements and plan. As a result, Statoil has decided on a buoy based 'Floating Light Detection and Ranging' (FLiDAR) approach for wind resource measurements, and metocean buoys for oceanographic and meteorological measurements. The procurement process for selecting a supplier and final concept is underway, with the intention to award a contract by the end of calendar year (CY) 2017. There are currently no plans for traditional fixed bottom meteorological masts.

SAP survey plans are currently being drafted, with the intended submission in Q4 2017. Consultation on the survey plans with BOEM and Tribes and other relevant stakeholders will take place in Q1 2018.

A draft Fisheries Liaison Plan and Coexistence Plan have been developed, which will feed into the Fisheries Communications Plan. This will be published on the Statoil project webpage in Q1 2018.

During the requested preliminary term extension, and subject to BOEM's approval of the survey plan(s), Statoil intends to undertake site investigations, including geophysical and geotechnical surveys. The relevant data collected from these surveys will be included in the SAP and the COP as appropriate. Once the SAP is approved and other necessary permits are issued, Statoil intends to deploy FLiDAR buoy(s) / meteorological buoy(s) in the Lease area. A preliminary calendar year schedule for SAP activities is:

- Submission of survey plans Q4 2017;
- Procurement of survey contractors Q4 2017;
- Survey plan consultation meetings with BOEM, Tribes and relevant stakeholders Q1 2018;
- Initiate surveys Q2 2018;
- SAP submission Q3 2018; and
- FLiDAR and metocean buoy deployment Q4 2018.

An extension to the preliminary term will increase the time available to allow for full and effective stakeholder engagement, survey planning and project related technical decisions. It is also important for the project to aim for a survey window in spring 2018 that provides an opportunity for maximizing synergies with the wider COP survey and consultation activities.

We appreciate your review of our request for a 12-month extension of the preliminary term. If you have any questions or comments, please contact the Permitting Manager, Martin Goff, at mgof@statoil.com or +1 (202) 813-7444.

Sincerely,

Meagan Keiser

Secretary, Statoil Wind US LLC

United States Department of the Interior

BUREAU OF OCEAN ENERGY MANAGEMENT
WASHINGTON, DC 20240-0001

NOV 13 2017

Ms. Meagan Keiser
Statoil Wind US LLC
120 Long Ridge Road, Suite 3E01
Stamford, Connecticut 06902

Dear Ms. Keiser:

The Bureau of Ocean Energy Management (BOEM) has received Statoil Wind US LLC's (Statoil) October 10, 2017, letter requesting a 12-month extension of the preliminary term for commercial lease OCS-A 0512, from April 1, 2018, to April 1, 2019, pursuant to 30 C.F.R. § 585.235(b). BOEM is approving your request for the reasons described below.

Your letter indicates that Statoil has been actively maturing the project survey plans and technical scope towards submission of a Site Assessment Plan (SAP) as required by lease OCS-A 0512, by conducting the following activities:

1. Hosting a workshop with BOEM on May 30, 2017.
2. Completion of a geological desktop study.
3. Consultation with wind resource and metocean supply chain representatives resulting in a decision to pursue deployment of a buoy based Floating Light Detection and Ranging (FLiDAR) as a wind resource solution.
4. Drafting of SAP survey plans and consultation with BOEM, Tribes, and other relevant stakeholders.

Your letter also states that while Statoil has made significant progress to date, more time is necessary to complete several activities to collect information required to submit a SAP. These include:

1. Advancing full and effective stakeholder engagement;
2. Survey planning and project related technical decisions, and;
3. Seasonal considerations in relation to undertaking offshore site characterization work as well as planning to maximize synergies with wider construction and operations plan survey and consultation efforts.

Your letter provides a plan for conducting geophysical and geotechnical surveys during the requested preliminary extension term. The results from these surveys will be included in the SAP planned for filing in Q3 (calendar year) 2018. Assuming the SAP is approved by BOEM; Statoil would deploy the FLiDAR(s) and wave buoy(s) in the lease area in Q4 2018.

BOEM has reviewed your request and has determined an extension of the preliminary term is justified. We base our decision on the fact that Statoil has identified their previous and planned

activities over the next year to support SAP submission and development of commercial lease OCS-A 0512.

Therefore, pursuant to 30 C.F.R. § 585.235(b) and in consideration of the information provided in your October 10, 2017 letter, your request to extend the preliminary term of commercial lease OCS-A 0512 to April 1, 2019, is approved.

If you have any questions please contact Mr. Luke Feinberg at 703-787-1705 or luke.feinberg@boem.gov.

Sincerely,

James F. Bennett
Program Manager
Office of Renewable Energy Programs

Appendix B
Equipment Specifications and Modelling Results

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

This page intentionally left blank

Appendix C
Site Characterization Report
(Contains Privileged or Confidential Information - Provided Under Separate Cover)

This page intentionally left blank

Appendix D
Marine Archaeological Resource Assessment Report in Support of the Empire Wind Offshore Wind Farm

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

This page intentionally left blank

Appendix E
Benthic Assessment

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

This page intentionally left blank

Appendix F
Health and Safety Plan

(Contains Privileged or Confidential Information - Provided Under Separate Cover)

This page intentionally left blank

Appendix G
Vessel Specifications

This page intentionally left blank

RANA MILLER

MILLER'S LAUNCH

PIER 7 1/2, STATEN ISLAND, NY

Main Particulars

Length Overall	150 ft.	46 m
Length BP	130.9 ft.	40 m
Beam	36 ft.	11 m
Depth	11.5 ft	4 m
Light Draft	5 ft.	2 m
Loaded Draft	10 ft.	3 m
Summer Freeboard	2 ft.	1 mm
Lightship	387.73 LT.	395 MT

Capacities

Potable Water (Deliverable)	62,878 USG	264 Tons
Fuel	31,478 USG	119 m^3
Liquid Mud	1,200 BBLS	191 m^3
Methanol	515 BBLS	82 m^3
Potable Water (Domestic)	15,288 USG	58 m^3
Deadweight	530 LT.	540 MT.

Cargo Deck

Tonnage	390 LT.	397 MT.
Strength	0.36 lbs./ft.^{2}	4 MT./m^2
Length	92 ft	28 m
Width	30 ft.	9 m
Clear Area	2,670 ft.2	248 m^2

Tonnage

GRT	90 US tons	443 tons
NRT	50 US tons	132 tons

Machinery

Main Engines	Cummins KTA-38
Brake Horsepower	1700
Reduction Gears	Rentjies561
Gear Ratio	5:01
Propellers	74x59
Rudders	Spade
Auxiliary Generators	2 100kw
Bow Thrusters	Schottel
Liquid Mud Circulation	5X4X14 Mission Magnum

Performance

Maximum Speed	12 knots	
Cruising Speed	10 knots	
Maximum Fuel Consumption	85 USG/Hr	
Cruising Fuel Consumption	50 USG/Hr	5 m^3/24 Hrs

Discharge Rates

Potable Water	400 USG/min @ 80 ft.	91 m^3/Hr @ 24 m
Fuel Oil	400 USG/min @ 80 ft.	91 m^3/Hr @ 24 m
Liquid Mud	700 USG/min @ 150 ft.	159 m^3/Hr @ 46 m
Methanol	400 USG/min @ 80 ft.	91 m^3/Hr @ 24 m

AccomModations

Cabins*Berths	5*18
Officers	2
Crew	3
VIP	0
Lounge	6
Mess	10

Electronics & Controls

Depth Recorder	1
DP	N/A
GPS	Furuno / Northstar GPS Plotter
Radar(s)	2-Furuno
HF Radio	1
SSB	1
Internet E-mail	Satellite (Boat Tracs)
VHF	2-ICOM
XM Satallite	Real Time 3D Weather
Autopilot	Comnav Marine

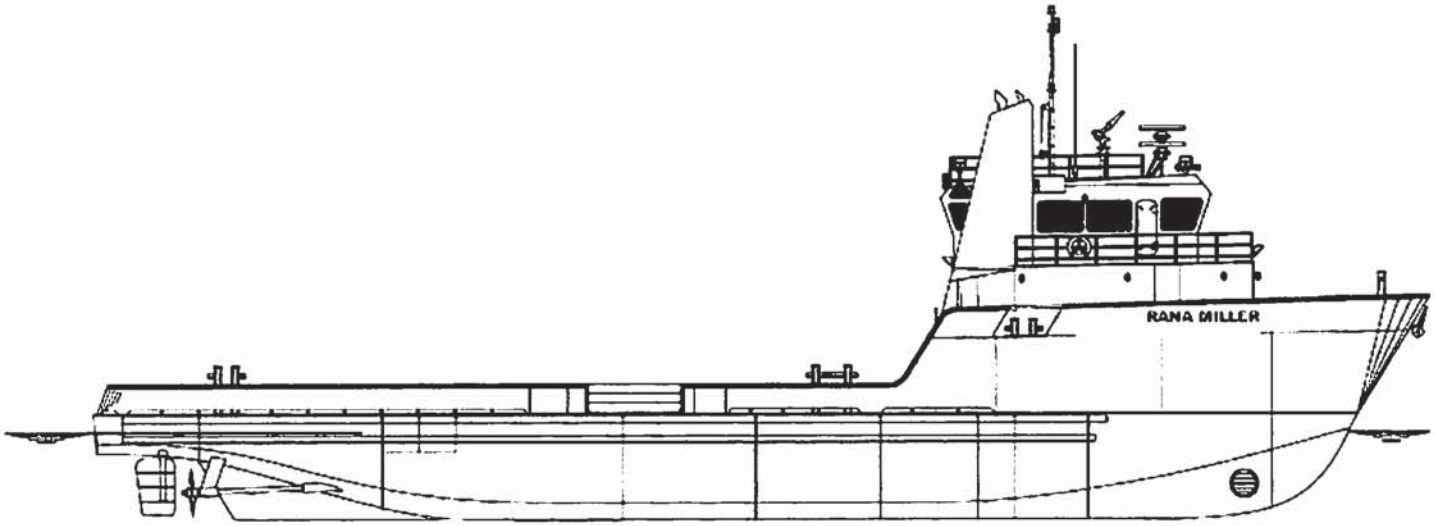
Special Equipment

Windlass	Bolinger 2 Inches 600 ft.	750LB Anchor
External FIFI	1900 GPM	
Stern Deck Winch	Skagit Model JUW-075	Single Drum
Stern Tugger Winch	2-Gear Matic	Tugger
Number of Monitors	1	
E-Pirb	Equipped	
Satellite TV	Direct TV	

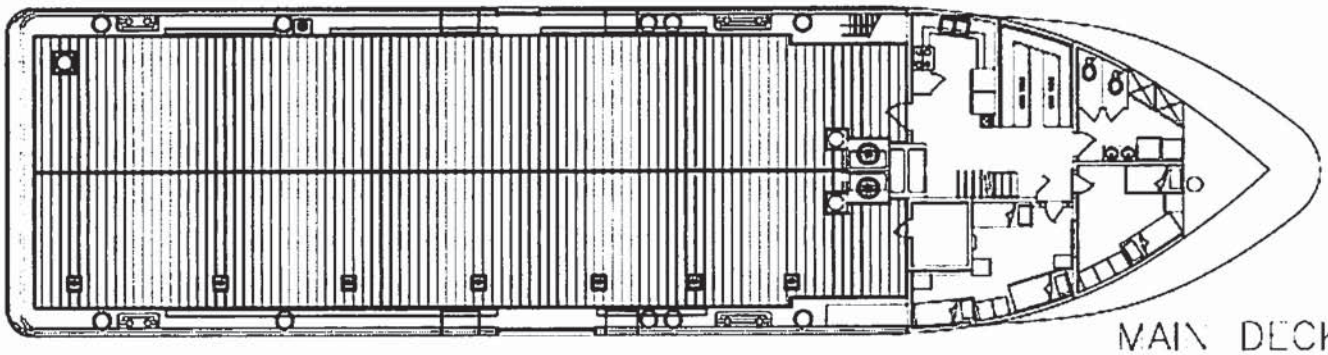
Documentation

Class	150 FT. MS
Flag	United States
USCG	USCG Sub L, OSV
Year Built	1997
Official Number	1052663
BUILDER	Bollinger Shipyard

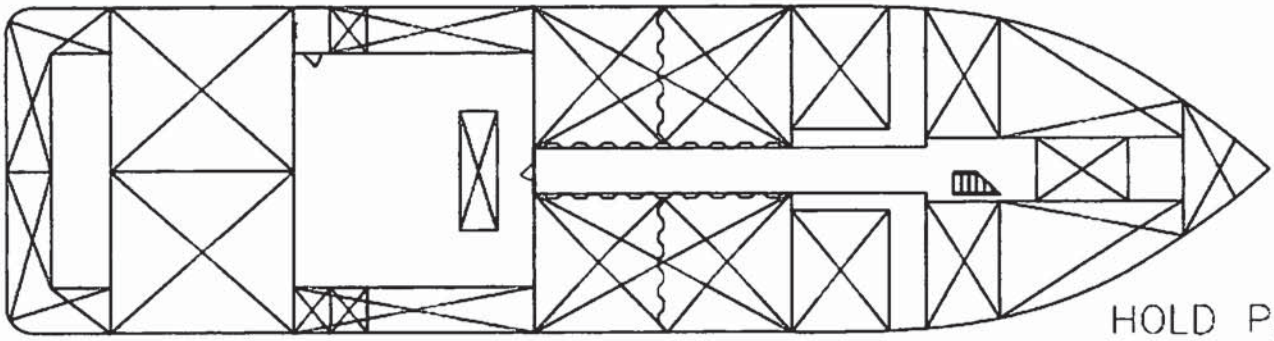
This specification is preliminary and subject to change without notice. Exact tank capacities, deadweight, deck cargo capacity and other figures that have been calculated and may change when the actual vessel is delivered.



OUTBOARD PROFILE



MAIN DECK



HOLD PLAN

Appendix H
Air Quality Emissions Calculations

This page intentionally left blank

EMPIRE WIND OFFSHORE WIND FARM
Air Emission Calculations
Emission Summary - FLiDAR Buoy Deployment

Met Facilities Activity	VOC tpy	NO_X tpy	CO tpy	PM/PM_{10} tpy	$PM_{2.5}$ tpy	SO_2 tpy	HAPs tpy	GHG tpy CO_2e
Deployment Activities (yr. 1)	0.015	0.53	0.27	0.014	0.014	7.08E-05	0.003	38.0
Maintenance Activities (yrs. 1-2)	0.034	1.25	0.64	0.033	0.032	1.66E-04	0.007	89.0
Maintenance Activities (yrs. 3-4)	0.018	0.64	0.32	0.017	0.016	8.45E-05	0.004	45.4
Unscheduled Visits (up to 1 per yr.)	0.002	0.08	0.04	0.002	0.002	1.06E-05	0.000	5.7
Decommissioning Activities (End of Yr. 2)	0.010	0.35	0.18	0.009	0.009	4.92E-05	0.002	26.4
Decommissioning Activities (End of Yr. 4)	0.005	0.18	0.09	0.005	0.005	2.44E-05	0.001	13.0
Maximum Annual Emissions (tons)[1]	**0.051**	**1.86**	**0.95**	**0.049**	**0.048**	**2.47E-04**	**0.011**	**132.7**
Total Project Lifetime Emissions (tons)	**0.12**	**4.53**	**2.31**	**0.12**	**0.12**	**6.04E-04**	**0.026**	**324.3**

Note:
1. The maximum annual emissions occur for Year 1 of the project, and include the initial deployment activities, two rounds of 6-month inspections, and up to one unscheduled visit.

EMPIRE WIND OFFSHORE WIND FARM
Air Emission Calculations
Marine Vessel Emissions - FLiDAR Buoy Deployment (Rana Miller)

Vessels/Equipment	No. of Engines per vessel	Dimensions (ft) length x breadth x draft	Emission Factor Used (see EFs worksheet)	Activity	Engine Rating (hp)	Fuel Type	Trips	Hrs/trip	Operating Days	Operating Hours (hrs/day)	Total Vessel Operating Hours (hrs)	Average load (%)	Fuel Usage Gallons	Total Emissions: VOC tons	NO_X tons	CO tons	PM_{10} tons	$PM_{2.5}$ tons	SO_2 tons	HAPs tons	CO_2 tons	CH_4 tons	N_2O tons	CO_2e tons
Work boat (Rana Miller or similar)		150' x 36' x 10'		Deploying FLIDAR 1																				
- main engines	2		2		850	Diesel	1	14	1	12	26	43%	958.2	4.22E-03	0.15	0.08	4.03E-03	3.91E-03	2.03E-05	8.68E-04	10.78	1.41E-03	3.13E-04	10.91
- aux. generator	1		2		99	Diesel	1	14	1	12	26	43%	55.8	2.46E-04	8.92E-03	4.55E-03	2.35E-04	2.28E-04	1.18E-06	5.05E-05	0.63	8.19E-05	1.82E-05	0.64
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
Work boat (Rana Miller or similar)		150' x 36' x 10'		Deploying FLIDAR 2																				
- main engines	2		2		850	Diesel	1	11	1	12	23	43%	847.6	3.73E-03	0.14	0.07	3.57E-03	3.46E-03	1.80E-05	7.68E-04	9.54	1.24E-03	2.77E-04	9.65
- aux. generator	1		2		99	Diesel	1	11	1	12	23	43%	49.4	2.17E-04	7.89E-03	4.03E-03	2.08E-04	2.01E-04	1.05E-06	4.47E-05	0.56	7.25E-05	1.61E-05	0.56
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
Work boat (Rana Miller or similar)		150' x 36' x 10'		Deploy met buoy + subsea mooring																				
- main engines	2		2		850	Diesel	1	14	1	12	26	43%	958.2	4.22E-03	0.15	0.08	4.03E-03	3.91E-03	2.03E-05	8.68E-04	10.78	1.41E-03	3.13E-04	10.91
- aux. generator	1		2		99	Diesel	1	14	1	12	26	43%	55.8	2.46E-04	8.92E-03	4.55E-03	2.35E-04	2.28E-04	1.18E-06	5.05E-05	0.63	8.19E-05	1.82E-05	0.64
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
Work boat (Rana Miller or similar)		150' x 36' x 10'		6-month maintenance (x3)																				
- main engines	2		2	FLIDAR 1 (Yrs. 1-2)	850	Diesel	9	10	9	12	198	43%	7,297.0	3.21E-02	1.17	0.60	3.07E-02	2.98E-02	1.55E-04	6.61E-03	82.12	1.07E-02	2.38E-03	83.10
- aux. generator	1		2	met buoy (Yrs. 1-2)	99	Diesel	9	10	9	12	198	43%	424.9	1.87E-03	6.79E-02	3.47E-02	1.79E-03	1.73E-03	9.01E-06	3.85E-04	4.78	6.24E-04	1.39E-04	4.84
bow thruster	1		2	subsea mooring (Yrs. 1-2)	300	Diesel	0	0	9	12	108	43%	702.4	3.09E-03	1.12E-01	5.73E-02	2.96E-03	2.87E-03	1.49E-05	6.36E-04	7.90	1.03E-03	2.29E-04	8.00
- aux. engine	1		2		99	Diesel	0	0	9	12	108	100%	539.0	2.37E-03	8.62E-02	4.40E-02	2.27E-03	2.20E-03	1.14E-05	4.88E-04	6.07	7.91E-04	1.76E-04	6.14
Work boat (Rana Miller or similar)		150' x 36' x 10'		6-month maintenance (x3)																				
- main engines	2		2	FLIDAR 2 (Yrs. 1-2)	850	Diesel	3	8	3	12	60	43%	2,211.2	9.74E-03	0.35	0.18	9.31E-03	9.03E-03	4.69E-05	2.00E-03	24.89	3.25E-03	7.21E-04	25.18
- aux. generator	1		2		99	Diesel	3	8	3	12	60	43%	128.8	5.67E-04	2.06E-02	1.05E-02	5.42E-04	5.26E-04	2.73E-06	1.17E-04	1.45	1.89E-04	4.20E-05	1.47
bow thruster	1		2		300	Diesel	0	0	3	12	36	43%	234.1	1.03E-03	3.74E-02	1.91E-02	9.85E-04	9.56E-04	4.96E-06	2.12E-04	2.63	3.44E-04	7.64E-05	2.67
- aux. engine	1		2		99	Diesel	0	0	3	12	36	100%	179.7	7.91E-04	2.87E-02	1.47E-02	7.56E-04	7.33E-04	3.81E-06	1.63E-04	2.02	2.64E-04	5.86E-05	2.05
Work boat (Rana Miller or similar)		150' x 36' x 10'		6-month maintenance (x4)																				
- main engines	2		2	met buoy (Yrs. 3-4)	850	Diesel	8	10	8	12	176	43%	6,486.2	2.86E-02	1.04	0.53	2.73E-02	2.65E-02	1.38E-04	5.88E-03	73.00	9.52E-03	2.12E-03	73.87
- aux. generator	1		2	subsea mooring (Yrs. 3-4)	99	Diesel	8	10	8	12	176	43%	377.7	1.66E-03	6.04E-02	3.08E-02	1.59E-03	1.54E-03	8.01E-06	3.42E-04	4.25	5.54E-04	1.23E-04	4.30
bow thruster	1		2		300	Diesel	0	0	8	12	96	43%	624.3	2.75E-03	9.98E-02	5.09E-02	2.63E-03	2.55E-03	1.32E-05	5.66E-04	7.03	9.17E-04	2.04E-04	7.11
- aux. engine	1		2		99	Diesel	0	0	8	12	96	100%	479.1	2.11E-03	7.66E-02	3.91E-02	2.02E-03	1.96E-03	1.02E-05	4.34E-04	5.39	7.03E-04	1.56E-04	5.46
Work boat (Rana Miller or similar)		150' x 36' x 10'		Unscheduled buoy check																				
- main engines	2		2	(assume up to 1 trip/yr in event	850	Diesel	1	10	1	12	22	43%	810.8	3.57E-03	0.13	0.07	3.41E-03	3.31E-03	1.72E-05	7.34E-04	9.12	1.19E-03	2.64E-04	9.23
- aux. generator	1		2	of damage or malfunction)	99	Diesel	1	10	1	12	22	43%	47.2	2.08E-04	7.55E-03	3.85E-03	1.99E-04	1.93E-04	1.00E-06	4.28E-05	0.53	6.93E-05	1.54E-05	0.54
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
Work boat (Rana Miller or similar)		150' x 36' x 10'		Decommissioning FLIDAR 1																				
- main engines	2		2	(end of Yr. 2)	850	Diesel	1	14	1	12	26	43%	958.2	4.22E-03	0.15	0.08	4.03E-03	3.91E-03	2.03E-05	8.68E-04	10.78	1.41E-03	3.13E-04	10.91
- aux. generator	1		2		99	Diesel	1	14	1	12	26	43%	55.8	2.46E-04	8.92E-03	4.55E-03	2.35E-04	2.28E-04	1.18E-06	5.05E-05	0.63	8.19E-05	1.82E-05	0.64
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	1.97E-04	7.14E-03	3.64E-03	1.88E-04	1.82E-04	4.07E-06	1.63E-05	2.16	2.81E-04	6.26E-05	2.18
Work boat (Rana Miller or similar)		150' x 36' x 10'		Decommissioning FLIDAR 2																				
- main engines	2		2	(end of Yr. 2)	850	Diesel	1	11	1	12	23	43%	847.6	3.73E-03	0.14	0.07	3.57E-03	3.46E-03	1.80E-05	7.68E-04	9.54	1.24E-03	2.77E-04	9.65
- aux. generator	1		2		99	Diesel	1	11	1	12	23	43%	49.4	2.17E-04	7.89E-03	4.03E-03	2.08E-04	2.01E-04	1.05E-06	4.47E-05	0.56	7.25E-05	1.61E-05	0.56
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
Work boat (Rana Miller or similar)		150' x 36' x 10'		Decomm. met buoy + subsea mooring																				
- main engines	2		2	(end of Yr. 4)	850	Diesel	1	14	1	12	26	43%	958.2	4.22E-03	0.15	0.08	4.03E-03	3.91E-03	2.03E-05	8.68E-04	10.78	1.41E-03	3.13E-04	10.91
- aux. generator	1		2		99	Diesel	1	14	1	12	26	43%	55.8	2.46E-04	8.92E-03	4.55E-03	2.35E-04	2.28E-04	1.18E-06	5.05E-05	0.63	8.19E-05	1.82E-05	0.64
bow thruster	1		2		300	Diesel	0	0	1	12	12	43%	78.0	3.44E-04	1.25E-02	6.36E-03	3.28E-04	3.19E-04	1.65E-06	7.07E-05	0.88	1.15E-04	2.55E-05	0.89
- aux. engine	1		2		99	Diesel	0	0	1	12	12	100%	59.9	2.64E-04	9.57E-03	4.88E-03	2.52E-04	2.44E-04	1.27E-06	5.43E-05	0.67	8.79E-05	1.95E-05	0.68
													27,358.1	**0.12**	**4.37**	**2.23**	**0.12**	**0.11**	**5.83E-04**	**2.47E-02**	**309.4**	**4.04E-02**	**8.97E-03**	**313.1**

Notes:
1. Three separate round trips will be required for equipment deployment: one for FLIDAR 1; one for FLIDAR 2; and one for both the met buoy and subsea mooring.
2. Three separate round trips will be required for equipment decommissioning: one for FLIDAR 1; one for FLIDAR 2; and one for both the met buoy and subsea mooring.
3. Four separate round trips will be required for each 6-month maintenance period: one for FLIDAR 1; one for FLIDAR 2; one for the met buoy; and one for the subsea mooring.
4. 6-month maintenance activities will be performed at 6 months, 12 months, and 18 months after the initial deployment of equipment.
5. It is also assumed that up to one unscheduled round trip per year may be needed to visit a buoy site if there is evidence of damage (such as partial or total loss of data transmissions), or if transmitted GPS data indicated that a buoy had drifted significantly outside the “watch circle,” which allows for buoy movement inside a roughly 100-meter radius from the recorded deployment coordinates.
Examples of events that could cause such damage or buoy displacement include, but are not limited to, hurricane-strength tropical or "nor'easter" storms, heavy snow accumulation, or heavy icing in the event of extremely low temperatures. Trip time is based on travel to the farthest away buoy location (FLIDAR 1).
6. Trip time constitutes the round trip transit time to and from the project site. The number of hours per trip were estimated based on an assumed transit speed of 4 knots when towing a buoy, and 8 knots when not towing a buoy. Round trip distances are estimated to be: 82 nm to the deployment location for FLIDAR 1, the met buoy, and the subsea mooring; and 66 nm to the deployment location for FLIDAR 2.
7. Operating hours/day is the estimated time each vessel is at the deployment site performing its associated activities.
8. The auxiliary engine on the work boat powers the winch, crane, and A-frame, and will only operate in the immediate vicinity of each deployment site.
9. Emission calculations based on vessels traveling from Miller's Launch in Staten Island.
10. The engines utilized on each of the vessels are assumed to be Category 1 engines based on engine horsepower rating (<1,000 kW) and cylinder displacement (1-5 liters per cylinder).
11. Emission factors for marine vessel engines are from Table 3-8 in the ICF International report to the US EPA "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", April 2009. (See emission factors summary page) Assumed all engines to be used are certified to meet EPA Tier 1 engine standards; therefore, the Tier 1 emission factors in Table 3-8 from the ICF International report was used to provide conservative estimate.
12. HAP emission factors for commercial marine vessels were determined using the methodology identified by US EPA for the 2011 National Emissions Inventory (NEI); i.e., they are calculated as percentages of the PM_{10}, $PM_{2.5}$, or VOC emissions from the CMVs. The HAP emisson for nonroad engines were based on EPA's AP-42 Volume 1, Chapters 3.3 and 3.4 for small and large diesel engines. (see HAP emission factor summary pages)
13. Average load factors were estimated based on load factors presented in Table 3-4 of the ICF International report.

EMPIRE WIND OFFSHORE WIND FARM
Emission Factor Summary

Commercial Marine Vessels (CMVs)

		Commercial Marine Vessel Emission Factors (g/hp-hr) /a									Fuel Cons.
	Engine Type	VOC	NO_x	CO	PM/ PM_{10} /b, /c	$PM_{2.5}$ /b	SO_2 /c	CO_2	CH_4	N_2O	(gal/hp-hr) /d
1	Category 2 engines	0.37	7.3	3.73	0.46	0.45	0.0010	515	0.067	0.015	0.050
2	Category 1 engines ≤ 1000 kW	0.20	7.3	3.73	0.19	0.19	0.0010	515	0.067	0.015	0.050
3	Category 3 engines (MSD using MDO) (>30L/cyl.)	0.37	9.8	0.82	0.14	0.13	0.296	482	0.003	0.023	0.046
4	All Categories aux. engines (MSD using MDO)	0.30	10.4	0.82	0.14	0.13	0.316	515	0.003	0.023	0.049

/a Emission factors for Category 1 and 2 engines are from Table 3-8 from ICF International report to the US EPA "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", April 2009 (converted from g/kW-hr to g/hp-hr by multiplying by 0.746 kW/hp). Assumed all Category 1 and 2 engines to be used are certified to meet EPA Tier 1 and 2 marine engine standards respectively (providing conservative estimate for Category 1 engines); therefore the Tier 1 and 2 emission factors in Table 3-8 from the ICF International report was used. Note, the CO emission factor for Category 1 Tier 2 engines is higher than what is provided for Tier 1 engines, thus the Tier 2 emission factor for CO was used to provide a conservative estimate.

/b All PM is assumed to less than 10 µm in diameter; therefore, PM emission factor is equivalent to PM_{10} emission factor. $PM_{2.5}$ is estimated to be 97 % of PM_{10} per EPA guidance in "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression-Ignition," EPA420-R-10-018/NR-009d, July 2010.

/c Emission factors for Category 1 and 2 engines for SO_2 and PM_{10} presented in Table 3-8 of the ICF report (ICF International 2009) are based on a fuel sulfur content of 1.5 percent. These factors were adjusted for the 15 ppmw sulfur content in ultra-low sulfur diesel fuel, by multiplying the emission factors by 0.001 and 0.86 for SO_2 and PM_{10}, respectively, following the approach used in Section 3.4.2 of the ICF Report.

/d Fuel consuption rate for Category 1 and 2 marine engines was estimated based on CO_2 emission factor (g/hp-hr) and the emission factor for the mass of CO_2 generated per gallon of fuel (10.21 kg CO_2/gal fuel) as presented in the Table 13.1 of the "2014 Climate Registry Default Emission Factors." Fuel consumption for Category 3 marine engines was based on the BSFC (g/kW-hr) in the ICF International report.

EMPIRE WIND OFFSHORE WIND FARM
EPA NEI HAP emission factors for Commercial Marine Vessels

HAP emission factors for commercial marine vessels were determined using the methodology identified by US EPA for the 2011 National Emissions Inventory (NEI); i.e., they are calculated as percentages of the PM10, PM2.5, or VOC emissions from the CMVs.

CMV fuel type			Diesel (distillate)		Residual			
Operating description			In Port	Underway	In Port		Underway	
SCC code			2280002100	2280002200	2280003100		2280003200	
Type			Maneuvering	Cruising	Manuevering	Hotelling	Cruising	Reduced Speed Zone
Type Code			M	C	M	H	C	Z
Pollutant	HAP?*	Fraction of						
Ammonia	No	PM10	0.01	0.02	0.00238	0.0108	0.00477	0.00477
Arsenic	Yes	PM10	0.0000175	0.00003	8.74126E-05	0.0004	0.000174825	0.000174825
Benzo[a]Pyrene	Yes	PM10	0.0000025	0.000005	4.37063E-07	0.000002	8.74126E-07	8.74126E-07
Benzo[b]Fluoranthene	Yes	PM10	0.000005	0.00001	8.74126E-07	0.000004	1.74825E-06	1.74825E-06
Benzo[k]Fluoranthene	Yes	PM10	0.0000025	0.000005	4.37063E-07	0.000002	8.74126E-07	8.74126E-07
Beryllium	Yes	PM10			0.000000546	0.000000546	0.000000546	0.000000546
Cadmium	Yes	PM10	0.00000283	0.00000515	0.0000226	0.0000059	0.0000226	0.0000226
Chromium (VI)	Yes	PM10	0.0000085	0.000017	0.00006528	0.000204	0.00006528	0.00006528
Chromium III	Yes	PM10	0.0000165	0.000033	0.00012672	0.000396	0.00012672	0.00012672
Cobalt	Yes	PM10			5.94406E-05	0.000292	0.000153846	0.000153846
Hexachlorobenzene	Yes	PM10	0.00000002	0.00000004	3.4965E-09	0.000000016	6.99301E-09	6.99301E-09
Indeno[1,2,3-c,d]Pyrene	Yes	PM10	0.000005	0.00001	8.74126E-07	0.000004	1.74825E-06	1.74825E-06
Lead	Yes	PM10	0.000075	0.00015	1.39642E-05	0.00006	0.0000262	0.0000262
Manganese	Yes	PM10	0.00000153	0.000001275	0.0000573	0.0000573	0.0000573	0.0000573
Mercury	Yes	PM10	0.000000025	0.00000005	2.7076E-07	0.0000014	5.24476E-07	5.24476E-07
Nickel	Yes	PM10	0.0005	0.001	0.003250219	0.0154	0.00589	0.00589
Phosphorus	Yes**	PM10			0.001787587	0.00438	0.005734266	0.005734266
Polychlorinated Biphenyls	Yes	PM10	0.00000025	0.0000005	4.37063E-08	0.0000002	8.74126E-08	8.74126E-08
Selenium	Yes	PM10	2.83E-08	5.15E-08	1.9125E-06	0.00000908	0.00000348	0.00000348
Total HAP (ratioed to PM10)			**0.0006**	**0.0013**	**0.0055**	**0.0212**	**0.0123**	**0.0123**
Acenaphthene	Yes	PM2.5	0.000018	0.000015	0.00000034	0.00000034	0.00000034	0.00000034
Acenaphthylene	Yes	PM2.5	0.00002775	0.000023125	0.000000525	0.000000525	0.000000525	0.000000525
Anthracene	Yes	PM2.5	0.00002775	0.000023125	0.000000525	0.000000525	0.000000525	0.000000525
Benz[a]Anthracene	Yes	PM2.5	0.00003	0.000025	0.000000567	0.000000567	0.000000567	0.000000567
Benzo[g,h,i,]Perylene	Yes	PM2.5	0.00000675	0.000005625	0.000000128	0.000000128	0.000000128	0.000000128
Chrysene	Yes	PM2.5	0.00000525	0.000004375	9.93E-08	9.93E-08	9.93E-08	9.93E-08
Fluoranthene	Yes	PM2.5	0.0000165	0.00001375	0.000000312	0.000000312	0.000000312	0.000000312
Fluorene	Yes	PM2.5	0.00003675	0.000030625	0.000000695	0.000000695	0.000000695	0.000000695
Naphthalene	Yes	PM2.5	0.00105075	0.000875625	0.0000199	0.0000199	0.0000199	0.0000199
Phenanthrene	Yes	PM2.5	0.000042	0.000035	0.000000794	0.000000794	0.000000794	0.000000794
Pyrene	Yes	PM2.5	0.00002925	0.000024375	0.000000553	0.000000553	0.000000553	0.000000553
Total HAP (ratioed to PM2.5)			**0.0013**	**0.0011**	**0.000024**	**0.000024**	**0.000024**	**0.000024**
2,2,4-Trimethylpentane	Yes	VOC	0.0003	0.00025	NA	NA	NA	NA
Acetaldehyde	Yes	VOC	0.0557235	0.04643625	0.000229	0.000229	0.000229	0.000229
Acrolein	Yes	VOC	0.002625	0.0021875	NA	NA	NA	NA
Benzene	Yes	VOC	0.015258	0.012715	0.0000098	0.0000098	0.0000098	0.0000098
Ethyl Benzene	Yes	VOC	0.0015	0.00125	NA	NA	NA	NA
Formaldehyde	Yes	VOC	0.1122	0.0935	0.00157	0.00157	0.00157	0.00157
Hexane	Yes	VOC	0.004125	0.0034375	NA	NA	NA	NA
Propionaldehyde	Yes	VOC	0.004575	0.0038125	NA	NA	NA	NA
Styrene	Yes	VOC	0.001575	0.0013125	NA	NA	NA	NA
Toluene	Yes	VOC	0.0024	0.002	NA	NA	NA	NA
Xylenes (Mixed Isomers)	Yes	VOC	0.0036	0.003	NA	NA	NA	NA
Total HAP (ratioed to VOC)			**0.2039**	**0.1699**	**0.0018**	**0.0018**	**0.0018**	**0.0018**

*For completeness, all of the pollutants in EPA's database are shown, but not all are HAP as defined in Section 112 of the Clean Air Act and as updated in 40 CFR 63 Subpart C.

**Only elemental phosphorus (CAS #7723140) is a HAP; phosphorus-containing compounds in general are not.

Reference: US EPA, "2011 National Emissions Inventory, version 1, Technical Support Document", draft, November 2013, available from http://www.epa.gov/ttn/chief/net/2011nei/2011_neiv1_tsd_draft.pdf; Table 104 on pp. 178-179 refers to the dataset "2011EPA_HAP-Augmentation" for HAP emissions, which is available from ftp://ftp.epa.gov/EmisInventory/2011/doc; the factors above are from that