UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

Maryland Wind Offshore Wind Project
Letter of Authorization

US Wind, Inc. (US Wind), and those persons it authorizes or funds to conduct activities on its behalf in the specified geographical region (see **Specified Geographical Region** section and Figure 1 below), are authorized to take marine mammals incidental to construction of the Maryland Wind Offshore Wind Project (hereafter known as the "Project"), located in state and Federal waters offshore Maryland, subject to the provisions of the Marine Mammal Protection Act (16 USC 1361 *et seq*.; MMPA) of 1972, as amended, and the applicable regulations (see 50 CFR §§ 217.300 - 217.309), provided they are in compliance with all terms, conditions, and requirements described herein.

Effective Dates

This Letter of Authorization (LOA) is effective for a period of five years, beginning on January 1, 2025 and expiring on December 31, 2029.

Specified Geographical Region

The specified geographical region is the Mid-Atlantic Bight, defined as waters from Cape Hatteras, North Carolina to Cape Cod, Massachusetts and extending into the west Atlantic to the 100-m isobath, and includes, but is not limited to, the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf (OCS)-A 0490 Commercial Lease of Submerged Lands for Renewable Energy Development, along the relevant Export Cable Corridors (ECCs), and at the sea-to-shore transition points located within Delaware Seashore State Park (see Figure 1). The Project area is defined as the Lease Area and area along the associated export cable routes to sea-to-shore transition points.

Specified Activities

The specified activities are impact pile driving of wind turbine generator (WTG), offshore substations (OSS), and meteorological tower (Met Tower) foundations; high-resolution geophysical (hereafter, "HRG") site characterization surveys; vessel transit within the specified geographical region to transport crew, supplies, and materials; WTG and OSS operation, fishery and ecological monitoring surveys; placement of scour protection; and trenching, laying, and burial activities associated with the installation of the export cable from OSSs to shore-based converter stations and inter-array cables between turbines.

1. Permissible Methods of Taking

US Wind may incidentally, but not intentionally, take marine mammals within the specified geographical region in the course of conducting the specified activities, provided US Wind is in complete compliance with all terms, conditions, and requirements described herein.

(a) Permissible methods of taking consist of:

(1) By Level B harassment associated with the acoustic disturbance of marine mammals by impact pile driving of WTG, OSS, and Met Tower foundations, and HRG site characterization surveys; and

(2) By Level A harassment associated with impact pile driving WTG foundations.

(3) Take by mortality (death) or serious injury of any marine mammal species is not authorized.

(b) The incidental taking of marine mammals by the specified activities described in paragraph (a) of this section is limited to the species and stocks found in Table 1.

2. Prohibitions

Except for the takings described under **Permissible Methods of Taking**, it is unlawful for any person to do any of the following in connection with the specified activities described herein:

(a) Violate or fail to comply with the terms, conditions, and requirements of this LOA or the regulations;

(b) Take any marine mammal not specified in Table 1;

(c) Take any marine mammal in Table 1 in any manner other than specified in the **Permissible Methods of Taking** section or number greater than those specified in Table 1; and

(d) Take any marine mammal in Table 1 after NMFS determines such takings results in more than a negligible impact on the species or stocks.

Pursuant to 16 USC § 1371(a)(5)(B), NMFS shall withdraw or suspend this authorization to take marine mammals, if, after notice and opportunity for public comment[1], it finds that:

(1) The methods of taking or the mitigation, monitoring, or reporting measures are not being substantially complied with, or

[1] If NMFS determines an emergency exists that poses a significant risk to the well-being of a species or stock, the notice and comment requirement is waived (see 16 USC 1371(a)(5)(C)(i)).

(2) The taking authorized in the regulations and this LOA is having, or may have, more than a negligible impact on an affected species or stock.

3. Mitigation Requirements

When conducting the specified activities in the specified geographic region, US Wind must implement the following mitigation measures:

(a) *General conditions.* US Wind must comply with the following general measures:

(1) A copy of any issued LOA must be in the possession of US Wind and its designees, all vessel operators, visual protected species observers (PSOs), passive acoustic monitoring (PAM) operators, pile driver operators, and any other relevant designees operating under the authority of the issued LOA;

(2) US Wind must conduct training for construction, survey, vessel personnel, and the marine mammal monitoring team (PSO and PAM operators) prior to the start of all in-water activities in order to explain responsibilities, communication procedures, marine mammal detection and identification, mitigation, monitoring, and reporting requirements, safety and operational procedures, and authorities of the marine mammal monitoring team(s). This training must be repeated for new personnel who join the work during the Project. A description of the training program must be provided to NMFS at least 60 calendar days prior to the initial training before in-water activities begin. Confirmation of all required training must be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to initiating Project activities;

(3) Prior to and when conducting any in-water construction activities and vessel operations, US Wind personnel and contractors (*e.g.*, vessel operators, PSOs) must use available sources of information on North Atlantic right whale presence in or near the Project Area including daily monitoring of the Right Whale Sightings Advisory System and monitoring the U.S. Coast Guard's VHF Channel 16 throughout the day to receive notification of any sightings and/or information associated with any Slow Zones (*i.e.*, Dynamic Management Areas (DMAs) and/or acoustically-triggered Slow Zones) to provide situational awareness for both vessel operators and PSO(s) and PAM operator(s) teams. The marine mammal monitoring team must monitor these systems no less than every 4 hours;

(4) Any large whale observation or acoustic detection by a PSO(s) or a PAM operator(s) must be conveyed to all vessel captains. Any marine mammal observed by project personnel must be immediately communicated to any on-duty PSO(s), PAM operator(s), and all vessel captains;

(5) In the event that a large whale is sighted or acoustically detected that cannot be confirmed as a non-North Atlantic right whale, it must be treated as if it were a North Atlantic right whale for purposes of mitigation;

(6) PSOs and PAM operators have the authority to call for a delay or shutdown to an activity, and US Wind must instruct all personnel regarding their authority. Any disagreements between a PSO, PAM operator, and the activity operator regarding delays or shutdowns must only be discussed after the mitigative action has occurred;

(7) Any marine mammals observed within a clearance or shutdown zone must leave (of their own volition) prior to commencing pile driving activities or HRG surveys;

(8) If an individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant Level B harassment zone prior to or during a specified activity, the activity must be delayed or shut down, unless doing so would result in imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. The activity must not commence or resume until the animal(s) has been confirmed to have left the Level B harassment zone and is on a path away from the applicable zone or after 15 minutes with no further sightings for small odontocetes and pinnipeds, and 30 minutes for all other species with no further sightings;

(9) For in-water construction heavy machinery activities other than pile driving, if a marine mammal is on a path towards or comes within 10 meters (m; 32.8 feet (ft)) of equipment, US Wind must cease operations until the marine mammal has moved more than 10 m (32.8 ft) on a path away from the activity to avoid direct interaction with equipment;

(10) All vessels must be equipped with a properly installed, operational Automatic Identification System (AIS) device and US Wind must report all Maritime Mobile Service Identify (MMSI) numbers to NMFS Office of Protected Resources (*pr.itp.monitoringreports@noaa.gov*) prior to commencing initial vessel transits;

(11) By accepting the LOA, US Wind consents to on-site observation and inspections by Federal agency personnel (including NOAA personnel) during activities described in this subpart, for the purposes of evaluating the implementation and effectiveness of measures contained within the LOA and this subpart;

(12) It is prohibited to assault, harm, harass (including sexually harass), oppose, impede, intimidate, impair, or in any way influence or interfere with a PSO, PAM operator, or vessel crew member acting as an observer, or attempt the same. This prohibition includes, but is not limited to, any action that interferes with an observer's responsibilities, or that creates an intimidating, hostile, or offensive environment. Personnel may report any violations to the NMFS Office of Law Enforcement; and.

(13) US Wind must also abide by the reasonable and prudent measures and terms and conditions of the Biological Opinion and Incidental Take Statement, as issued by NMFS, pursuant to section 7 of the Endangered Species Act.

(b) *Vessel strike avoidance measures*[2]. US Wind must comply with the following vessel strike avoidance measures while in the specific geographic region, unless a deviation is necessary to maintain safe maneuvering speed and justified because the vessel is in an area where oceanographic, hydrographic, and/or meteorological conditions severely restrict the maneuverability of the vessel; an emergency situation presents a threat to the health, safety, or life of a person(s); or when a vessel is actively engaged in emergency rescue or response duties, including vessel-in distress or environmental crisis response. An emergency is defined as a serious event that occurs without warning and requires immediate action to avert, control, or remedy harm. Speed over ground will be used to measure all vessel speeds:

(1) Prior to the start of the Project's activities involving vessels, all vessel personnel must receive a protected species training that covers, at a minimum, identification of marine mammals that have the potential to occur where vessels would be operating; detection and observation methods in both good weather conditions (*i.e.*, clear visibility, low winds, low sea states) and bad weather conditions (*i.e.*, fog, high winds, high sea states, with glare); sighting communication protocols; all vessel speed and approach limit mitigation requirements (*e.g.*, vessel strike avoidance measures); and information and resources available to the Project personnel regarding the applicability of Federal laws and regulations for protected species. This training must be repeated for any new vessel personnel who join the Project. Confirmation of the vessel personnel's training and understanding of the Incidental Take Authorization (ITA) requirements must be documented on a training course log sheet and reported to NMFS prior to vessel activities;

(2) All vessel operators, regardless of their vessel's size, must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course to avoid striking any marine mammal;

(3) All underway vessels (*e.g.*, transiting, surveying) operating at any speed, must have a dedicated visual observer aboard and on duty at all times whose sole responsibility (*i.e.*, must not have duties other than observing) is to monitor for marine mammals within a 180 degree (°) direction of the forward path of the vessel (90° port to 90° starboard) located at an appropriate vantage point for ensuring vessels are maintaining appropriate separation distances. Visual observers must be equipped with alternative monitoring technology (*e.g.*, night vision devices, infrared cameras) for periods of low visibility (*e.g.*, darkness, rain, fog, *etc.*). The dedicated visual observer must receive prior training on protected species detection and identification, vessel strike minimization procedures, how and when to communicate with the vessel captain, and reporting requirements in this subpart. Visual observers may be third-party observers (*i.e.*, NMFS-approved PSOs; see section 4(a)) or trained crew members (see (b)(1) of this subsection);

[2] In the event that there is a conflict between the vessel strike measures in this LOA and other implementing vessel/marine mammal regulations (*e.g.*, 50 CFR 224.103, 50 CFR 224.105), US Wind must follow the more protective measures.

(4) US Wind must continuously monitor the U.S. Coast Guard VHF Channel 16 at the onset of transiting through the duration of transiting, over which North Atlantic right whale sightings are broadcasted. At the onset of transiting and at least once every 4 hours, vessel operators and/or trained crew member(s) must also monitor the project's Situational Awareness System (if applicable), WhaleAlert, NMFS' website, and relevant NOAA information systems such as the Right Whale Sighting Advisory System (RWSAS) for the presence of North Atlantic right whales;

(5) All vessels, regardless of size, must transit at 10 kn (11.5 mph) or less from November 1- April 30 in the specified geographic region;

(6) All vessels, regardless of size, must travel at 10 kn (11.5 miles per hour (mph)) or less within any Seasonal Management Area (SMA) or active North Atlantic right whale Slow Zone (*i.e.*, DMAs or acoustically-triggered slow zone);

(7) All vessel operators, regardless of their vessel's size, must immediately reduce vessel speed to 10 kn (11.5 mph) or less for at least 24 hours when a North Atlantic right whale is sighted at any distance by any Project-related personnel or acoustically detected by any Project-related PAM system. Each subsequent observation or acoustic detection in the Project area shall trigger an additional 24-hour period. If a North Atlantic right whale is reported by project personnel or via any of the monitoring systems (refer back to paragraph (b)(4) of this subsection) that vessel must operate at 10 kn (11.5 mph) or less for 24 hours following the reported detection;

(8) All vessels, regardless of size, must immediately reduce speed to 10 kn (11.5 mph) or less when any large whale (other than a North Atlantic right whale) or large assemblages of cetaceans are observed within 500 m (1,640 ft miles (mi)) of an underway vessel;

(9) If vessel(s) are traveling at speeds greater than 10 kn (11.5 mph) (*i.e.*, during periods where no other speed restrictions are enacted) in the transit corridor (defined as from a port to the Lease Area or return), in addition to the required dedicated visual observer, US Wind must monitor the transit corridor in real-time with PAM prior to and during transits. If a North Atlantic right whale is detected via visual observation or PAM detection within or approaching the transit corridor, all vessels in the transit corridor must travel at 10 kn (11.5 mph) or less for 24 hours following the detection. Each subsequent detection shall trigger a 24-hour reset. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection in the transit corridor in the past 24 hours;

(10) All vessels must maintain a minimum separation distance of 100 m (328 ft) from all non-ESA-listed large whales (*i.e.*, humpback whales and minke whales) (see table 2). If one of these species is sighted within 100 m (328 ft) of a transiting vessel, the vessel must turn away from the whale(s), reduce speed, and shift the engine(s) to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 100 m (328 ft);

(11) All vessels must maintain a minimum separation distance of 50 m (164 ft) from all delphinid cetaceans and pinnipeds with an exception made for those that approach the vessel (*i.e.*, bow-riding dolphins) (see table 2). If a delphinid cetacean or pinniped is sighted within 50 m (164 ft) of a transiting vessel, the vessel must turn away from the animal(s), shift the engine to neutral, with an exception made for those that approach the vessel (*e.g.*, bow-riding dolphins). Engines must not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m (164 ft);

(12) When a marine mammal(s) is sighted while the vessel(s) is transiting, the vessel must take action as necessary to avoid violating the relevant separation distances (*e.g.*, attempt to remain parallel to the animal's course, slow down, and avoid abrupt changes in direction until the animal has left the area of its own volition). This measure does not apply to any vessel towing gear or any situation where respecting the relevant separation distance would be unsafe (*i.e.*, any situation where the vessel is navigationally constrained);

(13) All vessels underway must not divert or alter course to approach any marine mammal;

(14) Vessel operators must check, daily, for information regarding the establishment of mandatory or voluntary vessel strike avoidance areas (*i.e.*, DMAs, Seasonal Management Areas (SMAs), Slow Zones) and any information regarding North Atlantic right whale sighting locations; and

(15) US Wind must submit a Marine Mammal Vessel Strike Avoidance Plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of vessel activity if vessels will operate over 10 kn (11.5 mph). The plan must provide details on the vessel-based observer and PAM protocols for transiting vessels. If a plan is not submitted and approved by NMFS prior to vessel operations, all project vessels transiting year-round must travel at speeds of 10 kn (11.5 mph) or less. US Wind must comply with any approved Marine Mammal Vessel Strike Avoidance Plan.

(c) *WTG, OSS, and Met Tower foundation installation.* US Wind must comply with the following WTG, OSS, and Met Tower foundation installation measures unless doing so could result in imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals, or the lead engineer determines there is risk of pile refusal or pile instability:

(1) Foundation installation via impact pile driving must not occur December 1st through April 30th, annually:

(2) Monopiles must be no larger than 11-m in diameter. No more than one monopile may be installed per day, unless otherwise approved in writing by NMFS. Pin piles for the OSSs must be no larger than 3-m in diameter. No more than four 3-m pin piles may be installed per day. Met tower pin piles must be no larger than 1.8-m in diameter. No more than two 1.8-m pin piles may be installed per day.

Hammer energies must not exceed 3,500 kJ for pin pile installation. The minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of all piles must be used. The impact hammer energy rating must not exceed 4,400 kilojoules;

(3) US Wind must not initiate foundation pile driving earlier than 1 hour prior to civil sunset or later than 1.5 hours prior to civil sunrise, and may only continue pile driving into darkness if stopping operations represents a risk to human health, safety, and/or pile stability, unless US Wind submits, and NMFS approves, an Alternative Monitoring Plan, which would allow pile driving to begin after daylight hours have ended. Until this is submitted, reviewed, and approved by NMFS, US Wind may not begin any new pile driving outside of the daylight hours previously defined in this subsection;

(4) Soft-start must occur at the beginning of impact pile driving and at any time following a cessation of impact pile driving of 30 minutes or longer. Soft-start involves initiating hammer operation at a reduced energy level (relative to full operating capacity) followed by a waiting period. US Wind must comply with a soft-start protocol as described in the approved Pile Driving Monitoring Plan;

(5) US Wind must implement clearance and shutdown zones, which must be measured using the radial distance around the pile being driven;

(6) US Wind must utilize PSO(s) and PAM operator(s), as described in 4(a) and 4(b). At least three on-duty PSOs must be stationed and observing on the foundation installation vessel/platform. A minimum of three PSOs must be active on each of the two dedicated PSO vessels. On-duty PSOs must be located at the best vantage point(s) on any platform, as determined by the Lead PSO, in order to obtain 360-degree visual coverage of the entire clearance and shutdown zones around the activity area, and as much of the Level B harassment zone as possible. Concurrently, PAM operator(s) must be actively monitoring for marine mammals with PAM 60 minutes before, during, and 30 minutes after pile driving in accordance with a NMFS-approved PAM Plan;

(7) PSOs must visually monitor clearance zones for marine mammals for a minimum of 60 minutes prior to commencing pile driving (see table 3). The entire minimum visibility zone must be visible (*i.e.,* not obscured by dark, rain, fog, *etc.*) for a full 60 minutes immediately prior to commencing pile driving. If PSOs cannot visually monitor the minimum visibility zone prior to foundation pile driving at all times), pile driving operations must not commence;

(8) All clearance zones must be confirmed to be free of marine mammals for 30 minutes immediately prior to the beginning of soft-start procedures. If a marine mammal is detected within or about to enter the applicable clearance zones, prior to the beginning of soft-start procedures, impact pile driving must be delayed until the animal has been visually observed exiting the clearance zone or until a specific time period has elapsed with no further sightings. The specific time periods are 15 minutes for small odontocetes and pinnipeds, and 30 minutes for

all other species. PAM operators must immediately communicate all detections of marine mammals at any distance to the Lead PSO, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination;

(9) For North Atlantic right whales, any visual observation by a PSO or acoustic detection within 10 km (6.21 mi) must trigger a delay to the commencement of pile driving. The clearance zone may only be declared clear if no North Atlantic right whale acoustic or visual detections have occurred within the clearance zone during the 60-minute monitoring period. If pile driving has been shut down due to the presence of a North Atlantic right whale, pile driving may not restart until the North Atlantic right whale has neither been visually nor acoustically detected for 30 minutes;

(10) If a marine mammal is detected (visually or acoustically) entering or within the respective shutdown zone after pile driving has begun, the PSO or PAM operator must call for a shutdown of pile driving and US Wind must stop pile driving immediately, unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals, or the lead engineer determines there is pile refusal or pile instability. If pile driving is not shut down in one of these situations, US Wind must reduce hammer energy to the lowest level practicable and the reason(s) for not shutting down must be documented and reported to NMFS Office of Protected Resources within the applicable monitoring reports (*e.g.*, weekly, monthly)(see 4(f));

(11) If pile driving has been shut down due to the presence of a marine mammal other than a North Atlantic right whale, pile driving must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and has been visually or acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections have occurred. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species. In cases where these criteria are not met, pile driving may restart only if necessary to maintain pile stability at which time US Wind must use the lowest hammer energy practicable to maintain stability;

(12) US Wind must deploy at least two functional noise abatement systems that reduce noise levels to the modeled harassment isopleths, assuming 10-dB attenuation, during all impact pile driving and comply with the following measures:

(i) If using a bubble curtain, at least a double bubble curtain must be used; ;

(ii) Bubble curtains must distribute air bubbles using an air flow rate of at least 0.5 m^3/(minute*m). The bubble curtain(s) must surround 100 percent of the piling perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtain(s) must adjust the air supply and

operating pressure such that the maximum possible sound attenuation performance of the bubble curtain(s) is achieved;

(iii) The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact;

(iv) No parts of the ring or other objects may prevent full seafloor contact with a bubble curtain ring;

(v) Construction contractors must train personnel in the proper balancing of airflow to the bubble curtain ring. US Wind must inspect and carry out appropriate maintenance on the noise attenuation system prior to every pile driving event and prepare and submit a Noise Attenuation System (NAS) inspection/performance report[3]. Additionally, a full maintenance check (*e.g.*, manually clearing holes) must occur prior to each pile being installed. US Wind must develop and implement a maintenance plan that identifies the frequency of hose inspection, flushing, pressure tests, and re-drilling and that is designed to minimize the potential for sediment clogging to affect bubble curtain performance. Adjustments to the frequency of these maintenance steps must be made as necessary to ensure optimal performance of the bubble curtain system; and

(vi) Corrections to the bubble ring(s) to meet the performance standards in paragraph (c)(12) of this section must occur prior to impact pile driving of monopiles, 3-m (9.8 ft) pin piles, and 1.8-m (5.9 ft) pin piles. If US Wind uses a noise mitigation device in addition to the bubble curtain, US Wind must maintain similar quality control measures as described in this paragraph (c)(12) of this section.

(13) US Wind must implement PAM in accordance with the NMFS-approved PAM Plan. The PAM system components (*i.e.*, acoustic buoys) must not be placed closer than 1 km (0.6 mi) to the pile being driven so that the activities do not mask the PAM system. US Wind must demonstrate and prove the detection range of the system they plan to deploy while considering potential masking from pile-driving and vessel noise. The PAM system must be able to:

(i) Detect all marine mammals to the maximum extent possible;

(ii) Maximize baleen whale detections; and

(iii) Must be capable of detecting North Atlantic right whales at 10 km (6.21 mi)[4];

[3] For piles for which thorough SFV is carried out, this report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the respective pile. Performance reports for piles monitoring with abbreviated SFV must be submitted with the weekly pile driving reports.

[4] NMFS recognizes that other marine mammals (*e.g.*, harbor porpoises) may not be detected at 10 km (6.21 mi).

(14) US Wind must conduct thorough sound field verification (SFV) measurements during pile driving activities associated with the installation of, at minimum, the first three monopile foundations installed each calendar year, the first three full jacket foundations (inclusive of all pin piles installed for a given jacket foundation), and the first foundation for any foundation scenarios that were modeled for the exposure analysis (*e.g.*, rated hammer energy, number of strikes, representative location) that does not fall into one of the previously listed categories for each of the three construction campaigns. Thorough SFV measurements must continue until at least three monopiles and three jacket foundations demonstrate noise levels are at or below those modeled, assuming 10 decibels (hereafter, "dB") of attenuation. Thorough SFV measurements must be conducted as follows:

(i) SFV measurements must be made at a minimum of four distances from the foundation(s) being driven, along a single transect, in the direction of lowest transmission loss, including, but not limited to, 750 m (2,460 ft) and three additional ranges selected such that measurement of Level A harassment and Level B harassment isopleths are accurate, feasible, and avoids extrapolation. At least one additional measurement at an azimuth 90 degrees from the array at 750 m (2,460 ft) must be made. At each location, there must be a near bottom and mid-water column hydrophone (measurement systems);

(ii) The recordings must be continuous throughout the duration of all pile driving of each pile for a given foundation;

(iii) The SFV measurement systems must have a sensitivity appropriate for the expected sound levels from pile driving received at the nominal ranges throughout the installation of the pile(s). The frequency range of SFV measurement systems must cover the range of at least 20 hertz (hereafter, "Hz") to 20 kilohertz (hereafter, "kHz"). The SFV measurement systems must be designed to have omnidirectional sensitivity so that the broadband received level of all pile driving exceeds the system noise floor by at least 10 dB. The dynamic range of the SFV measurement system must be sufficient such that, at each piling location, the signals must avoid poor signal-to-noise ratios for low amplitude signals and avoid clipping, nonlinearity, and saturation for high amplitude signals;

(iv) All hydrophones used in SFV measurements systems are required to have undergone a full system, traceable laboratory calibration conforming to International Electrotechnical Commission (hereafter, "IEC") 60565, or an equivalent standard procedure, from a factory or accredited source to ensure the hydrophone receives accurate sound levels, at a date not to exceed 2 years before deployment. Additional *in-situ* calibration checks using a pistonphone are required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.*, high-pass, low-pass, *etc*.), which are not already accounted for by the calibration, the filter performance (*i.e.*, the

filter's frequency response) must be known, reported, and the data corrected before analysis;

(v) US Wind must be prepared with additional equipment (*e.g.*, hydrophones, recording devices, hydrophone calibrators, cables, batteries, *etc*.), which exceeds the amount of equipment necessary to perform the measurements, such that technical issues can be mitigated before measurement; and

(vi) US Wind must submit interim thorough SFV reports within 48 hours after each foundation is measured (see section 4(f) for interim and final reporting requirements).

(15) For thorough SFV on monopile and jacket foundations:

(i) During thorough SFV, installation of the next foundation (of the same type/foundation method) may not proceed until US Wind has reviewed the initial results from the thorough SFV and determined that there were no exceedances of any distances to the identified thresholds based on modeling, assuming 10 dB attenuation. Subsequent SFV measurements are also required should larger piles be installed or if additional monopiles are driven that may produce louder sound fields than those previously measured (*e.g.*, higher hammer energy, greater number of strikes, *etc*.);

(ii) If any of the thorough SFV measurements from any foundation (monopile or jacket) indicate the distances to NMFS' marine mammal Level A harassment or Level B harassment thresholds (peak or cumulative), assuming 10 dB attenuation, are greater than the modeled distances, before the next foundation is installed, US Wind must notify NMFS by email within 24 hours of reviewing the thorough SFV measurements as well as identify and propose for review and concurrence[5]: additional, modified, and/or alternative noise attenuation measures or operational changes[6] that present a reasonable likelihood of reducing sound levels to the modeled distances on subsequent foundations; provide a written explanation to NMFS Office of Protected Resources supporting that determination and requesting concurrence to proceed; and, following NMFS Office of Protected Resources' concurrence, deploy those additional measures or modifications on any subsequent foundation of the same pile type/installation methodology that are installed[7];

(1) US Wind must also increase clearance and shutdown zone sizes for subsequent piles of the same type (*e.g.*, if triggered by SFV results

[5] This step does not necessarily have to occur when the results are received but information related to this must be proposed in the SFV Plan for NMFS review and concurrence.

[6] Such examples include if the pile was installed with a double bubble curtain without a near field sound attenuation device, add a nearfield noise attenuation device; adjust hammer operations; adjust noise attenuation system to improve performance.

[7] Such as if threshold distances are exceeded on pile 1, then additional measures must be deployed before installing pile 2.

for a monopile, for the next monopile) so that they are at least the size of the distances to those thresholds as indicated by SFV. For every 1,500 m (4,921.3 ft) that a marine mammal clearance or shutdown zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone. US Wind must deploy any additional PSOs consistent with the approved Marine Mammal Monitoring Plan in consideration of the size of the new zones and the species that must be monitored;

(2) Following installation of a pile with additional, alternative, or modified noise attenuation measures or operational changes, if thorough SFV results indicate that sound fields are within Level A harassment and Level B harassment thresholds, assuming 10 dB attenuation, thorough SFV must be conducted on two additional piles of the same type/installation method (for a total of at least three piles with consistent noise attenuation measures). If the thorough SFV results from all three of those foundations are within the distances to isopleths of concern modeled, assuming 10 dB attenuation, US Wind must continue to implement the approved additional, alternative, or modified sound attenuation measures/operational changes[8]. Use of the expanded clearance and shutdown zones must continue for additional piles until US Wind requests and receives concurrence from NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office (GARFO) to revert to the original clearance and shutdown zones; and

(3) If, after all practicable measures that could be taken to reduce noise levels have been successfully implemented and exhausted, and thorough SFV measurements continue to indicate that the distances to the marine mammal harassment thresholds are greater than those modeled assuming 10 dB attenuation, US Wind must consult with NMFS Office of Protected Resources to evaluate the circumstances before additional piles are installed.

(iii) If thorough SFV results indicate that ranges to isopleths corresponding to the Level A harassment and/or Level B harassment thresholds are less than ranges predicted by modeling (assuming 10 dB attenuation), US Wind may request a modification of the clearance and shutdown zones from NMFS Office of Protected Resources. For NMFS Office of Protected Resources to consider a modification request for reduced zone sizes, US Wind must have conducted thorough SFV measurements on an additional three foundations and ensure that the subsequent foundations would be

[8] Per the Biological Opinion, US Wind has the option to request concurrence from NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division to return to the original clearance and shutdown zones or US Wind can continue with the expanded clearance and shutdown zones and the additional PSOs.

installed under conditions that are predicted to produce smaller harassment zones than those modeled assuming 10-dB of attenuation.

(16) US Wind must conduct abbreviated SFV monitoring, on the remaining piles for which thorough SFV is not conducted. Abbreviated SFV must be conducted as follows:

(i) SFV measurements must be made at a single acoustic recorder, consisting of a near-bottom and mid-water hydrophone, at approximately 750 m from the pile being driven, in the direction of lowest transmission loss to record sounds throughout the duration of all pile driving of each foundation. Reports of abbreviated SFV monitoring must be included in the weekly pile driving reports;

(ii) The abbreviated SFV data collected will be used to compare the noise levels defined as a result of thorough SFV;

(iii) Abbreviated SFV monitoring duration and equipment must comply with the conditions specified in measures (14)(ii) through (14)(v); and

(iv) US Wind must review abbreviated SFV results for each pile within 24 hours of completion of the foundation installation. If measured levels at 750 m did not exceed the expected levels defined during thorough SFV, US Wind does not need to take any additional action. If measured levels from abbreviated SFV for any pile are greater than expected levels (as defined by thorough SFV), US Wind must evaluate the available information from the pile installation to determine if there is an identifiable cause of the greater than expected sound levels (*i.e.,* a failure of the noise attenuation system), identify and implement corrective action, and report this information (inclusive of an explanation of the suspected or identified cause) to NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office within 48 hours of completion of the installation of the pile, during which the greater than expected sound levels occurred. If US Wind can demonstrate that this greater than expected sound level was the result of a failure of the noise attenuation system (*e.g.,* loss of a generator supporting a bubble curtain such that one bubble curtain failed during pile driving) that can be remedied in a way that returns the noise attenuation system to pre-failure conditions, or if there is another satisfactory explanation for the increase in sound that is not expected to be repeated for subsequent piles, US Wind can request concurrence from NMFS to proceed without thorough SFV monitoring, that would otherwise be required, within 72 hours. US Wind is required to remedy any such failure of the noise attenuation system prior to carrying out any additional pile driving;

(v) If results of abbreviated SFV monitoring for any pile exceed the expected noise levels at 750 m established through the initial thorough SFV, US Wind must resume thorough SFV monitoring (as described in 3(c)(15)) for

installation of the same foundation type and installation method within 72 hours after the completion of pile driving with an exceedance. US Wind can request concurrence from NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office to resume abbreviated SFV following submission of an interim report from thorough SFV that demonstrates ranges to the Level A harassment and Level B harassment thresholds within expected values (assuming 10 dB attenuation). US Wind may automatically resume abbreviated SFV monitoring if three consecutive thorough SFV reports indicate ranges to the Level A harassment and Level B harassment thresholds are within modeled distances (assuming 10 dB attenuation).

(17) US Wind must conduct SFV measurements during turbine operations to estimate turbine operational source levels and transmission loss rates in accordance with an NMFS-approved SFV Plan;

(18) US Wind must submit a SFV Plan to NMFS Office of Protected Resources for review and approval at least 180 calendar days prior to planned start of foundation installation activities and abide by the Plan, if approved. At a minimum, the SFV Plan must describe how US Wind would ensure that the first three monopile foundation/first three entire jacket foundations (inclusive of all pin piles for a given jacket foundation) installation sites selected for thorough SFV measurements are representative of the rest of the monopile and jacket foundation installation sites such that future pile installation events are anticipated to produce similar sound levels to those piles measured. In the case that these sites/scenarios are not determined to be representative of all other pile installation sites, US Wind must include information in the SFV Plan on how additional sites/scenarios would be selected for SFV measurements. The SFV Plan must also include methodology for collecting, analyzing, and preparing SFV measurement data for submission to NMFS Office of Protected Resources and describe how the effectiveness of the sound attenuation methodology would be evaluated based on the results. Pile driving and SFV for pile driving may not occur until NMFS approves the SFV Plan for this activity;

(19) US Wind must submit a Foundation Installation Pile Driving Marine Mammal Monitoring Plan to NMFS Office of Protected Resources for review and approval at least 180 calendar days prior to planned start of foundation pile driving and abide by the Plan, if approved. US Wind must obtain both NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division's concurrence with this Plan prior to the start of any pile driving. The Plan must include a description of all monitoring equipment and PAM and PSO protocols (including number and location of PSOs) for all pile driving. The Plan must also include a description of how all mitigation and monitoring requirements included within this authorization will be implemented as well as a pile driving installation summary and sequence of events. No foundation pile installation can occur without NMFS' approval of the Plan;

(20) US Wind must submit a Passive Acoustic Monitoring Plan (hereafter, "PAM Plan") to NMFS Office of Protected Resources for review and approval at least 180 calendar days prior to the planned start of foundation installation activities (impact pile driving) and abide by the PAM Plan, if approved. No pile installation can occur if US Wind's PAM Plan does not receive approval from NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division. The PAM Plan must include:

(i) A description of all proposed PAM equipment and hardware, the calibration data, bandwidth capacity, address how the proposed passive acoustic monitoring must follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind.

(ii) A description of all proposed PAM equipment, procedures, and protocols including proof that vocalizing North Atlantic right whales will be detected within the clearance and shutdown zones.

(21) In the event of a cetacean live stranding (or near-shore atypical milling) event within 50 km of the pile driving activities, where the NMFS Stranding Network is engaged in herding or other interventions to return animals to the water, NMFS will advise of the need to implement shutdown procedures for all active pile driving activities operating within 50 km of the stranding. Shutdown procedures for live stranding or milling cetaceans include the following:

(i) If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, NMFS will advise that the shutdown around the animals' location is no longer needed;

(ii) Otherwise, shutdown procedures will remain in effect until NMFS determines and advises that all live animals involved have left the area (either of their own volition or following an intervention); and

(iii) If further observations of the marine mammals indicate the potential for re-stranding, additional coordination will be required to determine what measures are necessary to minimize that likelihood (*e.g.*, extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

(d) *HRG surveys*. The following requirements apply to HRG surveys operating sub-bottom profilers (hereafter, "acoustic sources") (*i.e.*, sparkers and Compressed High Intensity Radiated Pulse (CHIRPs)):

(1) US Wind must establish and implement clearance and shutdown zones for HRG surveys using visual monitoring, as described in this section (see table 4);

(2) US Wind is required to have at least one PSO on active duty per HRG vessel during HRG surveys that are conducted during daylight hours (*i.e.*, from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at

least two PSOs on active duty per vessel during HRG surveys that are conducted during nighttime hours;

(3) Prior to starting the survey and after receiving confirmation from the PSOs that the clearance zone is clear of any marine mammals, US Wind is required to ramp-up acoustic sources, which involves initiating source operation at a reduced energy level (relative to full operating capacity) followed by a waiting period, unless the equipment operates on a binary on/off switch. Ramp-up must occur at the beginning of source activation and at any time following a cessation of acoustic source use greater than 30 minutes. US Wind must also ensure visual clearance zones are fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to the initiation of survey activities using acoustic sources;

(4) Ramp-up and activation must be delayed if a marine mammal(s) enters its respective shutdown zone. Ramp-up and activation may only be reinitiated if the animal(s) has been observed exiting its respective shutdown zone or until a specific amount of time has elapsed since the last sighting[9];

(5) Prior to a ramp-up procedure starting or activating acoustic sources, the acoustic source operator (operator) must notify a designated PSO of the planned start of ramp-up as agreed upon with the Lead PSO. The notification time should not be less than 60 minutes prior to the planned ramp-up or activation in order to allow the PSOs time to monitor the clearance zone(s) for 30 minutes prior to the initiation of ramp-up or activation (pre-start clearance). During this 30-minute pre-start clearance period, the entire applicable clearance zones must be visible, except as indicated in measure (d)(12) of this section;

(6) A PSO conducting pre-start clearance observations must be notified again immediately prior to reinitiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed;

(7) Ramp-ups must be scheduled so as to minimize the time spent with the source activated;

(8) Acoustic sources must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Acoustic sources must be used at the lowest practicable source level to meet the survey objective, when in use, and must be turned off when they are not necessary for the survey;

(9) US Wind must implement a 30-minute clearance period of the clearance zones immediately prior to the commencing of the survey or when there is more than a 30-minute break in survey activities or PSO monitoring. A clearance period is a period when no marine mammals are detected in the relevant zone;

[9] The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species.

(10) If a marine mammal is observed within a clearance zone during the clearance period, ramp-up or acoustic surveys may not begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until a specific time period has elapsed with no further sighting[10];

(11) In any case when the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (infrared (IR)/thermal camera), and the Lead PSO has determined that the clearance zones are clear of marine mammals, survey operations may commence (*i.e.*, no delay is required) despite periods of inclement weather and/or loss of daylight. Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up;

(12) Once the survey has commenced, US Wind must immediately shut down acoustic sources if a marine mammal is sighted entering or within a respective shutdown zone, except in cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations may continue (*i.e.*, no shutdown is required) so long as no marine mammals have been detected. The shutdown requirement does not apply to small delphinids of the following genera: *Delphinus, Stenella, Lagenorhynchus,* and *Tursiops*. If there is uncertainty regarding the identification of a marine mammal species (*i.e.*, whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified in this paragraph is detected in the shutdown zone;

(13) If an acoustic source has been shut down due to the presence of a marine mammal, the use of an acoustic source may not commence or resume until the animal(s) has been confirmed to have left the Level B harassment zone or until a specific time period has elapsed with no further sighting[11]; and

(14) If an acoustic source is shut down for a period longer than 30 minutes, all clearance and ramp-up procedures must be initiated. If an acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, acoustic sources may be activated again without ramp-up only if PSOs have maintained constant observation and no additional detections of any marine mammal occurred within the respective shutdown zones.

(e) *Fisheries monitoring surveys*. The following requirements apply to fishery monitoring surveys:

(1) All captains and crew conducting fishery surveys must be trained in marine mammal detection and identification. Marine mammal monitoring will be

[10] The specific time period is 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species.
[11] The specific time period is 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species.

conducted by the captain and/or a member of the scientific crew within 1 nautical mile (nmi) (1.85 km; 1.2 mi) and 15 minutes prior to deploying gear, during, and for 15 minutes after haul back;

(2) Survey gear must be deployed as soon as possible once the vessel arrives on station. Gear must not be deployed if there is a risk of interaction with marine mammals. Gear may be deployed after 15 minutes of no marine mammal sightings within 1 nmi (1,852 m) of the sampling station;

(3) US Wind and its cooperating institutions, contracted vessels, and commercially hired captains must implement the following "move-on" rule: if marine mammals are sighted within 1 nmi (1.2 mi) of the planned location and 15 minutes before gear deployment, then US Wind and its cooperating institutions, contracted vessels, and commercially hired captains, as appropriate, must move the vessel away from the marine mammals to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, US Wind and its cooperating institutions, contracted vessels, and commercially hired captains must move again or skip the station;

(4) If a marine mammal is at risk of interacting with or entangled in deployed gear, all gear must be immediately removed from the water. If marine mammals are sighted before the gear is fully removed from the water, US Wind must take the most appropriate action to avoid marine mammal interaction and the vessel must slow its speed and maneuver the vessel away from the animals to minimize potential interactions with the observed animal;

(5) US Wind must maintain visual marine mammal monitoring effort during the entire period of time that gear is in the water (*i.e.*, throughout gear deployment, fishing, and retrieval) unless using ropeless gear as well as for 15 minutes prior to deploying gear and for 15 minutes after haul back;

(6) All fisheries monitoring gear must be fully cleaned and repaired (if damaged) before each use/deployment;

(7) US Wind's fixed gear must comply with the Atlantic Large Whale Take Reduction Plan regulations at § 50 CFR 229.32 during fisheries monitoring surveys;

(8) All gear must be emptied as close to the deck/sorting area and as quickly as possible after retrieval;

(9) During any survey that uses vertical lines, buoy lines must be weighted and must not float at the surface of the water and all groundlines must consist of sinking lines. All groundlines must be composed entirely of sinking lines. Buoy lines must utilize weak links. Weak links must break cleanly leaving behind the bitter end of the line. The bitter end of the line must be free of any knots when the weak link breaks. Splices are not considered to be knots. The attachment of buoys, toggles, or other floatation devices to groundlines is prohibited;

(10) All in-water survey gear, including buoys, must be properly labeled with the scientific permit number or identification as US Wind's research gear. All labels and markings on the gear, buoys, and buoy lines must also be compliant with the applicable regulations, and all buoy markings must comply with instructions received by the NOAA Greater Atlantic Regional Fisheries Office Protected Resources Division;

(11) All survey gear must be removed from the water whenever not in active survey use (*i.e.*, no wet storage);

(12) All reasonable efforts, that do not compromise human safety, must be undertaken to recover gear; and

(13) All lost gear associated with the fishery surveys must be reported to the NOAA Greater Atlantic Regional Fisheries Office Protected Resources Division (*nmfs.gar.incidental-take@noaa.gov*) within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.

4. Monitoring and Reporting Requirements

When conducting the specified activities in the specified geographic region, US Wind must implement the following monitoring and reporting measures:

(a) *Protected species observer (PSO) and passive acoustic monitoring (PAM) operator qualifications.* US Wind must implement the following measures applicable to PSOs and PAM operators:

(1) US Wind must use independent, NMFS-approved PSOs and PAM operators, (*i.e.*, the PSOs and PAM operators must be employed by a third-party observer provider), must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant crew with regard to the presence of protected species and mitigation requirements;

(2) All PSOs and PAM operators must have successfully attained a bachelor's degree in one of the natural sciences. The educational requirements may be waived if the PSO or PAM operator has acquired the relevant skills through a suitable amount of alternate experience. Requests for such a waiver must be submitted to NMFS Office of Protected Resources and must include written justification containing alternative experience[12];

(3) All PSOs must have:

[12] Alternate experience that may be considered includes, but is not limited to: previous work experience conducting academic, commercial, or government-sponsored marine mammal visual and/or acoustic surveys; or previous work experience as a PSO/PAM operator.

(i) Visual acuity in both eyes (with correction of vision being permissible) sufficient enough to discern moving targets on the water's surface with the ability to estimate the target size and distance (binocular use is allowable);

(ii) Ability to conduct field observations and collect data according to the assigned protocols;

(iii) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

(iv) Writing skills sufficient to document observations, including but not limited to: the number and species of marine mammals observed, the dates and times of when in-water construction activities were conducted, the dates and time when in-water construction activities were suspended to avoid potential incidental take of marine mammals from construction noise within a defined shutdown zone, and marine mammal behavior; and

(v) Ability to communicate orally, by radio, or in-person, with project personnel to provide real-time information on marine mammals observed in the area.

(4) All PSOs must be trained in northwestern Atlantic Ocean marine mammal identification and behaviors and must be able to conduct field observations and collect data according to assigned protocols. Additionally, PSOs must have the ability to work with all required and relevant software and equipment necessary during observations (as described in paragraphs (b)(8) and (b)(9) of this section);

(5) All PSOs and PAM operators must successfully complete a relevant training course within the last 5 years, including obtaining a certificate of course completion. This requirement is waived for any PSOs and PAM operators that completed a relevant training course more than five years prior to seeking approval but have been working consistently as a PSO or PAM operator within the past five years;

(6) PSOs are responsible for obtaining NMFS' approval. NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who has completed training in the last 5 years but has not yet attained the requisite field experience. An unconditionally approved PSO is one who has completed training within the last 5 years and attained the necessary experience (*i.e.*, demonstrate experience with monitoring for marine mammals at clearance and shutdown zone sizes similar to those produced during the respective activity). A conditionally approved PSO must be paired with an unconditionally approved PSO;

(7) At least one on-duty PSO for each activity (*e.g.*, foundation installation and HRG surveys) and at least one PAM operator must be designated as the Lead PSO. The Lead PSO must meet the minimum requirements described in section 4(a)(2) through (5) and have a minimum of ninety days of at-sea experience visually monitoring marine mammals, including baleen whales, and no more than eighteen

months may have elapsed since the conclusion of their last at-sea experience. The Lead PAM operator must meet the minimum requirements as described below in section 4(a)(9);

(8) PSOs for HRG surveys may be unconditionally or conditionally approved. PSOs for foundation installation activities must be unconditionally approved;

(9) PAM operators are responsible for obtaining NMFS approval. To be approved as a PAM operator, the person must meet the following qualifications:

(i) Must have completed a PAM operator training course and demonstrate that they have prior experience with relevant PAM software, equipment, and real-time acoustic detection systems;

(ii) Must demonstrate that they have prior experience independently analyzing archived and/or real-time PAM data to identify and classify baleen whale and other marine mammal vocalizations by species, including North Atlantic right whale and humpback whale vocalizations, and experience with deconflicting multiple species' vocalizations that are similar and/or received concurrently;

(iii) PAM operators must be independent observers (*i.e.*, not construction personnel), trained to use relevant project-specific PAM software and equipment, and must also be able test software and hardware functionality prior to beginning real-time monitoring;

(iv) Must be able to identify and classify marine mammal acoustic detections by species in real-time (prioritizing North Atlantic right whales and noting other marine mammal vocalizations, when detected);

(v) For each acoustic detection, the PAM operator must be able to categorically distinguish between whether a marine mammal or other species sound is detected, possibly detected, or not detected. The PAM operator must notify the Lead PSO of any confirmed or possible detections, including baleen whale detections that cannot be identified to species;

(vi) If the PAM software is capable of localization of sounds or deriving bearings and distance, the PAM operator must demonstrate experience using this technique;

(vii) Have the qualifications and relevant experience/training to safely deploy and retrieve equipment and program the software, as necessary; and

(viii) A Lead PAM operator must meet all of these requirements and have a minimum of 90 days in the specified role or sufficient alternative experience.

(10) US Wind must submit NMFS previously approved PSOs and PAM operators to NMFS Office of Protected Resources for review and confirmation of their approval for specific roles at least 30 business days prior to commencement of the activities requiring PSOs and/or PAM operators or 15 business days prior to when new PSOs and/or PAM operators are required, after activities have commenced;

(11) For prospective PSOs and PAM operators not previously approved, or for PSOs and PAM operators whose approval is not current, US Wind must submit resumes for approval at least 60 business days prior to PSO and PAM operator use. Resumes must include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO or PAM operator experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training;

(12) PSOs may work as PAM operators and vice versa, pending NMFS-approval; however, they may only perform one role at any single time and must not exceed work time restrictions, which must be tallied cumulatively; and

(13) All PSOs and PAM operators must complete a Permits and Environmental Compliance Plan training and a 2-day refresher session that must be held with the PSO provider and Project compliance representative(s) prior to the start of in-water project activities (*e.g.*, HRG survey, foundation installation, *etc*.).

(b) *General PSO and PAM operator requirements.* The following measures apply to PSOs and PAM operators and must be implemented by US Wind:

(1) PSOs must monitor for marine mammals prior to, during, and following all impact pile driving and HRG surveys that use sub-bottom profilers (with specific monitoring durations and needs described in paragraphs (c) through (e) of this section, respectively). Monitoring must be done while free from distractions and in a consistent, systematic, and diligent manner;

(2) PAM operator(s) must acoustically monitor for marine mammals prior to, during, and following all pile driving activities. PAM operators may be located on a vessel or remotely on-shore but must have the appropriate equipment (*i.e.*, computer station equipped with a data collection software system available wherever they are stationed) and be in real-time communication with PSOs and transiting vessel captains. The PAM operator must monitor to and past (see table 3) the clearance zone for large whales;

(3) For foundation installation, PSOs must visually clear (*i.e.*, confirm no observations of marine mammals) the entire minimum visibility zone for a full 30 minutes immediately prior to commencing activities. For HRG surveys, which do not have a minimum visibility zone, the entire clearance zone must be visually cleared and as much of the Level B harassment zone as possible;

(4) All PSOs must be located at the best vantage point(s) on any platform, as determined by the Lead PSO, in order to obtain 360-degree visual coverage of the entire clearance and shutdown zones around the activity area, and as much of the

Level B harassment zone as possible. PAM operators may be located on a vessel or remotely on-shore, but must have the appropriate equipment (*i.e.*, computer station equipped with a data collection software system and acoustic data analysis software) available wherever they are stationed, and data or data products must be streamed in real-time or in near real-time. The PAM operator(s) must assist PSOs in ensuring full coverage of the clearance and shutdown zones;

(5) All on-duty PSOs must remain in real-time contact with the on-duty PAM operator(s). PAM operator(s) must immediately communicate all acoustic detections of marine mammals to PSOs, including any determination regarding species identification, distance, and bearing (where relevant) relative to the pile being driven and the degree of confidence (*e.g.*, possible, probable detection) in the determination. All on-duty PSOs and PAM operator(s) must remain in contact with the on-duty construction personnel responsible for implementing mitigations (*e.g.*, delay to pile driving) to ensure communication on marine mammal observations can easily, quickly, and consistently occur between all on-duty PSOs, PAM operator(s), and on-water Project personnel;

(6) The PAM operator must inform the Lead PSO(s) on duty of animal detections, including any determination regarding species identification, distance, bearing, and degree of confidence in the determinations, approaching or within applicable ranges of interest to the activity occurring via the data collection software system, (*e.g.*, *Mysticetus* or similar system) who must be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.*, delay);

(7) Any visual observations of marine mammals by any project personnel must be communicated immediately to on-duty PSOs and vessel captains associated with other project vessels to increase situational awareness;

(8) PSOs must use high magnification (25x) binoculars, standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. During foundation installation, at least two PSOs on the pile driving-dedicated PSO vessel(s) must be equipped with functional Big Eye binoculars (*e.g.*, 25 x 150; 2.7 view angle; individual ocular focus; height control); these must be pedestal mounted on the deck at the best vantage point that provides for optimal sea surface observation and PSO safety. PAM operators must have the appropriate equipment (*i.e.*, a computer station equipped with a data collection software system available wherever they are stationed) in accordance with the NMFS-approved PAM Plan;

(9) During periods of low visibility (*e.g.*, darkness, rain, fog, poor weather conditions, *etc.*), PSOs must use alternative technology (*i.e.*, infrared or thermal cameras) to monitor the clearance and shutdown zones, as approved by NMFS;

(10) PSOs must remain in real-time contact with the PAM operators and construction personnel responsible for implementing mitigation (*e.g.*, delay to pile driving) to ensure communication on marine mammal observations can easily, quickly, and

consistently occur between all on-duty PSOs, PAM operator(s), and on-water project personnel; and

(11) PSOs and PAM operators must not exceed 4 consecutive watch hours on duty at any time, must have a 2-hour (minimum) break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period. If the schedule includes PSOs and PAM operators on-duty for 2-hour shifts, a minimum 1-hour break between watches must be allowed.

(c) *PSO and PAM operator requirements during WTG, OSS, and Met Tower foundation installation*. The following measures apply to PSOs and PAM operators during WTG, OSS, and Met Tower foundation installation and must be implemented by US Wind:

(1) At least three on-duty PSOs must be stationed and observing from the pile driving activity platform during impact pile driving. Additionally, US Wind must use two dedicated-PSO vessels during impact pile driving and each vessel must have at least three PSOs on duty. Concurrently, at least one PAM operator per acoustic data stream (equivalent to the number of acoustic buoys) must be actively monitoring for marine mammals 60 minutes before, during, and 30 minutes after impact pile driving in accordance with a NMFS-approved PAM Plan;

(2) PSOs and PAM operator(s), using a NMFS-approved PAM system, must monitor for marine mammals 60 minutes prior to, during, and 30 minutes following all pile-driving. If PSOs cannot visually monitor the minimum visibility zone for the 60 minutes prior to and during pile driving using the equipment described in measure 4(b)(8), pile driving operations must not commence or must shutdown if they are currently active; and

(3) US Wind must conduct PAM for at least 24 hours immediately prior to pile driving activities. The PAM operator must review all detections from the previous 24 hour period prior to pile driving.

(d) *PSO requirements during HRG surveys*. The following measures apply to PSOs during HRG surveys using acoustic sources that have the potential to result in harassment and must be implemented by US Wind:

(1) At least one PSO must be on active duty monitoring during HRG surveys conducted during daylight (*i.e.*, from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at least two PSOs must be on active duty monitoring 30 minutes before, during, and 30 minutes after HRG surveys conducted at night;

(2) PSOs on HRG vessels must begin monitoring 30 minutes prior to activating acoustic sources, during the use of these acoustic sources, and for 30 minutes after use of these acoustic sources has ceased;

(3) Any observations of marine mammals must be communicated to PSOs on all nearby survey vessels during concurrent HRG surveys; and

(4) During daylight hours when survey equipment is not operating, US Wind must ensure that visual PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified acoustic sources.

(e) *Monitoring requirements during fisheries monitoring surveys*. The following measures apply during fisheries monitoring surveys and must be implemented by US Wind:

(1) All captains and crew conducting fishery surveys must be trained in marine mammal detection and identification; and

(2) Marine mammal monitoring must be conducted within 1 nmi from the planned survey location by the trained captain and/or a member of the scientific crew for 15 minutes prior to deploying gear, throughout gear deployment and use (unless using ropeless gear), and for 15 minutes after haul back.

(f) *Reporting*. US Wind must comply with the following reporting measures:

(1) Prior to initiation of any specified activities, US Wind must demonstrate, in a report submitted to NMFS Office of Protected Resources, that all required training for US Wind personnel (including the vessel crews, vessel captains, PSOs, and PAM operators) has been completed;

(2) US Wind must use a standardized reporting system during the effective period of the LOA. All data collected related to the Project must be recorded using industry-standard software that is installed on field laptops and/or tablets. Unless stated otherwise, all reports must be submitted to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*), dates must be in MM/DD/YYYY format, and location information must be provided in Decimal Degrees with the coordinate system information (*e.g.*, North American Datum of 1983 (NAD83), World Geodetic System 1984 (WGS84), *etc.*);

(3) For all visual monitoring efforts and marine mammal sightings, the following information must be collected and reported to NMFS Office of Protected Resources:

(i) The date and time that monitored activity begins or ends;

(ii) The construction activities occurring during each observation period;

(iii) Survey activity information (and changes thereof), including at minimum the general specifications of all acoustic sources, power output of all sparkers and boomers while in operation, number of operational sparker tips for all sparkers, tow depth(s) of all towed acoustic sources, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.);

(iv) The watch status (*i.e.*, sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);

(v) The PSO who sighted the animal;

(vi) The time of sighting; the weather parameters (*e.g.*, wind speed, percent cloud cover, visibility);

(vii) The water conditions (*e.g.*, Beaufort sea state, tide state, water depth);

(viii) All marine mammal sightings, regardless of distance from the activity;

(ix) The species (or lowest possible taxonomic level possible);

(x) The pace of the animal(s);

(xi) The estimated number of animals (minimum/maximum/high/low/best);

(xii) The estimated number of animals by cohort (*e.g.*, adults, yearlings, juveniles, calves, group composition, *etc*.);

(xiii) The description (*i.e.*, as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);

(xiv) The description of any marine mammal behavioral observations (*e.g.*, observed behaviors such as feeding or traveling) and observed changes in behavior, including an assessment of behavioral responses thought to have resulted from the specific activity;

(xv) The animal's closest distance and bearing from the pile being driven or specified HRG equipment and estimated time entered or spent within the Level A harassment and/or Level B harassment zone(s);

(xvi) The activity at time of sighting (*e.g.*, impact pile driving, vibratory pile driving, construction surveys);

(xvii) The use of any noise attenuation device(s); and specific phase of activity (*e.g.*, ramp-up of HRG equipment, HRG acoustic source on/off, soft-start for pile driving, active pile driving, *etc*.);

(xviii) The description of any mitigation-related action implemented, or mitigation-related actions called for but not implemented, in response to the sighting (*e.g.*, delay, shutdown, *etc*.) and time and location of the action;

(xix) Any other human activity in the area; and

(xx) All other applicable information, as required in any LOA issued under Section 5 herein.

(4) If a marine mammal is acoustically detected during PAM, the following information must be recorded and reported to NMFS:

(i) Location of hydrophone (latitude and longitude; in decimal degrees) and site name;

(ii) Bottom depth and depth of recording unit (in meters);

(iii) Recorder (model & manufacturer) and platform type (*i.e.*, bottom-mounted, electric glider, *etc*.), and instrument ID of the hydrophone and recording platform (if applicable);

(iv) Time zone for sound files and recorded date/times in data and metadata (in relation to Universal Coordinated Time (UTC); *i.e.*, Eastern Standard Time (EST) time zone is UTC-5);

(v) Duration of recordings (start/end dates and times; in International Organization for Standardization (ISO) 8601 format, yyyy-mm-ddTHH:MM:SS.sssZ);

(vi) Deployment/retrieval dates and times (in ISO 8601 format);

(vii) PAM recording schedule;

(viii) Hydrophone and recorder sensitivity (in dB re. 1 microPascal (μPa));

(ix) Calibration curve for each recorder;

(x) Bandwidth/sampling rate (in Hz);

(xi) Sample bit-rate of recordings; and

(xii) Detection range of equipment for relevant frequency bands (in meters) wherein, the following information must be noted:

(1) Species identification (if possible);

(2) Call type and number of calls (if known);

(3) Temporal aspects of vocalization (date, time, duration, *etc.*);

(4) Date times in ISO (8601 format);

(5) Confidence of detection (detected, or possibly detected);

(6) Comparison with any concurrent visual sightings;

(7) Location and/or directionality of call (if determined) relative to acoustic recorder or construction activities;

(8) Location of recorder and construction activities at time of call;

(9) Name and version of detection or sound analysis software used, with protocol reference;

(10) Minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and

(11) Name of PAM operator(s) on duty.

(5) US Wind must compile and submit weekly reports during foundation installation to NMFS Office of Protected Resources that document: the type of pile, pile diameter, daily start and stop of all pile driving associated with the Project; the start and stop of associated observation periods by PSOs and PAM operators; hammer log (number of strikes, max hammer energy, duration of piling), any changes to noise attenuation systems and/or hammer schedule; details on the deployment of PSOs and PAM operators; a record of all observations/detections of marine mammals (acoustic and visual); any mitigation actions (or if mitigation actions could not be taken, provide reasons why); and details on the noise attenuation system(s) used and its performance. Weekly reports must also include abbreviated SFV results. The weekly reports must also confirm that the required SFV was carried out for each pile and that results were reviewed on the required timelines. US Wind must also include in the weekly reports any indications that distances to the identified Level A harassment and Level B harassment thresholds for marine mammals were exceeded and an explanation of factors that contributed to each exceedance (if found) and corrective actions that were taken to avoid exceedance on subsequent piles. The weekly report must also identify which turbines become operational and when (a map must be provided). Weekly reports are due on Wednesday for the previous week (Sunday Saturday). Once all foundation pile installation is completed, weekly reports are no longer required by US Wind;

(6) US Wind must compile and submit monthly reports to NMFS Office of Protected Resources during foundation installation that include a summary of all information in the weekly reports, including Project activities carried out in the previous month, vessel transits (number, type of vessel, MMIS number, and route), number of piles installed, all detections of marine mammals, and any mitigative action taken. Monthly reports are due on the 15th of the month for the previous month. The monthly report must also identify which turbines became operational and when (a map must be provided). Once all foundation pile installation is completed, monthly reports are no longer required by US Wind;

(7) US Wind must submit a draft annual report to NMFS Office of Protected Resources 90 days following completion of activities each year. US Wind must provide a final report within 30 calendar days following resolution of NMFS' comments on the draft report. The draft and final reports must summarize information included in the weekly and monthly reports including, at a minimum, highlighting any unusual marine mammal sightings, behaviors, or impacts detected during the year and detailing the following: the total number of marine mammals of each species/stock detected and how many were within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity type; marine mammal detections and behavioral observations before, during, and after each

activity; what mitigation measures were implemented (*i.e.*, number of shutdowns or clearance zone delays, *etc*.) or, if no mitigative actions were taken, why not; operational details (*i.e.*, days and duration of impact pile driving, days and amount of HRG survey effort, *etc*.); any PAM systems used; the results, effectiveness, and which noise attenuation systems were used during relevant activities (*i.e.*, foundation impact pile driving); summarized information related to situational reporting; and any other important information relevant to the Project, including additional information that may be identified through the adaptive management process. The draft and final reports shall also include georeferenced, time-stamped vessel tracklines for all time periods during which HRG acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (e.g., when the sources began operating, when they were turned off, or when they changed operational status). Geographic Information System (GIS) files shall be provided in Environmental Systems Research Institute, Inc. (ESRI) shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. The draft and final reports shall also include ESRI vector GIS shapefile(s) of the final location of all tracklines, piles, cable routes, and other permanent structures, including an indication of what year it was installed and began operating. In addition to the report, all raw observational data shall be made available;

(8) US Wind must submit its draft 5-year report to NMFS Office of Protected Resources on all visual and acoustic monitoring conducted within 90 calendar days of the completion of activities occurring under the LOA. A final 5-year report must be prepared and submitted within 60 calendar days following receipt of any NMFS Office of Protected Resources comments on the draft report. If no comments are received from NMFS Office of Protected Resources within 60 calendar days of NMFS Office of Protected Resources receipt of the draft report, the report shall be considered final. The draft and final 5-year reports must include, but is not limited to, the following: the total number (annually and across all 5 years) of marine mammals of each species/stock detected and how many were detected within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity; summary table(s) indicating the amount of each activity type (*e.g.*, pile installation, HRG) completed in each of the 5 years and total. The draft and final reports shall also include georeferenced, time-stamped vessel tracklines for all time periods during which HRG acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (e.g., when the sources began operating, when they were turned off, or when they changed operational status). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. The draft and final report shall include Environmental Systems Research Institute, Inc. (ESRI) vector Geographic Information System (GIS) shapefile(s) of the final location of all tracklines, piles, cable routes, and other permanent structures including an indication of what year it was installed and

began operating; ESRI vector GIS shapefile of all North Atlantic right whale sightings, including dates and group sizes; a 5- year summary and evaluation of all SFV data collected; a 5-year summary and evaluation of all PAM data collected; a 5-year summary and evaluation of marine mammal sighting and behavioral observations; a 5-year summary and evaluation of mitigation and monitoring implementation and effectiveness; a list of any unusual marine mammal sightings, behaviors, or impacts recorded during the five-year period, and a list of recommendations to inform environmental compliance assessments for future offshore wind actions;

(9) US Wind must provide the initial results of the thorough SFV measurements (see subsection 3(c)(15)) to NMFS Office of Protected Resources in an interim report after each foundation installation event as soon as they are available and prior to any subsequent foundation installation, but no later than 48 hours after each completed foundation installation event. The report must include, at minimum: a summary of pile installation activities (pile diameter, pile weight, pile length, water depth, sediment type, total installation time [start time, end time], duration of pile driving), hammer energies and schedule used during pile driving, including the total number of strikes and the maximum hammer energy; the model-estimated acoustic ranges ($R_{95\%}$) to compare with the real-world sound field measurements; peak sound pressure level (SPL_{pk}), root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPL_{rms}), and sound exposure level (SEL, in single strike for pile driving, $SEL_{ss,}$), for each hydrophone, including at least the maximum, arithmetic mean, minimum, median (L_{50}) and L_5 (95 percent exceedance) statistics for each metric; estimated marine mammal Level A harassment and Level B harassment acoustic isopleths, calculated using the maximum-over-depth L_5 (95 percent exceedance level, maximum of both hydrophones) of the associated sound metric; comparison of modeled results assuming 10-dB attenuation against the measured marine mammal Level A harassment and Level B harassment acoustic isopleths; estimated transmission loss coefficients; pile identifier name, location of the pile and each hydrophone array in latitude/longitude; depths of each hydrophone; one-third-octave band single strike SEL spectra; if filtering is applied, full filter characteristics must be reported; and hydrophone specifications including the type, model, and sensitivity. US Wind must also report any immediate observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices. If results are suspected to have been significantly influenced by contaminating background noise (e.g. vessels), sufficient evidence must be provided to support any related claims. If any *in-situ* calibration checks for hydrophones reveal a calibration drift greater than 0.75 dB, pistonphone calibration checks are inconclusive, or calibration checks are otherwise not effectively performed, US Wind must indicate full details of the calibration procedure, results, and any associated issues in the 48-hour interim reports.;

(10) US Wind must conduct abbreviated SFV for all foundation installations for which the thorough SFV monitoring is not carried out, whereas a single acoustic recorder must be placed at an appropriate distance from the pile. All results must be included in the weekly reports. Any indications that distances to the identified Level A harassment and Level B harassment thresholds for marine mammals were exceeded must be addressed by US Wind, including an explanation of factors that contributed to the exceedance and corrective actions that were taken to avoid exceedance on subsequent piles;

(11) The final results of all SFV measurements from all foundation installations must be submitted by US Wind no later than 90 calendar days following completion of all annual SFV measurements. The final reports must include all details included in the interim report, descriptions of any notable occurrences, explanations for results that were not anticipated, or actions taken during foundation installation, and, at minimum, the following: the peak sound pressure level (SPL_{pk}), the root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPL_{rms}), the single strike sound exposure level (SEL_{ss}), the integration time for SPL_{rms}, the spectrum, and the 24-hour cumulative SEL extrapolated from measurements at all hydrophones. The final report must also include at least the maximum, mean, minimum, median (L_{50}) and L_5 (95 percent exceedance) statistics for each metric; the SEL and SPL power spectral density and/or one-third octave band levels (usually calculated as decidecade band levels) at the receiver locations should be reported; range of transmission loss coefficients; the local environmental conditions, such as wind speed, transmission loss data collected on-site (or the sound velocity profile); baseline pre-activity and post-activity ambient sound levels (broadband and/or within frequencies of concern); a description of depth and sediment type, as documented in the Construction and Operation Plan (COP), at the recording and foundation installation locations; the extents of the measured Level A harassment and Level B harassment zone(s); hammer energies required for pile installation and the number of strikes per pile; the hydrophone equipment and methods (*i.e.*, recording device, bandwidth/sampling rate; distance from the pile where recordings were made; the depth of recording device(s)); a description of the SFV measurement hardware and software, including software version used, calibration data, bandwidth capability and sensitivity of hydrophone(s), any filters used in hardware or software, any limitations with the equipment, and other relevant information; the spatial configuration of the noise attenuation device(s) relative to the pile; a description of the noise abatement system and operational parameters (*e.g.*, bubble flow rate, distance deployed from the pile, *etc*.), and any action taken to adjust the noise abatement system. A discussion which includes any observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices;

(12) If, at any time during the Project, US Wind becomes aware of any issue or issues which may (to any reasonable subject-matter expert, including the persons

performing the measurements and analysis) call into question the validity of any measured Level A harassment or Level B harassment isopleths to a significant degree, which were previously transmitted or communicated to NMFS Office of Protected Resources, US Wind must inform NMFS Office of Protected Resources within 1 business day of becoming aware of this issue or before the next pile is driven, whichever comes first;

(13) Performance reports for each bubble curtain deployed must include water depth, current speed and direction, wind speed and direction, bubble curtain deployment/retrieval date and time, bubble curtain hose length, bubble curtain radius (distance from pile), diameter of holes and hole spacing, air supply hose length, compressor type (including rated cubic feet per minute (CFM) and model number), number of operational compressors, performance data from each compressor (including revolutions per minute (RPM), pressure, start times, and stop times), free air delivery (m^3/min), total hose air volume (m^3/(min m)), schematic of GPS waypoints during hose laying, maintenance procedures performed (pressure tests, inspections, flushing, re-drilling, and any other hose or system maintenance) before and after installation and the time and date of each of these procedures, and the length of time the bubble curtain was on the seafloor prior to foundation installation. Additionally, the report must include any important observations regarding performance (before, during, and after pile installation), such as any observed weak areas of low pressure. The report may also include any relevant video and/or photographs of the bubble curtain(s) operating during pile driving;

(14) Full PAM detection data, metadata, and location of recorders (or GPS tracks, if applicable) from all real-time hydrophones used for monitoring during construction must be submitted by US Wind within 90 calendar days following completion of foundation installation pile driving each season and every 90 calendar days for transit lane PAM using the International Organization for Standardization (ISO) standard metadata forms and instructions available on the NMFS Passive Acoustic Reporting System website *(https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*). Submit the completed data templates to *nmfs.nec.pacmdata@noaa.gov*. Concurrently, the full acoustic recordings from all real-time hydrophone systems must also be sent to the National Centers for Environmental Information (NCEI, *https://www.ncei.noaa.gov/products/passive-acoustic-data*) for archiving within 90 calendar days following completion of activities requiring PAM for mitigation. Submission details can be found at: *https://www.ncei.noaa.gov/products/passive-acoustic-data*;

(15) If a North Atlantic right whale is acoustically detected at any time by a project-related PAM system, US Wind must ensure the detection is reported as soon as possible to NMFS, but no longer than 24 hours after the detection via the "24-hour North Atlantic right whale Detection Template" (*https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-*

system-templates). Calling the hotline is not necessary when reporting PAM detections via the template;

(16) Inclusive of all instances wherein an exemption to a measure is taken (which must be reported to NMFS Office of Protected Resources within 24 hours), US Wind must submit situational reports if the following circumstances occur, including but not limited to the following:

(i) If a North Atlantic right whale is observed at any time by PSOs or project personnel, US Wind must ensure the sighting is immediately (if not feasible, as soon as possible, and no longer than 24 hours after the sighting) reported to NMFS and the Right Whale Sightings Advisory System (RWSAS). If in the Northeast Region (Maine to Virginia/North Carolina border) call (866-755-6622). If in the Southeast Region (North Carolina to Florida) call (877-WHALE-HELP or 877-942-5343). If calling NMFS is not possible, reports can also be made to the U.S. Coast Guard via channel 16 or through the WhaleAlert app (*https://www.whalealert.org*). The sighting report must include the time, date, and location of the sighting, number of whales, animal description/certainty of sighting (provide photos/video if taken), Lease Area/project name, PSO/personnel name, PSO provider company (if applicable), and reporter's contact information;

(ii) If a North Atlantic right whale is observed at any time by PSOs or project personnel, US Wind must submit a summary report to GARFO (*nmfs.gar.incidental-take@noaa.gov*) and NMFS Office of Protected Resources, and NMFS Northeast Fisheries Science Center (NEFSC; *ne.rw.survey@noaa.gov*) within 24 hours with the above information and the vessel/platform from which the sighting was made, activity the vessel/platform was engaged in at time of sighting, project construction and/or survey activity at the time of the sighting (*e.g.*, pile driving, cable installation, HRG survey), distance from vessel/platform to sighting at time of detection, and any mitigation actions taken in response to the sighting;

(iii) If a North Atlantic right whale is detected via real-time PAM, data must be submitted using the NMFS Passive Acoustic Reporting System Metadata and Detection data spreadsheets and instructions available at *https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*, as soon as feasible but no longer than 24 hours after the detection;

(iv) If an observation of a large whale occurs during vessel transit, US Wind must report the time, date, and location of the sighting; the vessel's activity, heading, and speed (knots); Beaufort sea state, water depth (meters), and visibility conditions; marine mammal species identification to the best of the observer's ability and any distinguishing characteristics; initial distance and bearing to marine mammal from vessel and closest

point of approach; and any avoidance measures taken in response to the marine mammal sighting;

(v) In the event that personnel involved in the Project discover a stranded, entangled, injured, or dead marine mammal, US Wind must immediately report the observation to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866-755-6622), and if in the Southeast Region (North Carolina through Florida), call the NMFS Southeast Stranding Hotline (877-WHALE-HELP (877-942-5343)). Separately, US Wind must report, within 24 hours, the incident to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and, if in the Greater Atlantic Region, to the NMFS Greater Atlantic Regional Fisheries Office (GARFO; *nmfs.gar.incidental-take@noaa.gov*) or, if in the Southeast Region, to the NMFS Southeast Regional Office (SERO; *secmammalreports@noaa.gov*). The report must include contact (*e.g.*, name, phone number, *etc*.), time, date, and location (*i.e.*, specify coordinate system) of the first discovery (and updated location information, if known and applicable); species identification (if known) or description of the animal(s) involved; condition of the animal(s) (including carcass condition if the animal is dead); observed behaviors of the animal(s) (if alive); photographs or video footage of the animal(s) (if available); and general circumstances under which the animal was discovered; and

(vi) In the event of a suspected or confirmed vessel strike of a marine mammal by any vessel associated with the Project or other means by which Project activities caused a non-auditory injury or death of a marine mammal, US Wind must immediately report the incident to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866-755-6622), and if in the Southeast Region (North Carolina through Florida) call the NMFS Southeast Stranding Hotline (877-WHALE-HELP (877-942-5343)). Separately, US Wind must immediately report the incident to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and, if in the Greater Atlantic Region, to the NMFS Greater Atlantic Regional Fisheries Office (GARFO; *nmfs.gar.incidental-take@noaa.gov*) or, if in the Southeast Region, to the NMFS Southeast Regional Office (SERO; *secmammalreports@noaa.gov*). The report must include time, date, and location (*i.e.*, specify coordinate system) of the incident; species identification (if known) or description of the animal(s) involved (*i.e.*, identifiable features including animal color, presence of dorsal fin, body shape and size, *etc*.); vessel strike reported information (*e.g.*, name, affiliation, email for person completing the report); vessel strike witness (if different than the reporter) information (*e.g*., name, affiliation, phone number, platform for person witnessing the event, etc.); vessel name and/or MMSI number; vessel size and motor configuration (inboard,

outboard, jet propulsion); vessel's speed leading up to and during the incident; vessel's course/heading and what operations were being conducted (if applicable); part of vessel that struck marine mammal (if known); vessel damage notes; status of all sound sources in use at the time of the strike; if the marine mammal was seen before the strike event; description of behavior of the marine mammal before the strike event (if seen) and behavior immediately following the strike; description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility, *etc*.) immediately preceding the strike; estimated (or actual, if known) size and length of marine mammal that was struck; if available, description of the presence and behavior of any other marine mammals immediately preceding the strike; other animal-specific details, if known (*e.g.*, length, sex, age class); behavior or estimated fate of the marine mammal post-strike (*e.g.*, dead, injured but alive, injured and moving, external visible wounds (linear wounds, propeller wounds, non-cutting blunt-force trauma wounds), blood or tissue observed in the water, status unknown, disappeared); to the extent practicable, any photographs or video footage of the marine mammal(s); and, any additional notes the witness may have from the interaction. For any numerical values provided (*i.e.*, location, animal length, vessel length, *etc*.), please provide if values are actual or estimated. US Wind must immediately cease activities until the NMFS Office of Protected Resources is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of the LOA. NMFS Office of Protected Resources may impose additional measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. US Wind may not resume their activities until notified by NMFS Office of Protected Resources.

(17) US Wind must report any lost gear associated with the fishery surveys to the NOAA Greater Atlantic Regional Fisheries Office Protected Resources Division (*nmfs.gar.incidentaltake@noaa.gov*) as soon as possible or but no later than 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear. All reasonable efforts, that do not compromise human safety, must be undertaken to recover gear.

5. Modifications to Letter of Authorization

(a) This LOA shall be modified, upon request by US Wind, provided that:

(1) The specified activities and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for promulgation of the regulations (see 50 CFR § 217.340 - 217.349 (excluding

changes made pursuant to the adaptive management provision in paragraph (c) of this section); and

(2) NMFS Office of Protected Resources determines that the mitigation, monitoring, and reporting measures required by the previous LOA were implemented successfully.

(b) Any LOA modification request by US Wind that includes changes to the activity or the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision found in Section 5(c)), shall be approved, provided that:

(1) NMFS Office of Protected Resources determines that the changes to the activity or the mitigation, monitoring, or reporting do not change the findings made for the regulations in this subpart and do not result in more than a minor change in the maximum annual or five-year total estimated number of takes for any species; and

(2) NMFS Office of Protected Resources may, if appropriate, publish a notice of proposed LOA in the *Federal Register*, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) *Adaptive Management*: NMFS Office of Protected Resources may modify (including delete, modify, or add to) the existing mitigation, monitoring, or reporting measures (after consulting with US Wind regarding the practicability of the modifications), if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring.

(1) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include, but are not limited to:

(i) Results from US Wind's monitoring;

(ii) Results from other marine mammals and/or sound research or studies; and

(iii) Any information that reveals marine mammals may have been taken in a manner, extent, or number not authorized by the regulations in this subpart or subsequent LOA.

(2) If the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS Office of Protected Resources shall publish a notice of proposed LOA in the Federal Register and solicit public comment.

(3) If NMFS Office of Protected Resources determines that an emergency exists that poses a significant risk to the well-being of species or stocks of marine mammals in Table 1, this LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the *Federal Register* within 30 days of the action.

Should you have questions regarding this LOA or the required conditions found herein, please contact NMFS Office of Protected Resources staff, Jaclyn Daly (*jaclyn.daly@noaa.gov*) and Jessica Taylor (*jessica.taylor@noaa.gov*).

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11/26/2024

Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.

Date

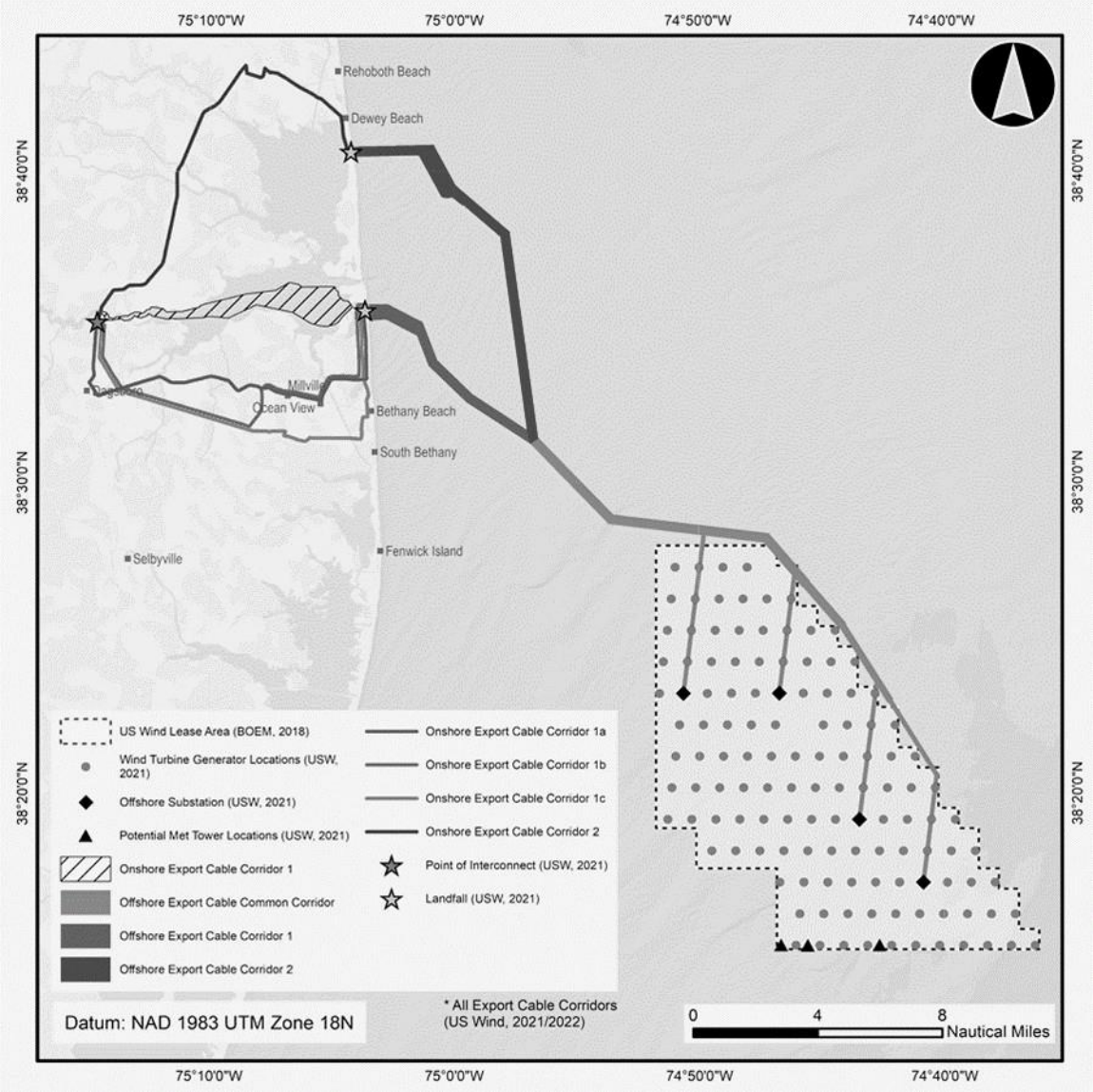

Figure 1 — Project Location

Table 1 – Maximum Annual and 5-year Total Take Authorized For the Maryland Wind Offshore Wind Project, Incidental to All Specified Activities

Common Name	Scientific Name	Stock	Maximum Annual Take		5-year Total Take	
			Level A Harassment	Level B Harassment	Level A Harassment	Level B Harassment
Order Artiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale*	*Eubalaena glacialis*	Western Atlantic	0	4	0	10
Family Balaenopteridae (rorquals)						
Fin whale*	*Balaenoptera physalus*	Western North Atlantic	2	18	6	35
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	2	16	6	30
Minke whale	*Balaenoptera acutorostrata*	Canadian Eastern Coastal	6	41	9	58
Sei whale*	*Balaenoptera borealis*	Nova Scotia	1	1	3	3
Family Delphinidae						
Killer whale	*Orca orcinus*	Western North Atlantic	0	3	0	9
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic	0	69	0	168
Bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic - Offshore	0	1,768	0	2,755

		Northern Migratory Coastal	0	1,591	0	2,165
Common dolphin	*Delphinus delphis*	Western North Atlantic	0	298	0	488
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	0	16	0	48
Short-finned pilot whale	*Globicephala macrorhynchus*	Western North Atlantic	0	11	0	33
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic	0	5	0	15
Risso's dolphin	*Grampus griseus*	Western North Atlantic	0	26	0	70
Rough-toothed dolphin	*Steno bredanensis*	Western North Atlantic	0	6	0	18
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic	0	46	0	138
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	3	39	6	68
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray seal	*Halichoerus grypus*	Western North Atlantic	0	341	0	496
Harbor seal	*Phoca vitulina*	Western North Atlantic				

Harp seal	*Pagophilus groenlandicus*	Western North Atlantic				

** Endangered Species Act-listed species*

Table 2 – Vessel Separation Distances

Vessel Separation Distances (meters)	
North Atlantic right whale (and unidentifiable large whales)	500
Other ESA-listed and Non ESA-listed large whale species[a]	100
Other marine mammals[b]	50

a – This consists of fin, sei, minke and humpback whales and aligns with the final Biological Opinion.

b- With the exception of seals and delphinid(s) from the genera *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops* that approach the vessel.

Table 3 – Clearance, Shutdown, and Minimum Visibility Zones, in Meters, Inclusive Of 10 dB Of Sound Attenuation

Monitoring zone	North Atlantic right whales	Other large whales	Delphinids and pilot whales	Harbor porpoises	Seals
Minimum visibility zone[a]	Monopiles: 2,900 m 3-m pin piles: 1,400 m 1.8-m pin piles: 200 m				
Visual clearance zone	Any visual distance from the pile driving location	Monopiles: 5,250 m 3-m pin piles: 1,400 m 1.8- m pin piles: 200 m[b]	Monopiles: 500 m 3-m pin piles, 1.8-m pin piles: 200 m[c]		
Visual shutdown zone	Any visual distance from the pile driving location	Monopiles: 2,900 3-m pin piles: 1,400 m 1.8-m Pin piles: 100 m[d]	Monopiles: 250 m 3-m pin piles, 1.8-m pin piles: 100 m[e]		
PAM clearance and shutdown zones[f]	10,000 m				
Level B Harassment (Acoustic Range, $R_{95\%}$)	Monopiles: 5,250 m 3-m pin piles: 500 m 1.8-m pin piles: 100 m				

a – The minimum visibility zone is equal to the modeled maximum $R_{95\ percent}$ distances to the Level A harassment threshold for low-frequency cetaceans for monopiles and 3-m pin piles. The minimum visibility zone for 1.8-m pin piles is equal to the clearance zone which is double the modeled maximum $R_{95\ percent}$ distance to the Level B harassment threshold (100 m) and four times the modeled maximum $R_{95\ percent}$ distance to the Level A harassment threshold (50 m) for low frequency cetaceans.

b – The clearance zone for other large whales from monopile installation is equal to the modeled maximum $R_{95\ percent}$ distance to the Level B harassment threshold (5,250 m). The clearance zone for other large whales from 3-m pin pile installation is equal to the modeled maximum $R_{95\ percent}$ distance to the Level A harassment threshold (1,400 m) given the Level B harassment zone is less than this distance (500 m). The clearance zone for other large whales from 1.8-m pin pile installation is equal to twice the modeled maximum $R_{95\ percent}$ distance to the Level B harassment threshold given the very small Level B harassment zone (100 m) which could be encompassed by the bubble curtains.

c- The clearance zone for non-large whales (*i.e.*, delphinids and pilot whales, harbor porpoises, and seals) from monopile and 3-m pin pile installation is equal to double the modeled maximum $R_{95\ percent}$ distance to the Level A harassment threshold for harbor porpoise (the most sensitive species). The clearance zone for 1.8-m pin pile installation is equal to double the modeled maximum $R_{95\ percent}$ distance to the Level B harassment threshold given Level A harassment thresholds were not exceeded for this activity (*i.e.*, 0 m).

d- The shutdown zones for other large whales from monopiles and 3-m pin pile installation are equal to the modeled maximum $R_{95\ percent}$ distances to the Level A harassment threshold for low-frequency cetaceans. The shutdown zone for other large whales from 1.8-m pin piles is equal to two times the modeled maximum $R_{95percent}$ distance to the Level A harassment threshold for low-frequency cetaceans.

e- The shutdown zones for non-large whales from monopile and 3-m pin pile installation are equal to the modeled maximum $R_{95\ percent}$ distance to the Level A harassment threshold for harbor porpoise (the most sensitive species). The shutdown zone for non-large whales from 1.8-m pin pile installation is equal to the modeled maximum $R_{95\ percent}$ distance to the Level B harassment threshold, given the Level A harassment thresholds were not exceeded for this activity (*i.e.*, 0 m).

f- The PAM system must be capable of detecting baleen whales at 10,000 m during pile driving. The system should also be designed to detect other marine mammals; however, it is not required these other species be detected out to 10,000 m given higher frequency calls and echolocation clicks are not typically detectable at large distances.

Table 4 – Largest Distances To The Level B Harassment Threshold For Different Types Of Acoustic Sources and Mitigation Zones During HRG Surveys

Marine mammal species	High-resolution Geophysical (HRG) Site Characterization and Assessment Surveys			
	Level B Harassment Zone (SPL_{RMS}) (Meters)		Specific zone sizes (meters)	
	Sub-bottom Profilers		Clearance zone	Shutdown Zone
	Applied Acoustics S boomer	AA Duraspark 400 tip sparker		
North Atlantic right whale (and unidentifiable large whales)	35.2	200	500	500
Other ESA-listed large whale species[a]			500	100
Other marine mammals[b]			200	100

Note: SPL_{RMS} = sound pressure level root-mean-square

a – This consists of fin and sei whales and aligns with the final Biological Opinion.

b – This is applicable to all delphinid cetaceans, harbor porpoises, and pinnipeds, with the exception of seals and delphinid(s) from the genera *Delphinus*, *Lagenorhynchus*, *Stenella* or *Tursiops*.