



## INCIDENTAL HARASSMENT AUTHORIZATION

South Fork Wind, LLC (South Fork Wind) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to incidentally harass marine mammals, when adhering to the following terms and conditions.

1. This incidental harassment authorization (IHA) is valid from November 15, 2022 through November 14, 2023.
2. This IHA authorizes take incidental to specified activities associated with the construction of the South Fork Wind Farm (SFWF) in the Atlantic Ocean offshore of New York, Rhode Island, and Massachusetts within the Wind Development Area (WDA) OCS-A 0517, and along an export cable route (SFEC) connecting the SFWF to locations on Long Island, New York.
3. General Conditions
  - a. A copy of this IHA must be in the possession of South Fork Wind, the Holder of this IHA (Holder), supervisory construction personnel, lead visual and acoustic protected species observers, and on each vessel associated with the Project at all times when activities subject to this IHA are being conducted.
  - b. The species and/or stocks authorized for taking are listed in Table 1. Authorized take, by Level A harassment and Level B harassment only, is limited to the species and numbers listed in Table 1.
  - c. The taking by serious injury or death of any of the species listed in Table 1 or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
  - d. South Fork Wind must ensure that construction supervisors and crews, the monitoring team, and relevant South Fork Wind staff are trained prior to the start of activities subject to this IHA, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during project construction must be trained prior to commencing work.



- e. South Fork Wind must abide by the Terms and Conditions of the Biological Opinion, issued by NMFS Greater Atlantic Regional Fisheries Office (GARFO) on October 1, 2021 pursuant to section 7 of the Endangered Species Act.
- f. 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 Level B harassment zone, impact and vibratory pile-driving activities and HRG acoustic sources must be shut down immediately (when practicable as described under 4(a)(ix)(1)) or be delayed if the activity has not commenced. Impact and vibratory pile driving and initiation of HRG acoustic sources must not commence or resume until the animal(s) has been confirmed to have left the relevant clearance zone or the observation time (as indicated in condition 4(a)(xi)(1-2)) has elapsed with no further sightings.
- g. Prior to and when conducting any in-water construction activities and vessel operations, South Fork Wind personnel (*e.g.*, vessel operators, PSOs) must use available sources of information on North Atlantic right whale (NARW) presence in or near the project area including daily monitoring of the Right Whale Sightings Advisory System, and monitoring of Coast Guard 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 PSOs.
- h. Intentional harassment is not authorized under this IHA; therefore, any marine mammals observed within a clearance or shutdown zone must be allowed to remain in the area (*i.e.*, must leave of their own volition) prior to commencing impact and vibratory pile-driving activities or construction surveys.

#### 4. Mitigation Measures

- a. Impact Pile Driving of Foundation Monopiles
  - i. Seasonal Restriction: Impact pile driving of monopiles in the WDA must not occur from January 1 through April 30. Impact pile driving of monopiles in the WDA must not occur in December unless unanticipated delays due to weather or technical problems, notified to and approved by the Bureau of Ocean Energy Management, arise that necessitate extending impact pile driving of monopiles into December.



- ii. Time of Day Restrictions: Impact pile driving of monopiles may commence only during daylight hours, no earlier than one hour after (civil) sunrise. Impact pile driving of monopiles may not be initiated any later than 1.5 hours before (civil) sunset. Impact pile of monopiles driving may continue after dark only when the installation of the same pile began during daylight (1.5 hours before (civil) sunset), when clearance zones were fully visible for at least 30 minutes (as described under condition 4(a)(vi)(6)), and must proceed for human safety or installation feasibility reasons.
- iii. No more than one monopile may be driven per day.
- iv. Monopiles must be no larger than 11 meters (m) in diameter.
- v. For all monopiles, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the monopiles must be used. Hammer energies must be recorded and reported (see condition 6(h)(iv)). Hammer energy must not exceed 4,000 kilojoules.
- vi. Implementation of Clearance Zones (visual and acoustic) and Passive Acoustic Monitoring (PAM) Monitoring Zone for impact pile driving of monopiles:
  1. South Fork Wind must deploy at least two active duty protected species observers (PSOs) on the impact pile-driving vessel to monitor for marine mammals, as described in condition 5(c).
  2. In addition to PSOs on the impact pile-driving vessel, South Fork Wind must deploy a dedicated PSO vessel to survey at a radius of 2.2 kilometers (km), or as modified based on sound field verification (SFV), around the pile being driven. At least 2 active duty PSOs must be deployed on the dedicated PSO vessel to monitor for marine mammals, as described in condition 5(c).
  3. South Fork must use a minimum of 1 active passive acoustic monitoring (PAM) PSO before, during, and after installation of all monopiles, to review and classify acoustic detections in real-time, as described in condition 5(d).
  4. Visual and passive acoustic monitoring must take place at all times from 60 minutes prior to, during, and 30 minutes post-completion of impact pile driving of monopiles.



5. For all impact pile driving of monopiles, South Fork Wind must establish clearance and PAM monitoring zones with radial distances as identified in Table 2 and Table 4.
  6. Impact pile driving of monopiles may only commence when visual clearance zones (Table 2 and Table 4) are fully visible (*e.g.*, not obscured by darkness, rain, fog, etc.) and clear of marine mammals for at least 30 minutes immediately prior to impact pile driving, as determined by the lead PSO.
  7. If the minimum visibility zone (2.2. km) is obscured (*e.g.*, by darkness, rain, fog, etc.), impact pile driving of monopiles must not be initiated until the minimum visibility zone is fully visible. Should such conditions arise while monopile installation is underway, the activity must be halted when practicable, according to condition 4(a)(ix)(1-3).
- vii. Visual Clearance Measures for NARWs: The following measures apply prior to and during impact pile driving of monopiles:
1. South Fork Wind must use PSOs to visually observe for NARWs 60 minutes immediately prior to, during, and 30 minutes after impact pile driving (see condition 5(c)(ii-iii) for minimum number of PSOs).
  2. If a PSO located on the pile-driving vessel or dedicated PSO vessel visually observes a NARW at any distance, impact pile driving must not begin until the PSOs have confirmed that they have not detected a NARW from either vessel at any distance for at least an additional 30 minutes.
  3. The minimum visual clearance zone identified in Table 2 must be fully visible and clear of NARWs for at least 30 minutes prior to initiating impact pile driving (note 4(a)(vii)(2) also applies should conditions allow for viewing distances greater than the minimum visual clearance zone).
  4. NARWs and their behavior must be monitored and documented, as described in section 5(c)(xv).
  5. Any large whale visually observed by a PSO within 2,000 m, or as modified based on SFV measurements, of the impact pile-driving vessel that cannot be identified to species must be treated as if it were a NARW for clearance and shutdown purposes.

6. Any sighting of a NARW by South Fork Wind personnel or by personnel contracted by South Fork Wind (including vessel crews and construction personnel) must be immediately reported to the lead PSO.
- viii. Passive Acoustic Monitoring (PAM) Clearance and Monitoring Measures for NARWs: The following PAM measures apply prior to and during impact pile driving of monopiles:
1. South Fork Wind must operate PAM systems capable of detecting NARWs in real-time in the PAM monitoring zone identified in Table 2.
  2. The PAM system for detecting NARWs and other large whales must not be placed closer than 1 km to the pile being driven.
  3. South Fork must acoustically monitor for NARWs 60 minutes immediately prior to, during, and 30 minutes after impact pile driving.
  4. The real-time PAM system must be configured to ensure that the PAM PSO is able to review acoustic detections within 5 minutes of the original detection in order to categorically determine if a NARW was detected (scale: no, possible, probable, yes).
  5. The PAM PSO must be trained in identification of species-specific mysticete vocalizations and is responsible for determining if the acoustic detection originated from a NARW.
  6. If the PAM PSO can confirm (*e.g.*, probable detection or greater) that a vocalization originated from a NARW located within the 5-km radius clearance zone (Table 2), the acoustic detection will be treated as a visual detection and impact pile driving must not commence.
  7. A confirmed PAM detection of any marine mammal, including NARWs, must be immediately relayed to visual PSOs to increase situational awareness.



8. If impact pile driving is delayed due to the presence of a NARW, impact pile driving may resume only when PSOs on the impact pile driving and dedicated PSO vessels, and the PAM PSO have confirmed that they have not detected a NARW within the clearance zone (*i.e.*, any distance visually, 5 km acoustically) for at least 30 minutes.
  9. Information on any acoustic detections of NARWs must be reported to NMFS, as described in condition 6(b).
- ix. Shutdown Measures for All Marine Mammals
1. In cases where pile driving has commenced and a shutdown is called for, the lead engineer on duty must evaluate the following to determine whether shutdown is practicable:
    - a. Use site-specific soil data and real-time hammer log information to judge whether a stoppage would risk causing pile refusal at re-start of piling; and
    - b. Check that the pile penetration is deep enough to secure pile stability in the interim situation, taking into account weather statistics for the relevant season and the current weather forecast.
    - c. Determinations by the lead engineer on duty will be made for each pile as the installation progresses and not for the site as a whole.
  2. If shutdown is called for but South Fork Wind determines shutdown is not practicable due to human safety concerns or to maintain installation feasibility (as described under 4(a)(ix)(1)), then reduced hammer energy must be implemented, when the lead engineer determines it is practicable.
  3. Following a shutdown, pile driving may not recommence until measure 4(a)(xi)(2) has been met.
- x. NARW Shutdown Measure: the following measure applies to NARWs during impact pile driving of monopiles:
1. Upon visual observation of a NARW by a PSO on the impact pile-driving or dedicated PSO vessel at any distance after impact pile

driving has commenced, a shutdown of impact pile driving must be implemented, as described in conditions 4(a)(ix)(1-3).

2. Upon a confirmed PAM detection of a NARW entering or within the 2-km PAM shutdown zone (Table 3) after impact pile driving has commenced, a shutdown of impact pile driving must be implemented, as described in conditions 4(a)(ix)(1-3).
  3. If impact pile driving has been shut down due to the presence of a NARW, impact pile driving may resume only when PSOs on the impact pile driving and dedicated PSO vessels have confirmed that they have not visually detected a NARW at any distance and the PAM PSO has confirmed they have not acoustically detected a confirmed NARW (*e.g.*, probable detection or greater) call within 5 km for at least 30 minutes.
- xi. Clearance and Shutdown Measures for All Other Marine Mammals (non-NARWs): The following measures apply to all non-NARW marine mammals prior to and during impact and vibratory pile driving.
1. If a marine mammal is observed entering or within the relevant clearance zones (Table 4) within the 30 minutes immediately prior to initiation of impact pile driving activity, impact pile driving must be delayed.
  2. Impact pile driving may commence when either the marine mammal(s) has voluntarily left the respective clearance zone and has been visually confirmed beyond that clearance zone, or when 30 minutes have elapsed without re-detection (for mysticetes, sperm whales, Risso's dolphins, and pilot whales) or 15 minutes have elapsed without re-detection (for all other marine mammals).
  3. If a marine mammal is visually detected entering or within the shutdown zone (Table 4) after impact pile driving has commenced, a shutdown of impact pile driving must be implemented, as described in conditions 4(a)(ix)(1-3).
- xii. For in-water construction heavy machinery activities other than impact and vibratory pile driving, if a marine mammal comes within 10 m of equipment, South Fork Wind must cease operations (when practicable) until the marine mammal has moved more than 10 m on a path away from the activity.

xiii. Soft Start:

1. South Fork Wind must implement soft start techniques for impact pile driving. The soft start must include a minimum of 20 minutes of 4-6 strikes/min at 10-20 percent of the maximum hammer energy.
2. Soft start is required at the beginning of driving a new pile and at any time following the cessation of impact pile driving for 30 minutes or longer.

xiv. South Fork Wind must implement a noise attenuation device(s) during all impact pile driving of monopiles.

1. The following requirements apply to bubble curtains:
  - a. A single big bubble curtain (BBC) must not be used unless paired with another noise attenuation device.
  - b. A double big bubble curtain (dBBC) may be used without being paired with another noise attenuation device.
  - c. The bubble curtain(s) must distribute air bubbles using an air flow rate of at least  $0.5 \text{ m}^3/(\text{min} \cdot \text{m})$ . 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 *e.g.* a single compressor malfunction, the offshore personnel operating the bubble curtain(s) will make appropriate adjustments to the air supply and operating pressure such that the most efficient performance of the bubble curtain(s) is achieved.
  - d. 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.
  - e. No parts of the ring or other objects may prevent full seafloor contact.
2. Construction contractors must train personnel in the proper balancing of airflow to the ring. Construction contractors must submit an inspection/performance report for approval by South Fork Wind within 72 hours following the performance test.



Corrections to the bubble ring(s) to meet the performance standards must occur prior to impact pile driving of monopiles.

3. If SFV measurements on the first pile indicate that the ranges to Level A harassment and Level B harassment isopleths are larger than those modeled, assuming 10-dB attenuation (Table 4), South Fork Wind must modify and/or apply additional noise attenuation measures (*e.g.*, improve efficacy of bubble curtain(s), modify the piling schedule to reduce the source sound, install an additional noise attenuation device) before the second pile is installed. Until SFV confirms the ranges to Level A harassment and Level B harassment isopleths are less than or equal to those modeled, assuming 10-dB attenuation, the shutdown and clearance zones must be expanded to match the measured ranges to the Level A harassment and Level B harassment isopleths. If the application/use of additional noise attenuation measures still does not achieve ranges less than or equal to those modeled, assuming 10-dB attenuation, and no other actions can further reduce sound levels, South Fork Wind must expand the clearance and shutdown zones according to those identified through SFV, in consultation with NMFS (see condition 5(f)(iv)).
  4. If the harassment zones are expanded beyond an additional 1,500 m, additional PSOs must be deployed on additional platforms, with each observer responsible for maintaining watch in no more than 180° and of an area with a radius no greater than 1,500 m.
- b. Pile Driving at the Horizontal Directional Drilling (HDD) site
- i. Vibratory and Impact Pile Driving Clearance and Shutdown Measures:  
The following measures apply to all pile-driving activities (impact hammering of casing pipe and vibratory) at the HDD site.
    1. Pile driving may only occur at the export cable landing site.
    2. Time of Day Restrictions: Vibratory and impact pile driving may commence only during daylight hours, no earlier than one hour after (civil) sunrise. Vibratory and impact pile driving may not be initiated any later than 1.5 hours before (civil) sunset. Vibratory and impact pile driving may continue after dark only when the installation of the same pile began during daylight hours (1.5 hours before (civil) sunset), when clearance zones were fully visible for at least 30 minutes (as described under condition 4(b)(i)(6)), and must proceed for human safety or installation feasibility reasons.



3. South Fork Wind must deploy at least 2 PSOs on duty on the impact or vibratory pile-driving platform, or nearby construction vessel in the immediate vicinity of the impact or vibratory pile-driving platform, at all times during impact or vibratory pile driving to visually monitor for marine mammals. PSO requirements are described under condition 5(b).
  4. Monitoring must take place from 30 minutes immediately prior to initiation of impact or vibratory pile-driving activity through 30 minutes post-completion of impact or vibratory pile-driving activity.
  5. For all impact or vibratory pile-driving activity, South Fork Wind must designate clearance zones with radial distances as identified in Table 5.
  6. Impact or vibratory pile driving may only commence when the clearance zones (Table 5) are fully visible (*e.g.*, not obscured by darkness, rain, fog, etc.) and clear of marine mammals for at least 30 minutes immediately prior to impact or vibratory pile driving, as determined by the lead PSO.
  7. If a marine mammal is visually detected entering or within designated shutdown zones (Table 5) after impact or vibratory pile driving has commenced, a shutdown of impact or vibratory pile driving must be implemented, as described in conditions 4(a)(ix)(1-3).
  8. Following a shutdown, impact or vibratory pile driving may not commence until condition 4(b)(i)(6) has been met.
- c. Construction surveys using specified HRG acoustic sources (boomers, sparkers, and Chirps)
- i. Clearance and Shutdown Measures: The following measures apply to all construction survey activities using specified HRG acoustic sources.
    1. South Fork Wind must deploy a minimum of one PSO on duty during daytime construction surveys and two PSOs on duty during nighttime construction surveys to monitor for marine mammals. PSO requirements are described under condition 5(b).

2. Monitoring must take place from 30 minutes prior to initiation of specified HRG acoustic sources through 30 minutes post-termination of specified HRG acoustic sources.
3. For all construction surveys using the specified acoustic sources, South Fork must designate clearance zones with radial distances as identified in Table 6.
4. Construction surveys using the specified HRG acoustic sources may only commence when the clearance zones are fully visible (*e.g.*, not obscured by rain, fog, etc.) and clear of marine mammals (as determined by the lead PSO) for at least 30 minutes immediately prior to initiation of specified acoustic sources.
5. In cases when the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (IR/thermal camera), and the lead PSO has determined that the clearance zones are clear of marine mammals (as described in condition 4(c)(i)(4) of this IHA), the use of the specified HRG acoustic sources may commence (*i.e.*, no delay is required) despite brief periods of inclement weather and/or loss of daylight. In cases when shutdown zones (as described in condition 4(c)(i)(8)) become obscured for brief periods due to inclement weather, the use of the specified HRG acoustic sources may continue (*i.e.*, no shutdown is required).
6. Construction surveys using specified HRG acoustic sources must not commence if:
  - a. Any NARW is observed within a 500-m radius of the specified HRG acoustics source(s); or
  - b. Any other marine mammals are observed within a 100-m radius of the specified HRG acoustic source(s), including small delphinids that might approach the vessel.
7. Any large whale sighted by a PSO within 1,000 m of active specified HRG acoustic sources that cannot be identified to species must be treated as if it were a NARW.
8. If a marine mammal is observed entering or within the relevant shutdown zones (Table 6) while the specified HRG acoustic sources are operational, the acoustic sources must be immediately shutdown (except as described in condition 4(c)(i)(9)).



9. If delphinids from the genera *Delphinus*, *Stenella*, or *Tursiops* are visually detected approaching the survey vessel or towed HRG survey equipment, shutdown is not required. If there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), PSOs must use their best professional judgment in making the decision to call for a shutdown.
10. Following a shutdown, the specified HRG acoustic sources may not be reactivated until either the marine mammal(s) that triggered the shutdown has voluntarily left and been visually confirmed beyond the relevant clearance zone, or when 30 minutes have elapsed without re-detection (for mysticetes, sperm whales, Risso's dolphins and pilot, whales) or 15 minutes have elapsed without re-detection (for all other marine mammals).
11. If the specified HRG acoustic sources are shut down for less than 30 minutes for reasons other than marine mammal mitigation (*e.g.*, due to mechanical or electronic failure), the acoustic sources may be re-activated as soon as is practicable at full operational level if PSOs have maintained constant visual observation during the shutdown and no visual detections of marine mammals occurred within the relevant shutdown zone during that time. For a shutdown of 30 minutes or longer, or if visual observation was not continued diligently during the pause, pre-start clearance observation is required, as described in condition 4(c)(i)(4) of this IHA.
12. During daylight hours when the specified HRG acoustic sources are not operating, South Fork Wind must ensure that PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified HRG acoustic sources and between acquisition periods. Off-effort PSO monitoring must be reflected in the monthly PSO monitoring reports.



- ii. Ramp-up
  - 1. When practicable, the specified HRG acoustic sources must be ramped up at the start or restart of survey activities. Ramp-up must begin with the power of the smallest acoustic source at its lowest practical power output. The power must then be increased and other acoustic sources added in a way such that the source level would increase gradually.
  - 2. Ramp-up will be delayed if a marine mammal(s) enters its respective shutdown zone. Ramp-up may not continue until the animal has been observed exiting its respective shutdown zone or an additional period has elapsed with no further sightings (*i.e.*, 15 minutes for small odontocetes and seals, 30 minutes for all other species).
- d. Vessel Strike Avoidance Measures: The following measures apply to South Fork Wind vessels, and vessels contracted by South Fork Wind, throughout the project area. These measures do not apply in cases where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the maneuverability restriction, cannot comply.
  - i. South Fork Wind must submit a NARW vessel strike avoidance plan 90 days prior to commencement of vessel use. The plan will, at minimum, describe how PAM (as implemented for condition 4(d)(ix)), in combination with visual observations, will be conducted to ensure the transit corridor is clear of NARWs. The plan will also provide details on the vessel-based observer protocols on transiting vessels.
  - ii. All vessels 65 feet or greater in length must comply with the 10-knot speed restriction in any Seasonal Management Area (SMA) per the NOAA ship strike reduction rule (74 FR 60173; October 10, 2008).
  - iii. Year-round, operators of all vessels will use all available sources of information on NARW presence, including daily monitoring of the Right Whale Sightings Advisory System, WhaleAlert app, and monitoring of Coast Guard VHF Channel 16 throughout the day to receive notifications of any sightings and/or consideration of information associated with any Slow Zones (*i.e.*, DMAs or acoustically-triggered slow zones) to plan vessel routes to minimize the potential for co-occurrence with any NARWs.

- iv. For construction surveys, members of the PSO monitoring team must consult the Right Whale Sightings Advisory System, WhaleAlert app, and monitor Coast Guard VHF Channel 16 throughout the day for reports of NARW presence in the project area.
- v. On all vessels, regardless of size or speed of travel, operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course as appropriate to avoid striking any marine mammal.
- vi. Whenever multiple project-associated vessels (*e.g.*, construction survey, crew transfer) are operating concurrently, any visual observations of ESA-listed marine mammals must be communicated to PSOs and/or vessel operators associated with other vessels to increase situational awareness.
- vii. Vessels of all sizes will operate port to port at 10 knots or less between November 1 and April 30 and while operating in the WDA, along the export cable route, or transit area to and from ports in NY, CT, RI, and MA, except for vessels transiting inside Narragansett Bay or Long Island Sound (unless during a DMA). Vessels transiting from other ports outside those described will operate at 10 knots or less when within any active SMA or within the WDA, including the lease area and export cable route.
- viii. All underway vessels (transiting or surveying) must have a dedicated visual observer on duty at all times to monitor for marine mammals within a 180° direction of the forward path of the vessel (90° port to 90° starboard). Visual observers must be equipped with alternative monitoring technology 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 IHA. Visual observers may be third-party observers (*i.e.*, NMFS-approved PSOs) or crew members.
  - 1. Observer training related to these vessel strike avoidance measures must be conducted for all vessel operators and crew prior to the start of in-water construction activities.
  - 2. Confirmation of marine mammal observer training (including an understanding of the IHA requirements) must be documented on a training course log sheet and reported to NMFS (see Condition 6(c)).



- ix. From May 1 through October 31, if a vessel is traveling at greater than 10 knots, in addition to the required dedicated observer (see condition 4(d)(viii)), real-time PAM of transit corridors must be conducted prior to and during transits.
  - 1. If a NARW is detected via visual observation or PAM within or approaching the transit corridor, all crew transfer vessels must travel at 10 knots or less for the following 12 hours. Each subsequent detection would trigger a 12-hour reset. A slow-down in the transit corridor expires when there has been no further visual or acoustic detection of a NARW in the transit corridor in the past 12 hours.
- x. Vessel speeds will immediately be reduced to 10 knots or less when a NARW is sighted at any distance by the observer or anyone on the underway vessel.
- xi. Vessel speeds will immediately be reduced to 10 knots or less when any large whale, mother/calf pair, or large assemblage of non-delphinoid cetaceans is observed near (within 100 m) an underway vessel.
- xii. In the event that any Slow Zone (designated as a DMA) is established that overlaps with an area where a project-associated vessel would operate, that vessel, regardless of size, will transit that area at 10 knots or less.
- xiii. All vessels must maintain a minimum separation distance of 500 m from a NARW. If a whale is observed but cannot be confirmed as a species other than a NARW, the vessel operator must assume that it is a NARW and take appropriate action.
- xiv. If underway, vessels must steer a course away from any sighted NARW at 10 knots or less such that the 500-m minimum separation distance requirement is not violated. If a NARW is sighted within 500 m of an underway vessel, that vessel must shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m.
- xv. All vessels must maintain a minimum separation distance of 100 m from sperm whales and non-NARW baleen whales. If one of these species is sighted within 100 m of an underway vessel, that vessel must shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 100 m.



- xvi. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all delphinoid cetaceans and pinnipeds, with an exception made for those that approach the vessel (*e.g.*, bow-riding dolphins). If a delphinoid cetacean or pinniped is sighted within 50 m of an underway vessel, that vessel must 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.
- xvii. When a marine mammal(s) is sighted while a vessel is underway, 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, avoid excessive speed or abrupt changes in direction until the animal has left the area). If a marine mammal(s) is sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engine(s) until the animal(s) is clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained.
- xviii. All vessels underway must not divert or alter course in order to approach any marine mammal. Any vessel underway must avoid excessive speed or abrupt changes in direction.

## 5. Monitoring

- a. South Fork Wind must prepare and submit Pile Driving and Marine Mammal Monitoring Plans to NMFS for review and approval at least 90 days before the start of any pile driving. The plans must include final project design related to pile driving (*e.g.*, number and type of piles, hammer type, noise attenuation systems, anticipated start date, etc.) and all information related to PAM PSO monitoring protocols for pile-driving and visual PSO protocols for all activities.
- b. South Fork Wind must employ qualified, trained PSOs to conduct marine mammal monitoring during activities associated with construction. PSO requirements are as follows:
  - i. PSOs must be independent observers (*i.e.*, not construction personnel);
  - ii. At least one PSO on active duty on the impact pile-driving platform, dedicated PSO vessel, vibratory pile-driving observation platform, and construction survey vessel must have prior experience working as a PSO in offshore environments;



- iii. Other PSOs may substitute education (*i.e.*, degree in biological science or related field) or training for experience;
  - iv. One PSO must be designated as lead observer or monitoring coordinator. The lead observer must demonstrate prior experience working as a PSO in offshore environments; and
  - v. All PSOs must be approved by NMFS. South Fork Wind must submit the CVs of the initial set of PSOs necessary to commence the project to NMFS OPR for approval at least 60 days prior to the first day of construction activities.
- c. South Fork Wind is required to adhere to visual monitoring protocols as follows:
- i. South Fork Wind must conduct briefings between construction supervisors and crews and the PSO team prior to the start of all pile-driving activities, and when new personnel join the project, to explain responsibilities, communication procedures, marine mammal monitoring protocols, and operational procedures. An informal guide must be included with the Marine Mammal Monitoring Plan to aid in identifying species if they are observed in the vicinity of the project area.
  - ii. A minimum of two PSOs must be on active duty on the impact pile-driving vessel from 60 minutes before, during, and for 30 minutes after all monopile installation activity.
  - iii. A minimum of two PSOs must be on active duty on a dedicated PSO vessel from 60 minutes before, during, and for 30 minutes after all monopile installation activity. The dedicated PSO vessel must survey at a radius of 2.2 km from the monopile, or as modified based on sound field verification, such that the distance to the perimeter is equal to the large whale clearance zone.
  - iv. A minimum of two PSOs must be on active duty on the impact or vibratory pile-driving platform at the HDD site, or on a platform in the immediate vicinity of the impact or vibratory pile-driving platform at the HDD site, from 30 minutes before, during, and for 30 minutes after all impact or vibratory pile driving.
  - v. A minimum of one PSO (daytime) and two PSOs (nighttime) must be on active duty on the construction survey vessel from 30 minutes before, during, and for 30 minutes after use of active specified HRG acoustic sources.



- vi. PSOs must not exceed four consecutive watch hours on duty at any time, must have a two-hour (minimum) break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period.
- vii. PSOs must be located at the best vantage point(s) in order to ensure coverage of the entire visual shutdown and clearance zones, and as much of the Level B harassment zones as possible, while still considering human safety.
- viii. PSOs must observe and collect standard survey data and data on marine mammals in and around the project area as described under 5(c)(xv).
- ix. PSOs must record all incidents of marine mammal occurrence, regardless of distance from the construction activity.
- x. For impact and vibratory pile driving, PSOs must document any behavioral reactions in concert with distance from the pile being driven. For construction surveys, PSOs must document any behavioral reactions in concert with distance from the active specified HRG acoustic source.
- xi. During all observation periods related to impact and vibratory pile driving, PSOs must use high-magnification (25X), as well as standard handheld (7X) binoculars, and the naked eye to search continuously for marine mammals. During periods of low visibility (*e.g.*, darkness, rain, fog, etc.), PSOs must use alternative technology (*e.g.*, IR/Thermal camera) to monitor shutdown and clearance zones.
- xii. During all observation periods related to construction surveys, PSOs must use standard handheld (7X) binoculars and the naked eye to search continuously for marine mammals. During periods of low visibility (*e.g.*, darkness, rain, fog, etc.), PSOs must use alternative technology to monitor shutdown and clearance zones (*e.g.*, IR/thermal camera).
- xiii. For all activities, monitoring distances must be measured with range finders or reticle binoculars. Distances to marine mammals observed must be based on the best estimate of the PSO, relative to known distances to objects in the vicinity of the PSO. Bearings to animals must be determined using a compass.



- xiv. When an observation of a marine mammal occurs during vessel transit, observers must record the following:
1. Time, date, and location (lat/long);
  2. The vessel's activity, heading, and speed;
  3. Sea state, water depth, and visibility;
  4. Marine mammal identification to the best of the observer's ability (*e.g.*, NARW, whale, dolphin, seal);
  5. Initial distance and bearing to marine mammal observed from the vessel and closest point of approach; and
  6. Any avoidance measures taken in response to the marine mammal sighting.
- xv. For all marine mammal sightings by PSOs, the following information must be collected and reported to NMFS:
1. Identification of the animal(s) (*i.e.*, genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;
  2. Pace of the animal(s);
  3. Estimated number of animals (high/low/best);
  4. Estimated number of animals by cohort (*e.g.*, adults, yearlings, juveniles, calves, group composition, etc.);
  5. 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);
  6. Description of any observations of marine mammal behavior (*e.g.*, observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (*e.g.*, no response or changes in behavioral state such as ceasing feeding, changing direction, or breaching);

7. Animal's closest distance from the pile being driven or specified HRG equipment and estimated time spent within the Level A harassment and/or Level B harassment zones;
  8. Construction activity at time of sighting (*e.g.*, vibratory installation/removal, impact pile driving, construction survey), use of any noise attenuation device, and specific phase of activity (*e.g.*, ramp-up HRG equipment, HRG acoustic source on/off, soft start for pile driving, active pile driving, etc.);
  9. Distance and bearing to each marine mammal observed;
  10. Description of any mitigation-related actions 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;
  11. Watch status (*i.e.*, sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
  12. PSO who sighted the animal;
  13. Time of sighting;
  14. Location of sighting;
  15. Water depth;
  16. Sea state and weather; and
  17. Marine mammal occurrence within relevant Level A harassment or Level B harassment zones.
- d. South Fork Wind must adhere to Passive Acoustic Monitoring protocols for impact pile driving of WTG foundations as follows:
- i. A Passive Acoustic Monitoring Plan must be submitted to NMFS and BOEM for review and approval at least 90 days prior to the planned start of pile driving. The plan must describe all proposed PAM equipment, procedures, and protocols;
  - ii. The plan must include a description of the PAM hardware and software used for marine mammal monitoring, including software version used, calibration data, bandwidth capability and sensitivity of hydrophone(s),

any filters used in hardware or software, and limitations of the equipment, and other information;

- iii. PAM must be conducted during all impact pile driving of monopiles;
- iv. PAM must begin at least 60 minutes prior to initiation of impact pile driving of monopiles, continue throughout monopile installation, and extend at least 30 minutes post monopile installation;
- v. PAM must be conducted by at least one dedicated PAM PSO. The PAM PSO(s) must demonstrate that they have completed specialized training for operating the PAM system;
- vi. PAM PSO(s) may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches; and
- vii. PAM PSO(s) must immediately communicate all detections of marine mammals to visual PSOs, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination.
- viii. For all acoustic detections of marine mammals, the following must be recorded:
  1. Identification, location, and depth of recording unit;
  2. Time zone for sound files and recorded date/times in data and metadata;
  3. Duration of recording (start/end dates and times);
  4. Type of recording (continuous/duty cycled);
  5. Hydrophone sensitivity;
  6. Bandwidth/sampling rate;
  7. Species identification (if possible);
  8. Call type (if known);
  9. Temporal aspects of vocalization (date, time, duration, etc.);
  10. Comparison with any concurrent visual sightings;



11. Name of observer/data collector/analyst;
  12. A record of the PAM PSO's review of any acoustic detections; and
  13. Location (if geometry/density of bottom-mounted or sonobuoy array allows) or directionality (directional hydrophones and/or lateral information from towed array) of detected calls including references to location of coincident human sound-producing activities.
- e. Sound Field Verification (SFV) for impact pile driving of WTG foundations
- i. To validate the estimated sound field, SFV measurements must be conducted during pile driving of the first three monopiles installed over the course of the project, with noise attenuation devices activated.
  - ii. A SFV Plan must be submitted to NMFS for review and approval at least 90 days prior to planned start of pile driving. This plan must describe how South Fork Wind will ensure that the first three monopile installation sites selected for SFV are representative of the rest of the monopile installation sites and, in the case that they are not, how additional sites will be selected for SFV. This plan must also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS. The plan must describe how the effectiveness of the noise attenuation system will be evaluated based on the results.
  - iii. In the event that South Fork Wind obtains technical information that indicates a subsequent monopile(s) is likely to produce larger sound fields, SFV must be conducted for that subsequent monopile(s).
  - iv. South Fork Wind must provide the initial results of the SFV measurements to NMFS in an interim report after each monopile installation for the first three piles as soon as they are available but no later than 48 hours after each installation. A final SFV report is due per condition 6(h) of this IHA.
- f. Level A Harassment and Level B Harassment Zone verification for impact pile driving of WTG foundations
- i. South Fork Wind must conduct SFV under the following circumstances:
    1. Impact driving of the first three monopiles installed over the duration of the IHA;

2. South Fork Wind obtains technical information that indicates a subsequent monopile is likely to produce larger sound fields; and
  3. At least three monopiles of the same size if a reduction to the clearance and/or shutdown zones in Table 2 and Table 4, where possible, is requested.
- ii. South Fork Wind must conduct SFV to empirically determine the ranges to the isopleths corresponding to Level A harassment and Level B harassment thresholds, including at the locations corresponding to the modeled ranges to the Level A harassment and Level B harassment isopleths (Table 4), or as agreed to in the SFV Plan. As a secondary method, South Fork Wind may also estimate ranges to Level A harassment and Level B harassment isopleths by extrapolating from *in situ* measurements at multiple distances from the monopile, including at least one measurement location at 750 m from the pile.
  - iii. For verification of the range to the Level B harassment isopleth, South Fork Wind must report the measured or extrapolated distances where the received levels  $SPL_{rms}$  decay to 160-dB $_{rms}$ , as well as integration time for such  $SPL_{rms}$ .
  - iv. If initial SFV measurements indicate ranges to the isopleths corresponding to Level A harassment and Level B harassment thresholds are greater than the ranges predicted by modeling, assuming 10-dB attenuation, South Fork Wind must implement additional noise attenuation measures prior to conducting additional pile driving. Initial additional measures may include improving the efficacy of the implemented noise attenuation technology and/or modifying the piling schedule to reduce the sound source. If modeled zones cannot be achieved by these corrective actions, South Fork Wind must install an additional noise attenuation device to achieve the modeled ranges. Each sequential modification must be evaluated empirically by SFV. Additionally, in the event that SFV measurements continue to indicate ranges to isopleths corresponding to Level A harassment and Level B harassment thresholds are consistently greater than the ranges predicted by modeling, NMFS may expand the relevant clearance and shutdown zones and associated monitoring measures.
  - v. If initial SFV measurements indicate ranges to the isopleths corresponding to Level A harassment and Level B harassment thresholds are less than the ranges predicted by modeling, assuming 10-dB attenuation, South Fork Wind may request a modification of the clearance and shutdown zones for impact pile driving (provided condition 5(f)(i)(3) has been met). For a modification request to be considered by NMFS, South Fork Wind must

have conducted SFV on at least three piles to verify that zone sizes are consistently smaller than those predicted by modeling. If a subsequent piling location is selected that was not represented by previous locations (e.g., substrate composition, water depth), SFV must be conducted. If NMFS approves zone modifications, any reductions in zone sizes must reflect SFV such that the shutdown and clearance zones would be equivalent to the measured range to the Level A harassment isopleth plus 10 percent and 20 percent, respectively. The shutdown zone for sei, fin, and sperm whales must not be reduced to a size less than 1,000 m. The visual and PAM clearance and shutdown zones for NARWs must not be decreased, regardless of acoustic field measurements. The Level B harassment zone would be equal to the largest measured distance to the Level B harassment isopleth.

## 6. Reporting

- a. If a NARW is observed at any time by PSOs or personnel on or in the vicinity of any impact or vibratory pile-driving vessel, dedicated PSO vessel, construction survey vessel, or during vessel transit, South Fork Wind must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866) 755-6622, to the U.S. Coast Guard via channel 16, and through the WhaleAlert app (<http://www.whalealert.org/>) as soon as feasible but no longer than 24 hours after the sighting. Information reported must include, at a minimum: time of sighting, location, and number of NARWs observed.
- b. If a NARW is detected via South Fork Wind PAM, the date, time, location (*i.e.*, latitude and longitude of recorder) of the detection as well as the recording platform that had the detection must be reported to [nmfs.pacmdata@noaa.gov](mailto:nmfs.pacmdata@noaa.gov) as soon as feasible, but no longer than 24 hours after the detection. Full detection data and metadata must be submitted monthly on the 15<sup>th</sup> of every month for the previous month via the webform on the NMFS North Atlantic right whale Passive Acoustic Reporting System website (<https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates>). For assistance, contact [nmfs.pacmdata@noaa.gov](mailto:nmfs.pacmdata@noaa.gov).
- c. Prior to initiation of project activities, South Fork Wind must demonstrate in a report submitted to NMFS ([itp.esch@noaa.gov](mailto:itp.esch@noaa.gov)) that all required training for South Fork Wind personnel (including vessel crew and captains, and PSOs) has been completed.
- d. South Fork Wind must compile and submit weekly PSO and PAM reports to NMFS (at [PR.ITP.monitoring.reports@noaa.gov](mailto:PR.ITP.monitoring.reports@noaa.gov)) that document the daily start and stop of all pile-driving activities, the start and stop of associated observation periods by PSOs, details on the deployment of PSOs, a record of all detections of marine mammals, 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 are due on Wednesday for the previous week (Sunday – Saturday).

- e. South Fork Wind must compile and submit monthly reports 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, and route), number of piles installed, and all observations of marine mammals. Monthly reports are due on the 15<sup>th</sup> of the month for the previous month.
- f. South Fork Wind must submit its draft final report(s) on all visual and acoustic monitoring conducted under the IHA within 90 calendar days of the completion of activities occurring under this IHA. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of NMFS' receipt of the draft report, the report will be considered final.
- g. All draft and final monitoring reports must be submitted to [PR.ITP.MonitoringReports@noaa.gov](mailto:PR.ITP.MonitoringReports@noaa.gov) and [itp.esch@noaa.gov](mailto:itp.esch@noaa.gov).
- h. Sound Field Verification Reporting: Final Results of SFV of monopile installations must be submitted as soon as possible, but no later than within 90 days following completion of impact pile driving of monopiles. The final report must include, at minimum, the following:
  - i. Peak sound pressure level ( $SPL_{pk}$ ), root-mean-square sound pressure level that contains 90% of the acoustic energy ( $SPL_{rms}$ ), single strike sound exposure level ( $SEL_{ss}$ ), integration time for  $SPL_{rms}$ ,  $SEL_{ss}$  spectrum, and 24-hour cumulative SEL extrapolated from measurements at distances specified in condition 5(f)(ii). All these levels must be reported in the form of (1) median, (2) mean, (3) maximum, and (4) minimum. The SEL and SPL power spectral density and one-third octave band levels (usually calculated as decidecade band levels) at the receiver locations should be reported;
  - ii. The sound levels reported must be in median and linear average (*i.e.*, average in linear space), and in dB;
  - iii. A description of depth and sediment type, as documented in the Construction and Operation Plan, at the recording and pile-driving locations;
  - iv. Hammer energies required for pile installation and the number of strikes per pile;



- v. Hydrophone equipment and methods (*i.e.*, recording device, bandwidth/sampling rate, distance from the pile where recordings were made; depth of recording device(s));
  - vi. Description of the SFV PAM 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;
  - vii. Local environmental conditions, such as wind speed, transmission loss data collected on-site (or the sound velocity profile), baseline pre- and post-activity ambient sound levels (broad-band and/or within frequencies of concern);
  - viii. Spatial configuration of the noise attenuation device(s) relative to the pile;
  - ix. The extents of the Level A harassment and Level B harassment zones; and
  - x. A description of the noise attenuation devices and operational parameters (*e.g.*, bubble flow rate, distance deployed from the pile, etc.) and any action taken to adjust noise attenuation devices.
- i. Reporting injured or dead marine mammals:
- i. In the event that personnel involved in the activities covered by the IHA discover an injured or dead marine mammal, South Fork Wind must immediately report the observation the NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755- 6622) or alternative electronic reporting systems as approved by the NOAA stranding program, as well as the U.S. Coast Guard. In addition, South Fork Wind must report the observation to NMFS Office of Protected Resources (OPR) within 24 hours ([PR.ITP.MonitoringReports@noaa.gov](mailto:PR.ITP.MonitoringReports@noaa.gov) and [itp.esch@noaa.gov](mailto:itp.esch@noaa.gov)). If the death or injury was clearly caused by the specified activity, the Holder must immediately cease all activities until NMFS OPR 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 this IHA. The report must include the following information:
    1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
    2. Species identification (if known) or description of the animal(s) involved;



3. Condition of the animal(s) (including carcass condition if the animal is dead);
  4. Observed behaviors of the animal(s), if alive;
  5. If available, photographs or video footage of the animal(s); and
  6. General circumstances under which the animal was discovered.
- ii. In the event of a vessel strike of a marine mammal by any vessel involved in the activities covered by the IHA, South Fork Wind must immediately report the incident to the NOAA Fisheries Marine Mammal and Sea Turtle Stranding and Entanglement Hotline (866-755-6622) or alternative electronic reporting systems as approved by the NOAA stranding program, as well as the U.S. Coast Guard. The incident must also be immediately reported to NMFS OPR (301-427-8401). South Fork Wind must immediately cease all activities until NMFS OPR 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 this IHA. The report must include the following information:
1. Time, date, and location (latitude/longitude) of the incident;
  2. Species identification (if known) or description of the animal(s) involved;
  3. Vessel's speed leading up to and during the incident;
  4. Vessel's course/heading and what operations were being conducted (if applicable);
  5. Status of all sound sources in use;
  6. 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;
  7. Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
  8. Estimated size and length of animal that was struck;
  9. Description of the behavior of the marine mammal immediately preceding and following the strike;



10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
  11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
  12. To the extent practicable, photographs or video footage of the animal(s).
7. This Authorization may be modified, suspended, or withdrawn if the Holder fails to abide by the conditions prescribed herein (including, but not limited to, failure to comply with monitoring or reporting requirements), or if NMFS determines: (1) the authorized taking is likely to have or is having more than a negligible impact on the species or stock of affected marine mammals, or (2) the prescribed measures are likely not or are not effecting the least practicable adverse impact on the affected species or stocks and their habitat.

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

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12/21/2021

Date



**Table 1. Authorized Numbers of Take, by Species, by Harassment Level.**

Species	Stock	Authorized Take All Activities	
		Level A harassment	Level B harassment
Fin whale <sup>E</sup>	W. North Atlantic	1	11
Sei whale <sup>E</sup>	Nova Scotia	1	2
Minke whale	Canadian East Coast	1	32
Humpback whale	Gulf of Maine	4	19
North Atlantic right whale	W. North Atlantic	0	13
Sperm whale <sup>E</sup>	W. North Atlantic	0	6
Long-finned pilot whale	W. North Atlantic	0	40
Atlantic spotted dolphin	W. North Atlantic	0	26
Atlantic white-sided dolphin	W. North Atlantic	0	183
Common dolphin	W. North Atlantic	0	1,945
Risso's dolphin	W. North Atlantic	0	60
Bottlenose dolphin	W. North Atlantic, offshore	0	2,381
Harbor porpoise	Gulf of Maine/Bay of Fundy	0	132
Gray seal	W. North Atlantic	0	1,379
Harbor seal	W. North Atlantic	0	1,373

<sup>E</sup> ESA-listed

**Table 2. Required NARW Clearance and Real-time PAM Monitoring Zones (radial distances from the pile) for Monopile Installation.**

Minimum Visibility Zone <sup>1,2,3</sup>	PAM Clearance Zone <sup>4</sup>	PAM Monitoring Zone <sup>5</sup>
2.2 km	5 km	10 km

<sup>1</sup> Defined as the area over which PSOs must be able to clearly observe marine mammals, including NARWs, to begin clearance process. This zone size cannot be reduced.  
<sup>2</sup> A visual detection of a NARW at any distance from the pile by a PSO on the pile-driving vessel or dedicated PSO vessel triggers a delay in pile driving.  
<sup>3</sup> Any large whale sighted by a PSO within 2,000 m of the pile that cannot be identified to species must be treated as if it were a NARW.  
<sup>4</sup> A confirmed PAM detection of a NARW within the PAM clearance zone must be treated as a visual detection, triggering a delay in pile driving.  
<sup>5</sup> Calls detected outside of the PAM clearance zone will be reported to the lead PSO immediately for situational awareness, but will not trigger a delay in pile driving  
<sup>6</sup> Zone sizes for NARWs must not be decreased.



**Table 3. Required NARW Shutdown Zones for Monopile Installation.**

NARW Shutdown Zone <sup>1,2</sup> (Visual and PAM)	
Visual	PAM
Any distance	2 km
<sup>1</sup> If NARW is sighted at any distance, a shutdown of pile driving must be implemented when practicable, as described under Condition 4(a)(ix)(1-3) of this IHA. <sup>2</sup> A confirmed PAM detection of a NARW within the PAM shutdown zone must be treated as a visual detection, triggering a shutdown of pile driving. <sup>3</sup> Zone sizes for NARWs must not be decreased.	

**Table 4. Impact Pile Driving: Radial Distances (m) to Level A Harassment and Level B Harassment Isopleths, Required Clearance and Shutdown Zones, and Vessel Separation Distances.**

Species	Level A Harassment Zone (SEL) <sup>1</sup>	Level A Harassment Zone (PK)	Level B Harassment Zone	Clearance Zone	Shutdown Zone	Vessel Separation Distance from Marine Mammals
Low-frequency Cetaceans						
Fin whale <sup>E</sup>	1,756	≤10	4,684	2,200	2,000	100
Minke whale	1,571	≤10	4,684	2,200	2,000	100
Sei whale <sup>E</sup>	1,769	≤10	4,684	2,200	2,000	100
Humpback whale	3,642	≤10	4,684	2,200	2,000	100
North Atlantic right whale <sup>E</sup>	1,621	≤10	4,684	See Table 2	See Table 3	500
Mid-frequency Cetaceans						
Sperm whale <sup>E</sup>	-	≤10	4,684	2,200	2,000	100
Atlantic spotted dolphin	-	≤10	4,684	100	50	50
Atlantic white-sided dolphin	-	≤10	4,684	100	50	50
Common dolphin	-	≤10	4,684	100	50	50
Risso's dolphin	-	≤10	4,684	100	50	50
Bottlenose dolphin	-	≤10	4,684	100	50	50
Long-finned pilot whale	-	≤10	4,684	100	50	50
High-frequency Cetaceans						



Harbor porpoise	365	301	4,684	450	450	50
Phocid Pinnipeds in Water						
Gray seal	120	≤10	4,684	150	150	50
Harbor seal	120	≤10	4,684	150	150	50
<sup>1</sup> SEL values are the 95% Exposure Ranges (ER <sub>95%</sub> ) and assume 10-dB reduction. <sup>2</sup> Upon receipt of an interim SFV report, NMFS may adjust the zones to reflect SFV measurements. However, minimum visibility zone will not be decreased, and zones for fin, sei, and sperm whales must not be decreased to a size less than 1 km. Zone sizes for NARWs must not be decreased. <sup>E</sup> ESA-listed						



**Table 5. Vibratory Pile Driving: Radial Distances (m) to Level A Harassment and Level B Harassment Isoleths, Required Clearance and Shutdown Zones, and Vessel Separation Distances.**

Species	Level A Harassment Zone (SEL)	Level B Harassment Zone(SPL)	Clearance Zone	Shutdown Zone	Vessel Separation Distance from Marine Mammals
Low-Frequency Cetaceans					
Fin whale <sup>E</sup>	1,470	36,766	1,500	1,500	100
Minke whale	1,470	36,766	1,500	1,500	100
Sei whale <sup>E</sup>	1,470	36,766	1,500	1,500	100
Humpback whale	1,470	36,766	1,500	1,500	100
North Atlantic right whale <sup>E</sup>	1,470	36,766	1,500	1,500	500
Mid-Frequency Cetaceans					
Sperm whale <sup>E</sup>	-	36,766	1,500	1,500	100
Atlantic spotted dolphin	-	36,766	100	50	50
Atlantic white-sided dolphin	-	36,766	100	50	50
Common dolphin	-	36,766	100	50	50
Risso's dolphin	-	36,766	100	50	50
Bottlenose dolphin	-	36,766	100	50	50
Long-finned pilot whale	-	36,766	100	50	50
High-Frequency Cetaceans					
Harbor porpoise	63	36,766	100	100	50
Phocid Pinnipeds in Water					
Gray seal	103	36,766	150	125	50
Harbor seal	103	36,766	150	125	50
<sup>E</sup> ESA-listed					



**Table 6. Construction Surveys: Radial Distances (m) to Level A Harassment and Level B Harassment Isopleths, Required Clearance and Shutdown Zones, and Vessel Separation Requirements.**

Species	Maximum Extent of Zone in meters (m) from All Potential HRG Sound Sources						Vessel Separation Distance from Marine Mammals
	Level A Harassment Zone (SEL)	Level A Harassment Zone (PK)	Level B Harassment Zones		Clearance Zone <sup>1</sup>	Shutdown Zone <sup>1</sup>	
			Chirps	Boomers and Sparkers			
Low-frequency cetaceans							
Fin whale <sup>E</sup>	<1	<1	54	141	100	100	100
Minke whale	<1	<1	54	141	100	100	100
Sei whale <sup>E</sup>	<1	<1	54	141	100	100	100
Humpback whale	<1	<1	54	141	100	100	100
N.A. right whale <sup>E</sup>	<1	<1	54	141	500	500	500
Mid-frequency cetaceans							
Sperm whale <sup>E</sup>	<1	<1	54	141	100	100	100
Atlantic spotted dolphin	<1	<1	54	141	100	-	50
Atlantic white-sided dolphin	<1	<1	54	141	100	-	50
Common dolphin	<1	<1	54	141	100	-	50
Risso's dolphin	<1	<1	54	141	100	-	50
Bottlenose dolphin	<1	<1	54	141	100	-	50
Long-finned pilot whale	<1	<1	54	141	100	-	50
High-frequency cetaceans							
Harbor porpoise	37	5	54	141	100	100	50
Phocid pinnipeds in water							
Gray seal	<1	<1	54	141	100	-	50
Harbor seal	<1	<1	54	141	100	-	50
<sup>1</sup> Pre-start clearance and shutdown are not required during construction surveys using only non-impulsive acoustic sources (e.g., USBL and parametric sub-bottom profilers) except for non-parametric sub-bottom profilers (e.g., Chirps). <sup>E</sup> North Atlantic (N.A.); ESA-listed							

