# Temporary Pier Pile Driving at the Sunrise Wind Landfall – Take Assessment and Mitigation Measures

Submitted To:

**National Marine Fisheries Service**
**Office of Protected Resources**
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Submitted By

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# Background

Construction of the cable landfall at Smith Point County Park parking lot will require equipment and materials to transit from Long Island to Fire Island. The only vehicle access to the Smith Point County Park parking lot is currently via the Smith Point Bridge. The Smith Point Bridge has had its posted weight limitation reduced to 15 tons gross weight due to structural condition issues and concerns over accelerated aging. Due to these weight limitations, Sunrise Wind will utilize a transport barge and temporary landing structure (pier) to transport the heavy construction equipment and materials necessary to energize the Sunrise Wind Farm Project across the Intracoastal Waterway (ICW) to Smith Point County Park. The materials moved using the barge and temporary equipment are required to energize the Project and includes equipment needed to complete the Landfall Horizontal Directional Drill (HDD), ICW HDD, and onshore civil works that are otherwise too heavy to travel across the Smith Point Bridg**e**.

# Project Description

## Temporary Pier – Smith Point County Park

A temporary pile-supported pier needs to be constructed on the inshore side of Fire Island to allow for the transportation of equipment and materials from Long Island to the construction site on Fire Island (Figure 1). Based on the available bathymetric data at the site, the pier will extend approximately 73 m (240 ft) offshore to reach deep enough water to ensure adequate clearance between the transfer barge and mudline at all tide levels (i.e., a minimum water depth of 4 feet at low tide). The pier will be approximately 88 m (288 ft) long and 4.9 m (16 ft) wide to accommodate the safe transfer of the equipment as well as provide an adequate walkway for the crew. The pier will be constructed out of a light aluminum deck system (or a similar alternative) supported on steel or aluminum girders framed into driven steel piles. The precise pier design and type of piles have not yet been determined. The anticipated piles will be either 35.6 x 35.6 cm (14 x 14 inch) H-shaped piles or 40.6 cm (16 in) diameter round steel piles. The piles will be lifted and driven into the seafloor by a barge-based crane and the barge will require two to four temporary "spud" piles to hold it in place during construction.

Based on the preliminary designs, the temporary pier will require the installation of up to 26 total "production" piles that will remain the entire time the temporary pier is in place. These production piles will include up to 24 piles to create "bents" that support the pier deck and two additional piles for mooring barges or boats to the pier. Each production pile will be either a 35.6 x 35.6 cm (14 x 14 inch) H-shaped pile or 40.6 cm (16 in) diameter round steel pile, or similar. The 40.6 cm (16 in) round steel pile would have a 3/8-inch wall thickness and a length of up to 100 ft. Temporary piles may be used to support a steel-framed template used to ensure installation of the bent production piles in the correct positions. The temporary piles may include up to 24 H-shaped or cylinder piles of the same size as the production piles. Therefore, a total of 50 piles (up to 26 production piles and up to 24 temporary piles) may be installed, and in some cases removed, during construction.

Installation and removal of the up to 24 temporary piles would be completed using only vibratory pile driving equipment. The up to 26 production piles will first be driven using a vibratory hammer followed by an impact hammer. A vibratory hammer with a centrifugal force of approximately 160 tons (e.g., APE 200) would be used for both installation and removal of piles. An impact hammer with a rated energy of approximately 15,000 ft-lbs (e.g., APE D8-42) would be used to complete installation of the production piles. Both production and temporary piles will be removed using vibratory pile driving.

The construction sequence will begin with installation of up to two temporary piles using a vibratory hammer to support the template at each grouping of production piles that form a bent. Installation of a single temporary pile will require up 15 minutes of vibratory pile driving. Once the temporary piles and template are in place, the bent production piles will be driven into place using a vibratory hammer followed by an impact hammer. Up to 15 minutes of pile driving may be required for each production pile, with vibratory pile driving for approximately 90% of the installation time (~13.5 min) followed by impact pile driving for the remaining 10% of the installation time (~1.5 min). Following installation of the bent production piles, the temporary piles supporting the template will be removed using only vibratory pile driving (up to 15 minutes each), and the template will be moved to the next position and again secured in place using up to two temporary piles. This process will continue until all production piles are installed.

It is anticipated that installation of the pier will occur over approximately three to four weeks in in and around December 2023 (upon receipt of all necessary permits). Installation of up to 26 production piles may result in a total of up to 351 minutes (5 hours 51 min) of vibratory pile driving (26 x 13.5 min) and 39 minutes of impact pile driving (26 x 1.5 min). Installation and removal of up to 24 temporary piles may require up to 720 minutes (16 hours) of vibratory pile driving only (2 x 24 x 15 min). The maximum total pile driving time for installation is therefore 1,071 min (17 hours 51 min) of vibratory pile driving and 39 minutes of impact pile driving.

Following completion of the landfall construction work on Fire Island, the temporary pier is expected to be removed in approximately April or May of 2025. Removal of the temporary pier would involve the removal of all 26 production piles using a vibratory hammer. Thus, the total duration of vibratory pile driving during pier removal may be up to 390 min (6 hours 30 min; 26 x 15 min).

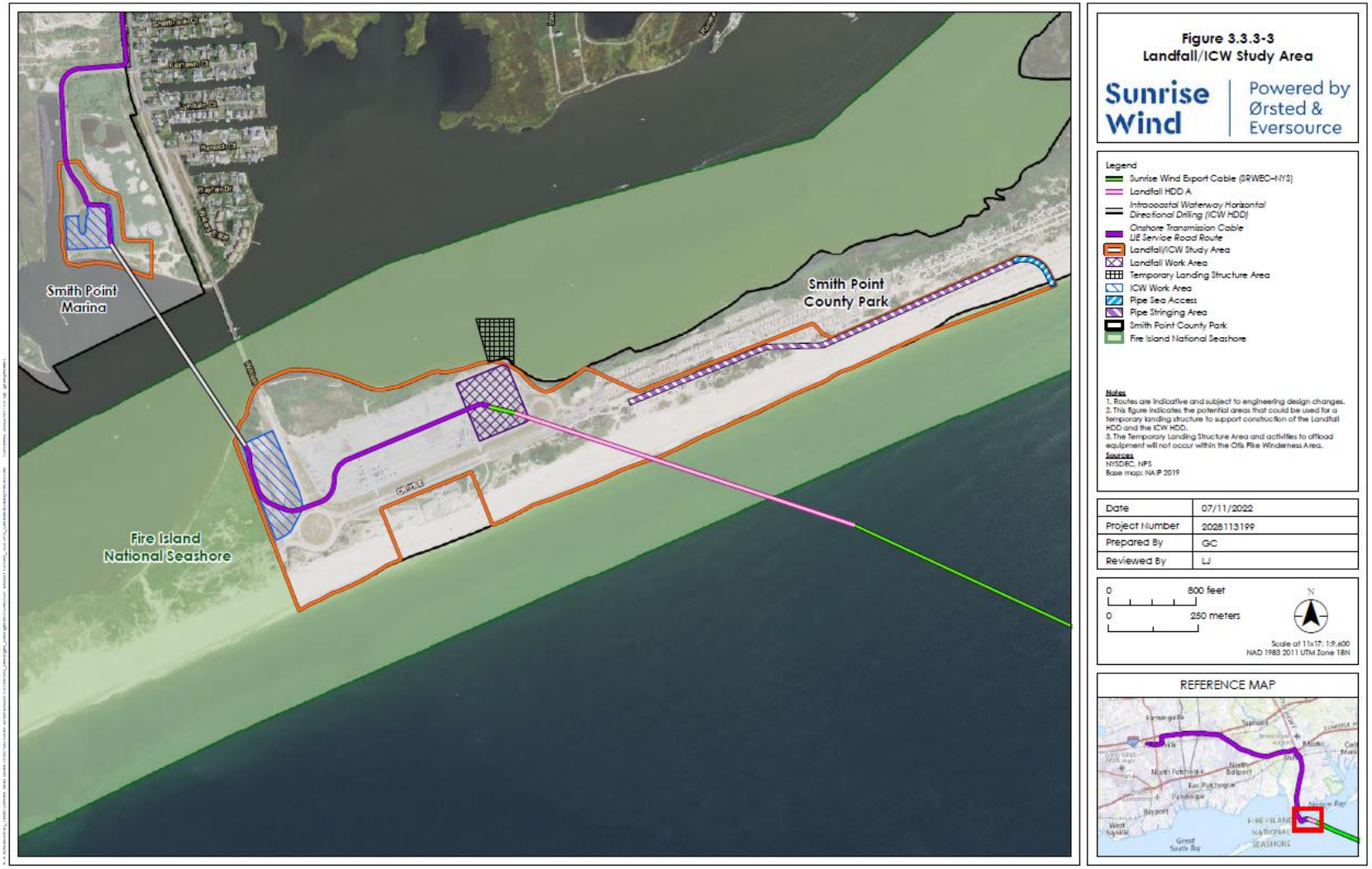


Figure 1: Location of the temporary pile-supported pier on the inshore side of Fire Island at Smith Point County Park

## Marine Mammal Presence

The planned activities are located well within the ICW where the only marine mammal species commonly reported are seals. Harbor and gray seals commonly occur in coastal waters and on coastal islands, ledges, and sandbars (Jefferson et al. 2008). Harbor seals occur seasonally along the coast during winter months from southern New England to New Jersey, typically from September through late May (Kenney and Vigness-Raposa 2010; Hayes et al. 2020). Seals are generally present on New York beaches from late fall until early spring (CRESLI 2020) and are most likely to be encountered at low tide. During project-specific geotechnical surveys, PSOs conducted monitoring within the nearshore inter-coastal waterway (on the landward side of Fire Island) for a total of 81 hours and 59 minutes during the month of February (Gardline 2021). PSOs identified three harbor seals and one unidentified pinniped during that time (Gardline 2021) resulting in a siting rate of approximately 0.05 seals/hr or one seal every 20.5 hours. Since the observations were made during February, they are likely representative of what can be expected during the planned construction in December.

## Area Potentially Exposed to Sounds Above Threshold Levels from Pile Installation and Removal

### Vibratory Pile Driving

The use of a vibratory hammer with a centrifugal force of approximately 160 tons (e.g., APE 200) to install and remove piles would introduce non-impulsive sound to the water. Representative source levels for the three different potential pile types and sizes being considered (14-in H-shaped piles or 16-in cylinder piles for the temporary pier) are summarized here. Measurement of a 12 in H-shaped pile using vibratory pile driving was stated to have a received level of 150 dB $SPL_{rms}$ at 10 m from the pile as reported in (Caltrans 2015) while installation of a 14 in H-shaped pile also produced received levels of 150 dB $SPL_{rms}$ at 10 m from the source during construction of the Chevron Long Wharf in Richmond, CA (Caltrans 2020). We could not find measurements taken during installation of a 16 in cylinder pile, but installation of a 12 in diameter cylinder pile was noted in Caltrans (2015) where the received level at 10 m from the pile was stated as 155 dB $SPL_{rms}$. The same 155 dB $SPL_{rms}$ level at 10 m was reported from measurements of a 13 in diameter cylinder pile in the Mad River Slough near Arcata, CA (Caltrans 2020; NMFS-SERO 2022). Measurements of a slightly larger 18 in diameter cylinder pile at Prichard Lake pumping station near Sacramento, CA resulted in a received sound level of 158 dB $SPL_{rms}$.

At the temporary pier location, using the highest level reported for a 16 in diameter cylinder pile surrogate (18 in diameter cylinder pile) of 158 dB $SPL_{rms}$ at 10 m and assuming spherical spreading loss results in an estimated source level of 178 dB $SPL_{rms}$ at 1 m and a distance of 794 m to the 120 dB $SPL_{rms}$ Level B threshold. Distances to Level A thresholds were calculated using the NMFS user spreadsheet tool for vibratory pile driving (A.1) (NMFS 2020). It was assumed that each pile would require 15 min to install (or remove) using vibratory pile driving and up to 12 piles could be installed (or removed) per day. The resulting distances to the Level A $SEL_{cum}$ thresholds assuming individual animals remained at the same distance from the pile during all pile driving that occurred in a 24 hr period are shown in Table 1.

Table 1. Distances to Level A $SEL_{cum}$ thresholds from vibratory pile driving calculated using the NMFS user spreadsheet tool.

| Hearing Group | $SEL_{cum}$ Threshold | Temporary Pier (up to 16 in cylinder pile) |
|---|---|---|
| Low-frequency Cetaceans | 199 | 9.2 |
| Mid-frequency Cetaceans | 198 | 1.5 |
| High-frequency Cetaceans | 173 | 12.4 |
| Phocid Pinnipeds (in water) | 201 | 6.3 |

## Impact Pile Driving

The use of an impact hammer with a rated energy of approximately 15,000 ft-lbs (e.g., APE D8-42) to finish installation of the temporary pier production piles will produce impulsive sounds intermittently for short durations of time. Sound level information is available for several similar installations of approximately the same size and type of piles. A sound level of 165 dB $SPL_{rms}$ at 10 m from the pile was reported during impact pile driving of a 15 in H-shaped pile during construction of the Ballena Isle Marina in Alameda, CA (Caltrans 2015). Installation of a smaller 12 in H-shaped pile during construction of the Noyo River Bridge in Fort Bragg, CA was reported to produce 165 dB $SPL_{rms}$ levels at 30 m from the pile (Caltrans 2020). Source levels from installation of 16 in cylindrical steel piles appear to be somewhat higher than for the H-shaped piles. Caltrans (2020) reported sound levels of 187 dB $SPL_{rms}$ at 10 m from a 16 in cylinder pile during construction of the SR 240 Bridge in Richland, WA. A similar sound level of 189 dB $SPL_{rms}$ at 10 m from the pile was reported during installation using a larger impact hammer (APE D19) in the Sacramento River near Redding, CA (Caltrans 2020).

At the temporary pier location, the highest level reported for impact pile driving of a 16 in diameter cylinder pile was 189 dB $SPL_{rms}$ at 10 m. Assuming spherical spreading this means the estimated source level was 209 dB $SPL_{rms}$ at 1 m resulting in a distance of 282 m to the Level B 160 dB $SPL_{rms}$ threshold. Distances to Level A thresholds were calculated using the NMFS user spreadsheet tool for impact pile driving (E.1) (NMFS 2020). It was assumed that each pile would require 1.5 minutes of impact pile driving and up to 12 piles could be installed per day. The resulting distances to the Level A $SEL_{cum}$ thresholds assuming individual animals remained at the same distance from the pile during all pile driving that occurred in a 24 hr period are shown in Table 2.

Table 2. Distances to Level A $SEL_{cum}$ thresholds from impact pile driving calculated using the NMFS user spreadsheet tool.

| Hearing Group | $SEL_{cum}$ Threshold | Temporary Pier (up to 16 in cylinder pile) |
|---|---|---|
| Low-frequency Cetaceans | 183 | 146.5 |
| Mid-frequency Cetaceans | 185 | 12.0 |
| High-frequency Cetaceans | 155 | 167.0 |

| | | |
|---|---|---|
| Phocid Pinnipeds (in water) | 185 | 91.6 |

The area potential exposed above the Level B take thresholds for vibratory and impact pile driving at the temporary pier location are shown in Figure 2. The longer distance associated with vibratory pile driving (794 m) extends slightly beyond the nearest shoreline on the far side of the ICW while the shorter 282 m distance from impact pile driving extends approximately halfway across the ICW.


Figure 2. Location of the temporary pier and areas of water potential exposed above Level B thresholds from vibratory and impact pile driving.

# Potential for Incidental Take

As noted in the previous section, the Level A distances assume that marine mammals remain within the calculated distances for the entire duration of pile driving that would occur within a 24-hour period. Individual marine mammals are unlikely to remain within these distances for the total assumed duration of piling, especially since the piling events would be intermittent throughout the day. As a result, the potential for Level A exposures, even without the planned monitoring and mitigation, is negligible.

Given the larger distances to Level B thresholds and the more instantaneous nature of potential for behavioral disturbance, Level B take of marine mammals is possible. However, based on ~90 hours of observational data from this location the only marine mammals likely to occur here are seals and even their presence is limited. Using the observed sighting rate of 0.05 seal/hr and the maximum duration of both vibratory and impact pile driving during both installation and removal of piles at the temporary pier location (25 hours), only 1.45 seals would be expected to be present. Implementation of the monitoring and mitigation measures summarized below, including pile driving during daylight only and using pre-start clearance and shutdown zones equivalent to the Level B thresholds distances, should prevent any actual Level B take. Therefore, Sunrise Wind is not requesting additional take as a result of installation and removal of piles at the temporary pier location.

# Mitigation Measures

The monitoring and mitigation measures described below are intended to prevent the exposure of marine mammals to underwater sound levels produced during construction of the temporary pier that could constitute "take" under the MMPA. All standard mitigation and monitoring requirements included in the PSMMP (11.1) will be followed in addition to these activity-specific measures. The proposed activity-specific mitigation measures will include:

- Pile driving only during daylight periods with minimum visibility distance equal to the pre-start clearance and shutdown zones;
- PSOs to monitor the pre-start clearance and shutdown zones; and
- Establishment and monitoring of shutdown and pre-start clearance zones equal to the Level B take threshold distances.

## Pre-start Clearance and Shutdown Zones

To avoid Level B (and Level A) take, the distances to the Level B thresholds will be used as the pre-start clearance and shutdown zones during vibratory and impact pile driving. Descriptions of the Level B threshold distance calculations are provided above and the area of water that may be exposed to those sound levels are shown in Figure 2.

### *Temporary Pier Location*

- Vibratory pile driving: 794 m
- Impact pile driving: 282 m

## Daytime Visual Monitoring

PSOs will maintain watch during the pre-start clearance period, throughout vibratory and impact pile driving for installation of all piles, and 30 minutes after piling is completed. Two PSOs will conduct

observations concurrently. One observer will monitor the pre-start clearance zone and shutdown zone with the naked eye and reticle binoculars; one PSO will monitor in the same way but periodically scan outside the shutdown zone.

## Pre-start Clearance and Shutdowns

PSOs will monitor the pre-start clearance and shutdown zone for 30 minutes prior to the start of pile driving. If a marine mammal is observed entering or within the applicable pre-start clearance zone, piling will not commence until the animal has exited the pre-start clearance zone or sufficient time has elapsed since the last sighting (15 minutes for pinnipeds and dolphins). Soft-start will not be initiated if the shutdown zone cannot be adequately monitored (i.e., obscured by fog, inclement weather, poor lighting conditions) for a full 30-minute period. If a marine mammal is observed entering or within the respective shutdown zone after piling has commenced, a shutdown will be implemented as long as health and safety is not compromised. PSOs will monitor the shutdown zone continually during any pauses in pile driving. Activities will be delayed until the animal(s) has moved outside the shutdown zone or when 15 minutes have elapsed without redetection of seals.

# Literature Cited

Caltrans. 2015. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. California Department of Transportation Division of Environmental Analysis, Sacramento California.

Caltrans. 2020. Hydroacoustic Biological Assessment Guidance. https://dot.ca.gov/programs/environmental-analysis/biology/hydroacoustics.

CRESLI. 2020. Coastal Research Education Society of Long Island, Inc Seal Research.

Gardline. 2021. Sunrise Wind Offshore Wind Farm 2020 and 2021 Protected Observer Technical Summary. 11472.E01SW.

Hayes, S. A., E. Josephson, K. Maze-Foley, and P. E. Rosel, eds. 2020. US Atlantic and Gulf of Mexico marine mammal stock assessments- 2020. NOAA Tech. Memo, NMFS-NE- 271, Woods Hole, MA.

Jefferson, T. A., M. A. Webber, and R. Pitman. 2008. Marine Mammals of the World: A comprehensive Guide to their Identification. London, UK.

Kenney, R. D., and K. J. Vigness-Raposa. 2010. Marine mammals and sea turtles of Narragansett Bay, Block Island Sound, Rhode Island Sound, and nearby waters: an analysis of existing data for the Rhode Island Ocean Special Area Management Plan. Pages 634-970 *in* Rhode Island Coastal Resources Management Council, editor. Rhode Island Ocean Special Area Management Plan Volume 2. Appendix A: technical reports for the Rhode Island Ocean Special Area Management Plan.

NMFS-SERO. 2022. SERO Multi-species Pile Driving Calculator. https://www.fisheries.noaa.gov/southeast/consultations/section-7-consultation-guidance.

NMFS. 2020. Marine Mammal Acoustic Technical Guidance.