Dominion Energy Coastal Virginia Offshore Wind Commercial Project

Protected Species Mitigation and Monitoring Plan

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ACRONYMS AND ABBREVIATIONS

BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CTV	crew transfer vessel
dB	decibel
DMA	Dynamic Management Area
Dominion Energy	Virginia Electric and Power Company, doing business as Dominion Energy Virginia
ECM	Environmental Compliance Monitor
ESA	Endangered Species Act
FR	*Federal Register*
ft	feet
HF	high-frequency
HRG	high-resolution geophysical
Hz	hertz
IR	infrared
km	kilometer
km/h	kilometer per hour
kHz	kilohertz
Lease Area	Lease No. OCS-A 0483
LF	low-frequency
LOA	Letter of Authorization
m	meter
MF	mid-frequency
MMPA	Marine Mammal Protection Act
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	NOAA National Marine Fisheries Service
OCS	Outer Continental Shelf
PAM	Passive Acoustic Monitoring
Project	Dominion Coastal Virginia Offshore Wind Commercial Project
PSO	Protected Species Observer
PTS	permanent threshold shift
SAR	Stock Assessment Report
SEL_{cum}	Cumulative Sound Exposure Level
SFV	sound field verification
SMA	Seasonal Management Area
WTG	Wind Turbine Generator

1 INTRODUCTION

Virginia Electric and Power Company doing business as Dominion Energy Virginia (Dominion Energy), is proposing to construct, own, and operate the Coastal Virginia Offshore Wind (CVOW) Commercial Project (Project) in the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) Offshore Virginia (Lease No. OCS-A 0483, the Lease Area; Figure 1) and in coastal waters where an Offshore Export Cable Route Corridor will be established. Dominion Energy will use high-resolution geophysical (HRG) survey equipment during construction activities in support of the Project; Dominion Energy also intends to use impact and vibratory pile driving to install Wind Turbine Generator (WTG) Monopile Foundations, Offshore Substation Jacket Foundations (jacket foundations with pin piles), and cofferdams and goal post piles at the Nearshore Trenchless Installation Punch-Out during Project construction.

Both the National Oceanic and Atmospheric Administration (NOAA) and the Bureau of Ocean Energy Management (BOEM) have advised that construction activities (including monopile and cofferdam installation activities) and sound-producing HRG survey equipment operating below 180 kilohertz (kHz; e.g., sub-bottom profilers) have the potential to cause acoustic harassment to marine species, in particular marine mammals. Pile driving activities associated with the use of temporary goal posts and cofferdams during the Trenchless Installation would also have the potential to cause acoustic harassment.

Dominion Energy has committed to the following comprehensive set of monitoring and mitigation measures during marine construction and survey activities for the Project; Dominion Energy also commits to engaging in ongoing consultations with NOAA National Marine Fisheries Service (NOAA Fisheries) regarding monitoring and mitigation protocols. The measures detailed in this document are designed to ensure that marine protected species are not adversely affected by the Project activities.

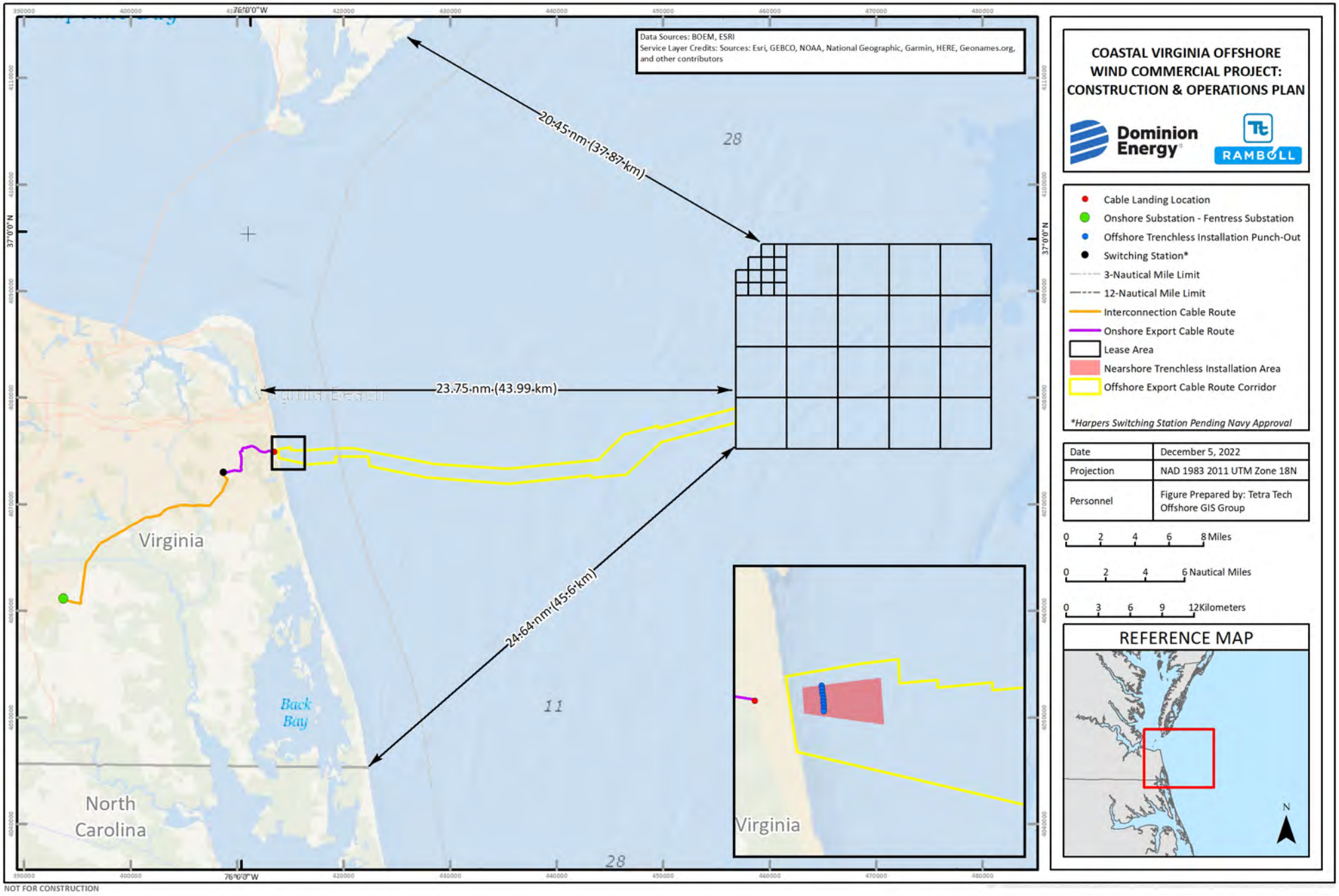

Figure 1. Project Area

2 MARINE PROTECTED SPECIES IN THE PROJECT AREA

Thirty-eight marine mammal species (Table 1), five sea turtle species (Table 2), and five species of protected fish (Table 3) are known to be present, at least seasonally, in the Project Area. All marine mammals are protected under the Marine Mammal Protection Act, and six marine mammal species are additionally listed under the Endangered Species Act (ESA). All of the sea turtle and protected fish species are listed under the ESA as either threatened or endangered.

Table 1. Marine Mammals Known to Occur in the Marine Waters of Coastal and Offshore Virginia

Common Name	Scientific Name	Occurrence/Seasonality a/	Status
Harbor porpoise	*Phocoena phocoena*	Common/Winter/Spring	MMPA – non-strategic
Atlantic spotted dolphin	*Stenella frontalis*	Common/Year-round	MMPA – non-strategic
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Uncommon/Fall/ Winter/Spring	MMPA – non-strategic
Bottlenose dolphin	*Tursiops truncatus*	Common/Year-round	MMPA – non-strategic
Clymene dolphin	*Stenella clymene*	Extralimital/Summer	MMPA – non-strategic
Dwarf sperm whale	*Kogia sima*	Uncommon/Variable	MMPA – non-strategic
False killer whale	*Pseudorca crassidens*	Uncommon/Variable	MMPA – non-strategic
Fraser's dolphin	*Lagenodelphis hosei*	Uncommon/Variable	MMPA – non-strategic
Killer whale	*Orcinus orca*	Uncommon/Year-round	MMPA – non-strategic
Long-finned pilot whale	*Globicephala melas*	Common/Year-round	MMPA – non-strategic
Short-finned pilot whale	*Globicephala macrorhynchus*	Uncommon/Year-round	MMPA – non-strategic
Pantropical spotted dolphin	*Stenella attenuata*	Uncommon/Summer	MMPA – non-strategic
Melon-headed whale	*Peponocephala electra*	Uncommon/Variable	MMPA – non-strategic
Pygmy killer whale	*Feresa attenuata*	Uncommon/Variable	MMPA – non-strategic
Pygmy sperm whale	*Kogia breviceps*	Uncommon/Year-round	MMPA – non-strategic
Risso's dolphin	*Grampus griseus*	Common/Year-round	MMPA – non-strategic
Rough-toothed dolphin	*Steno bredanensis*	Uncommon/Year-round	MMPA – non-strategic
Common dolphin (short-beaked)	*Delphinus delphis*	Common/Year-round	MMPA – non-strategic
Sperm whale	*Physeter macrocephalus*	Uncommon/Year-round	MMPA-strategic; ESA- – Endangered
Spinner dolphin	*Stenella longirostris orientalis*	Uncommon/Year-round	MMPA – non-strategic
Striped dolphin	*Stenella coeruleoalba*	Uncommon/Year-round	MMPA – non-strategic
White beaked dolphin	*Lagenorhynchus albirostris*	Uncommon/Variable	MMPA – non-strategic
Blainville's beaked whale	*Mesoplodon densirostris*	Uncommon/Spring/Summer	MMPA – non-strategic
Cuvier's beaked whale	*Ziphius cavirostris*	Uncommon/Variable	MMPA – non-strategic
Gervais' beaked whale	*Mesoplodon europaeus*	Uncommon/Spring/Summer	MMPA – non-strategic
Sowerby's beaked whale	*Mesoplodon bidens*	Uncommon/Variable	MMPA – non-strategic
True's beaked whale	*Mesoplodon mirus*	Uncommon/Spring/Summer	MMPA – non-strategic
Blue whale	*Balaenoptera musculus*	Uncommon/Year-round	MMPA – strategic; ESA – Endangered

Common Name	Scientific Name	Occurrence/Seasonality a/	Status
Common minke whale	*Balaenoptera acutorostrata*	Common/Year-round	MMPA – non-strategic
Fin whale	*Balaenoptera physalus*	Common/Year-round	MMPA – strategic; ESA –Endangered
Humpback whale (West Indies DPS) b/	*Megaptera novaeangliae*	Common/Fall/Winter/Spring	MMPA – non-strategic
Sei whale	*Balaenoptera borealis*	Uncommon/Winter/Spring/Summer	MMPA – strategic; ESA –Endangered
North Atlantic right whale	*Eubalaena glacialis*	Common/Year-round	MMPA – strategic; ESA –Endangered
West Indian manatee	*Trichechus manatus*	Extralimital/Variable	MMPA – strategic; ESA –Threatened
Gray seal	*Halichoerus grypus*	Uncommon/Fall/Winter/Spring	MMPA – non-strategic
Harbor seal	*Phoca vitulina*	Common/Fall/Winter/Spring	MMPA – non-strategic
Harp seal	*Pagophilus groenlandicus*	Uncommon/Winter/Spring	MMPA – non-strategic
Hooded seal	*Cystophora cristata*	Extralimital/Summer/Fall	MMPA – non-strategic

Notes:
a/ Occurrence defined as:
Common: occurrences are regularly documented and the Project Area is generally considered within the typical range of the species.
Uncommon: occurrences are occasionally documented and the Project Area is generally considered within the typical range of the species.
Extralimital: few occurrences have been documented and the Project Area is generally considered outside the typical range of the species; any occurrences would likely be of incidental individuals.

b/ Note that the humpback whale (Megaptera novaeangliae) was previously federally listed as endangered; however, based on the revised listing completed by NOAA Fisheries in 2016, the Distinct Population Segment (DPS) of humpback whales that occurs along the East Coast of the U.S., the West Indies DPS, is no longer considered endangered or threatened. The Commonwealth of Virginia has retained the endangered state listing status for the humpback whale.

Sources: Hayes et al. 2022; Roberts et al. 2016; Roberts and Halpin 2022

Table 2. Sea Turtles Known to Occur in the Marine Waters of Coastal and Offshore Virginia

Common Name	Scientific Name	Known Offshore Project Area Distribution	Occurrence/ Seasonality a/	Federal Status
Leatherback Sea Turtle	*Dermochelys coriacea*	Offshore, continental shelf and deeper	Uncommon/Year-round	Endangered
Atlantic Hawksbill Sea Turtle	*Eretmochelys imbricata*	N/A	Extralimital/Year-round	Endangered
Green Sea Turtle (North Atlantic Distinct Population Segment	*Chelonia mydas*	Coastal, bays, estuaries, and inlets	Uncommon/Year-round	Threatened
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Coastal, bays, estuaries, and inlets	Common/Year-round	Endangered

Common Name	Scientific Name	Known Offshore Project Area Distribution	Occurrence/ Seasonality a/	Federal Status
Loggerhead Sea Turtle (Northwest Atlantic Distinct Population Segment)	*Caretta caretta*	Throughout: offshore, continental shelf and deeper; coastal, bays, estuaries, and inlets	Common/Year-round	Threatened

Notes:
a/ Occurrence defined as:
Common: Occurrences are regularly documented, and the Project Area is generally considered within the typical range of the species.
Uncommon: Occurrences are occasionally documented, and the Project Area is generally considered within the typical range of the species.
Extralimital: Few occurrences have been documented, and the Project Area is generally considered outside the typical range of the species; any occurrences would likely be of incidental individuals.

Table 3. Protected Fish Known to Occur in the Marine Waters of Coastal and Offshore Virginia

Common Name	Scientific Name	Known Offshore Project Area Distribution	Federal Status
Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	Coastal rivers/estuaries, assumed presence in Offshore Project Area	Endangered
Shortnose Sturgeon	*Acipenser brevirostrum*	Low salinity rivers (Potomac and James rivers), Chesapeake Bay	Endangered
Giant Manta Ray	*Manta birostris*	Offshore Project Area	Threatened
Oceanic Whitetip Shark	*Carcharhinus longimanus*	Offshore Project Area	Threatened
Scalloped Hammerhead Shark	*Sphyrna lewini*	Offshore Project Area	Threatened

Source: Federal Register 1967; Federal Register 2012; (Federal Register 2014; Federal Register 2018a, 2018b;

3 PROTECTED SPECIES OBSERVER (PSO) AND PASSIVE ACOUSTIC MONITORING (PAM) OPERATOR REQUIREMENTS

A briefing will be conducted between the supervisors and crews, the Protected Species Observers (PSOs), Environmental Compliance Monitors (ECMs), and Dominion Energy at the outset of the Project. The purpose of the briefing will be to establish responsibilities of each party, define the chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures. A Lead PSO will be designated who will oversee the execution of the training, the ECM, the other PSOs, and other monitoring related duties.

3.1 PSO Requirements

All PSOs will be qualified and NOAA Fisheries-approved third-party PSOs. PSO qualifications will include a science degree and direct field experience on a marine mammal/sea turtle observation vessel and/or aerial surveys in the Atlantic Ocean/Gulf of Mexico. The *curriculum vitaes* (CVs), PSO training certifications, and NOAA Fisheries approval letters of all proposed PSOs will be submitted to BOEM for review and approval at least 15 days prior to the start of activities requiring monitoring.

All PSOs will receive additional environmental training that will be provided to all crew prior to the start of required monitoring activities and during any changes in crew, such that all personnel are fully aware and understand the mitigation, monitoring, and reporting requirements. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet

will certify that the crew members understand and will comply with the necessary requirements throughout the activities requiring monitoring. The training program will be provided to NOAA Fisheries for review and approval prior to the start of these activities.

3.2 Environmental Compliance Monitor Requirements

Trained crew observers will act as ECMs in support of activities for which a PSO is not required (e.g., crew vessel transits). An ECM must be an experienced crew member who has participated in the environmental training program that will be provided prior to the start of activities. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew members understand and will comply with the necessary requirements throughout the activities requiring monitoring. This training program will include vessel strike avoidance protocols to ensure the ECMs can sufficiently monitor for the presence of marine mammals and ensure compliance with NOAA Fisheries mitigation, monitoring, and reporting requirements.

3.3 PAM Operator Requirements

All passive acoustic monitoring (PAM) operators will have completed a BOEM/NOAA Fisheries approved PSO training program in addition to a PAM training course. PAM operators will have relevant observation experience in the Atlantic Ocean or Gulf of Mexico. The resumes of all proposed PSOs and PAM operators will be submitted to BOEM for review and approval by NOAA Fisheries at least one week prior to the start of mitigation and monitoring activities.

PAM operators will have the qualifications and relevant experience to meet the needs of the PAM program, including safe deployment and retrieval of equipment as necessary, set-up and monitoring of acoustic processing software, and knowledge in detecting and localizing marine mammal vocalizations. Like the PSO team, the PAM team will have a lead monitor (Lead PAM Operator) who will have experience in the Atlantic Ocean on similar projects. The remaining PAM operators will have previous PAM experience on similar projects and the ability to work with the relevant software and equipment.

In addition to the training indicated above, PAM operators will also complete a training course and refresher session with the PSO provider and Project compliance representative(s). The training will review the protected species expected in the Project Area and associated regulatory requirements, and it will be conducted shortly before the anticipated start of Project activities. The refresher session will be tailored to the needs of the particular PAM team and will take into consideration the recent field projects completed by the PAM team.

4 PSO AND PAM PROTOCOL FOR HRG SURVEY AND CONSTRUCTION ACTIVITIES

In the two days prior to, and daily throughout applicable construction activities, the Lead PSO of the monitoring team will consult NOAA Fisheries North Atlantic right whale reporting systems and monitor WhaleAlert software for the presence of North Atlantic right whales. The proposed activities will occur within the vicinity of the Right Whale Mid-Atlantic Seasonal Management Area (SMA) at the mouth of Chesapeake Bay. Activities conducted prior to May 1 must comply with the seasonal mandatory speed

restriction period for this SMA (November 1 through April 30) for any work or transit within this area. Pile driving of foundations will not occur from November 1 through April 30. Pile-driving associated with cofferdam and goal post installation will also not occur from November 1 through April 30.

Throughout all phases of the survey activities, Dominion Energy will monitor NOAA Fisheries North Atlantic right whale reporting systems for the establishment of a Dynamic Management Area (DMA). If NOAA Fisheries should establish a DMA in the Offshore Project Area being surveyed, within 24 hours of the establishment of the DMA Dominion Energy will work with NOAA Fisheries to determine which actions are necessary, including a potential shut down and/or alteration of activities to avoid the DMA.

4.1 Staffing for Foundation Construction Activities

4.1.1 Roles and Responsibilities During Construction Activities

A team of PAM Operators and PSOs will be on board the construction vessel and a secondary support vessel that will be conducting construction operations (impact piling of foundations) to undertake visual and acoustic watches, implement mitigation, and conduct data collection and reporting. Dual role PAM operators/PSOs will be allowed as necessary. The team will be of sufficient size to allow for two PSOs to be on duty on the installation vessel and two additional PSOs to be on duty on a PSO-dedicated vessel. Each PSO will be on duty for no more than a four-hour shift with at least a two-hour break in between each shift. No one PSO will be on duty for more than 12 hours during any 24-hour period.

4.1.1.1 Lead PSO / Lead PAM Operator

Prior to commencement of construction activities, a senior-level PSO/PAM operator will be designated Lead PSO/Lead PAM Operator on each location/vessel. The Lead will be the main point of contact (POC) for all communications between other Project or Vessel Managers and will ensure that all communication protocols are followed at all times during Project activities. The Lead will:

- Coordinate and oversee PAM and PSO Operations and ensure compliance with monitoring requirements;
- Acoustically monitor, detect, and identify marine mammals and determine distance to source;
- Record and report marine mammal sightings, construction activities, and environmental conditions according to plan;
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the plan;
- Communicate with the crew to implement mitigation actions as required by environmental protocols (including delays to initiation of all construction equipment);
- Maintain and troubleshoot the PAM system hardware and software;
- Oversee all deployments and retrievals of the hydrophone cable; and
- Participate in daily meetings and drills with crew when appropriate.

4.1.1.2 PAM Operator

All PAM operators will:

- Acoustically monitor, detect, and identify marine mammals and determine distance to source;
- Record and report marine mammal sightings, construction activities, and environmental conditions according to plan;
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements;
- Communicate with the crew to implement mitigation actions as required by environmental protocols;
- Assist Lead PAM Operator in maintaining and troubleshooting the PAM system hardware and software; and
- Oversee all deployments and retrievals of the hydrophone cable.

4.1.1.3 PSOs

All PSOs will:

- Visually monitor, detect, and identify protected species;
- Record and report according to plan;
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the plan;
- Communicate with the crew to implement mitigation actions as required by environmental protocols; and
- Participate in daily operation meeting with crew when appropriate.

4.2 Staffing for other Construction Activities

4.2.1 Roles and Responsibilities during Cofferdam and Goal Post Construction

Pile-driving associated with cofferdam and/or goal post construction will only occur during daylight hours and will therefore not necessitate PAM staffing. A team of PSOs will be onboard the construction vessel and a secondary support vessel that will be conducting construction operations (impact piling of foundations) to undertake visual watches, implement mitigation, and conduct data collection and reporting. The team will be of sufficient size to allow for two PSOs to be on duty on the installation vessel and two additional PSOs to be on duty on a PSO-dedicated vessel. Each PSO will be on duty for no more than a four-hour shift with at least a two-hour break in between each shift. No one PSO will be on duty for more than 12 hours during any 24-hour period. In the event a delay results in pile driving in low light situations, and where ceasing the pile driving activity would compromise safety (both human health and the environment) and/or the integrity of the Project, Dominion Energy will provide alternative monitoring capabilities such as additional PSOs, PAM, or infrared vision equipment to ensure effective monitoring throughout the duration of pile driving activities. PSOs and PAM operators will not be required for activities for which take is not requested in the LOA application (e.g., rock installation and cable installation).

4.3 Staffing during HRG Survey Activities

4.3.1 Roles and Responsibilities During Survey Activities

A team of PSOs will be on board each vessel that will be conducting 24-hour survey operations to undertake visual watches, implement mitigation, and conduct data collection and reporting. The team will be of sufficient size to allow for one PSO to be on duty during daylight hours and two during nighttime hours. For each vessel that will be conducting 12-hour/daylight only survey operations, the team will be of sufficient size to allow for one PSO to be on duty during daylight hours. For all surveys, each PSO will be on duty for no more than a four-hour shift with at least a two-hour break in between each shift. No one PSO will be on duty for more than 12 hours during any 24-hour period. PSOs and PAM operators will not be required for activities for which take is not requested in the LOA application (equipment operated under 180 kHz or not deemed a possible source of disturbance, e.g., Innomar).

4.3.1.1 Lead PSO

Prior to commencement of survey operations, a senior-level PSO will be designated Lead PSO on each survey/vessel. The Lead PSO will be the main POC for all communications between other Project or Vessel Managers and will ensure that all communication protocols are followed at all times during Project activities. The Lead PSO will:

- Coordinate and oversee PSO operations and ensure compliance with monitoring requirements;
- Visually monitor, detect, and identify marine mammals and determine distance to source;
- Record and report marine mammal sightings, survey activities, and environmental conditions according to survey plan;
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the plan;
- Communicate with the crew to implement mitigation actions as required by environmental protocols (including delays to initiation of regulated survey equipment operating below 180 kHz); and
- Participate in daily meetings and drills with crew when appropriate.

4.3.1.2 PSOs

All PSOs will:

- Visually monitor, detect, and identify protected species;
- Record and report according to survey plan;
- Monitor and advise on sound source and vessel operations for compliance with the environmental requirements for the survey plan;
- Communicate with the crew to implement mitigation actions as required by environmental protocols; and
- Participate in daily operation meeting with crew when appropriate.

5 PROTECTED SPECIES MITIGATION AND MONITORING ZONES

5.1 Impact Pile Driving for Foundations

Both noise attenuation technology and soft-start techniques will be employed during foundation installation impact pile driving to mitigate impacts to protected species. A monitoring zone of 500 m in all directions will be maintained for ESA-listed fish species. If any ESA-listed species is sighted, data on the sighting will be recorded and reported as per the Lease conditions.

Clearance and Shutdown zones will be established and continuously monitored during impact pile driving to minimize impacts to marine mammals (Table 4). Dominion Energy has estimated the minimum visibility distance to be 1,750 m, which was the basis of the proposed shutdown zones. This is consistent with previous experience during the CVOW Pilot Project and in line with other proposed minimum visibility zones for offshore wind construction. The estimated distance of 1,750 m was the exclusion zone (now termed shutdown zone) implemented during the Pilot Project. The distance was a readily enforceable distance for the PSOs, providing confidence in the enforcement of that zone in future projects, even in reduced visibility conditions. During the Pilot Project, only the occurrence of heavy fog prevented adequate coverage of the zones, resulting in the cessation of pile driving at that time. Otherwise, visibility was acceptable and allowed for both pile driving and adequate observation of marine mammals and sea turtles. At no time did glare affect visibility. Given the data collected on weather, environmental conditions, and PSO effectiveness during the Pilot Project, it was determined that in daylight, the zone could be effectively monitored (Jan De nul n.v. 2020). For the CVOW Commercial Project, the use of Big Eyes (long range binoculars) will also contribute to ensuring coverage of the minimum visibility zone. Dominion Energy proposes the following Clearance and Shutdown zones for impact pile driving of both monopiles and pin piles, as shown in Table 4, Figure 2, and Figure 3.

Table 4. Clearance and Shutdown Zones for Impact Pile Driving

Species	Clearance Zone (m)		Shutdown Zone (m)	
	One per Day	Two per Day	One per Day	Two per Day
North Atlantic right whale – PAM	at any distance	at any distance	at any distance	at any distance
North Atlantic right whale – visual detection	at any distance, minimum 1,750	at any distance, minimum 1,750	at any distance, minimum 1,750	at any distance, minimum 1,750
All other Mysticetes and sperm whales	5,100	6,500	1,750	1,750
Harbor porpoise	750	750	750	750
Dolphins and pilot whales	500	500	500	500
Seals	500	500	500	500
Sea Turtles	1,000	1,000	100	100

Notes:
Clearance and shutdown zones account for practicality concerns, including the functional effective distances for visual monitoring as based on experiences from the CVOW Pilot Project. Note for high frequency cetaceans, the peak PTS distance was used given the small size of harbor porpoises and the likely visible identification range. In general, if the modeled PTS distance was less than 100 m, the clearance zone was set at 250 m; whereas if the modeled zone was greater than 100 m but less than 500 m, it was set at 500 m.

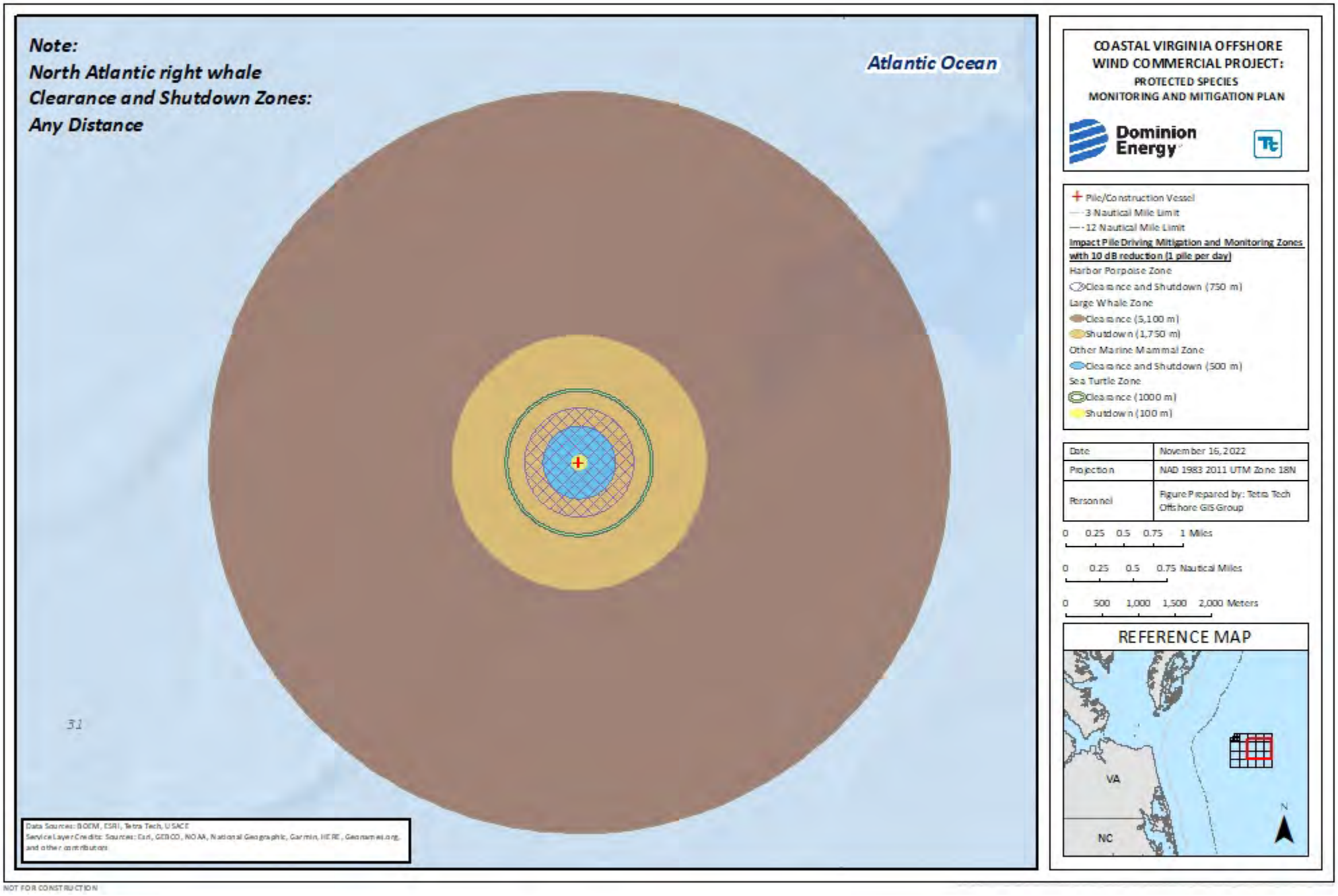

Figure 2. Impact Pile Driving Clearance and Shutdown Zones (1 pile per day)

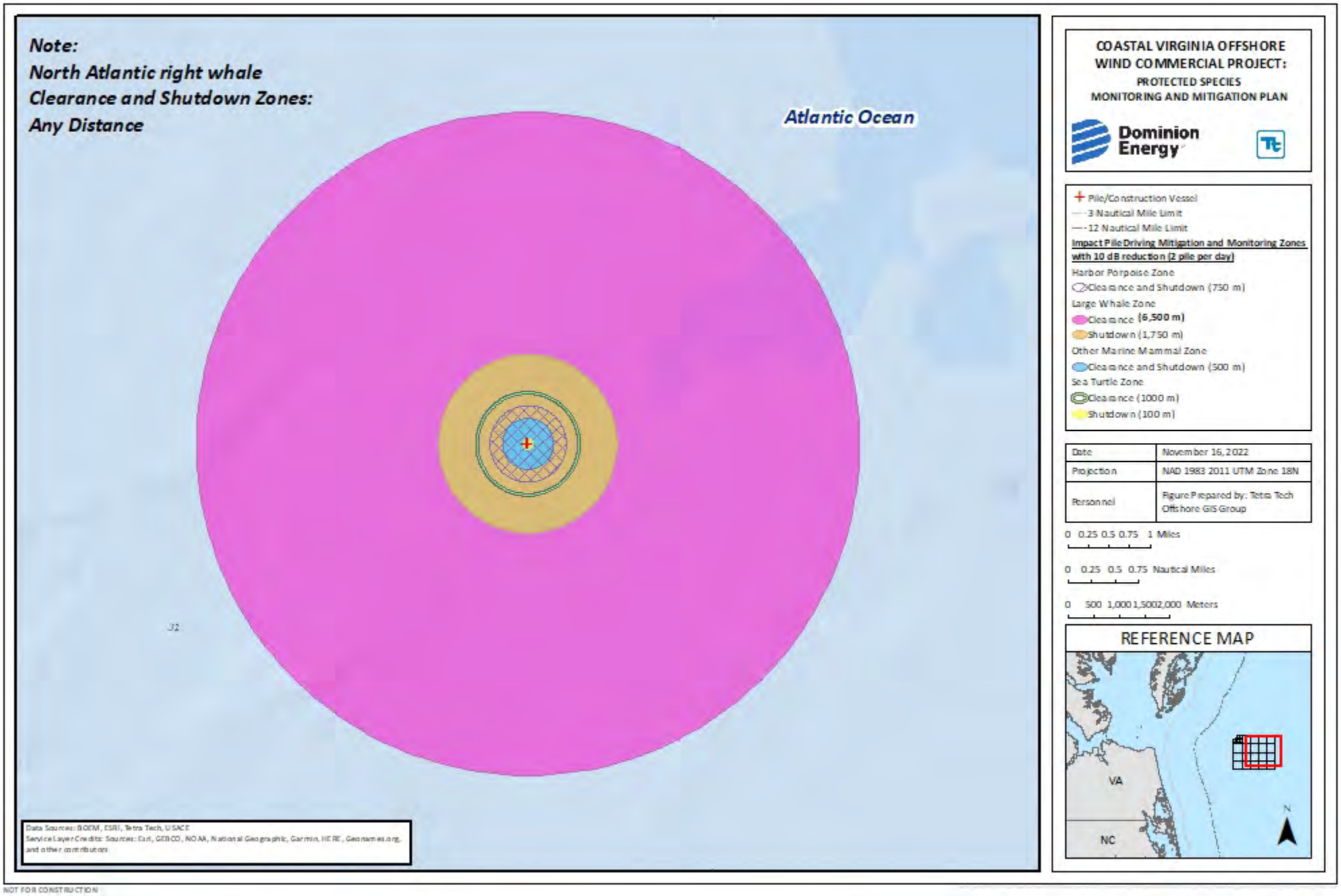

Figure 3. Impact Pile Driving Clearance and Shutdown Zones (2 piles per day)

5.2 Vibratory Pile Driving for Foundations

Noise attenuation via a double big bubble curtain or other abatement technology that can achieve a comparable reduction in sound propagation will be utilized during vibratory pile driving for foundation installation. During vibratory pile driving activities, a monitoring zone of 500 m in all directions will be maintained for ESA-listed fish species. If any ESA-listed species is sighted, data on the sighting will be recorded and reported as per the Lease conditions. The Clearance and Shutdown Zones for vibratory pile driving activities for foundations are shown in Table 5 and Figure 4.

Table 5. Clearance and Shutdown Zones (Vibratory Pile Driving for Foundations)

Species	Clearance zone (m)		Shutdown zone (m)	
	One Per Day	Two per Day	One Per Day	Two per Day
North Atlantic right whale – PAM	at any distance	at any distance	at any distance	at any distance
North Atlantic right whale – visual detection	at any distance, minimum 1,750	at any distance, minimum 1,750	at any distance, minimum 1,750	at any distance, minimum 1,750
All other Mysticetes and sperm whales	1,000	1,000	1,000	1,000
Harbor porpoise	500	500	500	500
Dolphins and pilot whales	250	250	250	250
Seals	250	250	250	250
Sea Turtles	1,000	1,000	100	100

Notes:

Clearance and shutdown zones account for practicality concerns, including the functional effective distances for visual monitoring as based on experiences from the CVOW Pilot Project.

In general, if the modeled PTS distance was less than 100 m, the clearance zone was set at 250 m; whereas if the modeled zone was greater than 100 m but less than 500 m, it was set at 500 m.

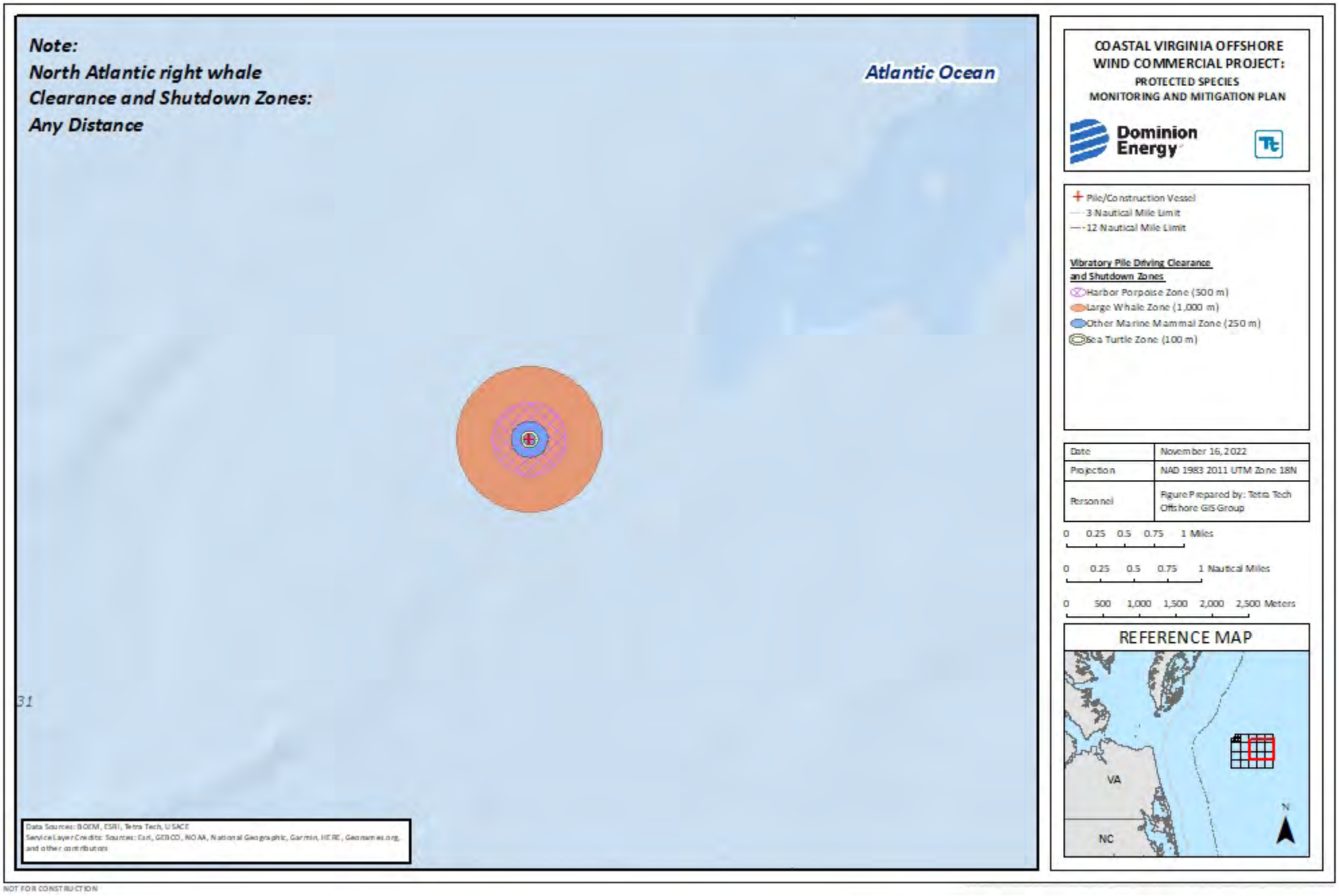

Figure 4. Clearance and Shutdown Zones for Vibratory Pile Driving.

5.3 Trenchless Installation – Cofferdams

Noise attenuation will not be utilized during vibratory pile driving for cofferdam installation. During vibratory pile driving activities, a monitoring zone of 500 m in all directions will be maintained for ESA-listed fish species. If any ESA-listed species is sighted, data on the sighting will be recorded and reported as per the Lease conditions. The Clearance and Shutdown Zones for vibratory pile driving activities for cofferdam installation are shown in Table 6.

Table 6. Clearance and Shutdown Zones for (Vibratory Pile Driving for Cofferdam Installation)

Species	Clearance zone (m)	Shutdown zone (m)
North Atlantic right whale – visual detection	at any distance	at any distance
All other Mysticetes, sperm whales, and pilot whales	1,000	1,000
Harbor porpoise	250	100
Dolphins	250	100
Seals	250	100
Sea Turtles	1,000	100

Notes:
In general, if the modeled PTS distance was less than 100 m, the clearance zone was set at 250 m; whereas if the modeled zone was greater than 100 m but less than 500 m, it was set at 500 m. Shutdown zones have been set at 100 m for non-mysticetes to prevent direct interactions with equipment.

5.4 Trenchless Installation – Goal Posts

Noise attenuation will not be utilized during goal post installation. Ramp up techniques will be employed during impact pile driving associated with trenchless installation to mitigate impacts to ESA-listed species. During pile driving activities, a monitoring zone of 500 m in all directions will be maintained for ESA-listed fish species. If any ESA-listed species is sighted, data on the sighting will be recorded and reported as per the Lease conditions. The Clearance and Shutdown Zones for impact pile driving associated with goal post installation activities are shown in Table 7.

Table 7. Clearance and Shutdown Zones for Goal Post Installation

Species	Clearance zone (m)	Shutdown zone (m)
North Atlantic right whale – visual detection	at any distance	at any distance
All other Mysticetes, sperm whales, and pilot whales	1,000	1,000
Harbor porpoise	750	100
Dolphins and pilot whales	250	100
Seals	500	100
Sea Turtles	1,000	100

Note:
Clearance and shutdown zones proposed based on distances to NOAA Fisheries harassment criteria (NOAA Fisheries 2018a).

5.5 HRG Surveys

Where technically feasible, a ramp-up procedure will be used for HRG survey equipment capable of adjusting energy levels at the start or re-start of HRG survey activities. Ramp-up must begin with the power of the smallest acoustic equipment at its lowest practical power output appropriate for the survey. When

technically feasible, the power must then be gradually turned up and other acoustic sources added in a way such that the source level increases gradually.

Ramp-up activities will be delayed if a marine mammal(s) or ESA-listed species enters a shutdown or clearance zone(s). Ramp-up will not continue until the animal has been observed exiting its respective shutdown or clearance zone or until an additional time has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

A monitoring zone of 500 m in all directions will be maintained for ESA-listed species. If any ESA-listed species is sighted, vessels will decrease speed to 10 knots or less (4 knots for water depths less than 4 feet) and steer away from the animal. Data on the sighting will be recorded and reported as per the Lease conditions. The Clearance and Shutdown Zones for HRG survey activities are shown in Table 8.

Table 8. Clearance and Shutdown Zones for HRG Survey Activities

Species	Clearance zone (m)	Shutdown zone (m)
North Atlantic right whale – visual detection	500	500
Endangered Species	500	500
All other marine mammals, except delphinids from genera *Delphinus, Lagenorhynchus, Stenella,* or *Tursiops* and seals	100	100
Sea Turtles	1,000	100

Note:
Clearance and shutdown zones proposed based on distances to NOAA Fisheries harassment criteria (NOAA Fisheries 2018a).

6 MONITORING EQUIPMENT AND PROTOCOLS FOR HRG SURVEY ACTIVITIES

6.1 Visual Monitoring Equipment

The PSOs will be equipped with binoculars and range finders to estimate distances to marine mammals located in proximity to their established zones. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identifications. Larger zones will be monitored using Big Eyes.

6.2 HRG Survey Visual Monitoring Protocol

Clearance and Shutdown zones will be established and continuously monitored during survey activities to minimize impacts to marine mammals (Table 8).

It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate and enforce the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate. Observations from other PSOs will be communicated to the Lead PSO on duty, who will then be responsible for implementing the necessary mitigation procedures. A PSO mitigation and monitoring communications flow diagram has been included as Appendix A.

Observations will take place from the highest available vantage point on the survey vessel. General 360-degree scanning will occur during the monitoring periods, and target scanning by the PSOs will occur when alerted of a marine mammal presence.

Data on all PSO observations will be recorded based on standard PSO collection requirements. This will include dates and locations of survey operations; time of observation, location, and weather; details of the sightings (e.g., species, age classification [if known], numbers, behavior), and details of any observed "taking" (behavioral disturbances or injury/mortality). The data sheet will be provided to both NOAA Fisheries and BOEM for review and approval prior to the start of survey activities.

6.2.1 Nighttime Monitoring for HRG Surveys

An Alternative Monitoring Plan will be implemented during nighttime HRG survey operations when equipment operating below 200 kHz is in use: vessel-based PSOs will use night-vision equipment (night-vision goggles with thermal clip-ons), infrared (IR) technology, and PAM. Recent studies have concluded that the use of IR (thermal) imaging technology may allow for the detection of marine mammals at night as well as improve the detection during all periods with automated detection algorithms (Weissenberger 2011). Studies have indicated that IR performance is independent of daylight and exhibits an almost uniform, omnidirectional detection probability within a radius of 5 km (3.1 miles). Results of studies demonstrate that thermal imaging can be used for reliable and continuous marine mammal protection (Zitterbart 2013) within these distances. For this reason, Dominion Energy finds that use of IR systems for mitigation purposes warrants additional application in the field as both a stand-alone tool and in conjunction with other alternative monitoring methods (e.g., night vision binoculars [specifications available upon request]). Additionally, rapidly developing experimental applications of technology, such as autonomous vehicles, remote operated vehicles, and machine learning analyses, may provide for enhanced monitoring capabilities in low light or limited vision situations (Macrander et al. 2021; Dujon et al. 2021).

7 MONITORING EQUIPMENT AND PROTOCOLS FOR CONSTRUCTION AND OPERATIONS

PSOs will be equipped with binoculars and range finders to estimate distances to marine mammals located in proximity to their established zones. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identification. Larger zones will be monitored using Big Eyes. Additional innovative technologies may be implemented as available market options continue to evolve.

Observations will take place from the highest available vantage point on the survey vessel. General 360-degree scanning will occur during the monitoring periods, and target scanning by the PSOs will occur when alerted of a marine mammal presence.

Data on all PSO observations will be recorded based on standard PSO collection requirements. This will include dates and locations of survey operations; time of observation, location, and weather; details of the sightings (e.g., species, age classification [if known], numbers, behavior), and details of any observed "taking" (behavioral disturbances or injury/mortality). The data sheet will be provided to both NOAA

Fisheries and BOEM for review and approval prior to the start of survey activities. In addition, prior to initiation of Project activities, all crew members will undergo environmental training, a component of which will focus on the procedures for sighting and protection of marine mammals and sea turtles. A briefing will also be conducted between the survey supervisors and crews, the PSOs, and Dominion Energy. The purpose of the briefing will be to establish responsibilities of each party, define the chains of command, discuss communication procedures, provide an overview of monitoring purposes, and review operational procedures.

7.1 Visual Monitoring Equipment

The PSOs will be equipped with binoculars and range finders to estimate distances to marine mammals located in proximity to their established zones. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species. Digital single-lens reflex camera equipment will be used to record sightings and verify species identification. Larger zones exceeding 1,000 m will be monitored using Big Eyes.

Pile driving (either vibratory or impact pile driving) will commence only during daylight hours no earlier than one hour after (civil) sunrise. Pile driving will not be initiated later than 1.5 hours before (civil) sunset. Pile driving may continue after dark when the installation of the same pile began during daylight (1.5 hours before (civil) sunset), when visual clearance zones were fully visible for at least 60 minutes and must proceed for human safety or installation feasibility reasons. Pile driving will not be initiated in times of low visibility when the visual clearance zones cannot be visually monitored, as determined by the Lead PSO on duty.

7.2 Visual Monitoring Protocol

During pile driving, PSOs will be on active duty as follows:

- A minimum of two PSOs will be on active duty at the pile driving vessel/platform from 60 minutes before, during, and for 30 minutes after all pile driving activity; and
- A minimum of two PSOs will be on active duty on a dedicated PSO vessel from 60 minutes before, during, and for 30 minutes after all pile driving activity. The dedicated PSO vessel will be located at the best vantage point in order to observe and document marine mammal sightings in proximity to the Clearance/Shutdown zones.

The bridge of the installation vessel, Orion, is at an elevation of 29 m. It is anticipated that PSOs will be placed on top of the bridge deck, at a platform 34 m high. PSOs will also be placed on the helipad (36.5 m) if conditions allow for safe placement of PSOs at this level. For reference, the platform height was 40 m for the Pilot Project, with a PSO viewshed of 5,148 m radius. The Pilot Project employed a jack-up vessel allowing for slightly higher platform height than the Orion, as it is a dynamic positioning vessel. If another installation vessel is used, location height of PSOs is expected to be similar. The use of Big Eyes is planned and would further expand the viewshed.

Visual monitoring of the established shutdown zones and monitoring zones will be performed by qualified and NOAA Fisheries–approved third-party PSOs. The PSOs will be responsible for visually monitoring and identifying marine mammals approaching or entering the established shutdown zones during survey

activities. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate and enforce the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate. Observations from other PSOs will be communicated to the Lead PSO on duty, who will then be responsible for implementing the necessary mitigation procedures. A PSO mitigation and monitoring communications flow diagram has been included as Appendix A.

For both impact and vibratory pile driving associated with foundation installation, Dominion Energy will implement a 60-minute clearance period of the clearance zones. Pile driving will not be initiated when a marine mammal is observed within its respective clearance zone. Pile driving will not begin until after the animal(s) has been observed exiting its respective zone, or until an additional time period has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

Pile driving will also be delayed upon a confirmed PAM detection of a North Atlantic right whale, if the PAM detection is confirmed to have been located at any distance.

For vibratory pile driving associated with cofferdam installation (and removal), Dominion Energy will implement a 30-minute clearance period of the clearance zones prior to the initiation of installation. During this period, the clearance zones will be monitored by the PSOs, using the appropriate visual technology for a 30-minute period. Vibratory hammer operation may not be initiated if any marine mammal is observed within its respective clearance zone. If a marine mammal is observed within a clearance zone during the clearance period, installation may not begin until the animal(s) has been observed exiting its respective zone or until additional time has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

It should be noted that the Lead PSO will determine if site conditions prevent adequate monitoring of the pile driving clearance zones (i.e., if they are obscured by fog, inclement weather, poor lighting conditions) for a 60-minute period prior to the commencement of either vibratory hammer operation or soft-start for impact pile driving. The Lead PSO will call for a delay until the conditions present in the clearance zones have been alleviated and the entire clearance zone is visible in all directions. If pile driving has been initiated before the onset of inclement weather, activities may continue through these periods if deemed necessary to ensure human safety and/or the integrity of the Project.

7.3 Passive Acoustic Monitoring Equipment

PAM will occur during all foundation installation activities and will supplement the visual monitoring program. The PAM system will be designed and established such that detection capability extends to at least 5 km from the pile driving location. For all foundation installations, the extent of the detection capabilities will depend on the available technology at the time of construction. The PAM system will offer real-time detection of low-frequency cetaceans, targeting a frequency range of approximately 20 Hz (corresponding to the ‘gunshot’ frequency of North Atlantic right whales [Van Parijs et al. 2021]) to 1,500 Hz (the upper limit of the core detection bandwidth for humpback whales [Van Parijs et al. 2021]). A focus will be placed on detecting the core detection bandwidth for North Atlantic right whales, 65-400 Hz (Van Parijs et al. 2021). Note that while these are the target frequencies, the actual detection bandwidth will vary

based on the subcontractor selected and available technology at the time of deployment. Preference will be given to systems that offer localization; however, incorporation of this capability will depend on the system ultimately selected. Currently, fixed surface buoys and gliding autonomous vehicles are preferred. Towed systems, while under consideration, are not preferred due to the potential for masking by vessel noise from the towing vehicle. Bottom-mounted, fixed systems are also not preferred as most of these systems only offer archival detection; although any real-time options will be taken under consideration. Drifter systems are not under consideration as their location is not always predictable.

7.4 Passive Acoustic Monitoring Protocol

During foundation installation, including vibratory and impact hammer installation, PAM will begin 60 minutes prior to the initiation of soft start, throughout foundation installation, and for 30 minutes after pile driving has been completed. To increase detection probability and thereby reduce potential impacts from Project activities to North Atlantic right whales during the month of May, PAM will be implemented for 24 hours prior to foundation installation in May. PAM will be conducted by a dedicated, qualified, and NOAA Fisheries-approved PAM operator.

The PAM operator(s) will monitor the hydrophone signals in real time both aurally (using headphones) and visually (via the monitor screen displays). PAM operators will communicate detections of any marine mammals to the Lead PSO on duty who will ensure the implementation of the appropriate mitigation measures (i.e., delay or shutdown of pile driving). PAM detection alone (i.e., in the absence of visual confirmation by a PSO of a marine mammal within a relevant Clearance/Shutdown zone) will not trigger mitigation measures (i.e., delay or shutdown of pile driving), with the exception of a PAM detection of a North Atlantic right whale confirmed to be within the relevant zone (Table 4 and Table 5). As outlined in Van Parijs et al. (2021) NOAA and BOEM Minimum Recommendations for Use of Passive Acoustic Listening Systems in Offshore Wind Energy Development Monitoring and Mitigation Programs, the PAM system will 1) consider the target frequencies, especially those for detecting North Atlantic right whales; 2) consider species-specific automated detection software options if feasible, 3) consider localization capabilities if feasible, 4) assess whether a towed or fixed system would be more appropriate, and 5) will archive all data in a publicly available fashion and report to the Northeast Passive Acoustic Reporting System via nmfs.pacmdata@noaa.gov following International Organization of Standardization (ISO) standards for required detection, measurement, and metadata information. The system chosen will dictate the design and protocols of the PAM operations.

8 MITIGATION MEASURES FOR PROTECTED SPECIES

Per the conditions outlined in Lease No. OCS-A 0483, Dominion Energy has committed to the following comprehensive set of mitigation measures during marine construction and surveys for the Project; Dominion Energy also commits to engaging in ongoing consultations with NOAA Fisheries. The mitigation procedures outlined in this section are based on protocols and procedures that have been previously approved by NOAA Fisheries, successfully implemented, and resulted in no take of marine mammals for similar offshore projects (ESS 2013; Dominion Energy 2013, 2014, 2020). Unless otherwise specified, the following mitigation measures apply to Project offshore construction activities.

8.1 Vessel Strike Avoidance Procedures

Dominion Energy will ensure that vessel operators and crew maintain a vigilant watch for protected species during all Project activities. Vessel crew members responsible for navigation duties will receive site-specific training on protected species sighting/reporting and vessel strike avoidance measures. Vessel strike avoidance measures will include, but are not limited to, the following, except under extraordinary circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- All vessel operators and crew will maintain vigilant watch for cetaceans, pinnipeds, and sea turtles and slow down or stop their vessel to avoid striking these protected species.
- All vessels will employ a dedicated lookout during all operations (note: this role will be filled by the PSO(s) as outlined below).
- A monitoring and vessel strike avoidance zone of 500 m in all directions will be maintained for ESA-listed species. If any ESA-listed species is sighted, vessels will decrease speed to 10 knots or less (4 knots for water depths less than 4 feet) and steer away from the animal. Data on the sighting will be recorded and reported as per the Lease conditions.

Vessel speed and navigation requirements are as follows:

- All vessel operators will comply with 10 knot (<18.5 km/h) speed restrictions in any SMA, DMA, or Slow Zone. In addition, all vessels 19.8 m (65 ft) or larger operating from November 1 through April 30 will operate at speeds of 10 knots (<18.5 km/h) or less.
- All vessel operators will reduce vessel speed to 10 knots (<18.5 km/h) or less when mother/calf pairs, pods, or larger assemblages of whales are observed near an underway vessel.
- All vessels will maintain a separation distance of 500 m (1,640 ft) or greater from any sighted ESA-listed species. If an ESA-listed species is sighted within the relevant separation distance, the vessel must steer a course away at 10 knots or less until the 500-m separation distance has been established. If a whale is observed but cannot be confirmed as a species that is not ESA-listed, the vessel operator must assume that it is an ESA-listed species and take appropriate action.
- All vessels will maintain a separation distance of 100 m (328 ft) or greater from any sighted non-ESA baleen whale. If sighted, the vessel underway must reduce speed and shift the engine to neutral and must not engage the engines until the whale has moved outside of the vessel's path and beyond 100 m (324 ft). If a survey vessel is stationary, the vessel will not engage engines until the whale has moved out of the vessel's path and beyond 100 m (328 ft).
- All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted dolphins or pinnipeds, except in the case of bow-riding.
- If underway, vessels must steer a course away from any sighted endangered species at 10 knots (<18.5 km/h) or less until the 500 m (1,640 ft) minimum separation distance has been established. If an endangered species is sighted in a vessel's path, or within 500 m (1,640 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Engines will not be engaged until the endangered species has moved outside of the vessel's path and beyond 500 m

(1,640 ft). If stationary, the vessel must not engage engines until the endangered species has moved beyond 500 m (1,640 ft).

- All vessels underway will not divert to approach any dolphin or pinniped and ensure that any vessel underway remains parallel to a sighted dolphin's or pinniped's course whenever possible. The vessel will not adjust course and speed until the dolphin or pinniped has moved beyond 50 m (164 ft) or has moved abeam of the underway vessel. Any vessel underway will avoid excessive speed or abrupt changes in direction to avoid injury to the sighted dolphin or pinniped. All vessels will reduce vessel speed to 10 knots (18.5 km/h) or less when pods (including mother/calf pairs) or large assemblages of dolphins are observed. The vessel will not adjust course and speed until the dolphins have moved beyond 50 m (164 ft) or abeam of the vessel.

8.2 Mitigation Methods for HRG Sound Sources

In the two days prior to, and daily throughout operations, the Lead PSO of the monitoring team will consult NOAA Fisheries North Atlantic right whale reporting systems and monitor WhaleAlert software for the presence of North Atlantic right whales. The proposed activities will occur within the vicinity of the Right Whale Mid-Atlantic SMA at the mouth of the Chesapeake Bay. Activities conducted prior to May 1 will need to comply with the seasonal mandatory speed restriction period for this SMA (November 1 through April 30) for any work or transit within this area.

Throughout all phases of the survey activities, Dominion Energy will monitor NOAA Fisheries North Atlantic right whale reporting systems for the establishment of a DMA. If NOAA Fisheries should establish a DMA in the Lease Area or cable route corridor being surveyed, within 24 hours of the establishment of the DMA Dominion Energy will work with NOAA Fisheries to determine actions necessary, including a potential shut down and/or alteration of activities to avoid the DMA.

8.2.1 Clearance, Ramp-up, and Shutdown Protocols for HRG Survey Activities

8.2.1.1 Clearance for HRG Survey Activities

For operation of HRG survey equipment with operating frequencies below 180 kHz with the potential to acoustically harass marine mammals, Dominion Energy will implement a 30-minute clearance period of the shutdown and clearance zones prior to the initiation of ramp-up. During this period, the shutdown and clearance zones will be monitored by the PSOs, using the appropriate visual technology for the duration. These measures differ slightly from the lease stipulations; however, Dominion Energy has requested a waiver from BOEM to align this condition more accurately with conditions that have been imposed for similar activities subsequent to issuance of the Lease in 2013. Ramp-up may not be initiated if any marine mammal is within its respective shutdown or clearance zone. If a marine mammal is observed within a shutdown or clearance zone during the clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective zone or until additional time has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

8.2.1.2 Ramp-up/Soft-Start Procedures

When technically feasible, survey equipment must be ramped up at the start or re-start of survey activities. Ramp-up must begin with the power of the smallest acoustic equipment at its lowest practical power output appropriate for the survey. When technically feasible, the power must then be gradually turned up and other acoustic sources added in a way such that the source level increases gradually.

Ramp-up activities will be delayed if a marine mammal(s) enters a shutdown or clearance zone(s). Ramp-up will not continue until the animal has been observed exiting its respective shutdown or clearance zone or until additional time has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

8.2.1.3 Shutdown for HRG Survey Activities

An immediate shutdown of the HRG survey equipment will be required if a marine mammal or sea turtle is sighted at or within its respective shutdown zone (Section 5.5). For dolphins, shutdown will not occur if the animal is determined to be exhibiting voluntary approach (i.e., bow-riding) behavior. For seals, whales, and, in particular, the North Atlantic right whale, the vessel operator will comply immediately with any call for shutdown by the Lead PSO. Any disagreement between the Lead PSO and vessel operator will be discussed only after shutdown has occurred. Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective shutdown zone within 30 minutes of the shutdown or after additional time has elapsed with no further sighting (i.e., 15 minutes for dolphins and pinnipeds and 30 minutes for all other species).

If the acoustic source is shut down for reasons other than mitigation (e.g., mechanical difficulty) for brief periods (i.e., less than 30 minutes), it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective shutdown zones.

If the acoustic source is shut down for a period longer than 30 minutes and PSOs have maintained constant observation, then ramp-up procedures will be initiated as described in Section 8.2.1.2, Ramp-up/Soft-Start Procedures.

8.3 Mitigation Methods for Construction Sound Sources

8.3.1 Noise Abatement Systems

Noise mitigation requirements and methods have not been finalized at this stage of Project design; however, Dominion Energy will use either a double big bubble curtain or an equivalent technology capable of achieving the target of a 10-dB sound level reduction. Dominion Energy achieved this level of reduction with a double big bubble curtain system during the Pilot Project. Dominion Energy may consider alternative technologies that are anticipated to achieve at least a similar level of attenuation.

8.3.2 Clearance, Ramp-up, and Shutdown Protocols for Pile Driving Activities

8.3.2.1 Clearance Procedures

For both impact and vibratory pile driving associated with foundation installation, Dominion Energy will implement a 60-minute clearance period of the clearance zones. Pile driving will not be initiated if any marine mammal is observed within its respective clearance zone. If a marine mammal is observed within a clearance zone during the clearance period, pile driving may not begin until the animal(s) has been observed exiting its respective zone, or until additional time has elapsed with no further sightings (i.e., 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species).

Pile driving will also be delayed upon a confirmed PAM detection of a North Atlantic right whale regardless of distance.

8.3.2.2 Ramp-up/Soft-Start Procedures

A soft start will occur at the beginning of the impact pile driving of each pile and at any time following the cessation of impact pile driving of 30 minutes or longer. The soft start requires an initial 30 minutes using a reduced hammer energy for pile driving.

Soft start is not feasible during vibratory pile installation.

8.3.2.3 Shutdown and Power-Down Procedures

The shutdown zones around the pile driving activities will be maintained, as previously described, by PSOs for the presence of marine mammals before, during, and after pile driving activity. For foundation pile driving, from an engineering standpoint, any significant stoppage of driving progress may allow time for displaced sediments along the piling surface areas to consolidate and bind. Attempts to restart the driving of a stopped piling may be unsuccessful and create a situation where a piling is permanently bound in a partially driven position. It is expected that while conducting impact pile driving, any marine mammals in the area will move away from the sound source. If a marine mammal is observed entering or within the respective zones after pile driving has commenced, a shutdown of pile driving will occur when practicable as determined by the lead engineer on duty, who must evaluate the following to determine whether shutdown is safe and practicable:

- Use of site-specific soil data and real-time hammer log information to judge whether a stoppage would risk causing piling refusal at restart of piling;
- Confirmation that 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; and
- Determination by the lead engineer on duty will be made for each pile as the installation progresses and not for the site as a whole.

If a shutdown is called for but the lead engineer determines shutdown is not practicable due to an 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, reduced hammer energy (power down) will be implemented when the lead engineer determines it is practicable.

Subsequent restart/increased power of the equipment can be initiated if the animal has been observed exiting its respective zone within 30 minutes of the shutdown, or after additional time has elapsed with no further sighting of the animal that triggered the shutdown (i.e., 15 minutes for small odontocetes and 30 minutes for all other species).

If pile driving shuts down for reasons other than mitigation (e.g., mechanical difficulty) for brief periods (i.e., less than 30 minutes), it may be activated again without ramp-up, if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective zones.

9 ADAPTIVE MANAGEMENT

Additional innovative technologies may be implemented as available market options continue to evolve. Dominion Energy would consider incorporating new technologies; however, nothing proposed in terms of the construction scenarios (e.g., piles per day, etc.) or mitigation (e.g., clearance and shutdown zones) would change.

9.1 Sound Field Verification

Dominion Energy will conduct field verifications of actual impact pile driving and vibratory pile driving during installation of the WTG foundations for model validation purposes and to further determine the effectiveness of the mitigation measures employed. Dominion Energy proposes that sound field measurements will be conducted during pile driving of the first three monopiles installed over the course of the Project.

If pile driving occurs across different seasons, sound field measurements will also be conducted during pile driving of a monopile in a season that differs from the season of the first monopile installation for comparison purposes (i.e., if the first monopile is driven in spring and pile driving also occurs in fall, sound field measurements will occur on a pile driven in the fall). If Dominion Energy receives technical information that indicates a subsequent monopile is likely to produce larger sound fields than modeled or previously measured, Dominion Energy will monitor the additional monopile. Dominion Energy will provide initial results of the sound field measurements to NOAA Fisheries as soon as they are processed.

Sound field measurements will be conducted at distances of approximately 750 m, 2,500 m, and 5,000 m from the pile being driven, as well as at the extent of the modeled Level B harassment zones to verify the accuracy of modeled zones. The recordings will be continuous throughout the duration of all impact hammering of each pile monitored. The measurement systems will have a sensitivity appropriate for the expected sound levels from pile driving received at the nominal ranges throughout the installation of the pile. The dynamic range of the system will be sufficient such that at each location, pile driving signals are not clipped and are not masked by noise floor.

10 REPORTING

Dominion Energy will provide the following reports, as necessary, during Project activities:

- Dominion Energy will contact BOEM and NOAA Fisheries within 24 hours of the commencement of pile driving activities each year and again within 24 hours of the completion of the activity for that year.
- During construction, weekly reports briefly summarizing sightings, detections, and activities will be provided to NOAA Fisheries and BOEM on the Wednesday following a Sunday-Saturday period.
- If a North Atlantic right whale is observed at any time by PSOs or personnel on any Project vessels, during any Project-related activity or during vessel transit, sighting information will be reported immediately to the NOAA Fisheries North Atlantic Right Whale Sighting Advisory System: (866) 755-6622.
- If a North Atlantic right whale is confirmed to have been detected via the PAM system, a report of the detection will be submitted to the NOAA Fisheries North Atlantic right whale Passive Acoustic Reporting System within 2 hours of occurrence, when practicable, or no later than 24 hours after occurrence.
- Dominion Energy will report any observed injury or mortality as soon as feasible and in accordance with NOAA Fisheries' standard reporting guidelines. Reports will be made by phone (866-755-6622) and by email (nmfs.gar.stranding@noaa.gov and PR.ITP.MonitoringReports@noaa.gov) and will typically include the following:
    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.
- During years covered by the applicable Letter of Authorization for Taking of Marine Mammals (2024-2029), an annual report summarizing the prior year's activities will be provided to BOEM and NOAA Fisheries that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of listed marine mammals that may have been incidentally taken during Project activities, and provides an interpretation of the results and effectiveness of all monitoring tasks. Draft annual reports will be provided March 1 of each year through 2030. Any recommendations made by NOAA Fisheries will be addressed in the final report, due after the LOA expires and will include a summary of all monitoring activities, prior to acceptance by NOAA Fisheries. Final reports will follow a standardized format for PSO reporting from activities requiring marine mammal mitigation and monitoring.
- Acoustic monitoring reports will include, but are not limited to, the following: dates and times of all detections, types and nature of sounds heard, whether detections were linked with visual sightings, water depth of the hydrophone array, bearing of the animal to the vessel (if determinable),

species or taxonomic group (if determinable), spectrogram screenshot, a record of the PAM operator/PSO's review of any acoustic detections, and any other notable information.

- During post-construction HRG surveys, within 90 days after the completion of survey activities, a draft report will be provided to BOEM and NOAA Fisheries that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of listed marine mammals that may have been incidentally taken during Project activities, and provides an interpretation of the results and effectiveness of all monitoring tasks. Any recommendations made by NOAA Fisheries will be addressed in the final report prior to acceptance by NOAA Fisheries.

All PSOs will use a standardized data entry format.

Monitoring Effort Information will include:

- Date (YYYY-MM-DD)
- Source status at time of observation (on/off)
- Number of PSOs on duty
- Start time of observations for each shift in UTC (HH:MM)
- End time of observations for each shift in UTC (HH:MM)
- Duration of visual observations of protected species
- Wind speed (knots), from direction
- Swell (meters)
- Water depth (meters)
- Visibility (km)
- Glare severity
- Block name and number
- Location: Latitude and Longitude
- Time clearance visual monitoring began in UTC (HH:MM)
- Time clearance monitoring ended in UTC (HH:MM)
- Duration of clearance visual monitoring
- Time of day of pre-clearance (day/night)
- Time power-up/ramp-up began (if applicable)
- Time equipment full power was reached (if applicable)
- Duration of power-up/ramp-up (if conducted)
- Time activity began
- Time activity ended
- Activity Duration
- Did a shutdown/power-down occur?
  - Time shutdown was called for (UTC)
  - Time equipment was shut down (UTC)
- Vessel location (latitude/longitude, decimal degrees) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts; recorded at :30 intervals if obtainable from data collection software

- Habitat or prey observations

Detection Information will include:

- Date (YYYY-MM-DD)
- Sighting ID (multiple sightings of the same animal or group should use the same ID)
- Time at first detection in UTC (YY-MMDDT HH:MM)
- Time at last detection in UTC (YY-MM-DDT HH:MM)
- PSO name(s) (Last, First) on duty
- Effort (e.g., ON=Hammer On; OFF=Hammer Off)
- Start time of observations
- End time of observations
- Compass heading of vessel (degrees)
- Beaufort scale
- Precipitation
- Cloud coverage (%)
- Sightings including common name and scientific name
- Certainty of identification
- Number of adults
- Number of juveniles
- Total number of animals or estimated group size
- Bearing to animal(s) when first detected (ship heading+ clock face)
- Distance determination method
- Distance from vessel (e.g., reticle distance in meters)
- Description of unidentified animals (include features such as overall size; shape of head; color and pattern; size, shape, and position of dorsal fin; height, direction, and shape of blow, etc.)
- Detection narrative (note behavior, especially changes in relation to activity and distance from source vessel/platform)
- Direction of travel/first approach (relative to vessel/platform)
- Behaviors observed: indicate behaviors and behavioral changes observed in sequential order (use behavioral codes)
- If any bow-riding behavior observed, record total duration during detection (HH:MM)
- Initial heading of animal(s) (degrees)
- Final heading of animal(s)(degrees)
- Shutdown zone size during detection (meters)
- Was the animal inside the shutdown zone? (Y/N)
- Closest distance to vessel (reticle distance in meters)
- Time at closest approach (UTC HH:MM)
- Time animal entered shutdown zone (UTC HH:MM)
- Time animal left shutdown zone (UTC HH:MM)

- If observed/detected during ramp-up/power-up: first distance (reticle distance in meters), closest distance (reticle distance in meters), last distance (reticle distance in meters), behavior at final detection
- Did a shutdown/power-down occur? (Y/N)
- Time shutdown was called for (UTC)
- Time equipment was shut down (UTC)
- Detections with PAM

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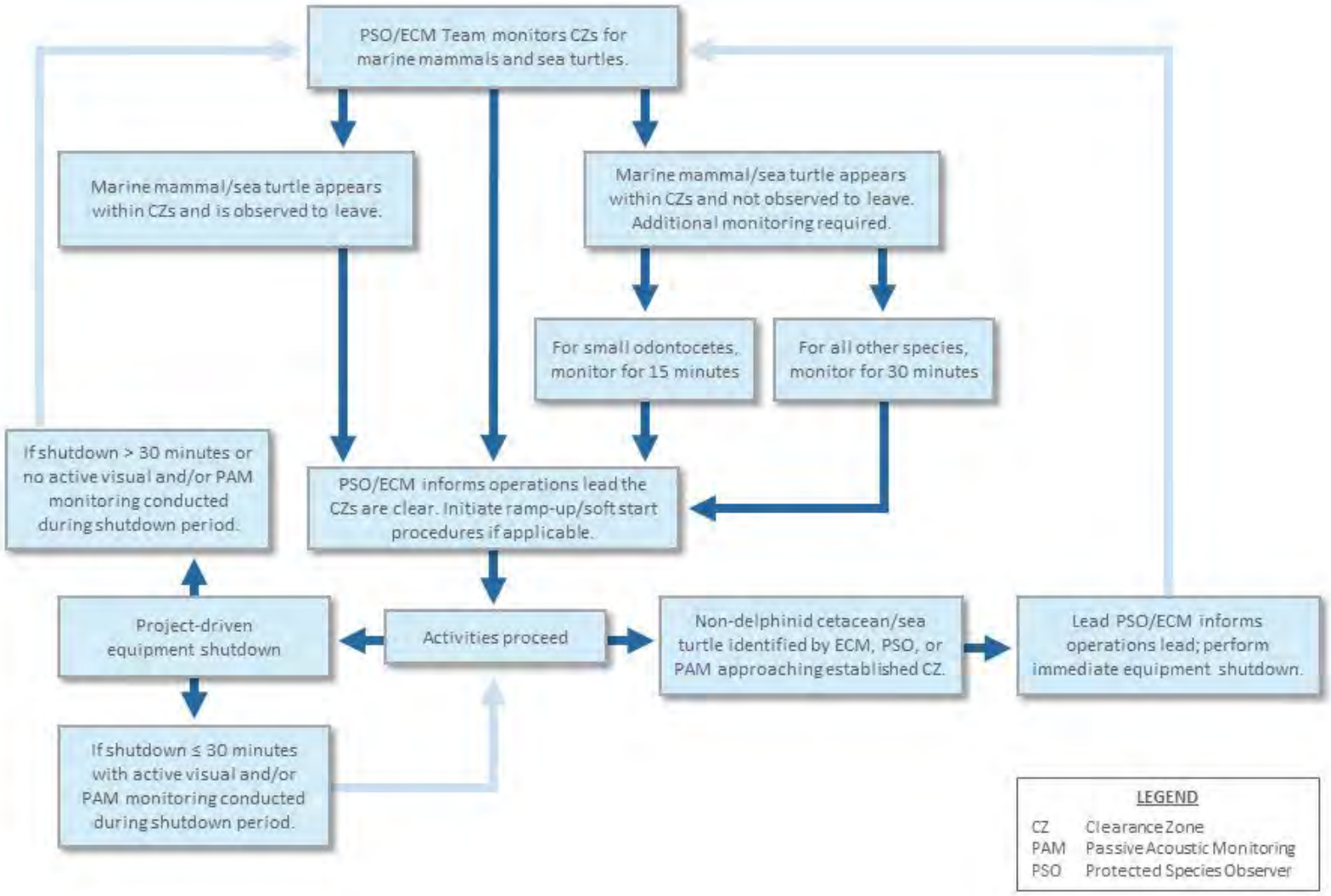
Appendix A

PSO Mitigation and Monitoring Communications Flow Diagram


PSO/ECM Team monitors CZs for marine mammals and sea turtles.
Marine mammal/sea turtle appears within CZs and is observed to leave.
Marine mammal/sea turtle appears within CZs and not observed to leave. Additional monitoring required.
For small odontocetes, monitor for 15 minutes
For all other species, monitor for 30 minutes
If shutdown > 30 minutes or no active visual and/or PAM monitoring conducted during shutdown period.
PSO/ECM informs operations lead the CZs are clear. Initiate ramp-up/soft start procedures if applicable.
Project-driven equipment shutdown
Activities proceed
Non-delphinid cetacean/sea turtle identified by ECM, PSO, or PAM approaching established CZ.
Lead PSO/ECM informs operations lead; perform immediate equipment shutdown.
If shutdown ≤ 30 minutes with active visual and/or PAM monitoring conducted during shutdown period.
LEGEND
CZ Clearance Zone
PAM Passive Acoustic Monitoring
PSO Protected Species Observer