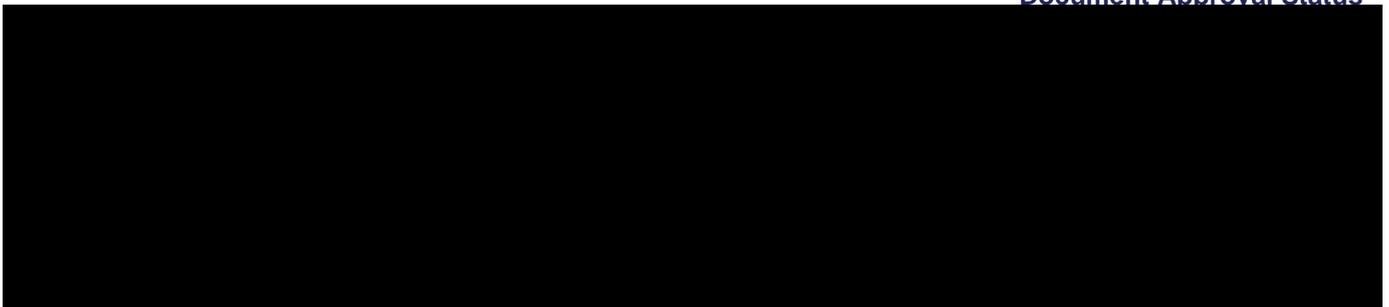# Coastal Virginia Offshore Wind

Balance of Plant

Engineering, Procurement, Transportation and Installation Services

Passive Acoustic Monitoring Plan

| CVOW Document Number	CVOW1-TIP-DMN-PLN-EN-00003
DMN/DOUS Document Number	CVOW1-TIP-DMN-PLN-EN-00003
PRY Document Number	NA

Document Approval Status

Document Revision Status

Rev.	Date	Issue purpose
00	03-Nov-2023	Issued for submission to Regulators
01	29-Feb-2024	Issued for submission to Regulators
02	22-Apr-2024	Issued for submission to Regulators
03	29-Apr-2024	Issued for submission to Regulators
04	03-May-2024	Issued for submission to Regulators

APPENDIX D - PASSIVE ACOUSTIC MONITORING PLAN

PART OF THE CONSTRUCTION MONITORING & MITIGATION PLAN (CMMP)

DEME Coastal Virginia Offshore Wind (CVOW)-Commercial Construction 2024 - 2026

Version 9

rpsgroup.com
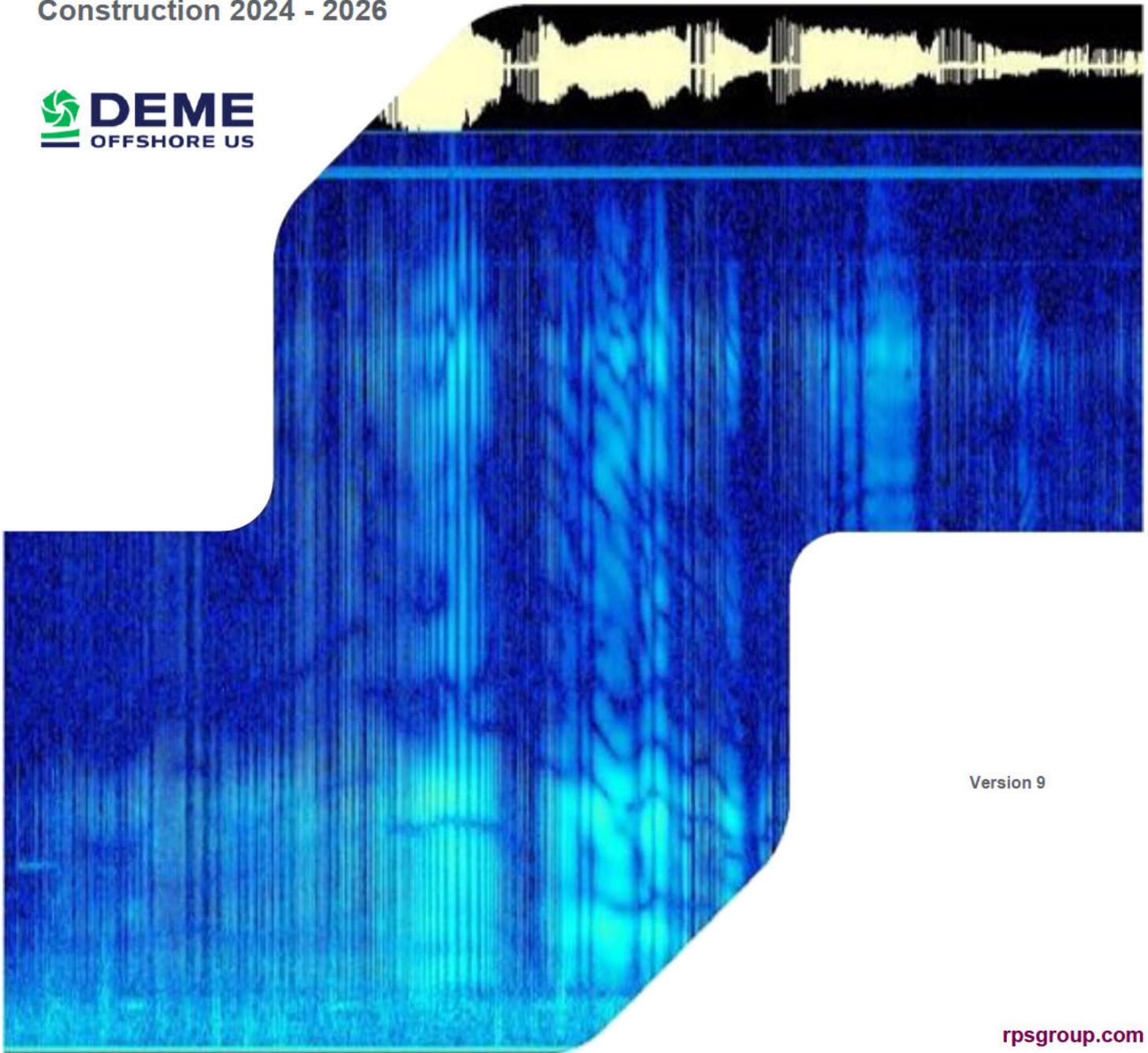
DOMINION CVOW-C BOEM LEASE OCS-A 0483
PAM Plan

With reference to National Marine Fisheries Service (NMFS) Letter of Authorization for wind farm construction operations including pile driving.

Revision		
Date	**Version**	**Revision made**
11 Aug 2023	1	First draft issued to DEME
13 Sep 2023	2	Second draft issued to DEME
20 Sep 2023	3	Third draft update by DEME
12 Oct 2023	4	Fourth draft submitted to DOMINION
30 Oct 2023	5	Fifth draft submitted to DOMINION
16 Feb 2024	6	Sixth draft submitted to DOMINION
22 April 2024	7	Seventh draft issued to DOMINION for Third Regulator submission
29 April 2024	8	Eight draft issued to DOMINION for Fourth Regulator submission
03 May 2024	9	Ninth draft issued to DOMINION for Fifth Regulator submission – Concurred version

Approval for issue

Contents

Tables

Figures

Appendices

1   GLOSSARY OF TERMS

Term	Definition
Adaptive Monitoring & Mitigation Plan	A stepwise approach to additional measures in the event that the initial field measurements of the SFV indicate that the distances to isopleths of concern are larger than those modeled. See PDMP in CMMP – Appendix C.
Alternative Monitoring Plan	A protected species monitoring plan that must be submitted to BOEM, which details monitoring methodology that will be used during nighttime and low-visibility conditions. See PDMP in CMMP – Appendix C.
CHORUS/ BioSound	The cetacean detection algorithms proposed by RPS and RTSYS are developed by initiatives of the CHORUS research institute. The development of algorithms for the detection, classification, and localization of PAM data, in particular using AI, and the assessment of biodiversity based on PAM data are referred to as "BIOSOUND" by CHORUS.
Clearance Zone (CZ)	The area that must be visually or acoustically clear of protected species prior to starting any sound source that could result in Level A or Level B exposures. This applies to construction sources using approved pre-determined distances.
Double Big Bubble Curtain (DBBC)	A pneumatic barrier system that intentionally disturbs the water column to dampen the propagation of sound waves traveling from the sound source equipment by attenuating the noise. See DBBC plan in CMMP – Appendix G.
False detection	A marine mammal detection that has been identified by a detector, either the CHORUS BioSound AI or by another detector (like Pamguard) that is later confirmed not to have been accurate, This could mean that the detection was not marine mammal in nature, or it could mean that it was originally identified as a detection of one species but was later determined to be a different species.
Harassment Zone (HZ)	Area in which it is determined that marine mammals will be impacted by the sound produced by the sources when active. These zones are specific to each species and hearing group of marine mammals. Any marine mammal within the zone, while the source is active, will be considered a Level A or Level B 'take' pending the exposure decibels and distance.
Level A Harassment Zone	The area within which Level A harassment, defined as the potential to injure a marine mammal, may occur. This includes but is not limited to the area personified by a sound source, within which a permanent threshold shift in hearing or other types of non-serious injury can occur.

Term	Definition
Level B Harassment Zone	The area within which Level B harassment, defined as the potential to disturb (but not injure) a marine mammal, may occur. This includes but is not limited to the area, personified by a sound source, within which a behavioral disturbance or temporary threshold shift in hearing can occur.
Monitoring & Coordination Centre	A daily Monitoring & Coordination Center (MCC) briefing will occur with all Project vessel Captains and any other pertinent crew and personnel to discuss the status of any Dynamic Management Area (DMA) and Slow Zones. Project vessels and their crew will be instructed to monitor the NOAA website for updates on DMAs, Slow Zones, and any NARW sightings in the Project area.
Minimum Visibility Zone (MVZ)	In addition to the clearance and shutdown zones that would be monitored both visually and acoustically, NMFS is proposing to establish a minimum visibility zone to ensure both visual and acoustic methods are used in tandem to detect marine mammals resulting in maximum detection capability.
Mitigation Zone	An area within which mitigation measures must be applied if a protected species is detected. Mitigation zones (MZ) include CZs, SZs, and HZs. The size of the MZ varies between species. This term (MZ) has replaced the previously used terminology, Exclusion zone (EZ).
Near Real-Time	In relation to Passive Acoustic Monitoring (PAM) buoy detections, refers to the time delay between detection of an acoustic event and the receipt of the processed data by the PAM Operator. This delay is caused by automatic processing of the electronic communication, but implies that there are no significant delays for mitigation purposes.
Operational PAM System	The operational PAM System is the combination of buoys (primary monitoring buoys and potential secondary monitoring buoys) in which are actively monitored by a PAM Operator per active buoy data stream before, during and after piling, where the combination of buoys selected will create a 10 km PAM monitoring zone around that pile driving location.
PAM Operator	A PAM Operator, who conducts monitoring, requests mitigation, undertakes data collection, meeting the PAM Operator training and experience requirements for this project, as outlined by NMFS.
PAM Clearance Zone	The area that must be cleared by acoustic monitoring for marine mammals prior to starting any sound source that could result in Level A or Level B exposures.
PAM Monitoring Zone	The area around any sound source that could result in Level A or Level B exposures which is acoustically monitored for the presence of marine mammals.

Term	Definition
PAM plan	This document, PAM plan in CMMP – Appendix D. The technical approach to performing near real-time PAM during pile driving activities for the Coastal Virginia Offshore Wind Commercial (CVOW-C) project.
Pile Driving Monitoring, Mitigation and Management Plan (PDMP)	The technical approach to monitor, mitigate and manage potential impacts to marine mammals and protected species during pile driving operations of the construction activities for the CVOW-C project in accordance with applicable regulatory documents and permits. See CMMP – Appendix C.
Pile driving or piling	The continuous sequence inclusive of vibratory and impact piling to install a monopile or OSS pin pile foundation into the seabed as per following steps: 1. Vibratory piling 2. Transition from vibratory hammer to impact hammer 3. Impact piling soft start 4. Impact piling
Pitch track	The reduced size spectrogram of a vocalization that has been detected by one of the AI marine mammal detectors. The spectrogram's size is a function of the pitch track of the vocalization it was created to highlight. As such it is not a true "pitch track" in the sense that it is not extracted vocalizations from the spectrogram.
Potential Secondary Monitoring Buoys (PSMB)	Any buoys in addition to the PMBs that have been identified as within the acoustic range of a pile installation site, where the buoy could potentially be substituted for a PMB in the event that a PMB was not operational. The combination of PMBs and PSMBs for any one pile installation site needs to create a 10 km PAM monitoring zone around that site.
Primary Monitoring Buoys (PMB)	The most optimal buoys that have been identified to be monitored during pile driving for each installation site where the combination of the buoys selected creates a 10 km PAM monitoring radius around the installation site.
Probable Detection Zone	The area in which a PAM Operator may localize a marine mammal to based on the presence or absence of vocalizations detected by each of the PMBs. The assumed range of detection of each buoy is considered, along with each buoy's position relative to the pile site, creating an overlap in the potential detection ranges which the Operator can then use to make assumptions about the probable detection zone of the animal.
Protected Species	May refer to multiple taxa, including ESA-listed marine mammals, marine mammals, sea turtles, and Atlantic sturgeon.

Term	Definition
PSO plan	The technical approach to performing in-situ visual Protected Species Observations (PSO) during pile driving activities for the Coastal Virginia Offshore Wind Commercial (CVOW-C) project. See Appendix F in CMMP
Shutdown Zone (SZ)	The area in which equipment shut down or other active mitigation measures must be applied, once a source is active, if a protected species is sighted inside the corresponding zone.
Works Manager (WM)	The main point of communication for pile driving operations schedule. The Works Manager (WM) will communicate directly with LPSO for planned piling operations, clearance, soft start, shutdown/delays, and post piling. In addition, the WM will assess the stability of a pile in the event that a shutdown is called. In close consultation with the piling vessel Captain, they may determine a shutdown is not feasible because the shutdown combined with impending weather conditions may require the piling vessel to "let go," which poses an imminent risk of injury or loss of life.

2 ACRONYM LIST

Ah	Ampere Hour
AI	Artificial Intelligence
AO	Area of Operations
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
COP	Construction & Operations Plan
CVOW-C	Coastal Virginia Offshore Wind-Commercial
CZ	Clearance Zone
dB	Decibels
DEME	DEME Group
DMA	Dynamic Management Area
DOI	Department of the Interior
ESA	Endangered Species Act
HSE	Health Safety and Environment
HZ	Harassment Zone
Hz	Hertz
JSA	Job Safety Analysis
kHz	Kilohertz
km	Kilometers
LOA	Letter of Authorization
m	Meters
MCC	Monitoring & Coordination Centre
MMPA	Marine Mammal Protection Act
MZ	PAM Monitoring Zone
NARW	North Atlantic right whale
NCEI	National Center for Environmental Information
NMFS GARFO	National Marine Fisheries Service – Greater Atlantic Regional Fisheries Office
NMFS OPR	National Marine Fisheries Service – Office of Protected Resources
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
OSS	Offshore Sub Station
PAM	Passive Acoustic Monitoring
PDMP	Pile Driving Monitoring and Mitigation Plan
PSMB	Potential Secondary Monitoring Buoy
PMB	Primary Monitoring Buoy

PM	Project Manager
PSO	Protected Species Observer
RPS	RPS Group
RTSYS	Provider of PAM acoustic recorders, buoys, and software
████████	████████████████████████████████
SZ	Shutdown Zone
T & C	Terms and Conditions
TBRA	Task Based Risk Assessment
USACE	U.S. Army Corps of Engineers
W	Watts
WDA	Wind Development Area
WM	Works Manager
WTG	Wind Turbine Generator

3   INTRODUCTION

This plan presents the technical approach to performing near real-time Passive Acoustic Monitoring (PAM) during foundation pile driving and associated construction activities for the Coastal Virginia Offshore Wind Commercial (CVOW-C) project in state and federal waters offshore Virginia. This monitoring plan is designed to satisfy the requirements of the MMPA Letter of Authorization (MMPA LOA).

The CVOW-C Project is committed to regulatory compliance and environmental stewardship. The procedures and policies presented in this plan have been developed through an extensive collaborative process with the federal oversight agencies and every effort has been made to integrate the best available science, technology, industry recommendations, and best practices. Construction and Operation Plan (COP) approval terms and conditions have been incorporated in relevant sections of the plan. Every Project-related vessel will have a copy of the COP approval terms and conditions on board as well as compliance and reporting information with easy reference to protocols and contact information. All Project personnel will receive training on compliance protocols and procedures, including the COP approval terms and conditions, prior to commencing work. The CVOW-C Environmental Compliance Coordinators (ECCs) and environmental support staff will conduct thorough review of all data and reports developed during construction activities to ensure Project compliance. The ECC and environmental support staff will also review all situational reporting and ensure that the information is communicated to the oversight agencies as applicable.

3.1   Summary of Technical Approach

RPS proposes to deploy a series of moored buoys ███████████████ AI Acoustic Buoy) throughout the Area of Operation (AO), each configured with a broadband hydrophone. This PAM system employs an AI neural network, ██ with species-specific detectors, and the system alerts remotely located PAM Operators to potential marine mammal vocalizations when encountered. The PAM Operators then analyze the provided pitch tracks, (spectrograms narrowed to a specific suspected vocalization) and the audio file, and the PAM Operator confirms or rejects the detection. By reducing the overall data to be analyzed, relative to a traditional PAM system, the PAM operator can manage and assess data from multiple system without the data becoming unmanageable.

On this project, a configuration of ███████ will be deployed across the section of the lease that best positions the detection radii to cover the 10,000 m mitigation zones of the upcoming piling sites, where buoys will be moved to accommodate best coverage as needed. ██ ██ .

At any time, a combination of █████ buoys will be active, recording continuously and transmitting potential detections to PAM Operators, where the active buoys will have been selected around each active piling site such that the 10,000 meter monitoring zone for North Atlantic right whale (NARWs) is achieved. The █████ primary buoys that have been identified for each monopile site with their GIS locations are shown in Attachment D-5.

The PAM Operators will be actively monitoring only those ████ active buoys that have been identified to create the acoustic monitoring zone around that specific pile site. ███████████████████████████████████████ ██ ██ ██ ███ .

The operational PAM system, as defined in the definitions section, will consist of a combination of buoys (primary monitoring buoys (PMBs) and potential secondary monitoring buoys (PSMBs)) and will be actively monitored by one PAM Operator per active buoy data stream during the 60-minute clearance period, during

pile driving and 30 minutes after pile driving. A minimum of ███████ buoys will the turned on for monitoring during these activities with a corresponding ███████ PAM Operators monitoring simultaneously, one per active buoy. At least ███████ additional PAM Operators will be available to take over monitoring from the first ███████ Operators in the event that the clearance search, piling and post clearance monitoring extend for more than four hours (the maximum allowable watch period), necessitating a monitoring watch handover.

RPS has experience in the US Gulf of Mexico region conducting predominantly remote acoustic monitoring from the shore, wherein trained and experienced remote PAM Operators monitored for protected species and a PAM operator onboard locally monitored and conducted troubleshooting for the PAM systems as needed and oversaw PAM cable deployments and retrievals. The remote PAM Operators and the vessel's monitoring team utilized multiple methods of communication, including Microsoft Teams audio calls, Microsoft Teams chat function, a WhatsApp group that included all vessel observers, RPAM software, and the vessel satellite phone system. RPS also deployed a Starlink system which utilized a satellite constellation in low Earth orbit to deliver broadband internet while offshore and in transit, to redirect data to the land-based PAM Operators. Similarly, RPS did not have any communication failures as part of the remote PAM activities conducted for the Vineyard Wind 1 project. To summarize, RPS intends to utilize the lessons learned from our experience in the US Gulf of Mexico and Atlantic, and extensive remote PAM operations while complying with CVOW Project's regulatory requirements.

3.2 Applicable Regulatory Documents and Permits

The permits applicable to the operations described in this plan and the requirements of those permits are described in the CMMP.

4   ACOUSTIC MONITORING TEAM (PERSONNEL)

4.1   Staffing Plan Overview

The DEME CVOW-C pile driving installation will be supported by a team of RPS Acoustic Technical Experts, Metocean Equipment personnel and a team of PAM Operators. All personnel, including the PAM Operators will primarily support their scope of work from a remote onshore location but where specific duties such as the deployment and maintenance of buoys will be performed offshore. The scope of work and responsibilities of each of the acoustic specialists is outlined below.

4.1.1   Shore-based Project Management Support Team

An RPS shore-based Project Managers (PM) will oversee and support the acoustic monitoring team comprised of the PAM Operators. The PMs will have experience in supporting acoustic monitoring operations and have expertise in offshore wind regulatory compliance, data collection and reporting requirements.

Additionally, a shore-based Data Manager will support the acoustic data collection of the PAM Operators and oversee, in conjunction with the PM, the regulatory reporting of the acoustic team. The Data Manager will also ensure that relevant data fields are standardized across the acoustic and Protected Species Observer (PSO) teams.

4.1.2   Buoy Deployment & Maintenance Team

The RPS Metocean team have designed a robust mooring system for the ▇▇▇▇▇ buoys where the mooring system was designed to provide as quiet of a monitoring environment as possible, maximizing the acoustic range of each hydrophone. The buoys and moorings will be serviced by the team during each eight-month operational period (May through October of each year). The deployment and retrieval of this equipment will be completed to industry standards and all safety precautions will be in place. The vessel will also abide by vessel strike avoidance maneuver requirements as required of all vessels transiting to and from the construction site and supporting all construction or survey operations.

4.1.2.1 Protected Species Risk Reduction Measures

Buoy equipment and deployment activities are designed to adhere to the best management practices recommended by NOAA Fisheries via the Endangered Species Act consultation to minimize any potential risks to protected marine species. All buoys will be properly labeled, including ownership and contact information.

To reduce the risk of entanglement, the best available mooring systems are used, specifically designed for the individual water depth at which each buoy will be deployed and in consideration of the local current and wave conditions. Mooring arrangements will be based on appropriate industry standards and will employ the shortest practicable line length for buoy deployment, thus ensuring that no excess line is present in the water column and further minimizing the risk of entanglement while ensuring the safety and integrity of the structure. Designs include ▇▇

Trained Project personnel or PSOs will maintain a vigilant watch for protected species, covering a 500 m radius zone, during buoy deployment and retrieval operations. In the event that a protected species is sighted within the 500 m zone, activities will stop until the animal has been observed exiting the zone. Buoy deployment will be a controlled process such that equipment is lowered to the seabed using a deck winch and A-frame to further minimize risks to benthic habitats.

In the event that any live or dead marine protected species becomes entangled, Project personnel will immediately report the interaction to the NOAA Fisheries stranding coordinator via the 24-hour Stranding Hotline at (866) 755-6622. Project personnel will assist in data collection and recovery efforts as practicable.

4.1.3   Acoustic Monitoring Team (PAM Operators)

PAM Operators will perform two acoustic monitoring scopes of work associated with pile driving activities.

Per the MMPA LOA, the Project is required to conduct PAM for at least 24 hours immediately prior to pile driving activities, and a PAM Operator is required to review all detections from the previous 24-hour period. Additionally, PAM Operators must monitor for marine mammals 60 minutes prior to, during, and 30 minutes following all pile-driving.

A team of ▮▮ PAM Operators will be perform these two acoustic monitoring work scopes.

Archival Acoustic Data Review:

All detections from the previous 24-hour period will be reviewed by a NMFS-approved PAM Operator prior to the start of piling to inform pre-piling situational awareness. RPS will have a team of ▮▮ PAM Operators available to perform this archival data review because this review will be undertaken by the ▮▮ PAM Operators that will take the second shift of monitoring watches, relieving the team of ▮▮ Operators that are scheduled to start the 60 minute clearance monitoring, in the event that they reach the end of their allowable 4-hour monitoring watch durations.

██

██

████████████████████████████████████

Acoustic Monitoring Prior to , During and After All Piling:

A minimum of one (1) NMFS-approved PAM Operator per active buoy will conduct monitoring during the 60 minutes before piling, during all piling, and 30 minutes after installation activities. The ▮▮ NMFS-approved PAM Operators will be actively on rotation at any one time, rotating the active monitoring periods such that the maximum monitoring watch duration requirements are complied with.

While monitoring, the designated Communications Lead PAM Operator on active duty will be the point of contact within the PAM team for relevant communications between the PSO and PAM team.

4.2   PAM Operator Role and Responsibilities

The roles and responsibilities of PAM Operators are identified below with respect to acoustic monitoring of marine mammal species. These roles require that assigned individuals must have no tasks other than to conduct observational effort, record observational data, and communicate with relevant operations and vessel crew regarding the presence of protected species and mitigation requirements.

The training and experience requirements of this role are outlined in Section 4.3 of this document.

PAM Operator

- Acoustically monitor, detect, and identify marine mammals' vocalizations, classifying to relevant regulatory species groupings where possible
- Determine distance of detected vocalization to operations, as possible, and as needed to support compliance requirements.
- Record and report marine mammal detections, installation activities and environmental conditions according to the reporting requirements outlined in the PAM Plan.

- Assist with PAM team monitoring schedules and ensure compliance with all regulatory monitoring requirements.
- Monitor the operational and functional status of the acoustic buoys, troubleshooting any hardware malfunctions remotely as feasible.
- Notify and implement other troubleshooting and maintenance support as needed to maintain the required monitoring status of the buoy system.
- Configure, maintain, and troubleshoot the acoustic monitoring software as needed.
- Participate in daily meetings when appropriate.

Lead PAM

- There will be a designated Lead PAM, as assigned by RPS only and not a reflection of a approval level from NMFS for the project. This person will be assigned for each monitoring rotation.
- Responsible for all of the outlined duties above of the PAM Operator in addition to
- Act as the Point of Contact for communications between the PAM team and the PSO team for detections and mitigation

4.3   PAM Operator Training Requirements

PAM Operators will have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. A waiver to the educational requirements may be requested for a proposed PAM Operator, if the Operator has acquired the relevant skills through a suitable amount of alternate experience. Requests for such a waiver shall be submitted to NMFS Office of Protected Resources and will include written justification detailing the alternate experience. Alternate experience that may be considered includes, but is not limited to, previous work experience conducting academic, commercial, or government-sponsored marine mammal acoustic surveys; or previous work experience as a PAM Operator; the PAM Operator should demonstrate good standing and consistently satisfactory performance of assigned duties.

NMFS approval of PAM Operators is required prior to the commencement of project activities. Dominion Energy will submit the resumes of the PAM Operators necessary to commence the project, to NMFS Office of Protected Resources (OPR) for approval at least 60 days prior to the first day of in-water construction activities requiring PAM Operators. Prior to the project activities, all RPS PAM Operators will have completed a relevant NMFS and BOEM recognized Passive Acoustic Monitoring training program within the last five years and obtained a certificate of course completion.

In addition to the more general PAM training that a PAM Operator will have completed in order to be approved (and as described above), every PAM Operator conducting acoustic monitoring on CVOW will also complete an RPS CVOW PAM training. RPS' CVOW PAM training will provide an in-depth review of the components that Operators will already have learned in the first training and implemented in the field on subsequent projects but that will be most relevant for the CVOW project. ████████████████████████

██
██
██
██
██
██
██

Additionally, prior to deployment, RPS PAM Operators will undergo a two-day training alongside the PSO team led by the RPS PMs to assimilate them with the full scope of the mitigation measures and operational

processes for the pile driving operations. This training is project specific and incorporates a project overview, health, safety, and environmental (HSE) requirements, environmental procedures review, full scope of day-to-day reporting requirements, equipment orientation, monitoring schedules, data collection and in-situ communications plan.

5   ACOUSTIC MONITORING EQUIPMENT

5.1   Overview

The PAM system consists of a series of ███████████████ AI PAM buoys deployed in a configuration designed to minimize the need to move the buoy location frequently (increasing risk to personnel) while also providing a 10 km PAM zone around each active pile installation site . Each buoy will be configured with a hydrophone deployed to ████████████████. Acquired acoustic data are automatically processed onboard the buoy in real-time by the embedded marine mammal detection classifiers in the AI neural network. Furthermore, active buoys will record all acoustic data continuously which will then be downloaded periodically during maintenance visits.

Potential detection events (marine mammal vocalizations identified by the AI supported detectors) will be transmitted by ███████████ to the on-duty PAM operators for review and validation. Detection events are transmitted in the ███. The PAM Operators on duty will assess the detection data from the detectors and confirm as a detection, possibly a detection, or not a detection, and, where appropriate, request mitigation. Additional information and specifics about the functionality of the system, including localization method, is provided in Section 5.6 below.

5.2   ████████ AI Acoustic Recording Buoy

The ████████ AI buoy design is based on a ███ ███████████████ ██ ████████████████████████████████████ ████████████████████████████ These buoys are some of the largest commercially available for real-time acoustic monitoring applications and were specifically selected due to the higher vessel traffic that is expected CVOW installation area relative to other locations.

The float is a high visibility bright yellow in color, making it easy to distinguish in daylight and it is equipped with lighting for nighttime visibility. The polyethylene used in the manufacture of the buoys benefits from the latest technology to maintain its color throughout the life of the buoy. ████████████████████████████████ ██.

Figure 1: ██████ AI acoustic monitoring and recording buoy

██
██████████████████████████████████████ This allows the buoy to keep its buoyancy and remain in operation, even in case of collision and during elevated sea states. The self-supporting central structure allows the buoy to stand upright, which facilitates handling (transport) and mooring operations.

███. The replacement operation can be carried out directly at sea on the deck of the buoy without having to remove the buoy's mooring system. Minor damage to the float casing can also be easily repaired on site.

██, ██████████ which provides autonomy in energy to support operations but where this is dependent on the environmental conditions and the power requirements of the buoy which vary depending on operational needs. The buoy will report back its energy charge parameters in near real time via the monitoring software which will allow the PAM Operator to adjust settings as needed to decrease energy consumption as necessary.

Each buoy is equipped with ████████████with the specifications outlined in Section 5.3. Each buoy will transmit data as described in Section 5.6 u████████████████████████
████████

Complete mechanical specifications of the ███████ AI buoy are provided in Attachment D-1.

5.3   Hydrophone Specifications

The ██████ AI buoy will be configured with a ██████████████████████████████ ████ to minimize the potential for entanglement. The hydrophone has a wide acquisition frequency band up to 170 kHz, which allows for the detection of low, mid and high frequency vocalizations from marine mammal species known to inhabit the operations area. ████████████████████████████
██████████████████████████████████

The hydrophone is deployed in a plastic housing which is highly resistant to corrosion.

Hydrophone specifications are provided in Attachment D-2.

A frequency response curve for the hydrophone is provided in Attachment D-3.

5.4   Buoy Deployment Locations & Estimated Acoustic Range

████████ AI buoys will be deployed throughout the planned pile driving installation in configurations allowing for sufficient coverage of each monopile's Monitoring Zone (MZ), Clearance Zone (CZ) and Shutdown Zone (SZ). Representative diagrams of the proposed configurations of these buoys are provided in Attachment D-4.

Each monopile location will have ████ primary monitoring buoys (PMB). Additionally, most monopile locations will have ████████ potential secondary monitoring buoys (PSMB). PSMBs will not be actively monitored unless one or more can be substituted for a PMB that cannot be monitored for any reason. The combination of PMBs and PSMBs monitored for a pile site will be capable of monitoring the 10 km PAM MZ around that pile. The list of PMB and PSMB allocations for the first year pile driving activities are provided in Attachment D-5.

The buoy deployment locations for OSS sites and the second year of pile driving activities will be provided as a supplemental attachment at a later date.

Table 1. Buoy deployment locations for first year of pile driving activities (2024)
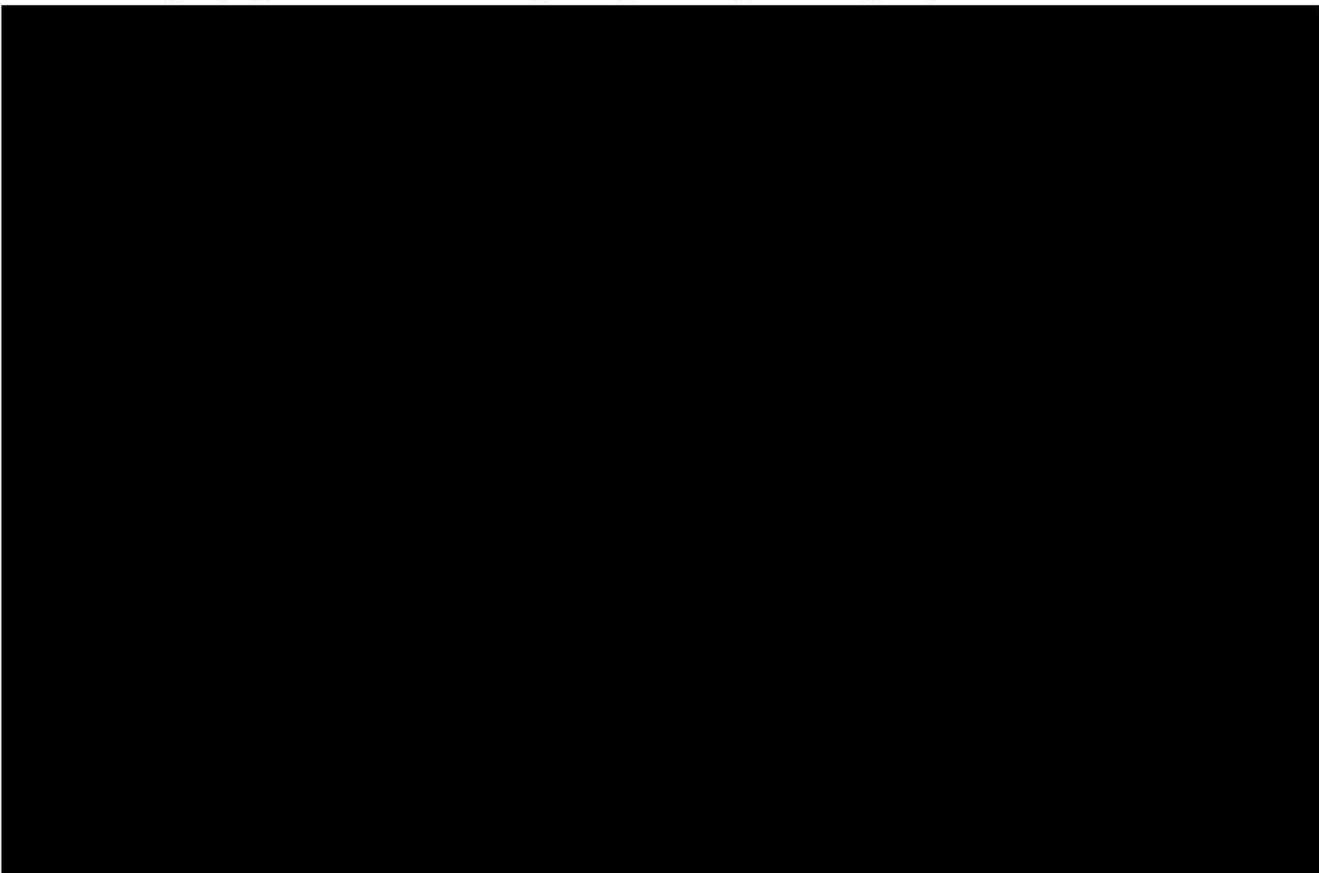
5.5   ████████ AI Operation and Maintenance Procedures

The RPS MetOcean team have extensive experience in developing and operating complex marine instrumentation in shallow and deepwater environments in the United States and internationally and they will be responsible for developing a mooring design for the ████████ AI buoy systems that maximizes the stability of the system and the acoustic range of the hydrophone.

A diagram of the mooring design for the buoy systems is provided in Attachment D-6.

The ████ AI buoys will be deployed and retrieved from a dedicated acoustic support auxiliary vessel that has been selected to meet the requirements of the task and the Health, Safety and Environment (HSE) requirements of the project. Vessel requirements are provided in Attachment D-7.

Deployment and retrieval procedures that incorporate the mooring design, a Job Safety Analysis (JSA) and Task-Based Risk Assessment (TBRA), once finalized, will be developed by the RPS Metocean team and the vessel operator and included in Attachment D-8.

Maintenance and servicing visits will be conducted as needed, and will be planned to coincide with operational downtime where acoustic monitoring will not be required to support the Project.

Buoy maintenance will include:

- Inspection of the buoy and hydrophone for integrity (no damages visible)
- Inspection of the hydrophone structure for fouling
- Replacement of batteries, as needed
- Removal of archived data and review of archived data to make sure the device has recorded continuously and as expected
- Replacement of data storage drives

The maintenance and servicing procedures of the buoys are provided in Attachment D-9.

5.6 Marine Mammal Detection Artificial Intelligence

The PAM system employed on the CVOW project consists of ████████████ AI PAM buoys with embedded classifier algorithms running through ████████████ AI neural network, also referred to as ████████ Acquired acoustic data is automatically processed onboard the buoy in real-time by the embedded version of the neural network.

The ████ PAM buoys each have a ████████████████████ hydrophone for marine mammal detection, with a working frequency band from 5 to 170,000 Hz. Applying ████ AI supported marine mammal detectors to detect narrowband and broadband vocalizations from different marine mammal species, each with their own distinct vocalization behavior and characteristics, the network will detect the presence of cetacean sounds produced within the hydrophone capture radius (expected acoustic detection ranges are provided below in Section 5.6.3). No additional filters are applied to the audio data during processing by the AI detectors.

Table 2 provides a list of the species and call types that are detected by the ████ AI detectors along with the parameters of the ████████████████ that is provided to the Operator for assessment. These parameters have been configured for the initial deployment based on the characteristics and patterns of the vocalizations where ████████████████████ is provided to ensure that the Operator can identify the species and/or call type but where the file size is restricted to a size that is manageable for transmission without depleting the system's power to a degree that could jeopardize its ability to continuously operate.

██ to ensure that Operators are provided with sufficient data to accurately identify each species vocalizations.

██
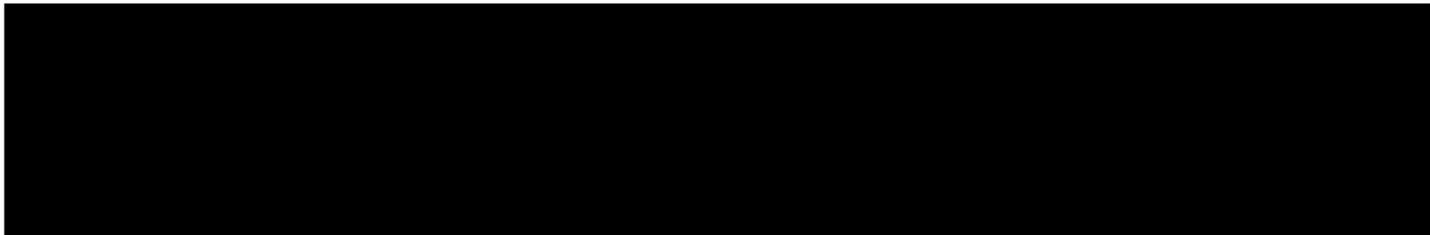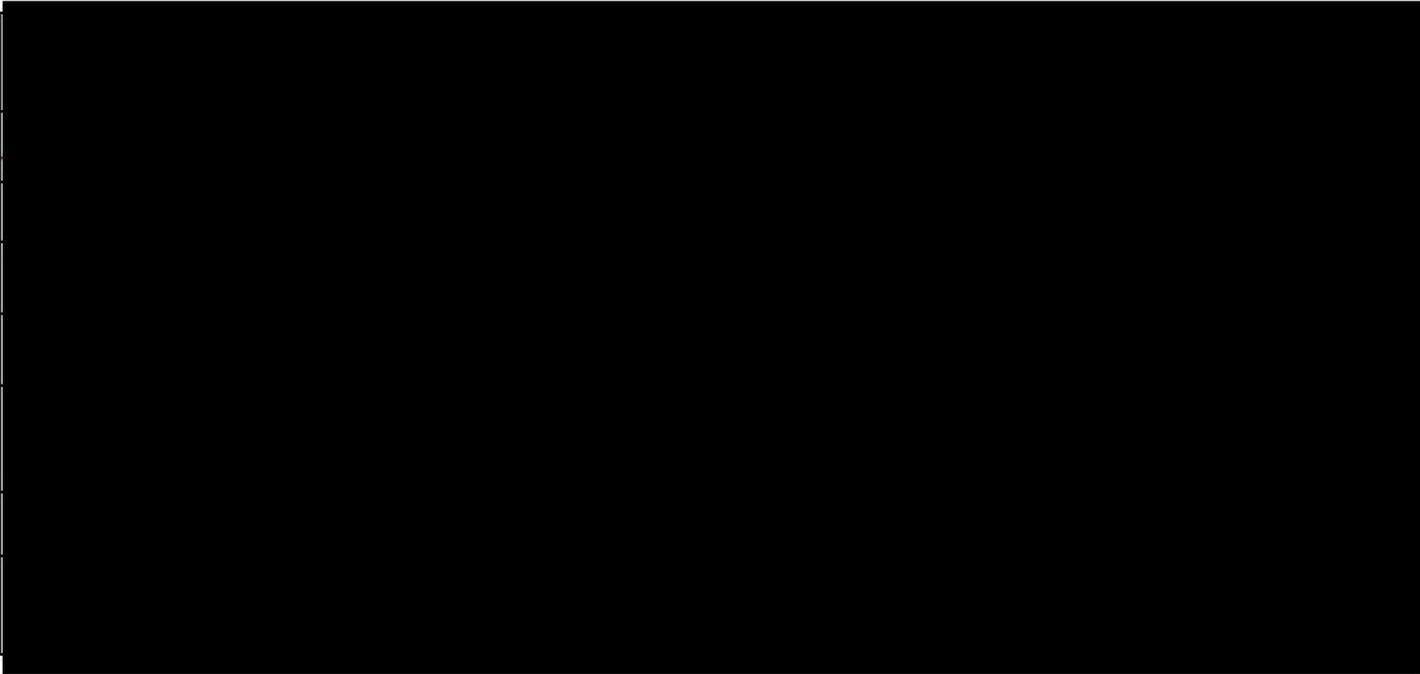
Table 3: Marine mammal species occurring in the project area with and without detectors

When the neural network identifies potential marine mammal vocalizations, it transmits ██████████ ██ When no potential marine mammal vocalizations are identified by the network, the transmissions are reduced to data updates demonstrating "system health" (█████████████████████████████████ ███████████

Onboard recorders will also be operating continuously, recording data up to the full hydrophone frequency range of 170 kHz and will record raw acoustic data for post processing analysis.

█████████ can effectively acoustically ██. The detection index threshold utilized varies between ████████ A low detection threshold leads to a high probability of detection (and a high probability of false alarm). A high detection threshold leads to a low probability of false alarm (and a low probability of detection). The performance of the NARW detector ████████████████████ probability of false alarm for NARW contact call (upcall) vocalizations at a threshold of ███ ████████████████████████████. A summary of academic research on training, validation and performance of the algorithm are also provided as citations and references in Attachment D-10.

███
████

5.6.1 Buoy Deployment

The buoys will be deployed and recovered with the two vessels used for PSO support vessels for pile driving. The vessels are expected to be mid-sized offshore support vessels with an ████████████████████rations. The buoys, as well as the █████████. buoy moorings, will be provided, deployed, and retrieved by the RPS Metocean team. ██. Deployment and recovery procedures will follow best management practices and are summarized in Attachment D-8. No gear or equipment is left behind when the buoys and associated moorings are recovered.

5.6.2 ████████ AI PAM Buoy Localization Method

Given the challenges of localization with a multi-hydrophone system on a non-moving platform, where bearings might be produced, but position can't be determined because bearing lines from a stationary platform will never intersect, ████████████████████████████████
██
███
██
██

5.6.3 Expected Range of Detection of Marine Mammal Functional Mitigation Groups

Acoustic detection ranges of the proposed hydrophones on the ▮▮▮▮▮▮▮ AI buoy system can extend out to tens of kilometers but these ranges are highly variable and dependent on environmental factors as well as the characteristics of the vocalizations themselves. Environmental factors that influence detection ranges include water depth, ocean noise (ambient and other biological), temperature and anthropogenic sounds that may be present. Key characteristics of the marine mammal vocalizations themselves that will impact the range at which they will be detected include the frequency range, decibel level and directionality.

Expected detection ranges for marine mammal species or species groups have been provided in Table 4 below, where the ranges are based on data collected during primary research, and comparable on buoy PAM systems equipped with hydrophones of comparable specifications. The geographic location of the data collected is also provided as reference. Even in waters as shallow as 20 meters, detections ranges remain on average 13 km ([Gervaise, C., Simard, Y., Aulanier, F., & Roy, N. (2021). Optimizing passive acoustic systems for marine mammal detection and localization: Application to real-time monitoring north Atlantic right whales in Gulf of St. Lawrence. Applied Acoustics, 178, 107949]).
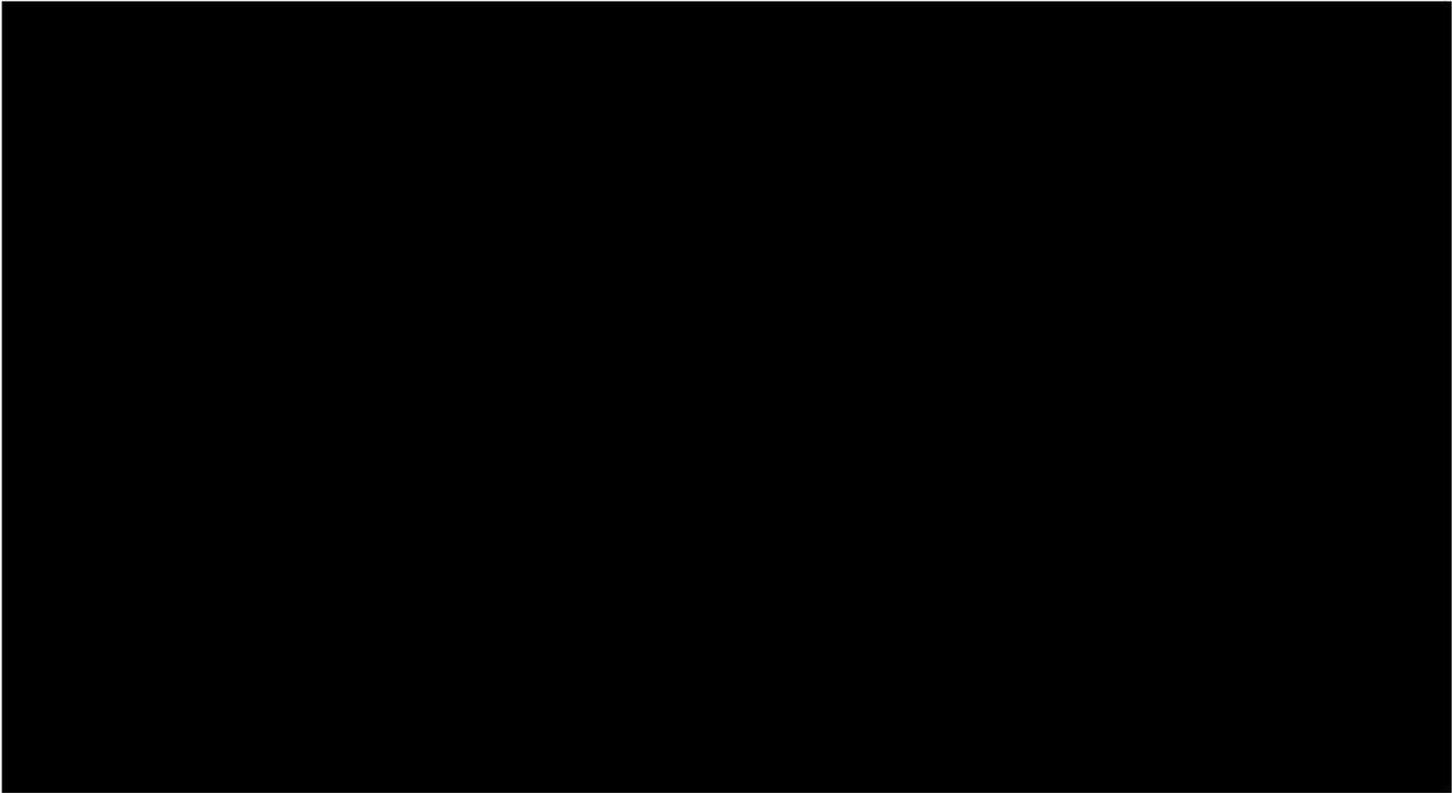
5.6.4 AI Relearning and Assessment
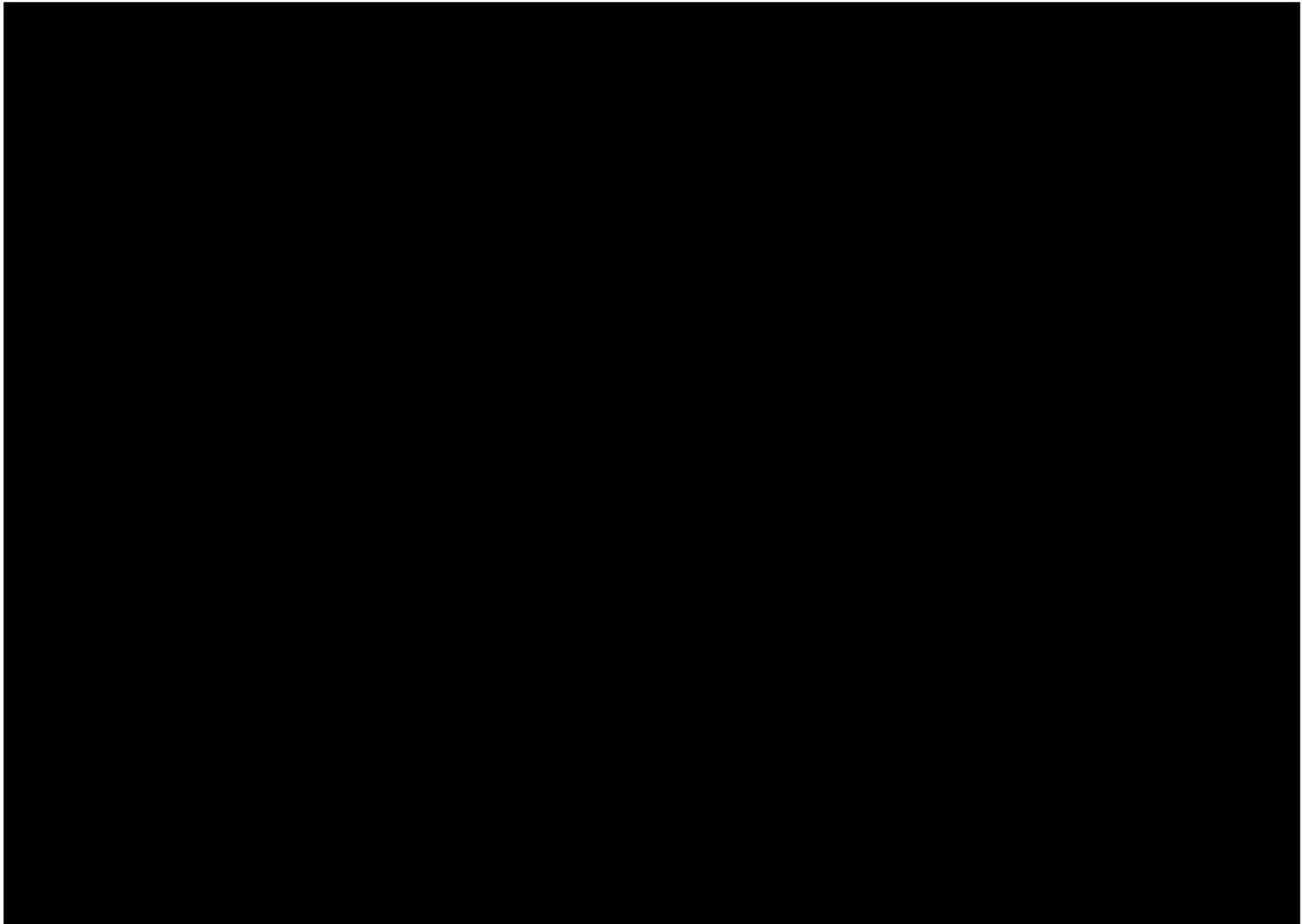
5.7   Acoustic Data Pathway

The pathway of acoustic data flow along with applicable processing that will occur at each location is summarized in Figure 4.
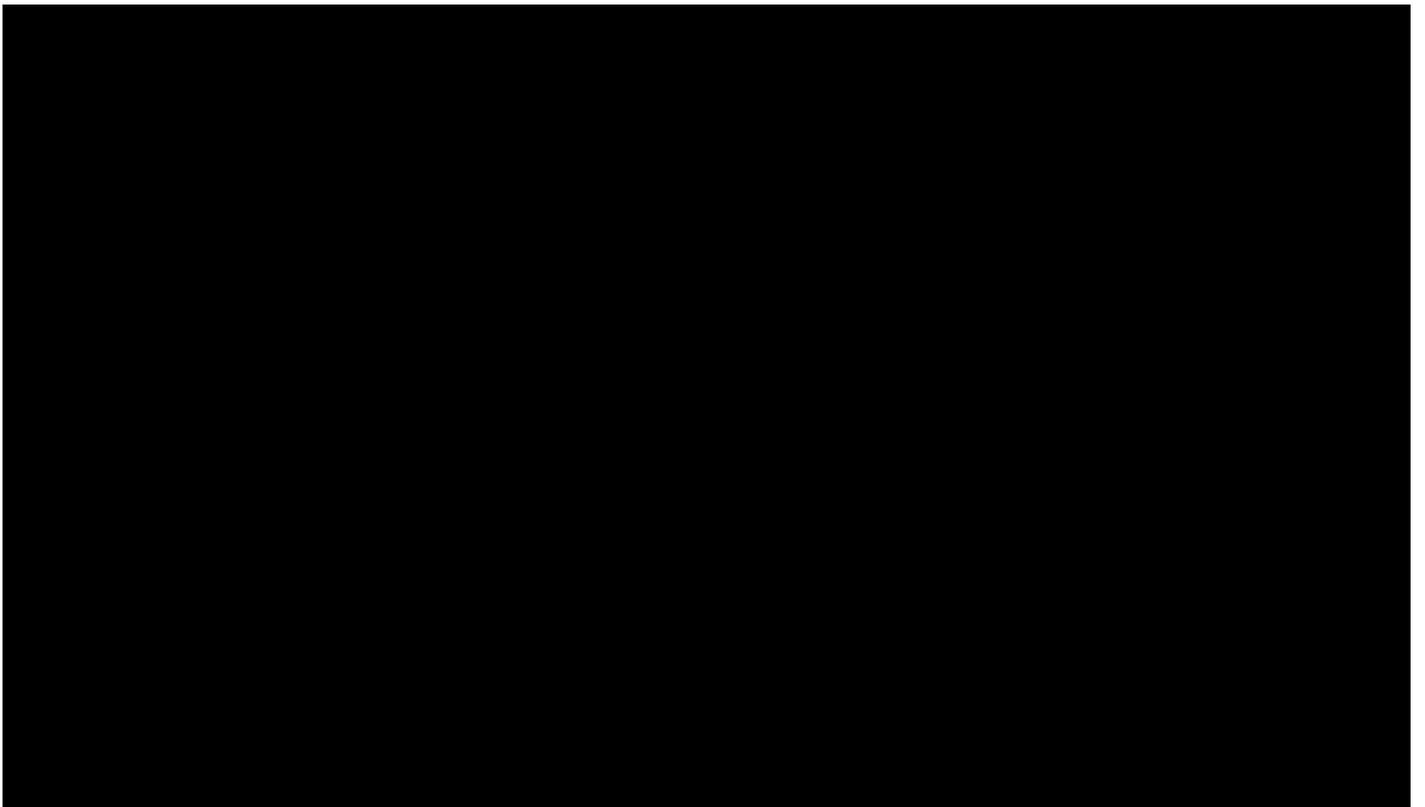
The AI on the buoys will process audio data real-time and ████████████████████████████
████ to PAM Operators when the AI supported detectors determine that a potential acoustic detection has occurred. At this point, as is typical with human PAM analysis, confirmation of a biological source and species determination can occur within a range of time from 1 to 2 seconds to several minutes, depending on the complexity of the data they have received. If a marine mammal species detection is confirmed by the PAM Operator, the detection and appropriate mitigation will be communicated to the PSO point of contact on the pile driving vessel immediately, where the PSO will communicate the mitigation request to the Works

Manager immediately. Extended communications regarding the detection, above what is required for mitigation, will be conducted based on the flow chart below.

6 ACOUSTIC MONITORING METHODOLOGY

6.1 Configuration of Monitoring Watches

A team of at least ▮ PAM Operators will be available to conduct monitoring to support the acoustic monitoring scopes of work: archival acoustic data review of 24 hour period preceding piling and monitoring of active piling, which includes the 60 minute clearance search, monitoring of all active piling and monitoring of 30 minute post piling period.

A representative monitoring watch is provided below to demonstrate how these two scopes of work will be covered by the PAM Operator team but where the watches may be adjusted by the team provided that they remain compliant with the following requirements:

- No watch period will exceed 4 hours in duration.
- Each four hour watch period will be followed by a minimum of a two hour break
- No Operator will monitor for more than 12 hours in a 24 hour period
- Each active buoy (data stream) will be monitored by one Operator and no Operator will monitor more than one buoy data stream at a time
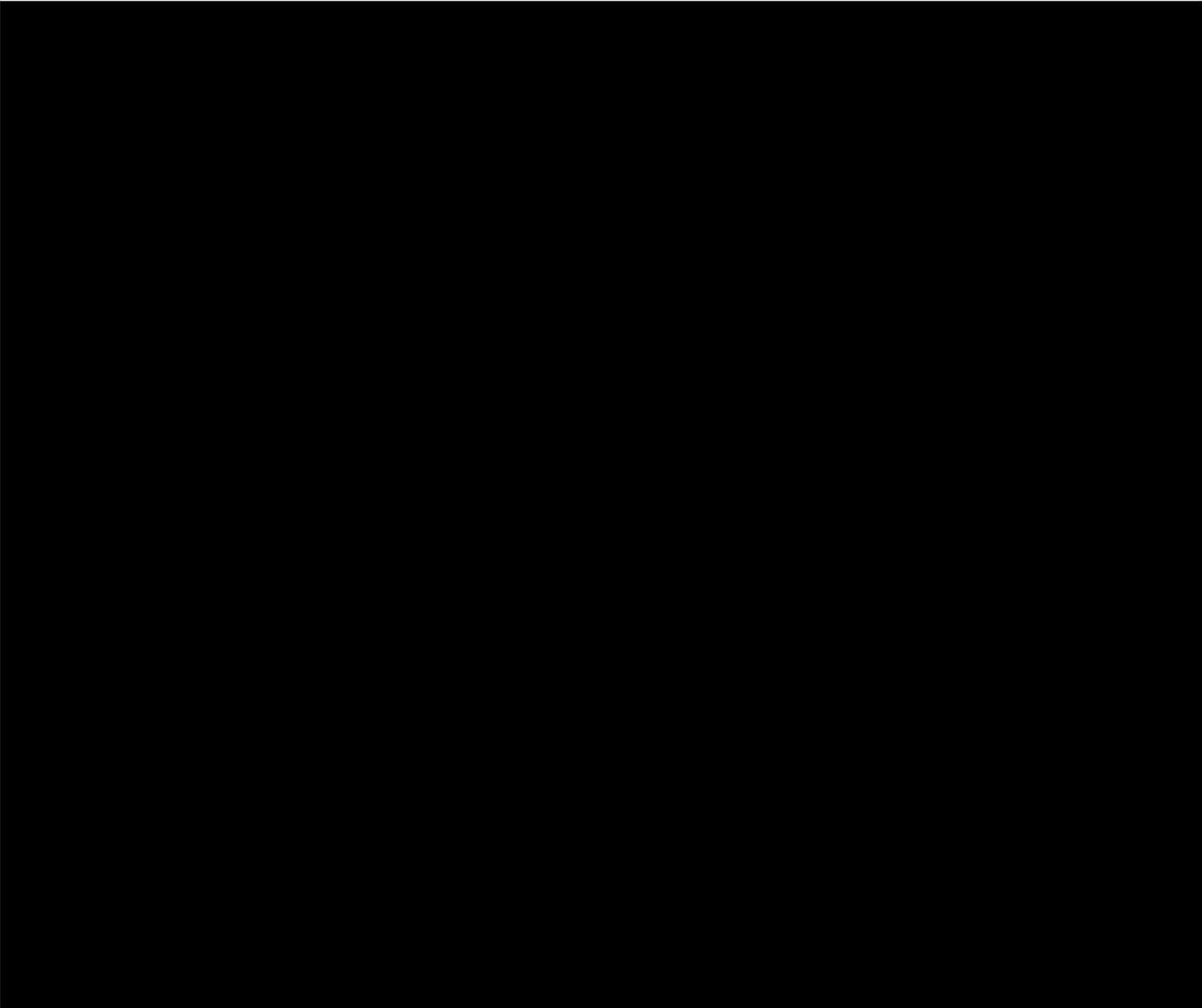
6.2 Acoustic Monitoring Procedures

Acoustic monitoring must be consistent, diligent, and free of distractions for the duration of the watch. The PAM Operators will monitor from a suitable location that provides a comfortable, ergonomic position that is sufficiently quiet to monitor the PAM system. The Operator will have consistent internet with sufficient bandwidth to log on to the Resonance application. Internet speed tests will be conducted prior to the start of each monitoring shift by each PAM Operator.

Prior to and when conducting any in-water construction activities and vessel operations, Dominion Energy personnel (e.g., vessel operators, PSOs, PAM Operators) are required to use available sources of information on North Atlantic right whale presence in or near the project area including daily monitoring of the Right Whale Sightings Advisory System. Additionally, the operational PAM system, as defined in the definitions of this plan, will be recording data for at least 24 hours immediately prior to pile driving activities and the PAM Operator will review all detections from the previous 24 hours period immediately prior to pile driving. Detections from the previous 24 hours period from the PAM buoys, including any suspected

detection made overnight with no PAM operator actively monitoring, will be communicated to the PSOs, Dominion Energy and the Vessel Operator as detailed in Figure 4 and Figure 5, and through this communication flow reported to NMFS within 24 hours of detection via North Atlantic right whale Detection Template (*https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*).

The PAM Operator will monitor the alerts from the AI running the marine mammal detection classifiers, where such alerts will be transmitted to the PAM Operator ████████████ during potential marine mammal activity and ████████████ (to confirm functionality) when there is no potential activity being identified by the AI. While the AI identifies possible biological activity and assesses species identification with a level of certainty, the PAM Operator will review the data and validate the detection. When such alerts of potential detections are transmitted to the PAM Operator, the PAM Operator will analyze the associated ██, to confirm or deny biological activity, determine species, and determine the required mitigation. PAM Operators will review all potential marine mammal detection data for the presence of potential NARW calls, as it is recognized that the humpback detector could misclassify NARW upcalls as humpback whale calls.

In the event that the PAM Operator does not conclude the potential cetacean vocalization in the transmitted ██████████████████████ is of biological origin, then a false positive will be recorded, and no mitigation action will be taken. If the PAM Operator confirms biological origin and is able to confirm that the vocalization is from a mysticete, but is unable to confirm whale species, the whale will be treated as a NARW until confirmation of another species is made, or the detection ends, and with appropriate species-specific mitigation protocols implemented throughout the detection. Such mitigation requests will be made to the LPSO real-time by a cellphone-based Voice over Internet Protocol (VoIP) application as first option. The Orion is equipped with a Starlink satellite system with latencies well under one second, which is better suited to voice communications than legacy very small aperture terminal (VSAT) systems, with negligible differences in communication speeds, when compared to cell phones on land-based cellular networks.

Because of the potential for communications failure at the level of hardware/software, there is a hierarchy of communication options, prioritized largely by speed of contact. The order of priority for operational communications around protected species mitigation is:

1st Mobile App Voice communication such as WhatsApp voice call
2nd WhatsApp text message
3rd Satellite Phone

If a marine mammal is detected, and mitigation is required, the first priority of the PAM Operator will be to request the necessary mitigation, following the procedures outlined in the communication flow charts for shutdowns and delays to initiation of pile driving. Note that the PAM Operator has the authority to request the mitigation actions as outlined in this document; however, the Works Manager retain the authority to determine whether the action can be implemented without risk to the safety or the vessel or crew.

The Works Manager must confirm that the requested action has been completed or indicate that the requested action (including reduced hammer power) cannot be undertaken without a risk to human health, safety, and/or pile stability. The pile driving shut down mitigation decision tree is depicted in Figure 5.

A minimum of single upcall detected on a single buoy will trigger a delay or shutdown. If pile driving has been shut down as a result of mitigation, due to the presence of a NARW, regardless of the acoustic or visual detection, pile driving may not restart until the NARW has neither been acoustically nor visually detected for 30 minutes. For pile driving shut down due to the presence of a marine mammal other than a NARW, pile driving must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and has been acoustically or visually confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or where no acoustic detections have occurred. The specific time

periods are 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other marine mammal species as per the final MMPA LOA.

.
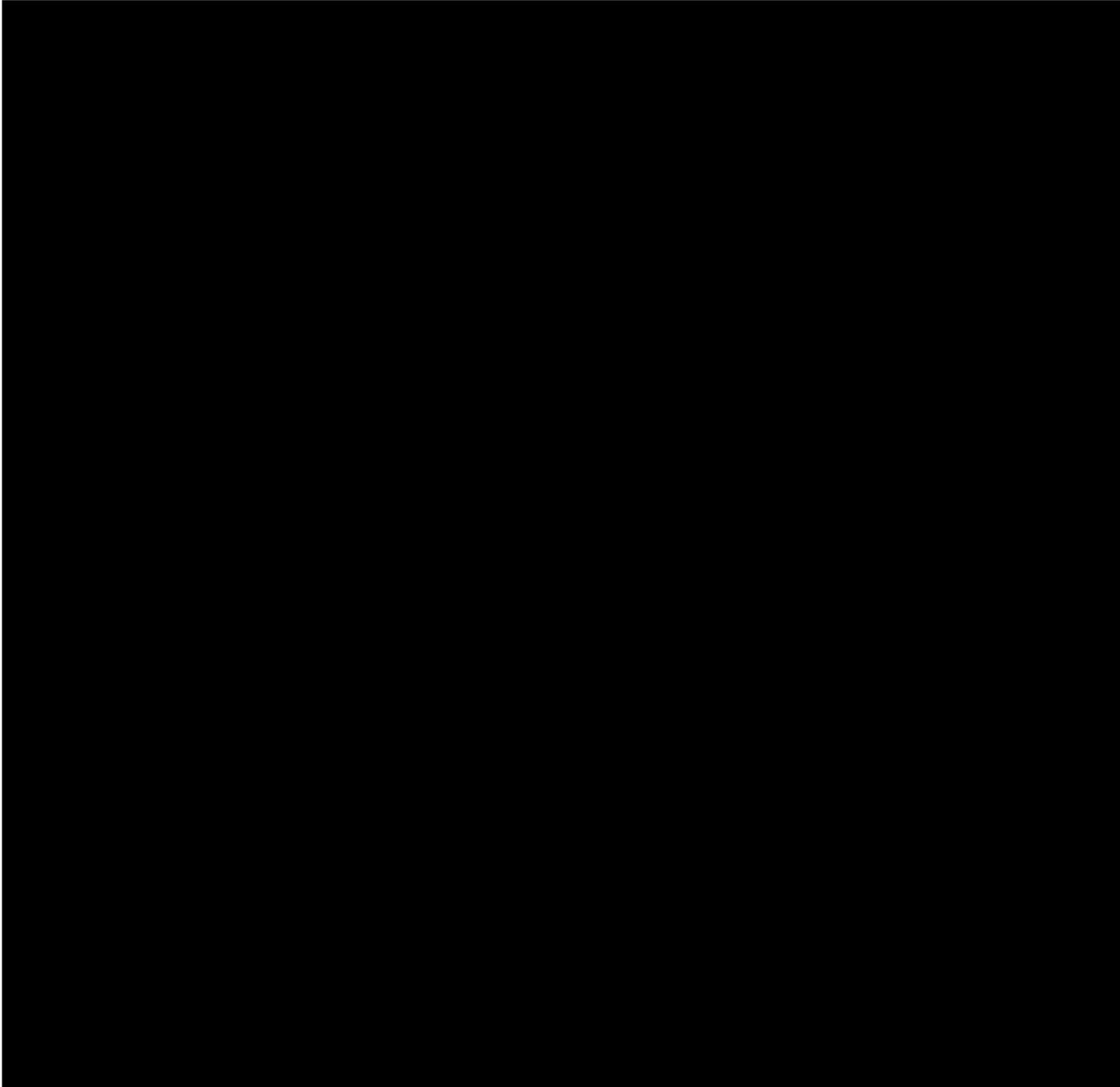
6.3   Monitoring Functionality Assurance

In near real-time, PAM Operators will be able to monitor the hydrophone and recorder system functionality by reviewing inside the monitoring portal. The buoys are recording and analyzing acoustic data with species-specific classifiers continuously. During periods absent of marine mammal vocalizations, the buoys will send data that confirms system function every ▮▮▮▮▮▮▮, including ▮▮ to the PAM Operator. During periods of possible acoustic detections, the system will send all previously mentioned data plus detection data and pitch tracks to the remote PAM operator every ▮▮▮▮▮▮▮.

Also, the acoustic descriptor can be used as Quality Control data to check if acoustic function is working as expected. For example, hydrophone damages can be monitored with these parameters.

███
█████ .

If a system failure is observed on one of the buoys, the team will first conduct remote troubleshooting, which is often successful in resolving most issues. T██
██████████████████████

Prior to commencement of mitigation monitoring, and at minimum two hours before the start of planned impact hammer activity, the PAM Operators will assess the previous day's detection from the project PAM system, as well as detection networks, for the purpose of preparedness and situational awareness. The nature of the previous day's detection data will be communicated to the LPSO on the Orion. The time needed to review the previous day's detections will be adjusted once it is determined the volume of expected transmissions at any given time of the year.

6.4   Communication Between PAM Operators

PAM Operators will each be conducting monitoring from their shore-based home offices where it is expected that communications among the team will easily achieved through a Teams communication group that has been established and will be monitored by the RPS PAM Project Management team, but where there are also WhatsApp groups and direct phone contact available to facilitate communications.

RPS will designate a Lead PAM to oversee the communications across the Operators on each monitoring shift, active or archival review. The designated Lead PAMO will also be responsible for overseeing the communications between the PAM team and the PSO teams, following the procedures outlined in the Communication section of the PAM and PSO Plans.

6.5   Classification of Detections by Operators

Each PAM Operator will assess the data received from the AI-supported detectors and determine whether there is a marine mammal detection, a possible detection or whether they are rejecting the identification of the sound as a marine mammal and calling the sound a false detection and confirming that it is not a detection. Operators will consider both the spectrogram data with the associated vocalization pitch track inside it evaluating the important characteristics such as frequency and shape'

Minimum recommendations from NOAA and BOEM (Van Parijs et al. 2021) for use of passive acoustic listening systems in offshore wind energy development requires visual review of data alongside acoustic detections of species such as North Atlantic right whales to ensure accuracy of detections. The recommendations document notes that in both PAM archival and real time data analysis, in addition to any software detector(s) used, a level of visual confirmation by an acoustic expert remains essential to improving accuracy and minimizing error in call type reporting. For this project, passive acoustic monitoring data analyses for species presence will occur through a) analysis of the audio transmitted by the PAM software detector(s) and b) visual and acoustic assessment of audio data by the PAM Operators who are trained and experienced in recognizing the vocalizations of the species of interest.

A reference set comprising of detailed information on vocalization characteristics (such as duration, frequency/ repetition, frequency range, example pitch tracks, shape etc.) and spectrograms of NARWs, blue whales, fin whales, sei whales, humpback whales and delphinids is available a resource and is incorporated into the PAM training.

CVOW NMFS approved PAM Operators will review and analyze the spectrograms with pitch tracks and the audio clips of all AI-detector identified detections, assessing how the confidence level that should be applied

to whether a real detection has been made of that marine mammal species or any marine mammal species vocalization at all. The PAM Operator assess the spectrogram visually, looking at the pitch track and listens to and processes the audio clip through any additional processing software that they deem, through their experience and professional judgement, will be useful (Raven, Pamguard etc.). They categorize each of the visual and aural review through the below process to categorize the detection as ████████████████████, ██████████████.

They will also consider other data sources, as appropriate, such as a) marine mammal detection events reported in the area through detection networks for situational awareness, b) their awareness of the reported detection from the area from the archival review of 24-hours of PAM data prior to pile driving activities, and c) regular communication with the PSOs regarding the visual detections that have been made in the area.

██
        ████████████████████████

	████████████			
	████	████	████	████
████████████	████	████	████	██████
████████	████████	████	██████████████████	██████
	████	██████████████████		████

7 PAM MITIGATION MONITORING PLAN

7.1 Zone definitions

Reference is made to the section 6.1 of the PDMP.

7.2 Acoustic Search Periods

Pile driving must only commence when all CZs can be monitored acoustically (i.e., sufficient buoys with hydrophones and recorders are confirmed to be functional) for at least 60 minutes prior to civil sunrise and no more than 1.5 hours before civil sunset.

Pile driving activities will not be initiated until the full extent of all CZs are acoustically monitorable.

At least one PAM Operator will be monitoring actively either aboard the pile driving vessel or from a remote location:

- Review previous 24 hours of detections from both project and detection/sighting networks immediately prior to pile driving activities.
- 60 minutes prior to pile driving activities,
- During pile driving activities and
- 30 minutes after pile driving activities.

A delay to or shutdown of pile driving as appropriate will be requested by the PAM Operator if a marine mammal is acoustically detected on any one of the PAM buoys, depending on the marine mammal species

type and appropriate CZ and SZ (e.g., immediate shutdown for any NARW/unidentified large whale detection, or non-NARW species potentially within the respective CZs and SZs depending on which type of piling is occurring).

Specifically, if a detection is made only on one buoy, PAM Operators will evaluate ██████████████

██
██
██
██
███
██
██
███
██
██████████████████████████████████████

██
██
██
██
██
██
██
██
██
██
██
██
██
██
██
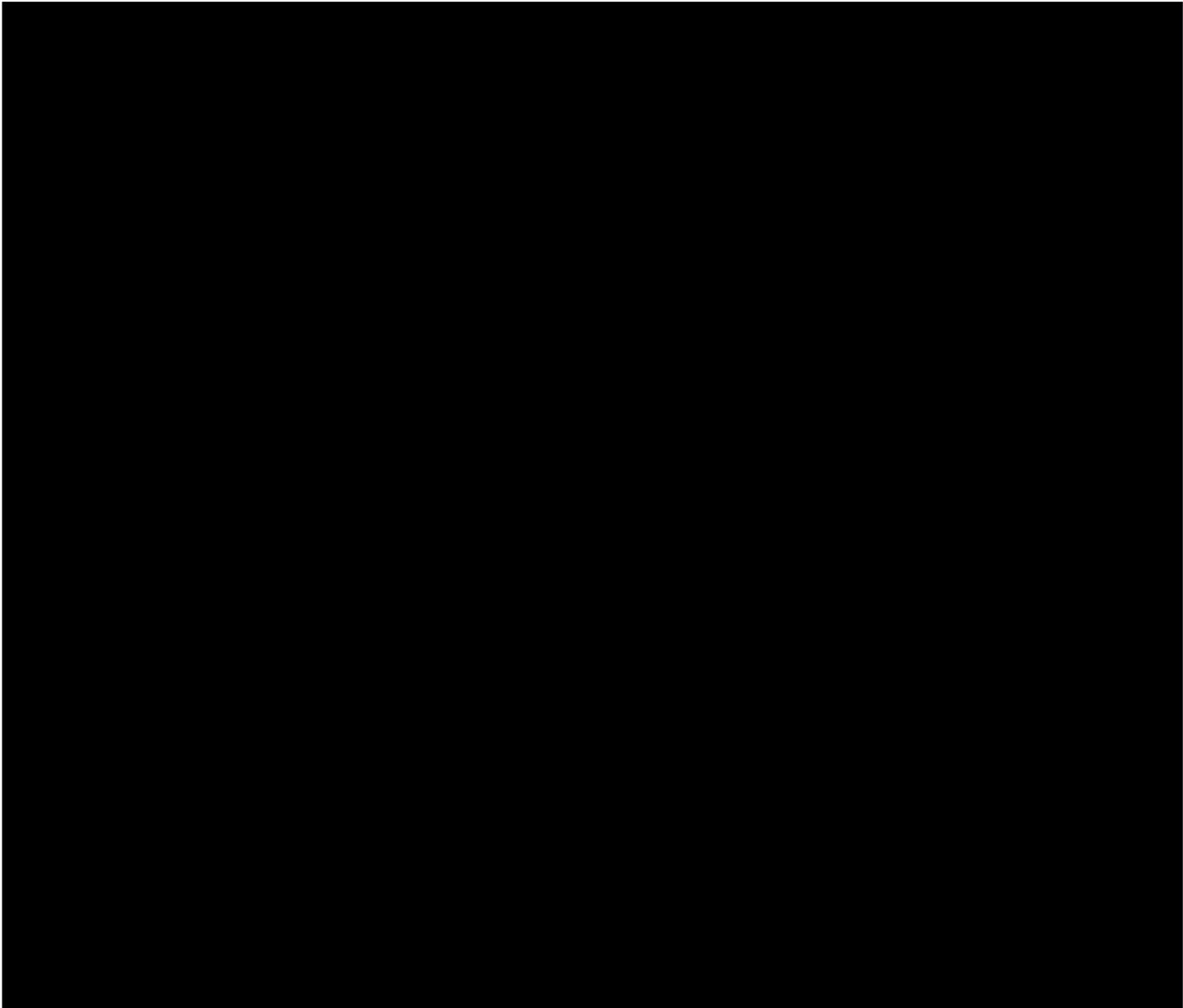
8   COMMUNICATIONS

A detailed Pile Driving operations Communication plan can be found in section 9 of the PDMP and includes;

- Communication methods (primary, and multiple back-ups)

- Communication procedures identifying the order in which communications should occur between different parties (PSOs, PAMs, DEME, Dominion; onshore and offshore reps) in various scenarios.

- Responsible parties for initiating each type of communication.

9   DATA COLLECTION & REPORTING

9.1   Data Collection

PAM Operators will utilize standardized data forms that have been provided to, and approved by, BOEM, BSEE and NMFS. These forms will contain, at minimum, all of the data elements listed below, and data will

be recorded in the field daily. An example of an approved PAM data collection template for pile driving activities is provided in Attachment D-12.

For all PAM buoys deployed, the following information must be recorded:

Monitoring Equipment Information

- Date (YYYY-MM-DD)
- Location of hydrophone buoy (latitude & longitude; in Decimal Degrees)
- Buoy location site name/identification number
- Bottom depth and depth of recording unit (in meters)
- Recorder unit model & manufacturer
- Hydrophone platform type (i.e., bottom-mounted, electric glider, etc.)
- Time zone for sound files and recorded date/times in data and metadata (in relation to UTC).
- Duration of recordings (start/end dates and times)
- Deployment/retrieval dates and times
- Continuous recording cycle
- Hydrophone and recorder sensitivity (in dB re. 1 µPa);
- Calibration curves of hydrophones and recorders
- Bandwidth/sampling rate (in Hz);
- Sample bit-rate of recordings; and
- Detection range of equipment for relevant frequency bands (in meters).

Monitoring Effort Information

- Date (YYYY-MM-DD)
- Location of hydrophone buoy (latitude & longitude; in Decimal Degrees)
- Buoy location site name/identification number

Marine Mammal Detection Information

- Species identification (if possible)
- Call type
- Number of calls
- Temporal aspects of vocalization (date, time, duration, etc., date times)
- Confidence of detection (detected, or possibly detected)
- Indicate if concurrent to a visual sighting.
- The detection zone of vocalization (if determined) relative to acoustic recorders and/or construction activity.
- Buoy IDs for the relevant buoys and construction activities at time of call
- Name and version of detection or sound analysis software used, with protocol reference.
- Minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and
- Name of PAM Operator(s) on duty.

9.2   Reporting NARW Detections

The report must include the project name, date (MM-DD-YYYY), unique identifier, and detection time (HH:MM), location, and number of animals.

It will be the responsibility of the PAM Operator to report any acoustic detections of NARW using the designated form. The report will immediately be sent to the RPS PM, and DEME Project Manager who will report to the

Dominion Energy Compliance Manager. The PAM Operator will make every effort to capture screenshots and document all relevant information associated with the detection.

If a NARW is detected, data will be submitted using the most up to date NMFS Passive Acoustic Reporting System Metadata and Detection Data reporting template available at [Template Datasheet For Real-Time North Atlantic Right Whale Acoustic and Visual Observation Data | NOAA Fisheries](#) as soon as feasible and no longer than 24 hours after the detection.

9.3   Weekly Report

Weekly PAM monitoring reports will be submitted to NMFS OPR, NMFS GARFO, BOEM, BSEE, DOI and USACE during the pile driving and construction period of the Project. They will be submitted on Wednesday for previous week (Sunday – Saturday). Weekly reports will document the daily start and stop times of all pile driving activities, the daily start and stop times of associated observation periods by the PAM Operators, and a record of all detections of marine mammals.

RPS will incorporate the weekly PAM reports into the overall protected species weekly reports.

The acoustic data to be included in the weekly reports is outlined below:

- Date (YYYY-MM-DD)
- PAM Team name(s) (Last, First)
- Time clearance PAM monitoring began in UTC (HH:MM)
- Time PAM monitoring ended in UTC (HH:MM)
- Duration of clearance PAM
- PAM Detections - For all marine mammal acoustic detections, the following information must be recorded:
    - Identification, location and depth of recording unit
    - Time zone for sound files and recorded date/times in data and metadata
    - Duration of recording (start/end dates and times)
    - Continuous recording
    - Species identification (if possible)
    - Call type (if known)
    - Temporal aspects of vocalization (date, time, duration, etc.)
    - Comparison with any visual sightings
    - Name of observer/data collector/Operator
    - A record of the PAM Operator's review of any acoustic detections.
    - Location and/or directionality of detected.
- Additional mitigation actions (if any).

Full detection data, metadata and an explanation of the imminent risk presented, and animals potentially impacted when a shutdown was called for but could not occur due to safety concerns, or when an animal was first detected within its HZ will be submitted within 24 hours to the RPS PM, DEME and Dominion Energy.

9.4   Monthly Report

PAM data will be collated monthly starting on the 1st and ending on the last day of the month. These reports will include a summary of all information in the weekly reports including project activities carried out in the previous month, including vessel transits (number, type of vessel, and route), piles installed, occurrence of aerial/vessel surveys (including with survey results) and all observations of marine mammals. These datasheets containing the combined RPS data will be submitted to DEME Project Manager monthly, with Dominion Energy in copy, by the 7th of the following month for review and to be submitted to Dominion

Energy for submission to NMFS OPR, NMFS GARFO, BOEM, BSEE, DOI and USACE on the 15th of the month.

9.4.1   Monthly PACM Report

The full acoustic species detection data and metadata will also be submitted monthly on the 15th of every month for the previous month. The International Organization for Standardization (ISO) standard metadata form template used for submission will come from NMFS Passive Acoustic Reporting System website at https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates for providing passive acoustic detection data. NARW real time detections that were made in and reported per the 24-hr requirement via NMFS' Template Datasheet for Real-Time North Atlantic Right Whale Acoustic and Visual Observation Data will also be included in the monthly PACM reports. The completed data templates will be submitted to nmfs.nec.pacmdata@noaa.gov.

9.5   Annual Report

Dominion Energy will submit an annual PAM summary report to NMFS Office of Protected Resources (at *PR.ITP.monitoringreports@noaa.gov*) no later than 90 days following the end of a given calendar year. A final annual report would be prepared by Dominion Energy and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments were received from NMFS within 60 calendar days of NMFS' receipt of the draft report, the report would be considered final.

9.6   Final Report

The RPS team will prepare a final report summarizing the construction activities and all visual and acoustic observations for pile driving operations. The RPS PM will compile full detection data, metadata, and location of recorders (or GPS tracks, if applicable) from all hydrophones used for monitoring during construction and submit this along with a first draft of the report to DEME, who will provide the report to the Dominion Energy Compliance Manager within 60 days of project completion.

Within 90 calendar days of the completion of activities occurring under the MMPA LOA, Dominion Energy will submit the draft final report(s) to NMFS (via the International Organization for Standardization (ISO) metadata forms available on the NMFS Passive Acoustic Reporting System website (https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates)). . Completed data templates will also be submitted to nmfs.nec.pacmdata@noaa.gov.

A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of NMFS' receipt of the draft report, the report shall be considered final.

On project completion all raw acoustic data will be submitted to National Centers for Environmental Information (NCEI). The full acoustic recordings from PAM systems will be sent to the NCEI for archiving, within 90 days following completion of activities via the submission details available at: *https://www.ncei.noaa.gov/products/passive-acoustic-data.*
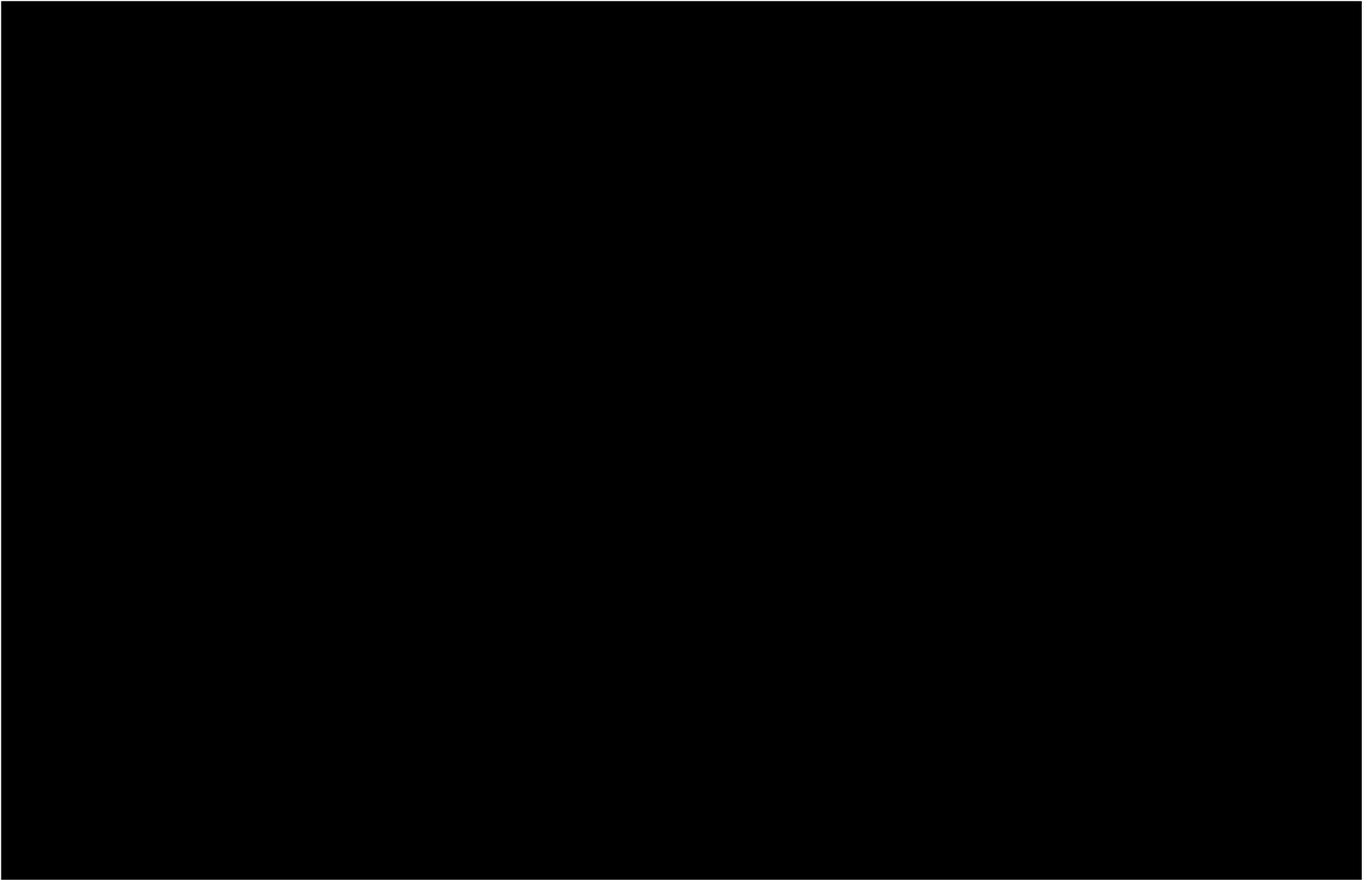
Attachment D-1 ████████AI Buoy Mechanical Specifications
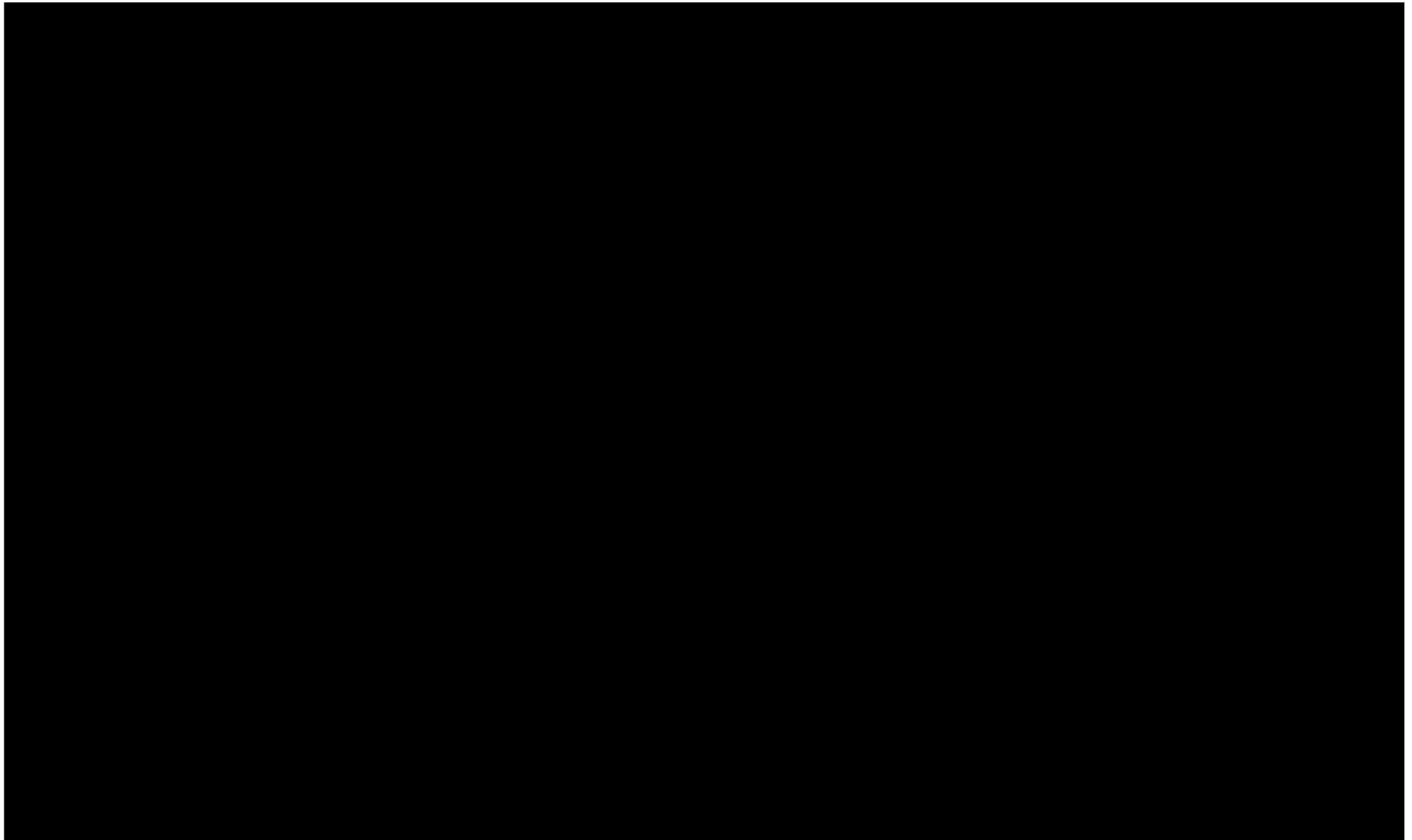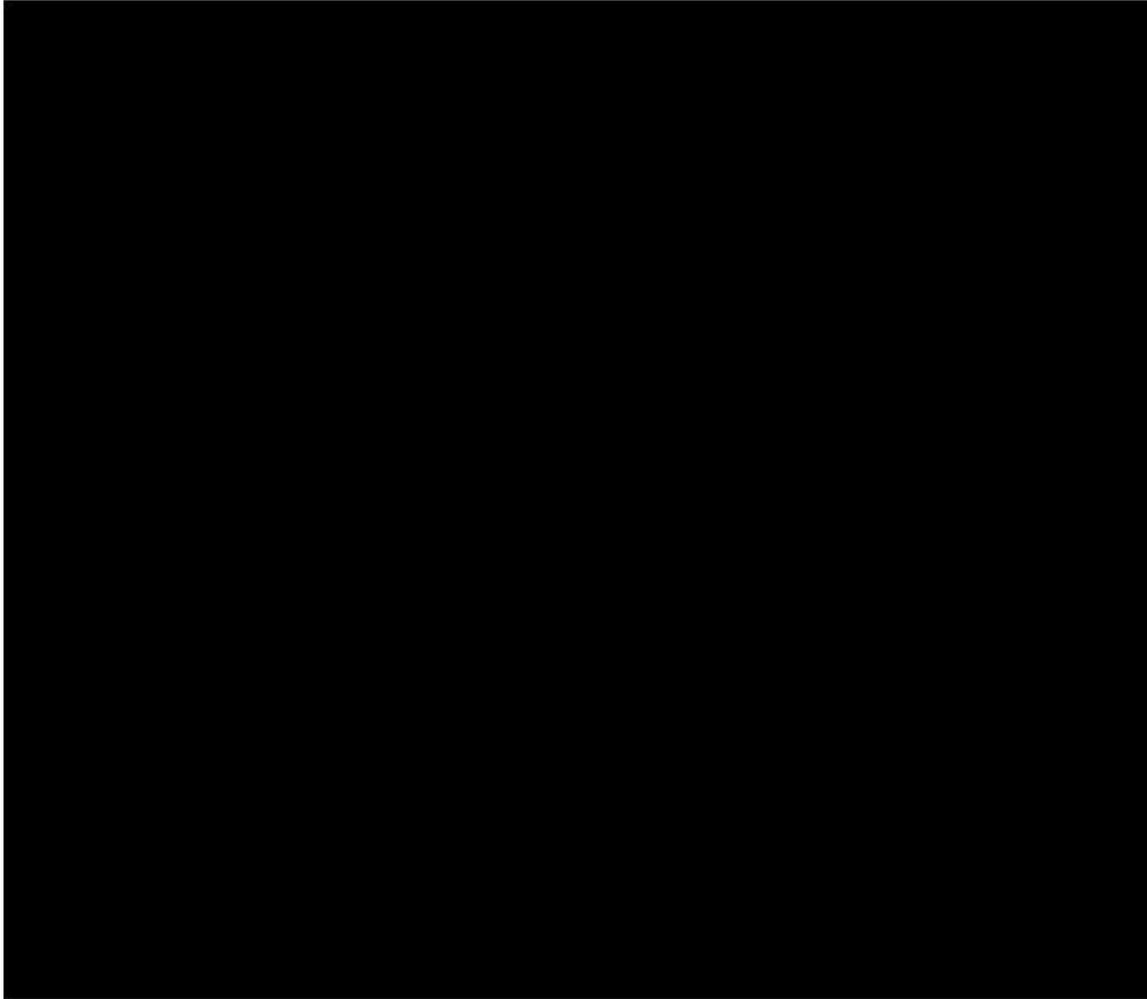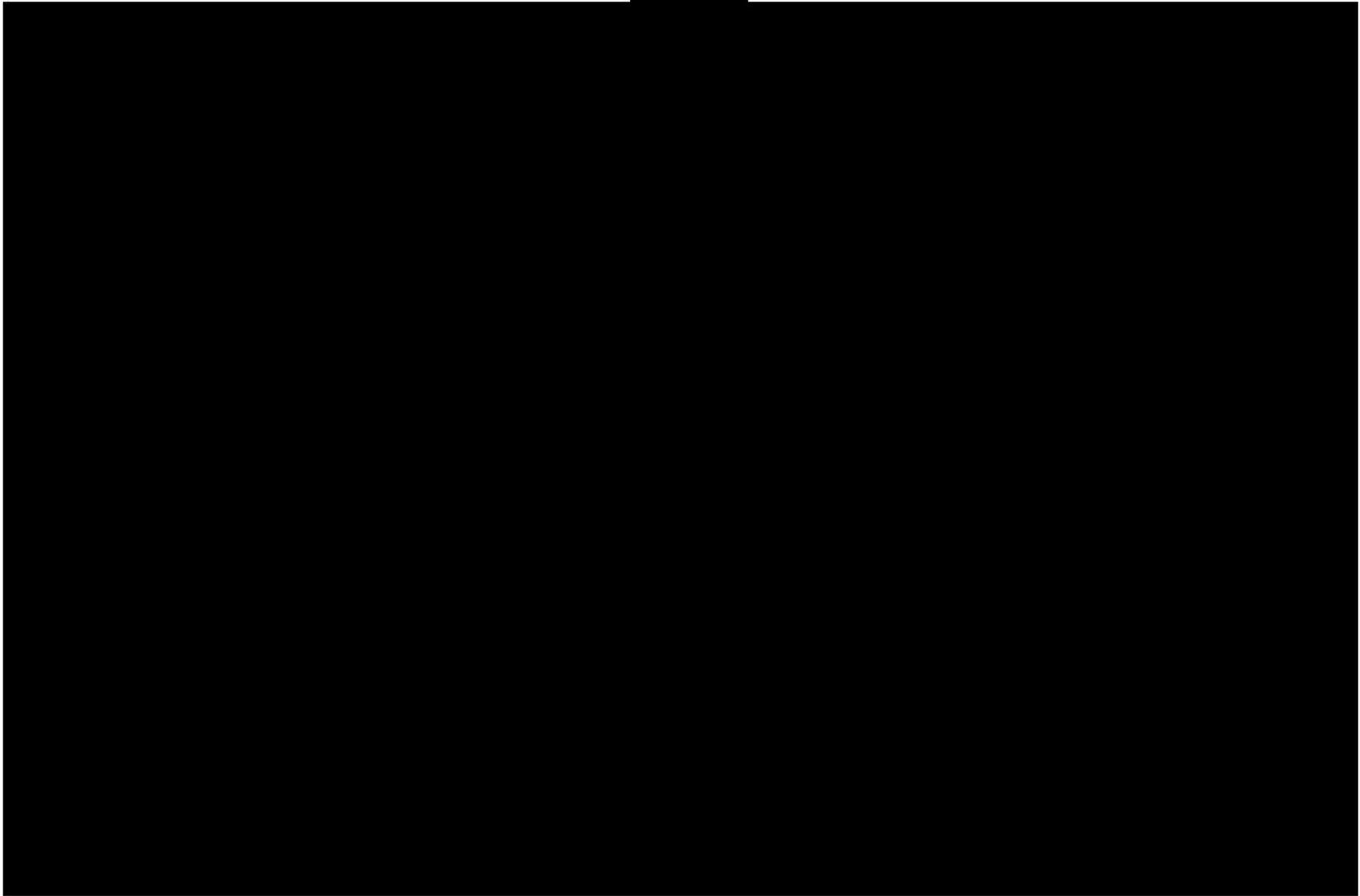
Attachment D-3 Hydrophone Frequency Response Curve

Attachment D-4   Proposed Buoy Distribution (Assuming Detection Ranges 7 km – 10 km)

Attachment D-5   Primary & Secondary Monitoring Buoy Allocation

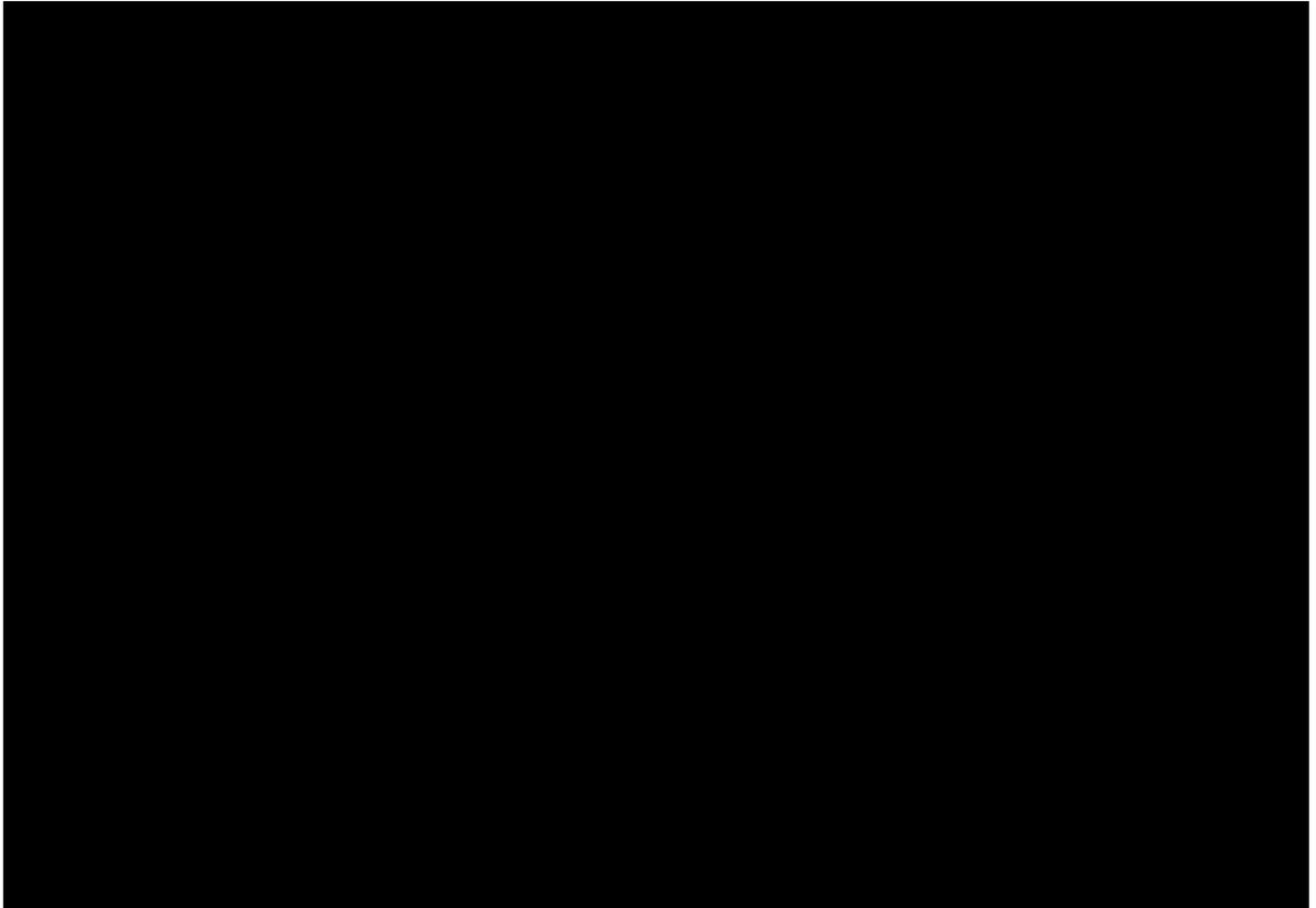# Attachment D-6   Mooring Design of ██████AI Buoy

Attachment D-7   Vessel Requirements for Buoy Operations

VESSEL REUIREMENTS
PAM BUOY OPERATIONS

VESSEL REQUIREMENTS

Version 1

Attachment D-8   Deployment and Retrieval Procedures for ▮▮▮▮▮ AI Buoys

Attachment D-9 ██████ AI Buoy Maintenance Plan & Procedures

Attachment D-12   PAM Data Collection Templates (Example)

Reference is made to Attachment F-3 in PSO Plan for Pile Driving Activities.