



# **Sporad na Mara Offshore Wind Farm**

## **Offshore Project**

### **Environmental Impact Assessment Report**

#### **Outline Marine Mammal Mitigation Protocol, Volume 3**

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# 1 INTRODUCTION

## 1.1 OVERVIEW

- 1.1.1.1 This Outline Marine Mammal Mitigation Protocol (MMMP) has been produced along with the Environmental Impact Assessment Report (EIAR) for the proposed Spiorad na Mara Offshore Wind Farm Project (hereafter referred to as 'the Offshore Project') and aims to address the specific criteria of M003 (see Table 13-25 within **Chapter 13: Marine Mammals, Volume 2**), which is the requirement for a MMMP. The purpose of this Outline MMMP is to provide a framework for the Final MMMP, which is anticipated to be required under conditions of the offshore consents. The Final MMMP will be approved by Scottish Ministers in accordance with section 36 (s.36) of the Electricity Act 1989 and granted to Spiorad na Mara Limited (referred to as "the Applicant").
- 1.1.1.2 The Outline MMMP outlines the approach and detail around mitigation for marine mammals (cetaceans – whales, dolphins and porpoises – and pinnipeds – seals), based on the results of underwater noise modelling, ensuring environmental compliance and minimising impacts. As no secondary mitigation was deemed to be required in the EIAR, this Outline MMMP forms part of the Offshore Project's embedded mitigation measures to control the effects of underwater noise from the Offshore Project on marine mammals. This Outline MMMP details embedded mitigation measures to remove the risk of auditory injury (permanent threshold shift (PTS)) to marine mammals during piling.
- 1.1.1.3 For the purposes of this Outline MMMP, the terms 'piling' and 'pile-driving' are used to denote percussive or impact piling, rather than the installation of piles via the drill-and-grout method.
- 1.1.1.4 Geophysical surveys and unexploded ordnance (UXO) clearance were not included within the EIAR design envelope and are therefore not included within this Outline MMMP.

## 1.1.2 PROJECT BACKGROUND

- 1.1.2.1 The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom wind turbine generators (WTGs). The Project will include both offshore and onshore infrastructure.
- 1.1.2.2 This Outline MMMP supports the application for the offshore components of the Project as outlined in **Chapter 1: Introduction, Volume 1a** of the EIAR. The components of the Offshore Project include all infrastructure and activities located seaward of Mean High-Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (**Figure 1.2: Offshore Project Location, Volume 1b** of the EIAR). Further detailed information is provided in **Chapter 3: Project Description, Volume 1a** of the EIAR.
- 1.1.2.3 The Offshore Project is situated off the northwest coast of the Isle of Lewis/*Eilean Leòdhais* and the Array Area is located 5-13 km offshore and is approximately 161 km<sup>2</sup> in size. It will comprise WTGs,

foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Turbine Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km<sup>2</sup>, within the Array Area. Driving of pin piles and pile casings for WTG installation will be undertaken in the northeast portion of the Array Area only; no piling will occur in the southwest portion.

- 1.1.2.4 The EIAR accompanies applications for offshore consents, licences and permissions for the Offshore Project to Marine Directorate - Licensing Operations Team (MD-LOT) under Section 36 (s.36) of the Electricity Act 1989, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, for the offshore infrastructure seaward of MHWS.
- 1.1.2.5 There are 2 sets of EIA regulations applicable to the Offshore Project: the Electricity Works (EIA) (Scotland) Regulations 2017 for offshore generating stations requiring s.36 consent; the Marine Works (EIA) (Scotland) Regulations 2017 for marine licence applications within Scottish territorial waters (0-12 nautical miles).

## 1.2 PURPOSE OF THE OUTLINE MMMP

- 1.2.1.1 The Outline MMMP, which details the approach to piling mitigation pre-consent, will form the basis of the Final MMMP, which is produced to ensure compliance once the Offshore Project's design is finalised post-consent. The Final MMMP will take into account any design changes that result in updates to the underwater noise modelling, as well as any feedback from stakeholders. It will be approved by Scottish Ministers as part of the discharge of conditions for the s.36 consent and associated Marine Licences.
- 1.2.1.2 The broad objectives of this Outline MMMP are as follows:
  - Set out statutory advice and requirements provided by Joint Nature Conservation Committee (JNCC) relating to minimising the risk of injury to marine mammals from underwater noise during the construction stage of the Offshore Project;
  - Detail the mitigation measures and strategies to be employed to prevent auditory injury in marine mammals occurring within the vicinity of the works, based on results of the underwater noise modelling (see **Appendix 13.3: Underwater Noise Modelling Assessment, Volume 2c**), and ensure they are not exposed to harmful levels of underwater noise during piling;
  - A mechanism for implementation and compliance from the Offshore Project to ensure that all mitigation actions are effectively delivered, monitored and, where necessary, adapted in response to site conditions or monitoring results. This approach ensures that potential adverse impacts on marine mammals are systematically minimised and that the Offshore Project remains fully aligned with regulatory requirements and best-practice guidance.

1.2.1.3 **Table 1-1** will list the s.36 and marine licence conditions of relevance to the Final MMMP. The licence and consent information including conditions, details and relevant sections will be completed post-consent once the Offshore Project’s design is finalised.

Table 1-1 s.36 and marine licences conditions of relevance to the Final MMMPs

Licence/Consent	Conditions	Details	Relevant Section
[To be added post-consent]			

1.2.1.4 The Final MMMP shall clearly set out the legislative requirements, applicable standards, and recognised best-practice measures that will define the construction standards and procedures to be followed by the Contractors. This will ensure that all activities are undertaken in full compliance with relevant legislation and reflect the current best practice in marine mammal protection and underwater noise mitigation. However, compliance with the Final MMMP does not exempt the Applicant, Contractors, or Subcontractors from their obligation to adhere to all applicable legislation, regulations, and byelaws governing construction activities.

### 1.3 LEGISLATION AND GUIDANCE

1.3.1.1 The Outline MMMP has been developed with reference to the following key legislation and guidance:

- **The Conservation of Habitats and Species Regulations 2017** and **The Conservation of Offshore Marine Habitats and Species Regulations 2017** (collectively “the Habitats Regulations”) — which make it an offence to deliberately capture, kill, injure, or disturb any porpoise, dolphin, or whale (i.e. any cetacean) and require the protection of European protected species (EPS) and designated sites;
- **The Marine (Scotland) Act 2010** which makes it an offence to intentionally or recklessly kill, injure, or take a live seal, or to harass a seal at a designated haul-out site;
- **The Marine and Coastal Access Act 2009** which provides for the sustainable management of the marine environment and establishes the requirement for marine licences covering activities likely to affect marine mammals between 12 and 200 nautical miles of the coast;
- **JNCC guidelines for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010)**;
- **The Marine Strategy Regulations 2010** which set objectives for achieving Good Environmental Status (GES), including the reduction of underwater noise impacts on marine fauna.

## 1.4 SCOPE OF THE OUTLINE MMMP

1.4.1.1 This Outline MMMP should be read in conjunction with **Chapter 3, Volume 1a** and the relevant parts of the following chapters and appendices:

- **Chapter 13, Volume 2:** This chapter provides detailed baseline information about the marine mammal species likely to be present in the vicinity of the Offshore Project and assesses the impacts of the Offshore Project on marine mammals;
- **Chapter 12: Fish Ecology, Volume 2a:** Changes to fish assemblages have the potential to affect marine mammal receptors, due to their reliance on fish as prey items;
- **Appendix 3.1: Percussive Piling Installation Approach, Volume 1c;**
- **Appendix 13.3: Underwater, Volume 2c:** Changes to underwater noise have the potential to affect marine mammal receptors and their prey species.

1.4.1.2 This Outline MMMP covers the following:

- Description of the mitigation zone;
- Outline of the marine mammal observer (MMO) and passive acoustic monitoring (PAM) operator roles and responsibilities;
- Protocols for reducing the risk of auditory injury to marine mammal receptors from piling;
- Procedure for reporting environmental compliance matters associated with the Outline MMMP to the JNCC and relevant bodies.

## 1.5 IMPLEMENTATION OF THE OUTLINE MMMP

1.5.1.1 This Management Plan will be submitted for approval to the Scottish Ministers / Licensing Authority and other stakeholders in relation to monitoring compliance with the specific requirements of the relevant consent conditions.

1.5.1.2 During construction activities, this Management Plan will be monitored by the Applicant's Construction Manager (or equivalent), Environmental Manager (or equivalent), and MD-LOT.

1.5.1.3 Where relevant, the Applicant will apply for European protected species (EPS) disturbance licences during the post-consent phase. These will be informed and supported by the Final MMMP.

## 1.6 OTHER RELATED MANAGEMENT PLANS

1.6.1.1 The Outline MMMP and Final MMMP will be developed with consideration of the content and requirements of other relevant Management Plans. These are set out in **Table 1-2** with details of the linkages.

Table 1-2 Other related management plans to the Outline MMMP

<b>Management Plan</b>	<b>Licence / consent conditions</b>	<b>Linkage with Outline MMMP</b>
<b>Outline Offshore Environmental Management Plan</b>	[To be added post-consent]	Provides a framework for environmental management and compliance that the Applicant and its contractors will adopt and adhere to throughout construction.
<b>Marine Pollution Contingency Plan</b>	[To be added post-consent]	Outlines measures to minimise the risk of pollution events and ensure an effective and coordinated response in the event of an incident.
<b>Outline Navigational Safety and Vessel Management Plan</b>	[To be added post-consent]	Outlines the approach and detail around navigational safety and vessel management, ensuring environmental compliance and minimising impacts on marine receptors.
<b>Outline Offshore Operational and Maintenance Plan</b>	[To be added post-consent]	Provides an outline of reasonably foreseeable offshore maintenance activities and the broad approach to be taken for each activity associated with the Offshore Project.

## 2 KEY PROJECT CHARACTERISTICS AND MAXIMUM DESIGN PARAMETERS

2.1.1.1 The final design of the Offshore Project, including number of WTGs, turbine configuration and foundation type, will be confirmed post-consent. The Offshore Project maximum design parameters relevant to the mitigation of auditory injury from underwater noise impacts on marine mammals are summarised in **Table 2-1**.

Table 2-1 Key relevant Offshore Project characteristics and maximum design parameters

Parameter	Characteristic
Offshore Project construction programme	A 5-year construction period is anticipated for offshore infrastructure, with work programmed within the Turbine Area between April and October to allow for optimal weather conditions. Construction is anticipated to commence in 2028/2029 with an estimated completion in 2032/2033, with working hours expected to be 24 hours, 7 days a week during the construction period.
Array Area	161 km <sup>2</sup>
Offshore Cable Area of Search (OCAS)	47 km <sup>2</sup>
Water depth range in Array Area/Turbine Area (MSL)	Water depths across the Turbine Area generally range from 37-67 m, except for a localised depression in the southwest corner of the Array Area where depths reach approximately 72 m.
Maximum number of WTGs	60
Maximum number of pin piles per multi-leg foundation	4
Maximum number of pin piles (in total)	240
WTG foundation type	There are currently 2 fixed foundation design options including multi-leg jacket foundations with pin piles and hybrid multi-leg jacket with gravity base structure (GBS). The multi-leg jacket foundations with pin piles present the maximum design scenario WTG foundation type.
Number of offshore substations	1
Foundation type for offshore substations	Foundation jacket (with pin piles, drill & grout)
Maximum number of pin piles for the offshore substation	16
Maximum hammer/blow energy used during piling*	5,000 kJ
Maximum pin pile/casing diameter*	5 m
Maximum percussive piling duration per 24 hour period	5.5 hours for piles / 4.5 hours for casings

Parameter	Characteristic
Maximum number of strikes per pin pile/casing*	10,635 strikes during 5.5 hours of piling
Maximum number of concurrent piling activities	0

\*of any modelled location

## 3 EIA ASSESSMENT FINDINGS

### 3.1 OVERVIEW

- 3.1.1.1 An EIAR has been prepared to assess the potential impacts of the Offshore Project on marine mammal receptors, considering the whole Offshore Project, from construction to decommissioning (**Chapter 13, Volume 2**).
- 3.1.1.2 Based on the piling worst-case modelling location assessed for the Offshore Project, piling operations have the potential to result in behavioural disturbance of marine mammals. However, auditory injury (PTS) is not expected to occur, provided that appropriate noise abatement and mitigation measures are effectively implemented. As outlined in Section 1.3, all marine mammals occurring in Scottish waters are legally protected from intentional killing or injury. Cetaceans, with all species listed under Annex IV of the Habitats Directive, are afforded strict legal protection as European protected species (EPS). Accordingly, this Outline MMMP and the Final MMMP may be reviewed and used to support any future EPS licence applications, ensuring consistency with statutory requirements and best practice guidance for marine mammal protection.

### 3.2 BASELINE CHARACTERISATION

3.2.1.1 Within **Chapter 13, Volume 2**, the marine mammal baseline has been characterised based on species abundance and density within the marine mammal Study Area (**Figure 13.1, Volume 2b**). Site-specific surveys including digital aerial survey (DAS) and PAM were carried out to inform the baseline, in addition to a desk-based study, which identified 14 marine mammal species, all of which were considered to be internationally Important Ecological Features (IEFs). The marine mammal receptors identified within the EIAR baseline characterisation were:

- Harbour porpoise *Phocoena phocoena*;
- White-beaked dolphin *Lagenorhynchus albirostris*;
- Common dolphin *Delphinus delphis*;
- Bottlenose dolphin *Tursiops truncatus*;
- Risso's dolphin *Grampus griseus*;
- Atlantic white-sided dolphin *Lagenorhynchus acutus*;
- Long-finned pilot whale *Globicephala melas*;
- Killer whale *Orcinus orca*;
- Beaked whale species, Family: Ziphiidae;
- Minke whale *Balaenoptera acutorostrata*;
- Humpback whale *Megaptera novaeangliae*;
- Fin whale *Balaenoptera physalus*;
- Grey seal *Halichoerus grypus*;
- Harbour seal *Phoca vitulina*.

### 3.3 ASSESSMENT OF UNDERWATER NOISE IMPACTS

- 3.3.1.1 Underwater noise modelling was carried out for noise-producing activities, including piling, in support of the EIA assessment (see **Appendix 13.3, Volume 2c**). Loud sounds such as piling, can cause auditory damage, altering the threshold of hearing. Permanent changes ('permanent threshold shift' or PTS) are considered to be auditory injuries and are the focus of this Outline MMMP.
- 3.3.1.2 As part of the embedded mitigation strategy to reduce noise levels to the south of the Turbine Area near Loch Roag/Loch Ròg, which is of ecological importance to Atlantic salmon (*Salmo salar*; see **Chapter 12, Volume 2a**), the Turbine Area was divided into sections, with different engineering approaches for each. Underwater noise modelling was undertaken for 6 piling locations, representing different environmental conditions and planned approaches to piling.
- 3.3.1.3 With the largest noise extents, results of the modelling for Location 6 presented the worst-case scenario for impacts on marine mammals. The larger noise contours were influenced by the position in deeper water and by using a higher maximum hammer energy, despite the shorter piling duration and lower number of strikes, when compared to other locations. Parameters used in the underwater noise model for Location 6 are given in **Table 3-1**.

Table 3-1 Modelled soft-start/ramp-up percussive piling scenario for Location 6 – outside buried channel, casing (5m)

Location 6	Single blow	Soft start	Ramp up				Max. energy
Energy kJ	550	550	1100	2200	3300	4400	5000
No. strikes	5	90	340	340	340	340	7140
Duration (s)	300	900	600	600	600	600	12600
Strike rate (blows/min.)	1	6	34	34	34	34	34
<b>Total: 8,595 strikes per pile, 270 mins. per pile, 4.5h per pile</b>							

- 3.3.1.4 For auditory injury associated with piling activities, the EIA concluded that, following the implementation of embedded mitigation measures, the potential effects on all marine mammal receptors are considered to be of **Minor** or **Negligible** significance (i.e. not significant in EIA terms). The embedded mitigation measures are incorporated into the design of the Offshore Project to prevent auditory injury in marine mammals and avoid significant adverse effects. No secondary mitigation measures were identified following the EIA conclusions.

3.3.1.5 To ensure that mitigation remains proportionate and evidence-based, measures will target only the risk of instantaneous auditory injury (PTS onset), calculated using unweighted peak sound pressure levels. Based on the underwater noise modelling undertaken for the Offshore Project, the maximum predicted range for instantaneous PTS onset at any location is:

- 150m for harbour porpoise;
- <50m for high frequency cetaceans such as dolphin species;
- <50m for low frequency cetaceans including minke, fin and humpback whales;
- <50m for grey and harbour seal.

3.3.1.6 The embedded mitigation measures set out in this Outline MMMP will remove the risk of auditory injury within these ranges.

## 4 DRAFT MITIGATION PROTOCOLS FOR PILING

### 4.1 OVERVIEW

4.1.1.1 This section of the Outline MMMP provides a comprehensive description of embedded piling mitigation measures for marine mammals, in accordance with the maximum design parameters detailed in the **Chapter 3: Offshore, Volume 1a**. The proposed mitigation measures included within this section are in line with the JNCC guidelines for piling (JNCC, 2010), and include the following:

- Defining a mitigation zone;
- Deployment of MMOs and PAM operators;
- Use of noise abatement systems;
- Undertaking a pre-piling search;
- Soft-start and ramp-up procedures;
- Approach to breaks in, concurrent and sequential piling.

4.1.1.2 The Final MMMP will provide an updated description of the embedded mitigation measures in the context of further project-specific information available post-consent at the pre-construction stage.

### 4.2 DEFINING A MITIGATION ZONE

4.2.1.1 JNCC guidance requires a mitigation zone to be established and clearly defined around the piling site prior to commencement of piling activities. The mitigation zone delineates the maximum area within which instantaneous auditory injury (PTS-onset, based on peak sound pressure level) could occur. The radius of the mitigation zone around the piling site will be no less than 500 m (JNCC, 2010). The mitigation zone is the specified area in which the MMO and PAM operatives are responsible for monitoring for the presence of marine mammals prior to and during piling (see Section 4.3).

4.2.1.2 Very-high frequency (VHF) cetaceans, such as harbour porpoise, are recognised as the most sensitive hearing group to underwater noise. As VHF cetaceans, harbour porpoise have a substantially higher upper-frequency hearing limit when compared to other cetacean hearing groups (Southall *et al.*, 2019). Underwater noise modelling for the offshore project indicates that the maximum predicted range for onset of instantaneous auditory injury to VHF cetaceans is less than 500 m (see **Appendix 13.3, Volume 2b**). Therefore, a mitigation zone with a radius of 500 m will be implemented around all piling activities. This distance may be refined post-consent, in discussion with the relevant stakeholders.

## 4.3 MARINE MAMMAL OBSERVERS AND PASSIVE ACOUSTIC MONITORING OPERATORS

- 4.3.1.1 MMO and PAM operators will advise the Operational Manager to support the Applicant's compliance with the marine licence, and regulations governing piling activities. The primary role of the MMO is to carry out visual monitoring to determine whether marine mammals are present within the mitigation zone prior to and during any piling activity. However, effective observation requires favourable conditions, including a sea state of four or less on the Beaufort scale (equivalent to JNCC sea state category 'c' or above), clear visibility, and daylight hours.
- 4.3.1.2 Under conditions where visual observation may be limited, PAM may be used to ensure compliance with the marine licence and to increase the chance of detecting the presence of marine mammals. The PAM operator's primary role is to acoustically detect marine mammals within the mitigation zone using a hydrophone array capable of detecting both high- and low-frequency signals to support distance estimation.
- 4.3.1.3 MMOs and PAM operators focus their monitoring efforts during mitigation periods, including the pre-activity search and the soft-start (see Section 4.6). In addition, they also provide advice to vessel crews to ensure compliance with the marine licence and JNCC guidance, and prepare reports documenting mitigation activities and Offshore Project compliance.

## 4.4 NOISE ABATEMENT SYSTEMS

- 4.4.1.1 The Applicant has committed to achieving a 12 dB reduction in noise levels at all piling locations throughout the programme through the use of noise abatement systems (NAS) (see **Appendix 3.1, Volume 2c**). The final MMMP will detail how this will be achieved.

## 4.5 PRE-PILING SEARCH

- 4.5.1.1 A pre-piling search will be carried out visually by an MMO, and/or acoustically using PAM equipment before the soft-start and ramp-up (see Section 4.6). The pre-piling search of the mitigation zone will be for a minimum of 30 minutes. The soft-start procedure can only begin once the pre-piling search has been completed and the mitigation zone is confirmed to be clear of marine mammals. While the pre-piling search may be carried out acoustically, the Offshore Project will comply with the guidance, which stipulates that piling should not commence during periods of darkness or poor visibility.
- 4.5.1.2 If marine mammals are detected within the mitigation zone, piling cannot commence until 20 minutes after the last visual or acoustic detection. If a marine mammal is detected during the soft-start, piling will cease, or at least the power will not be increased (in certain cases, cessation of piling may risk pile integrity, due to pile design or substrate), until the animal has left the mitigation zone and there are no further detections for 20 minutes.

## 4.6 SOFT-START AND RAMP-UP PROCEDURES

4.6.1.1 A soft-start is defined as the initial, intermittent and low-energy form of piling and the ramp-up is a gradual increase in piling energy, to reach full operational power, over a pre-designed period. JNCC guidance (JNCC, 2010) states that the soft-start/ramp-up duration should be no less than 20 minutes, to allow any marine mammals to leave the mitigation zone before piling power reaches levels at which auditory injury/PTS could occur.

## 4.7 BREAKS IN PILING

4.7.1.1 Once piling has reached full power, there is no requirement to cease piling or lower hammer energy if a marine mammal enters the mitigation zone. However, in the event of a break in piling of greater than ten minutes, the pre-piling search will recommence before another soft-start and ramp-up period, to full power.

4.7.1.2 If MMOs and/or PAM operators have continued to monitor the mitigation zone before and during the break and found no animals to be present, there need not be a delay in beginning the soft-start. There will again be a period of 20 minutes without marine mammal detections before re-starting the soft-start.

## 4.8 CONCURRENT AND SEQUENTIAL PILING

4.8.1.1 No concurrent piling events will occur.

4.8.1.2 The Offshore Project has limited the length of percussive piling installation to 5.5 hours for piles/4.5 hours for casings per 24-hour period, as detailed in **Appendix 3.1, Volume 2c**. This is inclusive of soft-start and ramp-up procedures, as detailed further in Appendix 13.3, **Volume 2c**. In principle, multiple piles could be installed within a 24-hour period, provided that the 5.5 hours (for piles)/4.5 hours (for casings) maximum is not exceeded.

## 4.9 REPORTING

4.9.1.1 Reports including piling activity and mitigation for the Offshore Project will be prepared. Reporting will include:

- A summary of the Offshore Project-specific information, MMO and PAM recording forms, and MMO report, alongside a copy of the consent and/or licence;
- A detailed account of piling operations undertaken including date, time, location and times of soft-start and ramp-up;
- A record of date, time, location and the MMO and PAM operators' account of works, to include timings of the pre-activity search, soft-starts, mitigation actions including any delays and the number of occasions where guidelines were not met and non-compliances were reported;

- Information on whether piling was stopped or delayed due to marine mammal presence;
- A summary of marine mammal observations, environmental conditions and any actions taken relating to marine mammal presence;
- Any further details of relevance to the piling operations or marine mammal observations.

4.9.1.2 Following the completion of piling, the reporting deliverables (including the main report and marine mammal recording forms) will be submitted to the regulator.

4.9.1.3 Other post-consent reporting, which may be required by the consent, Marine Licence or any European protected species licence, will be produced in accordance with the specified requirements and conditions. This includes submission of a close-out report of all licensed activities to the Marine Noise Registry.

## **4.10 COMMUNICATION AND RESPONSIBILITIES**

4.10.1.1 The Final MMMP will provide a detailed list of the roles and responsibilities of key personnel, alongside a communication strategy, to ensure that mitigation measures are successfully undertaken for piling operations. Key personnel involved in the implementation and compliance of piling activities which are relevant to this Outline MMMP may include the following:

- The Applicant's Environmental Manager;
- MMO;
- PAM Operator;
- Construction Contractor/Supervisor/Principal Contractor (responsible for dissemination of MMMP requirements to site teams).

4.10.1.2 These key personnel will be equipped with the appropriate means to effectively communicate with each other to ensure that protocols are carried out correctly and action can be taken if a marine mammal is observed or detected. In order to establish a strong communication chain, MMOs, PAM operatives and other relevant personnel (including the person who can start and/or stop piling operations) will attend a pre-mobilisation meeting.

### **4.10.2 ENVIRONMENTAL MANAGER**

4.10.2.1 The Applicant's Environmental Manager is the person who is responsible for the overall coordination and reporting, ensuring compliance for all of the mitigation and monitoring requirements for the Offshore Project. The Environmental Manager is responsible for ensuring compliance documents are included within contract documents, and management of the escalation protocol ensuring immediate notification to the Project director and regulators if non-compliance or any marine mammal incident occurs.

#### **4.10.3 MARINE MAMMAL OBSERVER**

4.10.3.1 There will be sufficient numbers of dedicated MMOs to ensure that monitoring is not compromised by fatigue. MMOs are responsible for the visual detection of marine mammals and advising the crew on the implementation of the mitigation procedures to ensure compliance with those procedures. MMOs are required to have completed the JNCC training and have sufficient experience. The MMO (and/or PAM operator) will be aware of command hierarchy and communication channels in place, and are required to ensure there is a workable communication procedure so that any detections can be reported to the identified person who can start and/or stop piling operations.

#### **4.10.4 PASSIVE ACOUSTIC MONITORING OPERATOR**

4.10.4.1 There will be sufficient numbers of dedicated PAM operators who are responsible for the acoustic detection of marine mammals using a hydrophone and PAMGuard software. The PAM operator is also responsible for the deployment, retrieval and maintenance of the hydrophone. PAM operators are required to have completed an appropriate training course and have sufficient experience to undertake these duties.

#### **4.10.5 CONSTRUCTION CONTRACTOR/SUPERVISOR**

4.10.5.1 The Construction Contractor or Supervisor is responsible for ensuring communication with the MMO and/or PAM operator regarding piling activities. For example, they notify the MMO to begin the 30-minute pre-watch, prior to the soft-start commencing.

## 5 GLOSSARY OF TERMS AND ABBREVIATIONS

5.1.1.1 A list of key terms and acronyms used in this Outline MMMP are provided in **Table 5-1** and **Table 5-2**.

Table 5-1 Acronyms and abbreviations

Term	Definition
ADD	Acoustic deterrent device
CEMP	Construction Environmental Management Plan
GBS	Gravity-based structure
EIAR	Environmental Impact Assessment Report
EPS	European protected species
JNCC	Joint Nature Conservation Committee
kJ	Kilojoule
km	Kilometre
m	Metre
MHWS	Mean High Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Mammal Observer
MSL	Mean Sea Level
MU	Management Unit
MW	Megawatts
N4	North 4
PAM	Passive acoustic monitoring
PTS	Permanent threshold shift
s.36	Section 36
UK	United Kingdom
UXO	Unexploded ordnance
VHF	Very-high-frequency cetacean
WFD	Water Framework Directive
WTG	Wind turbine generator

Table 5-2 Glossary

Term	Meaning
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs/OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.

Term	Meaning
Cetacean	A group of marine mammals that includes all whales, dolphins and porpoises.
Decibels (dB)	Unit of measurement to measure the intensity of a sound or the power level of an electrical signal by comparing to a given level of logarithmic scale.
Digital Aerial Survey (DAS)	Digital surveys carried out by aeroplane.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded Mitigation is considered as part of the impact assessment, before effect significance is identified.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Impact Assessment Report (EIAR)	The Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Project on the environment.
Impact	Change that is caused by an action; for example, foundation installation (action) during construction which results in habitat loss (impact).
Marine Mammal	A specialised group of mammals, which have adapted to life in the oceans and seas (and some rivers).
Maximum Design Scenario	The scenario within the Project Design Envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor. See <b>Chapter 3: Project Description, Volume 1a</b> for detailed description.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
Offshore	Pertaining to seaward of Mean High Water Springs (MHWS).
Offshore Cables	Electrical and communication cables located within the Array Area and Offshore Cable Area of Search. The Offshore Cables consist of Array Cables, Array Cables to Landfall, and Export Cables.
Offshore Cable Area of Search (OCAS)	The area within which the offshore cable infrastructure between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Project	The offshore components of the Sporad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS).
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Offshore Wind Farm (OWF)	A group of WTGs located offshore.
Onshore	Pertaining to landward of MLWS.

<b>Term</b>	<b>Meaning</b>
Passive Acoustic Monitoring (PAM)	The use of recorders fitted with hydrophones (in water) or microphones (in air) to 'listen' for sounds emitted by marine mammals or other sources.
Permanent Threshold Shift (PTS)	A permanent change in the hearing ability at a particular sound frequency, in this case caused by exposure to loud sound.
Pinniped	A group of carnivorous mammals, comprising the seals and their relatives.
Project	The Sporad na Mara offshore wind farm development. This term describes the whole development, including all offshore and onshore components.
Project Boundary	The 'red line boundary' encompassing all offshore and onshore components of the Project.
Receptor	Any physical, biological or anthropogenic element of the environment that may be affected or impacted by the Project. Receptors can include natural features such as the seabed and wildlife habitats as well as man-made features like fishing vessels and cultural heritage sites.
Significance	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
Study Area	The area within which a given survey was undertaken in order to obtain baseline information.
Temporary Threshold Shift (TTS)	A temporary change in the hearing ability at a particular sound frequency, in this case caused by exposure to loud sound.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) or Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder consultation and environmental assessment.
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

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