Bellrock Offshore Wind Farm

Wind Farm Development Area

Volume V

Outline Marine Mammal Mitigation Protocol

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Glossary of Terminology

Term	Definition
Acoustic Deterrent Device operator	A trained member of the team who will operate the Acoustic Deterrent Device.
Applicant	Bellrock Offshore Wind Farm Limited, the legal entity submitting Section 36 Consent and Marine Licence applications for the Bellrock Wind Farm Development Area.
Bellrock Offshore Wind Farm (or the Bellrock Project	An offshore wind farm capable of exporting up to 1.8 giga watt of renewable energy to the National Electricity Transmission System. The Wind Farm Development Area is located 120 kilometre east of Stonehaven, and will connect to the National Electricity Transmission System at the proposed SSEN Transmission Hurlie substation, west of Stonehaven in Aberdeenshire. The Bellrock Offshore Wind Farm comprises of the following Development Areas: ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Cable protection	Protective measure to minimise the effects of scour and hazards along the inter-array cables, and protecting these cables at infrastructure crossing points.
Commencement of construction	Commencement of construction to install the Wind Farm Infrastructure as authorised by the Wind Farm Development Area Section 36 Consent and Marine Licence (excluding site preparation works), being the earlier of: ▪ Intrusive pre-installation surveys; ▪ Placement on or installation in the seabed of anchors and associated scour protection, and mooring lines; ▪ Trench excavation for inter-array cables; or ▪ Trenching for, or laying of inter-array cables on or in the seabed.
Construction works	Works to install the Wind Farm Infrastructure as authorised by the Wind Farm Development Area Section 36 Consent and Marine Licence, such as: ▪ Site preparation works undertaken after commencement of construction; ▪ Pre-installation surveys (intrusive and/or non-intrusive); ▪ Placement on or installation in the seabed of anchors and associated scour protection, and mooring lines, and associated scour protection; ▪ Towing or transportation of the floating offshore unit to the Wind Farm Development Area from a port or wet storage facility; ▪ Floating offshore unit installation and commissioning, including hooking-up to the pre-installed mooring system; ▪ Trench excavation for inter-array cables; ▪ Laying of inter-array cables in or on the seabed and, associated cable protection; ▪ Installation of subsea cable hubs, including placing of associated fixed bottom structure; ▪ Final commissioning following cable connections and snagging; and ▪ Post installation surveys.

Term	Definition
Development Area	For consenting purposes, the area for which separate consents and/or Marine Licences will be sought by the Applicant, comprising: ▪ Wind Farm Development Area; ▪ Offshore Transmission Development Area; and ▪ Onshore Transmission Development Area.
Fixed bottom substructure	A substructure that provides support for the offshore substation or offshore reactive compensation station by transferring loads to the seabed, and provides a conduit for interconnector cables and/or offshore export cables.
Floating offshore unit	The combined wind turbine generator and floating substructure.
Floating substructure	A floating structure which provides buoyancy and, in conjunction with the station keeping system, supports a superstructure (e.g. wind turbine generator or offshore substation), and maintaining its position within the structure's excursion limit.
Inter-array cables	Armoured cable containing electrical and fibre optic cores, which link the wind turbine generators to each other and to the subsea cable hubs and/or the offshore substations and include dynamic inter-array cable and static inter-array cable sections.
Interconnector cable	Armoured cable containing electrical and fibre optic cores which link two or more offshore substations.
Localising	Using the vocalisation during a detection to work out the location of the marine mammals in relation to the monitoring equipment.
Marine Mammal Observers	Trained members of the team who will observe the Monitoring Area.
Mitigation Zone	The area around each pile and/or UXO clearance location in which it is predicted physical or permanent auditory injury is possible, which specific mitigation measures are required.
Monitoring Area	The area around each unexploded ordnance clearance to be monitored in the pre-watch, and the post clearance by either Marine Mammal Observers or Passive Acoustic Monitoring Operator.
National Electricity Transmission System	The high-voltage electricity power transmission network serving Great Britain which receives electricity from generators (such as offshore wind farms) and transmits that electricity to anywhere on the National Electricity Transmission System to satisfy demand.
Offshore export cable	Armoured cable containing electrical and fibre optic cores between the offshore substation(s) and the transition joint bay(s).
Offshore substation	An offshore platform which houses electrical equipment such as transformers, switchgear, and protection and control systems, enabling the wind farm's renewable electricity to be received via inter-array cables and exported via the offshore export cables.
Offshore Transmission Development Area	The boundary within which the Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned (and includes the whole of the Wind Farm Development Area).

Term	Definition
Offshore Transmission Infrastructure	Infrastructure located within the Offshore Transmission Development Area including fixed bottom and/or floating offshore substations, offshore reactive compensation station(s) and associated scour protection; interconnector cables and associated cable protection; and offshore export cables and associated cable protection (including activities associated with the Offshore Transmission Infrastructure construction, operation and maintenance, and decommissioning).
Onshore Transmission Development Area	The boundary within which the Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.
Operational life	The expected operational life of the Wind Farm Infrastructure from the Commercial Operation Date to the first floating offshore unit being decommissioned.
Passive Acoustic Monitoring	Use of acoustic sensors to monitor the presence of marine mammals in the Monitoring Area.
Passive Acoustic Monitoring operators	A trained member of the team who will use the Passive Acoustic Monitoring station to undertake acoustic monitoring of the Monitoring Area.
Piling Noise Mitigation Plan	Document outlining the management measures based on the final project design that will be implemented during pile installation and feeding in to the mitigation measures presented in the Marine Mammal Mitigation Protocol.
Pre-watch	The period prior to unexploded ordnance clearance during which observations are undertaken visually by the MMOs or acoustically by the Passive Acoustic Monitoring Operator of the Monitoring Area to determine if marine mammals are present in the Monitoring Area.
Primary Measures	Primary noise reduction measures aim to reduce noise emissions at the source through modifications to the project design (for example, operational methodology such as soft start, use of lowest practical hammer energy, alternative hammer types, alternative fixed bottom structure design).
Ramp-up	Ramp-up follows on from the soft-start piling procedure. It comprises a specified minimum period of piling, starting at the highest low-energy blow level achieves in the soft start and gradually increasing in hammer energy. The maximum hammer energy required (operational power for that specific pile) must not be reached within the ramp-up period.
Scour protection	Protective material positioned around anchors to avoid sediment being eroded as a result of the flow of water.
Secondary Measures	Secondary noise reduction measures aim to reduce the noise propagated through the water column during pile driving by employing noise mitigation systems and / or noise abatement systems (for example, casings, resonators and bubble curtains).
Site preparation works	Preparatory activities undertaken within the Wind Farm Development Area prior to the commencement of construction of the Wind Farm Infrastructure, which may comprise (and which may require separate consents): ▪ Geophysical surveys, geotechnical surveys, and non-archaeological/archaeological diver/ remotely operated vehicle surveys; ▪ Seabed preparation including sand wave levelling, slope levelling for gravity based anchors (if selected), boulder clearance, and pre-lay grapnel runs;

Term	Definition
	▪ Unexploded ordnance survey and/or clearance; ▪ Debris clearance; and ▪ Out of service cable/pipeline removal.
Soft start	The procedure used to commence piling at a low hammer energy. The soft start procedure consists of low-energy blows which are followed by the ramp-up procedure.
SSEN Transmission Hurlie substation	The onshore substation to be developed by SSEN Transmission, which will receive renewable electricity from the Bellrock Project onshore substation and allow supply of renewable electricity from the wind farm to the National Electricity Transmission System.
Static inter-array cable	The section of inter-array cable that is not designed to move.
Station keeping system	The system (including mooring lines and anchors) used to hold a floating offshore unit within its excursion limit and maintain the intended orientation of the floating offshore unit.
Subsea cable hub	A subsea device, with a gravel pad foundation, which allows the connection of multiple inter-array cables.
Towing	Transportation of a floating offshore unit or floating substructure between a port, and/or wet storage facility and/or the Wind Farm Development Area.
Transition bay	An underground structure at the landfall accessed by manhole or other means which accommodates the jointing of the offshore export cables and the onshore export cables. A fence may be installed around the access manhole for protection.
Wet storage	The temporary storage/anchorage of floating substructures and/or floating offshore units prior to their transportation to the Wind Farm Development Area.
Wind Farm Development Area	The boundary within which the Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned.
Wind Farm Infrastructure	Infrastructure located within the Wind Farm Development Area including wind turbine generators; floating substructures, station keeping systems and associated scour protection; inter-array cables and associated cable protection; and subsea cable hubs; and ancillary infrastructure including buoys (including activities associated with the Wind Farm Infrastructure construction, operation and maintenance, and decommissioning).
Wind turbine generator	A wind turbine generator converts wind energy into electrical energy. The main components include rotor assembly (composed of three blades and a hub); nacelle (containing the generator, shaft and gearbox, power electronic converter and transformer); and a tower (containing lifting equipment and switchgear).

Glossary of Abbreviations

Term	Definition
ADD	Acoustic Deterrent Device
CMS	Construction Method Statement
dB	Decibel
DP	Decommissioning Programme
E	East
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EOD	Explosive Ordnance Disposal
EPS	European Protected Species
FOU	Floating Offshore Unit
FSS	Floating Substructures
HF	High Frequence
IAC	Inter-Array Cables
INNSMP	Invasive Non-native Mitigation Plan
JNCC	Joint Nature Conservation Committee
kJ	Kilojoule
LF	Low Frequency
MA	Monitoring Area
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multi-Beam Echo Sounder
MD-LOT	Marine Directorate – Licensing and Operations Team
MMMP	Marine Mammal Mitigation Protocol
MMMT	Marine Mammal Mitigation Team
MMO	Marine Mammal Observer
MPCP	Marine Pollution Contingency Plan
MZ	Mitigation Zone
NAS	Noise Abatement System

Term	Definition
NPL	National Physical Laboratory
NW	North West
OCM	Operations Control Manager
OMP	Operation and Maintenance Plan
PAM	Passive Acoustic Monitoring
PAM-Op	Passive Acoustic Monitoring Operator
PCW	Phocid Carnivore in Water
PNMP	Piling Noise Mitigation Plan
PTS	Permanent Threshold Shift
RA	Risk Assessment
ROV	Remotely operated vehicle
SBP	Sub-bottom Profiler
SEL	Sound Exposure Level
SKS	Station keeping system
SNH	Scottish Natural Heritage
SPI	Shot Point Interval
SPL_{peak}	Peak Sound Pressure Level
SSS	Side Scan Sonar
UK	United Kingdom
USBL	Ultrashort Base Line
UXO	Unexploded ordnance
VHF	Very High Frequency
VMNSP	Vessel Management and Navigational Safety Plan
WFDA	Wind Farm Development Area
WTG	Wind turbine generator
µPa	Micro-pascal

1 Purpose of the Document

1.1 Introduction

1. In 2021, Crown Estate Scotland launched the ScotWind[1] leasing round which released areas of seabed in Scottish waters for new commercial scale offshore wind developments to help Scotland achieve its net-zero emissions target by 2045. In January 2022, Bellrock Offshore Wind Farm Limited (the Applicant[2]) was successfully awarded development rights for an area of seabed, to develop the Bellrock Wind Farm Development Area (WFDA), which forms part of the Bellrock Offshore Wind Farm (the Bellrock Project).The Bellrock Project comprises the following three Development Areas for which separate consents and/or licences will be sought by the Applicant:

   - The Bellrock WFDA within which the Bellrock Wind Farm Infrastructure will be constructed, operated and maintained, and decommissioned;
   - The Bellrock Offshore Transmission Development Area (OfTDA) within which the Bellrock Offshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned; and

     The Bellrock Onshore Transmission Development Area, within which the Bellrock Onshore Transmission Infrastructure will be constructed, operated and maintained, and decommissioned.

2. This Outline Marine Mammal Mitigation Protocol (MMMP) has been prepared by Haskoning on behalf of the Applicant and accompanies a Section 36 Consent (s.36) application[3] and a Marine Licence application4 submitted to Marine Directorate – Licensing Operations Team (MD-LOT) on behalf of the Scottish Ministers, for the construction, operation and maintenance (O&M) of the Bellrock Wind Farm Infrastructure located within the Bellrock WFDA.

3. This document presents the Outline MMMP and supports the Environmental Impact Assessment (EIA) Report for the Bellrock WFDA. The Outline MMMP recommends measures for mitigating the potential impact of auditory injury (permanent threshold shift (PTS)) on marine mammals from the following activities undertaken during construction of the Bellrock Wind Farm Infrastructure:

   - Geophysical surveys (**see Section 2**);
   - Piling (see **Section 3**); and
   - Unexploded ordnance (UXO) clearance (see **Section 4**).

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[1] The ScotWind leasing round was initiated based on the Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020a), which identified a number of sustainable areas for future commercial-scale offshore wind development, and provided the spatial strategy to support CES's ScotWind leasing round.

[2] The term 'Applicant' and 'Developer' are used within this plan to reflect the pre-consent and post-consent development phases of the Bellrock WFDA.

[3] Submitted under the Electricity Act 1989.

[4] Submitted under the Marine and Coastal Access Act 2009 (MCAA).

4. The final MMMP[5] will form part of a Piling Noise Mitigation Plan (PNMP), the preparation of which is anticipated to be a condition of the Bellrock WFDA's s.36 Consent and Marine Licence. The PNMP will be submitted to the Marine Directorate – Licensing Operations Team (MD-LOT) for approval prior to commencement of construction.

5. The mitigation measures presented in this Outline MMMP are informed by the data presented in following Bellrock WFDA EIA Report chapters and technical appendices and will be further refined based on the PNMP:

- **Chapter 9: Marine Mammals (Volume II)**;
- **Appendix 9.1: Marine Mammals Technical Report (Volume IV);** and
- **Appendix 9.2: Underwater Noise Modelling Report (Volume IV)**.

6. The Outline MMMP summarises the worst-case scenarios considered in the Bellrock WFDA EIA Report together with a summary of impacts and proposed mitigation measures. These worst-case scenarios may be updated post-consent when more detailed and refined parameters for the Bellrock WFDA are available.

1.2 Bellrock WFDA Background

7. The Bellrock WFDA covers an area of 280 km^2 and is located 120 km from Stonehaven (116 km from Peterhead) off the east coast of Scotland.

8. The key Wind Farm Infrastructure is as follows (see **Chapter 4: Project Description (Volume II)** for more details:

- Up to 132 Wind turbine generators (WTGs) with floating substructures (FSSs) (together termed as an 'floating offshore unit' (FOU));
- Station keeping systems (SKSs) for each FSS, including mooring lines, anchoring systems and ancillary elements;
- Scour protection for FSS anchoring points;
- Approximately 300 km of inter-array cables (IACs) comprising static IACs and dynamic IACs linking the individual FOUs to subsea cable hub(s) or to the offshore substation [6];
- Associated cable protection as required;
- Up to 18 subsea cable hubs; and
- Ancillary elements including buoys.

[5] Only where pile driving/drilling is utilised in the construction of the Bellrock Wind Farm Infrastructure,

[6] Offshore substations will be consented as part of the Bellrock OfTDA and will be included in the Bellrock OfTDA MMMP.

9. The earliest any offshore construction works will start is assumed to be 2031. Offshore construction works at Bellrock WFDA will take up to seven years to complete (excluding one year of site preparation works such as surveys). It should be noted that the construction programme is dependent on numerous factors including consent timeframes and funding mechanisms.

1.3 Marine Megafauna Species

10. Mitigation measures will be applied to any marine mammal and megafauna species observed during construction activities where a MMMP is required. The marine megafauna species expected to be of relevance to the Bellrock WFDA include:

- Harbour porpoise *Phocoena phocoena;*
- Bottlenose dolphin *Tursiops truncatus*;
- Short-beaked common dolphin *Delphinus delphis*;
- White-beaked dolphin *Lagenorhynchus albirostris*;
- Killer whale *Orcinus orca*;
- Minke whale *Balaenoptera acutorostrata*;
- Fin whale *Balaenoptera physalus*;
- Humpback whale *Megaptera novaeangliae*;
- Grey seal *Halichoerus grypus*; and
- Harbour seal *Phoca vitulina*.

1.4 Mitigation

11. As part of the project design process, several mitigation measures have been proposed to reduce the potential for impacts on environmental receptors. Those relevant to this Outline MMMP are summarised in **Table 1.1**.

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Table 1.1: Mitigation Measures of Relevance to the Outline MMMP

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-1	Minimum spacing of 1,150 m between FOUs (centre to centre) to reduce possibility of secondary entanglement	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Development Specification and Layout Plan to be developed and submitted to the Scottish Ministers for approval prior to commencement of construction.
WFDA-4	Where seabed preparation is required (e.g. seabed levelling), methods and equipment that have been designed to minimise the potential for sediment suspension and dispersal will be adopted as far as is reasonably practicable.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Construction Method Statement (CMS) to be developed and submitted to the Scottish Ministers for approval prior to commencement of construction.
WFDA-12	The PNMP will be submitted to MD-LOT for approval prior to the commencement of piling, outlining mitigation and management measures that will be implemented during pile installation.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a PNMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-18	A Vessel Management and Navigational Safety Plan (VMNSP) will be developed and implemented for the construction and O&M phases of the Bellrock Wind Farm Infrastructure. The VMNSP will set out the types and anticipated numbers of vessels to be deployed, together with indicative transit corridors between the Bellrock WFDA and the relevant construction ports. The VMNSP will be aligned with the Scottish Marine Wildlife Watching Code (Scottish Natural Heritage, 2017a) and the associated Guide to Best Practice for Watching Marine Wildlife (Scottish Natural Heritage, 2017b). As such, vessel operations will incorporate recognised good practice measures to reduce the risk of disturbance to, and collision with, marine mammals, seabirds, and other marine megafauna. Where practicable, vessel movements will follow defined transit corridors, thereby concentrating activity within established navigation corridors and reducing the spatial extent of potential disturbance and collision risk. The number of vessel movements will be limited to those necessary for safe and efficient delivery of the works.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Vessel Management Plan and Navigational Safety Plan to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline VMNSP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-19	Development of and adherence to a Marine Pollution Contingency Plan (MPCP) outlining the approach for managing and reducing risk of pollution and procedures to protect personnel and to be followed in the event of a pollution incident.	Tertiary	Secured in the s.36 Consent and Marine Licence, via a condition requiring a MPCP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. A **MPCP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-21	An Environmental Management Plan (EMP) will be prepared and implemented to set out the procedures to avoid, reduce, and manage potential environmental effects arising across the construction and O&M of the Bellrock Wind Farm Infrastructure, in accordance with relevant international and national legislation and guidance.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring an EMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline EMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-23	Implementation of soft start and ramp-up measures for piling (which would reduce underwater noise effects), to be set out in the PNMP and part of the MMMP for piling activities. Each piling event would commence with a soft start at a lower hammer energy followed, by a gradual ramp-up for at least 20 minutes to the maximum hammer energy required. The soft start and ramp-up allows mobile species to move away from the area before the maximum hammer energy with the greatest noise impact area is reached.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring an PNMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline MMMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-24	Development of, and adherence to, a MMMP. The MMMP for piling will be developed prior to commencement of construction and based upon best available information, methodologies, industry best practice, latest scientific understanding, current guidance and detailed project design. The MMMP for piling will be developed in consultation with MD-LOT and NatureScot, and will detail the proposed mitigation measures to reduce the risk of any physical or permanent auditory injury/change in hearing sensitivity (PTS) to marine mammals and impacts of disturbance during all piling operations. This will include details of designed-in mitigation, for the soft-start and ramp-up, as well as details of the mitigation zone and any additional mitigation measures required in order to minimise potential impacts of any physical injury or PTS, for example, the activation of acoustic deterrent device (ADD) for a maximum of 30 minutes[1] prior to the soft-start.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring an PNMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline MMMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-25	Development of, and adherence to, a PNMP. The PNMP will be developed in consultation with MD-LOT and NatureScot and prepared in accordance with the Marine Directorate guidance on mitigation and monitoring plans (Marine Directorate, 2025a), which sets out prescriptive requirements for what the PNMP should cover.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a PNMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline MMMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-26	A detailed MMMP will be prepared for UXO clearance. The MMMP for UXO clearance will ensure there are adequate mitigation measures to minimise the risk of any physical or permanent auditory injury to marine mammals as a result of UXO clearance. The most suitable mitigation measures, based upon best available information and methodologies at that time will be utilised. The MMMP for UXO clearance will be prepared in consultation with MD-LOT and NatureScot. The MMMP for UXO clearance will include details of all the required mitigation measures to minimise the potential risk of PTS as a result of underwater noise during UXO clearance. This would consider the options, suitability and effectiveness of mitigation measures such as, but not limited to: ▪ Avoidance of UXO if practicable; ▪ Use of low-order clearance techniques, such as deflagration; ▪ The potential use of noise abatement if any high-order detonation is required (taking into consideration the environmental limitations); ▪ Monitoring requirements for marine mammal observers; ▪ Requirements for ADDs; and Other UXO clearance techniques, or relocation of UXO. If more than one high-order detonation is required, other measures such as the use of scare charges; or multiple detonations, if UXO are located in close proximity, will also be considered.	Tertiary	The Applicant will seek consent for UXO clearance activities via a separate Marine Licence application process. Secured in the UXO MMMP as part of a Marine Licence prior to construction. An **Outline MMMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-27	If required, mitigation for geophysical surveys will follow the Joint Nature Conservation Committee (2017) 'Guidelines for Minimising the Risk of Injury to Marine Mammals from Geophysical Surveys.	Tertiary	Secured through the European Protected Species (EPS) Risk Assessment and EPS Licence.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-28	Development of UXO Threat and Risk Assessment. All UXO detonations will be subject to a risk assessment undertaken in accordance with relevant guidance such as publication C754 Assessment and Management of UXO Risk in the Marine Environment (Construction Industry Research and Information Association, 2015).	Tertiary	A UXO Threat and Risk Assessment has been developed to support an indicative assessment of UXO clearance in the Bellrock WFDA EIA Report and will inform separate Marine Licence application(s) for UXO clearance.
WFDA-33	Preparation of an Invasive Non-native Species Mitigation Plan (INNSMP) to include provisions for Invasive non-native species management. The INNSMP would implement biosecurity measures in line with international and national regulations and guidance, namely: ▪ International Convention for the Prevention of Pollution from Ships (MARPOL), which sets out requirements, including appropriate vessel maintenance; ▪ The International Convention for the Control and Management of Ships' Ballast Water and Sediments, which provides an international framework for the control of transfer of potentially invasive non-native species from ballast water; and Consideration of guidance from the International Maritime Organisation (IMO, 2023) on the control and management of ships' biofouling to minimise the transfer of invasive aquatic species.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring an INNSMP to be developed and submitted to the Scottish Ministers for approval before commencement of construction. The **INNSMP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-34	Adherence to the following international and national regulations and guidance, namely: ▪ International Convention for the Prevention of Pollution from Ships (MARPOL), which sets out requirements, including appropriate vessel maintenance; ▪ The International Convention for the Control and Management of Ships' Ballast Water and Sediments, which provides an international framework for the control of transfer of potentially invasive species from ballast water; and	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a VMNSP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
	Consideration of guidance from the International Maritime Organisation (IMO, 2023) on the control and management of ships' biofouling to minimise the transfer of invasive aquatic species.		An **Outline VMNSP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.
WFDA-43	The Applicant will ensure compliance with the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (MCA and Health and Safety Executive, 2017).	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Navigational Safety Plan to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline VMNSP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-47	Development of, and adherence to, a Decommissioning Programme (DP). The DP will set out the framework for the safe, orderly, and environmentally acceptable decommissioning and removal of the Bellrock Wind Farm Infrastructure, in the interests of safety and environmental protection. Climate change risk measures will be included in the DP to be developed prior to the commencement of construction and will include a review of site-specific weather and metocean conditions, recent extreme weather events and up-to-date climate change projection data will be undertaken to ensure risk assessments, health and safety protocols and guidelines on safe working practices are suitable for future climate conditions at the time of decommissioning works. The DP will be refreshed prior to decommissioning activities commencing. The DP will mitigate the risk of climate change impacts on decommissioning site personnel, plant and equipment and other assets and the risk of delays to the decommissioning programme due to extreme weather events, which are becoming more frequent and intense due to climate change.	Tertiary	Secured in the s.36 Consent and Marine Licence, via a condition requiring a DP to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
WFDA-50	No more than two non-rotating FOUs will be towed together at once and will not exceed a velocity of 10 knots.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring a Vessel Management Plan and Navigational Safety Plan to be developed and submitted to the Scottish Ministers for approval before commencement of construction. An **Outline VMNSP (Volume V)** is submitted alongside the s.36 Consent application and Marine Licence application for the Bellrock Wind Farm Infrastructure.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-59	Seabed contacting infrastructure will be micro-sited, where practicable, to avoid sensitive seabed habitats, low or limited mobility benthic species, such as Annex I habitats and Priority Marine Features. Micro-siting will be informed by surveys prior to the commencement of construction which will identify the location and extent of habitats and species.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring a CMS and Development Specification and Layout Plan to be developed and submitted to the Scottish Ministers for approval before commencement of construction.
WFDA-60	Development of, and adherence to, a CMS. The CMS will describe the methods for construction for all consented Wind Farm Infrastructure and set out the measures to be implemented to avoid or reduce adverse effects on the environment and legitimate users of the sea during the construction phase. This will include a clear definition of roles and responsibilities and reference to relevant health and safety protocols. In relation to climate change, the CMS will incorporate measures to ensure construction activities are resilient to current and projected extreme weather and metocean conditions. This will include, as appropriate: ▪ Monitoring of site-specific weather and metocean conditions, including use of recognised forecasting and severe weather alert services; ▪ Programming and phasing of construction activities with regard to seasonality and short- to medium-term forecasts; ▪ Definition of safe working limits for vessel, lifting, and installation operations and procedures for suspension of works where thresholds are exceeded; ▪ Measures to secure plant, equipment, and materials during adverse weather; and ▪ Risk assessments and safety procedures that account for site-specific extreme weather risks. Through these measures, the CMS will mitigate risks to construction personnel, plant, and equipment, and reduce the potential for programme disruptions arising from extreme weather events.	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring a CMS to be developed and submitted to the Scottish Ministers for approval before commencement of construction.

Measure ID	Embedded Mitigation Measure(s)	Mitigation Type	Means of Implementation
WFDA-61	Regular and periodic inspections and maintenance of all components of the Wind Farm Infrastructure will be undertaken over their operational lifetime to identify and remediate any damage and deterioration and maintain good working conditions. These will be included in the Operation and Maintenance Plan (OMP). Monitoring of site-specific weather and metocean conditions, recent extreme weather events and up-to-date climate change projection data will be undertaken to provide a dynamic risk assessment of climate change impacts and inform operation and maintenance planning. The OMP will mitigate the risks of climate change impacts on the conditions and performance of the Wind Farm Infrastructure and ensures that it is adaptable to future climate conditions and remains resilient over its operational life. The O&M strategy will be adaptive, with the frequency of maintenance, repair and replacement activities being adjusted based on need (i.e. increasing planned O&M visits for components with higher deterioration rates than anticipated).	Tertiary	Secured in the s.36 Consent and Marine Licence via a condition requiring an OMP to be developed and submitted to the Scottish Ministers for approval prior to the commissioning of the first WTG.
WFDA-62	Regular and periodic inspections and maintenance of the Wind Farm Infrastructure will be undertaken over its operational life to identify and remediate any damage and deterioration and maintain good working conditions (including any debris entangled with the Wind Farm Infrastructure). This will include but not be limited to: ▪ Surveys of subsea infrastructure.	Primary	Secured in the s.36 Consent and Marine Licence via a condition requiring an OMP to be developed and submitted to the Scottish Ministers for approval prior to the commissioning of the first WTG.
Notes: [1] Anything additional to 30-minutes ADD activation is considered secondary mitigation and therefore not a designed in measure.			

2 Geophysical Survey Marine Mammal Mitigation Protocol

2.1 Introduction

12. This Outline MMMP for geophysical surveys has been prepared to support the s.36 Consent and Marine Licence application, and future EPS licence application for geophysical surveys within the Bellrock WFDA.

13. Prior to any geophysical surveys undertaken during construction of the Wind Farm Infrastructure, an EPS RA will be conducted to determine whether the proposed surveys will pose a risk of disturbance or auditory injury to cetacean species.

2.2 Scenarios Considered

14. Geophysical surveys may be undertaken to inform the final design of the Wind Farm Infrastructure. Surveys may comprise the use of Side Scan Sonar (SSS), Sub-bottom Profiler (SBP), Multibeam Echo-Sounder (MBES), Single Beam Echo-Sounder and Ultrashort Base Line (USBL).

2.3 Guidance

15. This Outline geophysical survey MMMP follows the guidance provided in Joint Nature Conservation Committee (JNCC) (2017[7]); JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys and with the guidance for the use of PAM in United Kingdom (UK) waters for minimising the risk of injury to marine mammals from offshore activities (JNCC, 2023).

16. Geophysical survey equipment such as SBP, SSS and sparkers are currently expected to require mitigation to comply with the Scottish regulations and any potential EPS Licence (if required). The JNCC guidance currently only requires mitigation of MBES during surveys conducted in deep waters (>200 m). Therefore, it is not anticipated that MBES will require mitigation as surveys of the Project will take place in waters <200 m. NatureScot have also advised that if the USBL is operated above 210 decibels (dB) re 1 micro-pascal (µPa) peak sound pressure level (SPL_{peak}), then mitigation will be required to minimise the risk of injury, but that if it is operated below this threshold that mitigation will not be needed (as is expected during the Bellrock WFDA surveys) (NatureScot, 2024).

17. The equipment requiring mitigation will be confirmed in the final EPS RA, following advice from stakeholders and the issuing of an EPS licence (if required) for geophysical survey activity.

[7] Draft JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys were issued in 2025 for consultation and the updated requirements will be adhered to once published.

2.4 Mitigation Methods

18. The mitigation measures for the proposed surveys, as outlined within the JNCC guidelines (2017) will include:

- A MMO;
- If required, and if it is feasible and safe, to tow a hydrophone array alongside the survey equipment, PAM could be deployed as an additional mitigation measure (for example, PAM pre-survey searches to be undertaken during hours of darkness and in poor visibility);
- The MMO/PAM Operator (PAM-Op) must be informed sufficiently in advance of initiating survey equipment so that a full search can be completed prior to the soft start commencing. The standard radius of the mitigation zone (MZ) is 500 m, estimated from the centre of the noise source location:
  - The MMO must monitor the MZ for the full duration of the pre-watch search (for a period of at least 30 minutes prior to use of the survey equipment) and soft start period. Where PAM is being used in conjunction with or in place of visual surveys, acoustic monitoring must also occur for the full duration of the pre-watch search and soft start procedure. Once the soft start has ended and data acquisition begins, monitoring can cease.
- If marine mammals are detected within the MZ (500 m around noise source) during the pre-watch search, the soft start must be delayed until their passage, or the transit of the vessel, results in them being outside of the MZ. There must be a minimum of a 20-minute delay from the time of the last detection within the MZ and the commencement of the full soft start;
- Standard duration of a soft start for high resolution surveys, are:
  - From the start of the soft start until full operational power: minimum of 15 minutes; and
  - From the start of the soft start until the start of the survey line: maximum of 25 minutes.
- If line changes are expected to take longer than 40 minutes
  - Firing is to be terminated at the end of the survey line; :
  - A pre-watch search is to be undertaken during the scheduled line change;
  - The soft start is to be delayed if marine mammals are seen within the MZ during the pre-watch search; and
  - A full 20-minute soft start is to be undertaken before the start of the next line.
- If line changes are expected to be completed within 40 minutes:
  - Survey equipment firing can continue during the line change. The Shot Point Interval (SPI) should be increased to provide a longer duration between shots, with the SPI not to exceed 5 minutes. The power is increased and the SPI is decreased in uniform stages during the final 10 minutes of the line change, prior to data collection re-commencing.
- The MMO/PAM-Op should be located on the source vessel to ensure they are close enough to the survey equipment to effectively monitor the MZ;
- In circumstances of an unplanned break, it is imperative the MMO/PAM-Op begin to monitor the MZ as quickly as possible after an unplanned break has occurred:

  - For unplanned breaks of less than 10 minutes, the survey equipment can be restarted and data acquisition resumed in less than 10 minutes, so there is no requirement for a soft start and firing can recommence at the same power level as at prior to the break (or lower), provided no marine mammal(s) have been detected in the mitigation zone during the breakdown period.

- If a marine mammal is detected in the MZ during the inactive/silent period, the MMO/PAM-Op will advise to delay recommencement of the survey line until their passage, or the transit of the vessel, results in the marine mammals being outside of the MZ. There must be a minimum of a 20-minute delay from the time of the last detection within the MZ and a soft start must then be undertaken:
  - Unplanned breaks of longer than 10 minutes, a full pre-watch search and soft start should be carried out before the survey re-commences. If an MMO/PAM-Op has been monitoring during the breakdown period, this time can contribute to the pre-watch search time (30 minutes).
- If the breakdown occurs at night or during daylight conditions not conducive for a visual search, the MZ should be monitored as described above using PAM. If PAM is not available, the survey must be delayed until conditions are suitable for visual observations. The same procedures as above (for unplanned breaks) can be applied for planned breaks. However, if the planned break will be for less than 10 minutes, the MMO/PAM-Op must begin monitoring 20 minutes prior to the planned break and continue for the duration of the break.

3 Piling Marine Mammal Mitigation Protocol

3.1 Introduction

19. This Outline MMMP for piling has been prepared to support the s.36 Consent and Marine Licence application, and future EPS licence application for pile driving operations within the Bellrock WFDA.

20. This Outline MMMP for piling proposes the mitigation measures to reduce the likelihood of any injury, including any PTS, to marine mammals during all piling operations.

21. The final MMMP for piling will be developed in the prior to commencement of construction, when there will be more detailed information on the Bellrock WFDA design, and will incorporate the most appropriate mitigation measures based upon the latest and best available information, proven methodologies and including information presented in the PNMP and updated underwater noise modelling, if required. The final MMMP will include details of the embedded mitigation, such as the soft start and ramp-up, as well as details of the MZ and any additional mitigation measures required to minimise potential impacts of any physical injury or PTS. The final MMMP will be developed in consultation with MD-LOT and NatureScot.

3.2 Results from Underwater Noise Modelling

22. The aim of the MMMP for piling is to reduce the risk of PTS during piling of anchors from:

- First strike of the starting hammer energy during soft start;
- Single strike of the maximum hammer energy;
- Cumulative exposure during installation based on worst-case for three FOU driven piles installed sequentially in the same 24-hour period; and
- Cumulative exposure during installation based on worst-case concurrent modelling scenario of three sequentially installed FOU driven piles at the NW location and three piles sequentially installed at E-midpoint location within a 24-hour period (equating to a maximum of six piles installed over both locations in a 24-hour period).

23. The potential impact ranges presented in **Table 3.1** summarise the maximum predicted impact ranges (PTS) taken forward for assessment for piling. For more details, refer to **Appendix 9.2: Underwater Noise Modelling Report (Volume IV)** which describes the underwater modelling undertaken.

25. The underwater noise modelling was based on the following piling scenario for FOU driven piles:

- Three sequential FOU driven piles;
- Maximum diameter of up to 6 m;
- Maximum hammer energy of up to 3,000 kilojoules (kJ);
- Maximum starting energy of approximately 277 kJ; and
- A piling duration of up to 3 hours (2.99 hours) per pile.

Table 3.1: Summary of Impact Ranges for Sound Pressure Level Peak (SPL_{peak}) at Full Power and Cumulative Sound Exposure Level (SEL_{cum}) Modelled for Piling of FOU Driven Piles at the Worst-case Locations based on the Current Bellrock WFDA Design

Species (and Hearing Range)	Impact	Criteria and Threshold	Maximum Impact Range (Impact Area Shown in Brackets)	
			3x FOU Driven Piles at E-midpoint	3x FOU Driven Piles at NW-corner and 3x FOU Driven Piles at E-midpoint
Harbour porpoise (Very High Frequency (VHF))	PTS from single strike (without mitigation)	SPL_{peak} Unweighted (202 dB re 1 µPa) Impulsive	0.77 km (1.9 km^2)	-
	PTS from cumulative SEL (including soft start and ramp-up)	SEL_{cum} Weighted (155 dB re 1 μPa^2s) Impulsive	3.7 km (37 km^2)	600 km^2
Dolphin species (High Frequency (HF))	PTS from single strike (without mitigation)	SPL_{peak} Unweighted (230 dB re 1 µPa) Impulsive	N/A	-
	PTS from cumulative SEL (including soft start and ramp-up)	SEL_{cum} Weighted (185 dB re 1 μPa^2s) Impulsive	N/A	N/A
Baleen whales (Low Frequency (LF))	PTS from single strike (without mitigation)	SPL_{peak} Unweighted (219 dB re 1 µPa) Impulsive	0.06 km (0.01 km^2)	-
	PTS from cumulative SEL (including soft start and ramp-up)	SEL_{cum} Weighted (183 dB re 1 μPa^2s) Impulsive	25 km (1,500 km^2)	3,400 km^2

Species (and Hearing Range)	Impact	Criteria and Threshold	Maximum Impact Range (Impact Area Shown in Brackets)	
			3x FOU Driven Piles at E-midpoint	3x FOU Driven Piles at NW-corner and 3x FOU Driven Piles at E-midpoint
Grey and harbour seal (Phocid Carnivore in Water (PCW))	PTS from single strike (without mitigation)	SPL_{peak} Unweighted (218 dB re 1 µPa) Impulsive	0.07 km ($0.01\ km^2$)	-
	PTS from cumulative SEL (including soft start and ramp-up)	SEL_{cum} Weighted (185 dB re 1 µPa2s) Impulsive	N/A	70 km^2

3.3 Guidance

26. The current guidance on minimising the risk of injury to marine mammals from piling noise is provided by the JNCC (2010). These mitigation guidelines are supplemented by the JNCC guidance for the use of PAM in UK waters (JNCC, 2023).

27. Despite the additional guidance on the use of PAM, it is noted that guidance specific to piling has not been updated since 2010 and, therefore, is outdated. It does not take into consideration the considerable developments in our understanding of the effects of noise on marine mammals, and increased evidence that ADDs are effective at deterring marine mammals from the instantaneous PTS mitigation zone. For example, the use of ADDs as the sole mitigation measure without the need for additional visual and/or acoustic monitoring was used at Beatrice Offshore Wind Farm, Moray East Offshore Wind Farm and Moray West Offshore Wind Farm, all in the Moray Firth, and was shown to be effective for marine mammal mitigation. McGarry (2020) carried out a review of ADDs and therefore there is a good level of knowledge of the efficiency of devices, with the Lofitech having the largest deterrent ranges as described in **Section 4.5.4** Furthermore, the JNCC has advised that an addendum to provide updates to the JNCC (2010) piling guidelines is currently in preparation and, therefore, new advice may be available prior to the finalisation of the MMMP for piling.

28. Therefore, various potential options for the mitigation of instantaneous PTS are outlined below. The final MMMP for piling will commit to specific mitigation measures.

3.4 Mitigation Methods

29. The final MMMP for piling require the establishment of a MZ around the pile location before each pile driving activity, based on the maximum predicted distance for instantaneous PTS. The final MMMP for piling will provide details of the maximum predicted impact (PTS) ranges and areas for piling.

30. The Applicants will ensure that the mitigation measures are adequate to minimise the risk of any physical or auditory injury (PTS) to marine mammals.

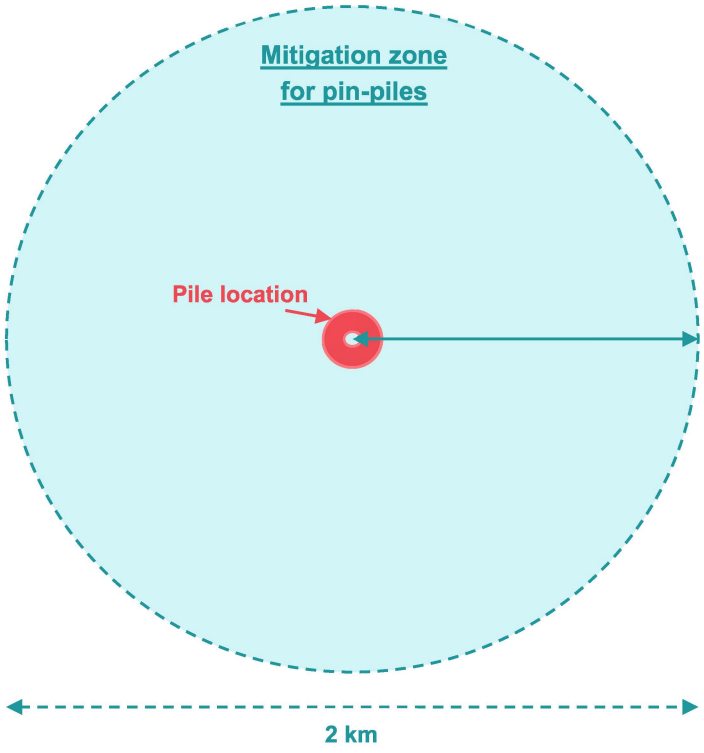
31. The methods for establishing the MZ and reducing the potential impacts of piling operations will be agreed with MD-LOT and NatureScot and will be secured as commitments within the final MMMP.

32. This Outline MMMP is providing mitigation measures based on the results from **Appendix 9.2: Underwater Noise Modelling Report (Volume IV)**.

33. The Outline piling mitigation measures therefore could include:

- Activation of ADDs (see **Section 3.4.1**);
- Soft start and ramp-up (see **Section 3.4.2**); and
- Procedure for breaks during piling (see **Section 3.4.3**).

Plate 3.1: Indicative Mitigation Zone for Pin-pile



3.4.1 Acoustic Deterrent Device

34. The type and model of Acoustic Deterrent Device (ADD) will be determined in the final MMMP for piling, based on the latest information and advice, and will provide sufficient evidence to demonstrate that it is effective at deterring the marine mammal species that could be present in the established MZ. The Lofitech ADD have proven to be effective mitigation for harbour porpoise, minke whale, grey and harbour seal (Sparling et al. 2015; McGarry et al. 2017, 2020; Boisseau et al. 2021). Studies have shown the Lofitech seal scarer to be effective for harbour porpoise at ranges of 7 to 9 km. 9 km is the maximum distance that has been recorded using a portable hydrophone cluster within 10 km off the ADD deployment (Graham et al. 2023). This 2023 study supports findings of previous studies, which have detected immediate response on activation of the device (Brandt et al. 2012, 2013a; Gordon et al. 2015; Thompson et al. 2020).

3.4.1.1 Acoustic Deterrent Device Pre-deployment Test

35. The ADD will be tested on site to ensure it is working correctly. If there are any technical problems with the ADD, then the ADD activation will be delayed until these issues are resolved. The ADD will be tested by deploying a calibrated hydrophone near the ADD, which will be connected to a computer with a suitable sound card and software e.g. PAMGuard, and used to verify the signal. The Project will have backup equipment to prevent any delays in piling.

36. The ADD operator will also ensure that the communications are in place between themselves and the Operations Control Manager (OCM) supervisor (as described in **Section 3.4.5**).

3.4.1.2 Acoustic Deterrent Device Locations

37. The ADD will be positioned within the water column in close proximity to the piling event as far as practically possible. It is proposed that the ADD will be deployed from the piling vessel at a location where it is safe to be positioned close to the piling event prior to the commencement of the pre-piling search.

38. The best location to deploy the ADD, and the method to provide power to the devices, will be decided through a pre-deployment survey from the vessel or vessels by the ADD operator, relevant offshore management team and vessel operational manager. Once the best location for the ADD has been determined, the control unit and power supply should be temporarily installed. For deployment of the ADD, the transducer part of the device will be lowered over the side of the deck (they should not be activated at this time) to a water depth that is below the draft of the vessel to ensure the sound can be emitted in all directions and not dampened by the presence of the vessel.

3.4.1.3 Acoustic Deterrent Device Activation Times

39. ADD will be activated to reduce the risk of instantaneous PTS from a single strike of the maximum hammer energy, based on the updated information from the PNMP.

40. The ADD activation times will be based on precautionary marine mammal swimming speeds as detailed in **Table 3.2.** The ADD activation duration based on the current underwater noise modelling is also presented in **Table 3.2**.

Table 3.2: Acoustic Deterrent Device Activation Time

Parameter	Baleen Whale (LF)[1]	Dolphins (HF)[2]	Harbour Porpoise (VHF)[3]	Seals (PCW)[4]
Maximum PTS SPL_{peak} impact range (km)	0.06	N/A	0.77	0.07
Minimum ADD duration (minuets)	1	N/A	10	1
ADD effect range (km) (ADD on for 10 min)	1.26	0.91	0.84	1.08

Notes:

[1] Based on a swimming speed of 2.1 m/s (Scottish National Heritage (SNH), 2016).

[2] Based on a swimming speed of 1.52 m/s (Bailey and Thompson, 2006).

[3] Based on a swimming speed of 1.4 m/s (SNH, 2016).

[4] Based on a swimming speed of 1.8 m/s (SNH, 2016).

3.4.2 Soft Start and Ramp-up

41. Following the activation period of the ADD, the soft start procedure will commence. Based on the current worst-case modelled scenario, the soft start will start with a duration of at least 15 minutes, at a maximum hammer energy of 227 kJ with six strikes per minute.

42. A gradual ramp-up period will follow the soft start, with the energy used per hammer blow gradually increasing so that if any marine megafauna are in the area, despite the pre-piling activation of the ADD, they are encouraged to leave by the initial low levels of underwater noise prior to the noise reaching levels which could cause PTS. The gradual ramp-up will last approximately 35 minutes, increasing hammer energy with 10 to 30 strikes per minute.

43. This 50-minute soft start and ramp-up procedure is more precautionary than the current JNCC (2010) guidance, which recommends that the soft start and ramp-up duration should be a period of not less than 20 minutes.

44. During the 50 minutes for the soft start and ramp-up it is estimated that marine mammals and megafauna will move away from the piling event, at least 4.2 km from the piling location for harbour porpoise. This will be greater than the maximum predicted distance for PTS from a single strike at the maximum hammer energy:

- During the 15-minute soft start it is estimated that marine mammals will move a minimum of 1.26 km from the piling (based upon a precautionary marine mammal swimming speed of 1.4 m/s (SNH, 2016); and
- If piling activity is stopped for more than two hours, a full restart of the procedures as stated above is conducted prior to piling re-commencing.

45. The soft start and ramp-up procedure will be primary mitigation for all piling operations and will be confirmed after full ground condition evaluation undertaken to inform the PNMP and updated underwater noise modelling, if required.

3.4.3 Breaks in Piling

46. In order to minimise ADD use and therefore reduce any unnecessary disturbance to marine mammals, the ADD will not be re-deployed for breaks in piling that are less than 6 hours. Studies have shown that harbour porpoise detections remain significantly reduced from baseline levels up to 6 hours after ADD activation (Brandt et al. 2013b) and further studies in Germany showed reduced porpoise detection rates for 28-48 hours after the end of pile driving (Brandt et al. 2013a; Rose et al. 2019).

47. The required procedure for restarting operations following a break in piling is dependent on the length of the break:

1. In the event of breaks in piling of <10 minutes, no mitigation is required. The pile driving can continue from the last hammer energy and strike rate (or lower) used without the need for another ADD deployment;
2. For breaks in piling >10 min but <6 hours, pile driving will recommence with a full soft start and ramp-up of hammer energy, wherever this is safe to do so, but without the need for pre-piling ADD deployment; and
3. If the break in piling is >6 hours, then the full pilling mitigation procedure of pre-piling ADD deployment, soft-start and ramp-up will be conducted.

3.4.4 Piling at Night/Poor Visibility

48. The deployment and activation of the ADD in poor visibility and at night will follow the same procedure as outlined in **Section 3.4.1**, as will the soft start and ramp-up procedure as outlined in **Section 3.4.2**.

3.4.5 Reporting

49. All reporting will be completed detailing the marine mammal mitigation activities and timings, and will be submitted to MD-LOT after the operation has been completed. These reports will include information on piling activities, date, time and location, information on hammer energies, number of strikes, start times of piling.

50. Marine Mammal Recording Forms will be completed (including the cover page, operations sheet, effort sheet, and sightings sheet). Deck forms can be used if preferred with the information transferred to the spreadsheet at the end of the watch. Details of ADD usage and observations of their efficacy, and any problems encountered and instances of non-compliance with the JNCC guidelines and variations from the agreed procedure will also be reported.

51. The ADD operator will maintain a detailed record, including all ADD deployment, activation and recovery times, a record of each verification of ADD activation and a note of any issues encountered with regard to the ADD deployment and activation. This will be sent to the Client Representative and/or other nominated responsible person.

52. A final report will be provided which will be submitted to MD-LOT, NatureScot and JNCC. The final report will include any data collected during piling operations; ADD deployment and activation, a detailed description of any technical problems encountered and what, if any, actions were taken. Communication and Responsibilities.

53. Clear communication channels between the ADD operator and the relevant offshore management team are required. Communication procedures will be established and agreed prior to any piling event with regard to the communication the deployment of ADD, and when the all clear is for piling to start. The relevant offshore management team will assign a person responsible for communication with the ADD operator. A communications protocol will be developed between the ADD operator and the Nominated Contact. This communications protocol will include, but not be limited to:

- Notification required prior to piling to ensure ADD and all equipment required is tested and ready for deployment;
- Once on board, the notification required to set-up equipment, test and deploy ADD to allow for the required activation prior to soft start commencing;
- Procedure to notify the Nominated Contact that deployment of ADD and activation for the required time has been successful, and next steps in the mitigation can commence, or if deployment of ADD and activation has not been successful that clearance activities will be delayed;
- Procedure to notify the ADD operator that each stage of the mitigation is successfully underway, and when the ADD can be switched off and retrieved from the water;
- Procedure to notify the relevant offshore management team that soft start can commence;
- Procedure to notify the ADD operator that further ADD activation is required; and
- Procedure to notify the Lead Operator that the piling operations have been successfully completed.

4 UXO Clearance Marine Mammal Mitigation Protocol

4.1 Introduction

54. This Outline MMMP for UXO clearance has been prepared to support the s.36 Consent and Marine Licence application, and future Marine Licence and future EPS Licence applications for the mitigation of Explosive Ordnance Disposal (EOD) operations within the Bellrock WFDA.

55. If UXOs are found within the Bellrock WFDA, a risk assessment (RA) will be undertaken and UXO will be either avoided by Wind Farm Infrastructure micro-siting, or removal, or disposed of the UXO in-situ. As detailed UXO surveys and the detailed design have not yet been completed, it is not possible at this time to determine how many UXOs will require clearance. As a result, a separate Marine Licence will be applied for to licence for the clearance (where required) of any UXO identified.

56. This Outline UXO MMMP details the potential contingency measures which could be used to manage the risk of PTS auditory injury to marine mammal species arising from UXO clearance operations to a negligible level.

4.2 Guidance

57. The policy paper Marine Environment: UXO Clearance Joint Position Statement was updated January 2025 (Defra et al. 2025) and states:

- Low noise methods should be the default method of UXO clearance;
- High order methods should be last resort;
- A noise abatement system (NAS) is required for any high order clearance;
- If high order clearance is the only method considered, an appropriate justification for this should be provided; and
- Regardless of the clearance tool or method used, all applicants should avoid, reduce and mitigate environmental impacts as far as possible.

58. Defra (2025) and the Marine Directorate (2025b) also published supporting guidance on the Marine License application, mitigation and monitoring, reporting and supporting evidence for low noise methods of UXO clearance. These updated policies along with the JNCC (2025) guidelines on minimising potential risk to marine mammals from UXO clearance have been taken into account in for the development of this Outline MMMP.

4.3 Summary of Clearance Methods

59. Prior to the use of any UXO clearance techniques, UXO mitigation measures such as avoidance or relocation will first be considered. Where such mitigation measures are not suitable, UXO clearance and disposal techniques will then be undertaken by specialist contractors, using techniques that will aim to minimise the impact of UXO clearance & disposal.

60. Where possible and safe to do so, the preferred options for UXO mitigation prior to any UXO clearance will be as follows, in order of preference:

- UXO will be avoided and left in-situ;
- Micro-siting of Wind Farm Infrastructure, if possible, to avoid any potential UXO, so clearance is not required; or
- If the UXO appears structurally sound and there is no risk, the UXO could potentially be relocated to a location that is not in a sensitive area (e.g. not within a designated site or in close proximity to existing or planned infrastructure) for subsequent clearance, subject to a proportional assessment of the risk posed to the vessel and staff from a health and safety perspective.

61. If these options are not possible, and UXO clearance is the only option, then low-order clearance will be the default method. High-order clearance will only be considered as a contingency if low-order clearance was unsuccessful after three attempts or the UXO device is unsafe for low-order clearance.

62. It is important to note these techniques and options are presented as current examples, but the mitigation options will be reviewed and updated based on the latest information and guidance in the final MMMP, which will be submitted with the Marine Licence application for UXO clearance.

63. The final MMMP will involve the establishment of a suitable MZ around a UXO location before any UXO clearance. The MZ is the entire mitigation area for the maximum PTS ranges.

64. The methods for establishing the MZ and reducing the potential impacts of any UXO clearance will be agreed with the MD-LOT and NatureScot and will be secured as commitments within the final MMMP.

4.3.1 Low Order

65. Low order UXO clearance techniques, where the ordnance is disposed of or rendered safe without a high-order clearance will be the default option for clearance for this work. Examples of low-order techniques include (National Physical Laboratory (NPL), 2020):

- Freezing the munition to render it inactive;
- Water abrasive suspension cutting in order to physically disrupt the munition;
- Disposal in a Static Detonation Chamber;
- Photolytic destruction of the munition; and
- Low-order deflagration.

66. Deflagration is a technique whereby the explosive within the UXO is rapidly burned at subsonic speeds using plasma from a small, shaped charge that generates insufficient shock to detonate the UXO (Merchant and Robinson, 2020; NPL, 2020). The explosive material inside the UXO reacts with a rapid burning rather than a chain reaction that will lead to a full explosion (NPL, 2020).

67. Substantial noise reduction for deflagration over high-order (SPL_{peak} and SEL are more than 20 dB lower) and acoustic output for deflagration depends only on the size of the shaped charge (rather than the size of the UXO) (NPL, 2020; Robinson et al. 2020).

68. The technique of low order clearance appears to present a viable option to avoid high-order explosive detonation. Low order techniques, such as deflagration, are relatively new to civilian applications but have been used by the UK military since 2005 (Merchant and Robinson, 2020).

4.3.2 High Order Clearance (≥ 263 kg) with Noise Abatement Systems

69. If high order clearance of a UXO larger than 263 kg is required as a contingency following three attempts to detonate using low order techniques or in situations where the UXO is too unstable for a safe low order clearance, additional mitigation measures are required. NAS will be considered for any high order clearance to reduce underwater noise impacts from the explosion.

4.4 Results from Current Underwater Noise Modelling

70. **Table 4.1** presents the indicative impact ranges for UXO clearance, considering various charge weights and impact criteria using both peak sound pressure level and cumulative sound exposure level (SEL_{cum}).

71. As a UXO clearance sound source is defined as a single pulse, as such the SEL_{cum} criteria from Southall et al. (2019) have been given as single pulse values in **Table 4.1** and fleeing receptor assumptions have not been applied (See **Appendix 9.3: UXO Assessment (Volume IV)**).

72. Although the predicted impact ranges in **Table 4.1** are large, the duration the noise is present must also be considered. For the detonation of a high order clearance of a UXO, each explosion is a single noise event, compared to the multiple pulse nature and longer durations of impact piling. The predicted impact ranges in bold in **Table 4.1** will be required to be mitigated for. For the purpose of this Outline MMMP, the proposed mitigation measures will be for low-order clearance, at a 1 km impact range, accounting for the highest PTS range of 990 m for harbour porpoise, as additional mitigation measures such as NAS will be required to mitigate for the worst-case high-order clearance.

73. It should be noted that the underwater noise modelling for UXO clearance is very indicative at this stage. A UXO investigation survey will take place prior to commencement of construction to identify the number, location and sizes of the UXO's where a more specified approach to underwater noise modelling will take place, that will include noise mitigation such as NAS if high order UXO clearance is going to be an option.

Table 4.1: PTS Impact Ranges for Marine Mammals Using the Southall et al. (2019) Impulsive Criteria for UXO Clearance Noise

Net Explosive Quantity Weight	PTS (Impulsive) SPL_{peak}[1]				PTS (Impulsive) SEL_{cum}			
	LF (219 dB)	HF (230 dB)	VHF (202 dB)	PCW (218 dB)	LF (213 dB)	HF (224 dB)	VHF (196 dB)	PCW (212 dB)
Low order (0.25 kg)	170 m	60 m	**990 m**	190 m	230 m	< 50 m	80 m	< 50 m
25 kg (+ donor)	820 m	260 m	4.6 km	910 m	2.2 km	< 50 m	570 m	390 m
55 kg (+ donor)	1.0 km	340 m	6.0 km	1.1 km	3.2 km	< 50 m	740 m	570 m
120 kg (+ donor)	1.3 km	450 m	7.8 km	1.5 km	4.7 km	< 50 m	950 m	830 m
240 kg (+ donor)	1.7 km	560 m	9.8 km	1.9 km	6.5 km	< 50 m	1.1 km	1.1 km
525 kg (+ donor)	2.2 km	730 m	12 km	2.5 km	9.5 km	50 m	1.4 km	1.6 km
698 kg (+ donor)	2.4 km	810 m	13 km	2.7 km	10 km	60 m	1.5 km	1.9 km
750 kg (+ donor)	2.5 km	830 m	**14 km**	2.8 km	11 km	60 m	1.5 km	2.0 km

Notes:

[1] Predicted impact ranges in bold text will require mitigation.

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4.5 Mitigation Methods

74. The Applicant will ensure that the mitigation measures are adequate to reduce the risk of any physical or PTS within the MZ during all UXO clearance.

75. The final MMMP will involve the establishment of a suitable MZ around a UXO location before any UXO clearance. The methods for establishing the MZ and reducing the potential impacts of any UXO clearance will be agreed with MD-LOT, in consultation with NatureScot, and will be secured as commitments within the final MMMP.

76. The UXO clearance mitigation measures could include:

- Low-order disposal techniques (see **Section 4.3.1**), this will be the default method for all UXO clearance;
- The use of NAS if high-order UXO clearance is required taking into account the environmental conditions within which they could be effective;
- Establishment of a MA with a minimum of 1 km radius (see **Section 4.5.1**):
  - The observation of the MA will be conducted by two trained, dedicated and at least one experienced MMOs during daylight hours and when conditions allow suitable visibility, pre- and post-detonation (see **Section 4.5.1**); and
  - Deployment of PAM in the MA (see **Section 4.5.3**), to monitor in conjunction with MMOs.
- The activation of ADD (see **Section 4.5.4**) prior to UXO clearance; and
- All UXO clearance taking place in daylight and in favourable conditions (tidal level 4 or less) with good visibility.

4.5.1 Monitoring Area

77. The Monitoring Area (MA) is the area over which a pre-clearance search will be undertaken by two trained, dedicated and at least one experienced MMO and one PAM operator. The size of the MA will be based on results from the underwater noise modelling. The worst-case MA established from the current underwater noise modelling is 14 km for harbour porpoise for an unmitigated High order clearance. With a large impact range of 14 km, additional mitigation as such NAS will be required.

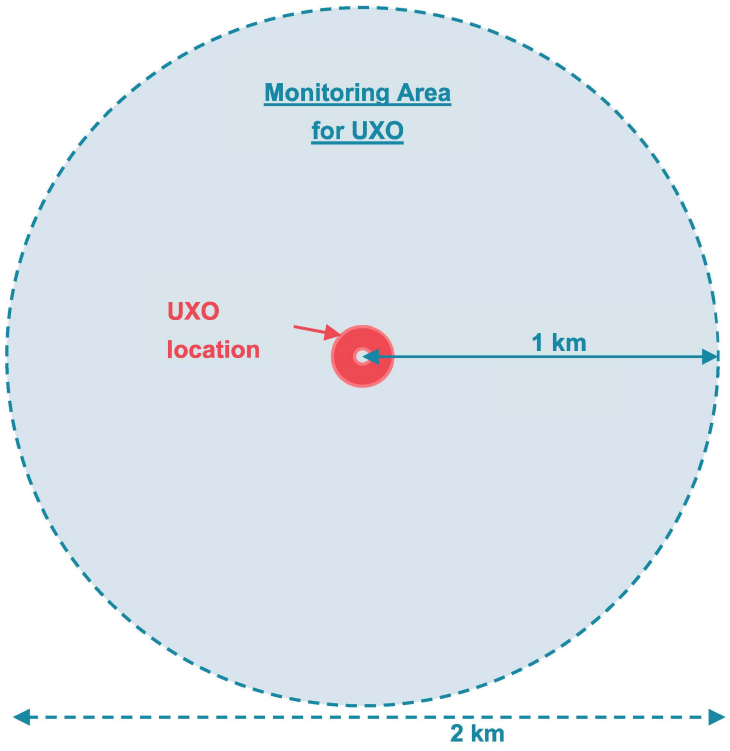
78. For low order clearance, the worst-case MA is 990 m for harbour porpoise, therefore, the MA will have a minimum radius of 1 km from the UXO location.

79. If predicted injury ranges (and consequently the MZ) are greater than 1 km, the visual search is still required and the MMO (and PAM operative if applicable) should focus their search efforts to within 1 km but also record any animals seen outside of this range. If it appears the animal is moving towards the detonation location, the MMO should monitor the movement and behaviour of the animal and use their expert judgement to determine a delay in detonation is required.

80. The 1 km radius of the MA will be measured out from the UXO clearance site with a 360° coverage, representing an area of 3.14 km^2 (**Plate 4.1**).

81. The MA will be monitored for a minimum of one hour prior to UXO clearance by both the MMO and PAM.

Plate 4.1: Monitoring Area for UXO Clearance



4.5.2 Marine Mammal Observers

82. Marine mammal observations will be undertaken by trained and dedicated JNCC accredited Marine Mammal Observers (MMOs), with at least one MMO having 20 weeks experience within UK waters over the past ten years.

83. At least two MMOs will conduct surveys to cover the entire MA and marine mammal observations will be carried out from vantage points to allow unobstructed observations of the entire MA.

84. The MMOs will be equipped with binoculars and a tool to estimate distance i.e. range finding stick or binoculars with reticles and reporting forms. The MMOs will scan the MA with the unaided eye and use binoculars when needed to look in detail at an area where a possible sighting has been made. Binoculars should not be used continually as they restrict peripheral vision and views close to the vessel.

85. Visual observations will be carried out to monitor the MA before, during and after UXO clearance.

86. The pre-clearance search will commence prior to all clearance events, or after any break in the clearance event, and at the end of a clearance event. The visual observations by the MMOs will commence at least one hour prior to the clearance event. This will continue until one hour has passed and no marine mammals have been detected within the MA, the MMOs will then advise that the UXO clearance can commence. The ADD will be activated during the monitoring period after at least a 30 minute pre-activation watch prior to ADD activation and at a time so that the end of ADD activation coincides with the end of the monitoring period prior to the UXO clearance (see **Section 4.5.4**).

87. If a marine mammal has been sighted within the MA, it will be monitored and tracked until it is clear of the MA and the EOD team notified. The marine mammal(s) must be clear of the MA for at least 20 minutes before the UXO clearance commences.

88. Prior to ADD activation, if animals are sighted within the MA, they will be tracked and monitored. If the animal is within 100 m of the ADD, the ADD activation will be delayed until the animal moves further away. If, at the end of the ADD activation period, the individual(s) remains within the MA, the ADD will be switched off to reduce any excessive noise and then the clearance event will be delayed, and the full mitigation procedure, including the pre-clearance search, will be undertaken again.

89. If the marine mammal(s) remains clear of the MA for at least 20 minutes and the one-hour pre-search has been completed, and the required ADD activation time has been completed, then the UXO clearance can commence. However, a precautionary approach will always be used; i.e. if the MMOs cannot be certain that the MA is clear of marine mammals, the UXO clearance must be delayed accordingly until the MMOs are certain that there are no marine mammals present within the MA.

90. All MMOs must be a safe distance from the clearance site prior to any UXO clearance.

91. The MMOs will continue observations during ADD activation, NAS activation (if required for high order clearance), during the UXO clearance as well as a post clearance search for at least 15 minutes after the UXO clearance is complete to record any evidence of injury to marine life, including fish kills. All observations will be noted in the mitigation report (**Section 4.5.5**), and a note included if nothing was sighted.

92. Marine megafauna observations will be carried out to monitor the MA during:

- Pre-activation search;
- Pre-clearance search;
- ADD activation;
- NAS activation (if it is required);
- UXO clearance; and
- Post-clearance search.

93. The MMOs will record all periods of marine mammal observations, including start and finish time of observations, when UXO clearance commenced and conditions during observations (e.g. tidal level, visibility, weather, etc.). Any sightings of marine mammals around the UXO vessel will also be recorded. The MMOs will complete the relevant marine mammal recording form(s) and reporting (see **Section 4.5.5**).

94. There will be clear communication channels between the PAM-Ops, MMOs, the ADD operator (the marine mammals mitigation team (MMMT)) and the EOD (see **Section 4.5.6**). The communication procedures will be established and agreed prior to any UXO clearance to ensure clear communication of any marine mammal observations within the MA, the deployment of ADD, and when the MA is clear for the UXO clearance to commence.

4.5.3 Passive Acoustic Monitoring

95. Passive Acoustic Monitoring (PAM) will be deployed in accordance with the guidance for the use of PAM in UK waters for minimising the risk of injury to marine mammals from offshore activities (JNCC, 2023) and the JNCC guidelines for minimising the risk of injury to marine mammals from UXO clearance in the marine environment (JNCC, 2025) to provide continuous monitoring for marine mammals during UXO clearance.

96. The type of PAM system and equipment will be confirmed in the final MMMP with consultation with MD-LOT and SNCB's and the clearance contractor depending on operational constraints.

97. Deployment of the PAM equipment will be within the MA, positioned to maximise acoustic coverage of the full clearance area.

98. Hydrophones will be selected to cover the frequency range of interest for all species (e.g. harbour porpoise, fin whale, grey seal vocalisations), with sensitivity appropriate to detect vocalisations at relevant ranges. The PAM equipment will be appropriate to detect all vocalising marine mammals in the MA. A detailed description of the PAM equipment and deployment will be included in the final MMMP for UXO clearance. PAM-Ops will be responsible for deployment, maintenance and operation of the equipment, including spare equipment, in relation to all UXO clearance.

99. A trained and experienced PAM-Ops will be on duty in conjunction with the MMOs during day light. UXO clearance will only occur during day light hours and in good visibility and tidal levels (tidal level 4 or less); in line with the JNCC (2025) guidance.

100. The PAM-Ops will record and report all periods of PAM, including start and finish time of monitoring, if and when marine mammals were detected, especially in relation to when ADDs were activated and, when UXO clearance was underway if possible. The PAM-Ops will provide the necessary data and information to be included in the reporting (see **Section 4.5.5**).

101. There will be clear communication channels between the PAM-Ops, MMOs, the ADD operator and the EOD (see **Section 4.5.6**).

4.5.4 Acoustic Deterrence Device

102. An ADD will be activated prior to any UXO low-order clearance or high-order clearance to ensure marine mammals are deterred from the area and reduce the risk of any physical or auditory injury.

103. ADDs have proven to be effective mitigation for harbour porpoise, dolphin species, grey and harbour seal (Sparling et al. 2015; McGarry et al. 2017, 2020). ADDs have been widely used as mitigation to deter marine mammals during offshore wind farm piling and UXO clearance at sites in Europe (for example, Brandt et al. 2011, 2012, 2013a,b) and offshore wind farm sites in the UK, including but not limited to, Galloper, Dudgeon Offshore Wind Farm, East Anglia ONE. Beatrice, and Moray East and West.

104. The type and model of ADD will be determined in the final MMMP for UXO clearance, based on the latest information and advice, and sufficient evidence will be provided to demonstrate that it is effective at deterring the marine mammal species that could be present in the MZ. At present it is the Lofitech ADD that has the largest documented deterrent ranges for harbour propose, up to 7.5 km with an immediate response on activation of the device (Brandt et al. 2012, 2013a; Gordon et al. 2015), a maximum deterrence range of 4.5 km for minke whale (Boisseau et al. 2021) and 1 km deterrent ranges for harbour seal (Brandt et al. 2012; 2013a; Harris et al. 2014; Gordon et al. 2015).

105. The ADD will be tested on deck prior to the pre-clearance search to ensure it is working correctly. If there are any technical problems with the ADD then, if required, the UXO clearance will be delayed until these issues are resolved. A back-up ADD will be present onboard; in case there are issues with activation of the primary system.

106. The ADD will be deployed and ready to be activated prior to UXO clearance and activated within the last 30 minutes of the pre-clearance search (depending on the time needed to deter marine mammals). If a marine mammal is detected within the MZ the ADD activation will be delayed until the animal is at least 100 m away from the ADD.

107. The ADD will be positioned within the water column to ensure that sound can be emitted in all directions. The ADD will be deployed from the vessel undertaking the clearance or a vessel in close proximity to the clearance site, where it is safe to be positioned prior to the commencement of the UXO clearance.

108. The best location to deploy the ADD, and the method to provide power to the device, will be decided through a pre-deployment survey from the vessel or vessels by the ADD operator(s), EOD supervisor and vessel operational manager. Once the best locations for the ADD have been determined, the control unit and power supply will be temporarily installed. For deployment of the ADD, the transducer part of the device will be lowered over the side of the deck to a water depth that is below the draft of the vessel to ensure the sound can be emitted in all directions and not dampened by the presence of the vessel.

109. The ADD will be activated after a minimum of 30-minute pre-activation watch and the end of the monitoring period will coincide with the end of ADD activation to ensure it is continuous. This will be immediately prior to either the bubble curtain activation (if being used) or clearance event to allow marine mammals to move beyond the area of potential PTS risk.

110. The ADD will not be activated during transit to another clearance event and will be activated prior to all clearance events. After the ADD has been activated for the required duration, the ADD operator will deactivate and recover the ADD and undertake routine checks to ensure it is still working correctly, ready for the next deployment and activation.

111. The ADD activation for UXO will be determined based on the maximum potential area for PTS and the animals swim speed (**Table 4.2**).

Table 4.2: Marine Mammal Swimming Speed used for ADD Activation Times

Species	Swim Speed (m/s)	Reference
Harbour porpoise (VHF)	1.4	SNH, 2016
Dolphins (HF)	1.52	Bailey and Thompson, 2006
Baleen whales (LF)	2.1	SNH, 2016
Pinnipeds (PCW)	1.8	SNH, 2016

112. The ADD activation times for high and/or low-order clearance is presented in **Table 4.3** and shows the minimum ADD activation time required is 167 minutes for an unmitigated high-order clearance and 11.8 minutes for low-order clearance to ensure all animals are outside of the 1 km impact range prior to low order UXO clearance.

Table 4.3: Acoustic Deterrent Device Activation Times and Deterrent Ranges for all Marine Mammals for High and/or Low-order UXO Clearance

Species Groups	Swim Speed (m/s)	Maximum PTS Impact Ranges (km) Without Noise Mitigation		ADD Duration (Mins) Required		Distance (km) Each Species Could Swim Based on the Worst-case ADD Duration	
		High-order	Low-order	High-order	Low-order	High-order	Low-order
Baleen whales (LF)	2.1	11	0.23	87	1.8	21	1.5
Dolphins (HF)	1.52	0.83	0.06	9	0.7	15.2	1.1
Harbour porpoise (VHF)	1.4	14	0.99	**167**	**12**	14	1.0
Pinnipeds (PCW)	1.8	2.8	0.19	26	1.8	18	1.3
Notes: Text in bold refers to the worst-case activation time.							

4.5.5 Reporting

113. All reporting will be completed detailing the marine mammal mitigation activities and timings, and any detections, and will be submitted to MD-LOT after the operation has been completed. These reports will include information on the relevant UXO clearance activities, date, time and location, information on charge sizes, start times of clearances, start and end of pre- and post-clearance watches by MMOs and the PAM-Op, details of activity during the relevant watches.

114. Marine Mammal Recording Forms will be completed (including the cover page, operations sheet, effort sheet, and sightings sheet). Deck forms can be used if preferred with the information transferred to the spreadsheet at the end of the watch. Details of ADD used and observations of their efficacy, and any problems encountered and instances of non-compliance with the JNCC guidelines and variations from the agreed procedure will also be reported.

115. The PAM-Op will be responsible for reporting all details on the PAM equipment, (for example the sensitivity of the hydrophones) including the deployment set up and the configuration of the PAM software, methods for marine mammal detection and localising if feasible. In addition, the MMMT will also be completing the Marine Mammal Recording Forms[8].

116. The ADD operator will maintain a detailed record, including all ADD deployment, activation and recovery times, a record of each verification of ADD activation and a note of any issues encountered with regard to the ADD deployment and activation.

117. After each UXO clearance event, a summary of monitoring effort and mitigation activities will be prepared and sent to the Client Representative or other nominated responsible person.

118. In the event of a marine mammal sighting and/or detection, the MMOs/PAM-Op will report the following information:

- Species or species group;
- Number of individuals, age, sex and size (e.g. juvenile or adult) (MMOs only);
- Physical description of individual features if unable to identify to species level (MMOs only);
- Behaviour when first sighted (e.g. travelling, foraging, resting) (MMOs only);
- Bearing and distance;
- Time, vessel position, vessel speed, vessel activity;
- Water depth (if known), tidal level, visibility, glare; and
- Any other vessels in the area (MMOs only).

119. A final report will be provided to MD-LOT and NatureScot. The final report will include any data collected during UXO clearance operations, details of PAM equipment, deployment and software configuration; ADD deployment and activation, a detailed description of any technical problems encountered and what, if any, actions were taken. The report will also include MMOs/PAM-Op

[8] https://data.jncc.gov.uk/data/24cc180d-4030-49dd-8977-a04ebe0d7aca/marine-mammal-recording-form-spreadsheet-explosives-uxo-2025-01.xlsx.

effort and discuss the protocols followed and put forward recommendations on the use of the mitigation measures during the UXO clearance that could benefit future construction projects.

4.5.6 Communication and Responsibilities

120. Clear communication channels between the MMMT (MMOs, the PAM-Op, the ADD operator) and the EOD team are required, and the communication procedures will be established and agreed prior to any clearance event with regard to the communication of any detection within the MA, the deployment of ADD, and when the MA is clear for clearance to take place. The EOD team will assign a person responsible for communication with the Lead Operator of the MMMT.

121. A communications protocol will be developed between the MMMT and the Nominated Contact.

122. This communications protocol will include, but not be limited to:

- Notification required prior to UXO clearance vessel deployment to ensure ADD and all equipment required is tested and ready for deployment;
- Once on board, the notification required to set-up equipment, test and deploy ADD to allow for the required activation prior to UXO clearance commencing;
- Procedure to notify the Nominated Contact that deployment of ADD and activation for the required time has been successful, and next steps in the mitigation can commence, or if deployment of ADD and activation has not been successful that clearance activities will be delayed;
- Procedure to notify the Lead Operator that each stage of the mitigation is successfully underway, and when the ADD can be switched off and retrieved from the water;
- Procedure to notify the Lead Operator that further ADD activation is required; and
- Procedure to notify the Lead Operator that the UXO clearance operations have been successfully completed.

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