



Eastern Green Link 2

Eastern Green Link 2: Unexploded Ordnance Marine Licence Application Documents Supporting Environmental Information Report

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Aberdeen
5th Floor Capitol Building
429-431 Union Street , Aberdeen
AB11 6DA , UK

T +44 (0)1224 628300
E [Redacted]

www.xodusgroup.com



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CONTENTS

GLOSSARY		6
ACRONYMS		8
1	INTRODUCTION	12
1.1	Project background	12
1.2	Purpose of this Supporting Environmental Information (SEI) Report	12
1.3	Scope of this SEI Report and UXO licensing approach	12
1.4	Structure of document	13
2	LEGISLATIVE CONTEXT	16
2.1	The Marine Acts	16
2.1.1	Territorial (Inshore) Waters (<12 NM)	16
2.1.2	Offshore Waters (>12 NM)	16
2.2	The Habitats and Birds Directives	16
2.3	European Protected Species (EPS) licensing	18
2.4	Marine Wildlife Licensing	18
2.5	Wildlife and Countryside Act 1981	19
2.6	Marine Protected Area (MPA) and Marine Conservation Zone (MCZ) Assessment	19
2.6.1	Marine (Scotland) Act 2010	19
2.6.2	Marine and Coastal Access Act 2009	20
2.7	Water Framework Directive (WFD) Assessment	20
2.7.1	Scottish waters	20
2.7.2	English waters	21
2.8	Consideration of National and Regional Marine Plans	21
2.8.1	Marine Policy Statement (MPS)	21
2.8.2	Scotland's National Marine Plan (SNMP)	21
2.8.3	North East Inshore and Offshore Marine Plans	22
2.8.4	East Inshore Marine Plan	22
2.8.5	Marine Plan Conformance Checklist	22
3	DESCRIPTION OF PROPOSED WORKS	59
3.1	Introduction	59
3.2	UXO clearance	59
3.2.1	UXO identification and inspection	59
3.2.2	Archaeological assessment of geophysical, magnetic anomaly and hydrographic data	59
3.2.3	UXO clearance process	60
3.2.4	UXO debris removal	60
3.2.5	Assessment approach	61
3.2.6	Embedded mitigation	62
3.2.7	Programme and timing	65
3.3	Stakeholder consultation	65



4	UNDERWATER SOUND MODELLING RESULTS	68
4.1	Introduction	68
4.2	Marine Mammals	68
4.3	Fish	69
5	ENVIRONMENTAL APPRAISAL METHODOLOGY	70
5.1	Environmental appraisal screening	70
5.2	Assessment methodology	87
5.2.1	Receptor sensitivity	87
5.2.2	Magnitude of impact	88
5.2.3	Consequence of impact	89
6	ENVIRONMENTAL APPRAISAL	90
6.1	Overview	90
6.2	Physical environment	90
6.2.1	Summary of baseline	90
6.2.2	Assessment of potential effects	91
6.3	Benthic environment	92
6.3.1	Summary of baseline	92
6.3.2	Assessment of potential effects	94
6.4	Fish and shellfish ecology	95
6.4.1	Summary of baseline	95
6.4.2	Assessment of potential effects	97
6.5	Marine mammals	99
6.5.1	Summary of baseline	99
6.5.2	Assessment of potential effects	104
6.6	Marine ornithology	118
6.6.1	Summary of baseline	118
6.6.2	Assessment of potential effects	121
6.7	Cumulative assessment	122
7	HABITATS REGULATIONS APPRAISAL / ASSESSMENT	125
7.1	Approach to HRA	125
7.2	Screening for Likely Significant Effects	125
7.2.1	Pre-screening of designated sites with potential connectivity with the MIC	125
7.2.2	Consideration of impact pathways	128
7.2.3	Conclusion of LSE Screening	134
7.3	Determination of AEoSI	135
7.3.1	Buchan Ness to Collieston Coast SPA - Scotland	135
7.3.2	Moray Firth SAC - Scotland	136
7.3.3	Berwickshire and North Northumberland Coast SAC – Scotland & England	139
7.3.4	Flamborough and Filey Coast SPA - England	141
7.3.5	Greater Wash SPA - England	142
7.3.6	Humber Estuary SAC - England	144
7.3.7	The Wash and North Norfolk Coast SAC - England	146
7.4	In-combination Effects	148



7.4.1	In-combination project list	149
7.4.2	In-combination assessment	149
7.5	HRA Conclusions	153
8	MARINE CONSERVATION ZONE AND MARINE PROTECTED AREA ASSESSMENT	153
8.1	Screening and Stage 1 Assessment Overview	153
8.1.1	Outcome of screening for MCZ and MPA Assessment	156
8.2	Stage 1 MPA Assessment	156
8.2.1	Firth of Forth Banks Complex MPA	156
8.2.2	Southern Trench MPA	156
8.3	MPA Cumulative assessment	159
8.3.1	Conclusions	159
8.4	MPA/MCZ Assessment Summary and Conclusions	159
9	OVERALL CONCLUSION AND SUMMARY	162
9.1	Environmental Appraisal	162
9.2	HRA	163
9.3	MCZ/MPA Assessment	164
10	REFERENCES	166
APPENDIX A	UXO CLEARANCE MARINE MAMMAL MITIGATION PROTOCOL (MMMP)	173
APPENDIX B	UXO CLEARANCE UNDERWATER SOUND ASSESSMENT	174



GLOSSARY

TERM	DEFINITION
Confirmed UXO (cUXO)	An object that has been positively identified as unexploded military ordnance, such as a bomb, mine, shell, or grenade, and is verified to pose a potential risk of detonation. In marine and terrestrial environments, confirmed UXO typically requires formal mitigation measures, such as clearance or avoidance, due to its hazardous nature.
Eastern Green Link 2	A joint venture comprised of National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission. Known collectively as 'the Applicant'.
Marine Scheme	Elements of the Eastern Green Link (EGL) 2 transmission link between Scotland and England which are seaward of Mean High Water Springs (MHWS). This is comprised of approximately 436 km of submarine High Voltage Direct Current (HVDC) cable of which 150 km is in Scottish waters and 286 km is in English waters.
Mean High Water Spring	The height of mean high water springs is the average of two successive high waters during a period of 24 hours in each month.
Marine Management Organisation (MMO)	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
Marine Directorate Licensing Operations Team (MD-LOT)	The regulator on behalf of Scottish Ministers for marine licence applications in the Scottish inshore region (between 0 and 12 NM) under the Marine (Scotland) Act 2010 and in the Scottish offshore region (between 12 and 200 NM) under the Marine and Coastal Access Act 2009.
Permanent Threshold Shift	A long-term change in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the non-recoverable reduction in hearing sensitivity that can occur as a result of exposure to high-amplitude sounds generated by underwater explosions.
Potential UXO (pUXO)	Refers to any object detected during surveys that exhibits characteristics consistent with unexploded ordnance but has not yet been positively identified.
Sound Exposure Level (SEL)	Sound Exposure Level (SEL) is a measure of energy that takes into account both received level and duration of exposure.
Sound Pressure Level (SPL)	Sound Pressure Level (SPL) is the pressure level of a sound, measured in decibels (dB).



TERM	DEFINITION
Temporary Threshold Shift	A short-term, recoverable reduction in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the reversible auditory impairment caused by high-amplitude sounds generated by underwater explosions. Hearing sensitivity typically returns to baseline levels after a period of recovery.
TNT equivalent (TNT_{eq})	A common reference point for assessing the relative power of explosive materials, using the energy released by the explosive 2,4,6-Trinitrotoluene (TNT) as a reference point.
UXO clearance	The disposal of UXO, which could include destructive intervention methods (e.g., detonation, deflagration), such as High Order Detonation and/or Low Order Deflagration.



ACRONYMS

TERM	DEFINITION
AA	Appropriate Assessment
ADD	Acoustic Deterrent Devices
AEoSI	Adverse Effect on Site Integrity
AEZ	Archaeological Exclusion Zones
AIS	Automatic Identification System
ALARP	As Low as is Reasonably Practicable
BWM	Ballast Water Management
CAR	Controlled Activities Regulations
CES	Coastal East Scotland
CGNS	Celtic and Greater North Sea
COLREGS	International Regulations for Preventing Collisions at Sea
cUXO	Confirmed Unexploded Ordnance
EASR	Environmental Authorisation (Scotland) Regulations
EDR	Effective Deterrent Range
EEZ	Exclusive Economic Zone
EGL2	Eastern Green Link 2
EIA	Environmental Impact Assessment
EOD	Explosive Ordnance Contractor
EPS	European Protected Species
EU	European Union
FLO	Fisheries Liaison Officer
GB	Great Britain
GNS	Greater North Sea
HDD	Horizontal Directional Drilling
HE	Historic England
HES	Historic Environment Scotland
HSE	Health, Safety and Environment
HF	High Frequency
HOD	High Order Deflagration



TERM	DEFINITION
HPMA	Highly Protected Marine Area
HRA	Habitats Regulations Appraisal/Assessment
HVDC	High Voltage Direct Current
ICES	International Council for the Exploration of the Sea
IHLS	International Herring Larval Survey
IMCA	International Marine Contractors Association
IMO	International Maritime Organisation
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometre
KP	Kilometre Point
LF	Low Frequency
LOD	Low Order Deflagration
LSE	Likely Significant Effect
m	Metre
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBES	Multi-Beam Echo Sounder
MCAA	Marine and Coastal Access Act
MCET	Marine Conservation and Environment Team
MCMS	Marine Case Management System
MCZ	Marine Conservation Zone
MD-LOT	Marine Directorate Licencing Operations Team
MHWS	Mean High Water Springs
MIC	Marine Installation Corridor
MLA	Marine Licence Application
MMMP	Marine Mammal Mitigation Plan
MMO	Marine Management Organisation
MMObs	Marine Mammal Observers
MNR	Marine Noise Registry
MPA	Marine Protected Area
MPP	Marine Planning Partnership



TERM	DEFINITION
MPS	Marine Policy Statement
MSA	Marine (Scotland) Act
MTF	Marine Technical Forum
MU	Management Unit
NCMPA	Nature Conservation Marine Protected Area
NE	Natural England
NGET	National Grid Electricity Transmission
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NMP	National Marine Plan
NPF4	National Planning Framework 4
NPPF	National Planning Policy Framework
NSAS	North Sea Autumn
NtM	Notice to Mariners
PAD	Protocol for Archaeological Discovery
PAM	Passive Acoustic Monitoring
PMF	Priority Marine Feature
PTS	Permanent Threshold Shift
pUXO	Potential Unexploded Ordnance
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SCOS	Special Committee on Seals
SEI	Supporting Environmental Information
SEL	Sound Exposure Level
SEPA	Scottish Environment Protection Agency
SMU	Seal Management Unit
SMWWC	Scottish Marine Wildlife Watching Code
SNMP	Scotland's National Marine Plan
SNS	Southern North Sea
SOLAS	International Convention for the Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan



TERM	DEFINITION
SPA	Special Protection Area
SPL	Sound Pressure Level
SQEP	Suitably Qualified and Experienced Personnel
SSEN	Scottish and Southern Electricity Networks
SSS	Side Scan Sonar
SSSI	Site of Special Scientific Interest
TI	Target Investigations
TNTeq	Trinitrotoluene Equivalent
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency
VTS	Vessel Traffic Services
WFD	Water Framework Directive
WSI	Written Scheme of Investigation
ZoI	Zone of Influence



1 INTRODUCTION

1.1 Project background

National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission¹ (hereafter collectively referred to as 'the Applicant') are jointly developing the Eastern Green Link 2 (EGL2) Marine Scheme.

The EGL2 Marine Scheme comprises a submarine High Voltage Direct Current (HVDC) link which extends from Mean High Water Springs (MHWS) at the Scottish Landfall in Sandford Bay, Peterhead, Aberdeenshire, to MHWS at the English Landfall at Fraisthorpe Sands, Bridlington, East Yorkshire. The Marine Scheme is approximately 436 kilometres (km) in length and 500 metres (m) in width; it follows a broadly north to south alignment from the Kilometre Point (KP) 0 at the Scottish landfall, to KP436 at the English landfall. Approximately 150 km of the Marine Scheme is within Scottish waters (territorial, <12 Nautical Miles (NM) from the coast; and offshore, 12-200 NM from the coast) and approximately 286 km within English waters (territorial and offshore), as detailed in Figure 1-1.

The EGL2 Marine Scheme has been granted two Marine Licences for the installation phase of the project by the Marine Directorate Licensing Operations Team (MD-LOT) (MS-00011033) and the Marine Management Organisation (MMO) (L/2023/00211/2). The project may require clearance of confirmed Unexploded Ordnance (cUXO) within a refined 80 m corridor within the Marine Scheme (the Marine Installation Corridor (MIC)) to enable installation of the cable. Given this, separate Marine Licences are being sought by the Applicant for the clearance of cUXO.

1.2 Purpose of this Supporting Environmental Information (SEI) Report

This Supporting Environmental Information (SEI) report provides information in support of Marine Licence Applications (MLAs) to cover the clearance of cUXO within the Marine Scheme. Two MLAs are required – one to MD-LOT for activities in Scottish waters, and one to the MMO for activities in English waters.

This SEI report comprises part of the application for the Unexploded Ordnance (UXO) clearance works within the Marine Scheme seaward of the Horizontal Directional Drilling (HDD) exit points at both the Scottish and English landfalls. The information within this SEI document is necessary to support the MLAs, to inform the regulators and their statutory and non-statutory consultees (where necessary) of the likelihood and magnitude of potential adverse impact on environmental receptors resulting from the proposed UXO clearance activities.

As confirmed with the regulators and as detailed in the original Environmental Appraisal (AECOM, 2022a), the Marine Scheme is not considered an 'Environmental Impact Assessment (EIA) Development' under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the Scottish EIA Regulations) and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) (the English EIA Regulations).

1.3 Scope of this SEI Report and UXO licensing approach

This SEI report has been produced to support the MLAs for UXO clearance works required to enable installation of the EGL2 Marine Scheme. It is intended to provide the necessary information to MD-LOT and the MMO (and their statutory and non-statutory consultees, where relevant) to support the Marine Licence decision-making process. Consideration of potential impacts and mitigation measures to reduce the potential for significant environmental effects to occur are provided. It also contains elements relating to the Habitats Regulations Appraisal/Assessment²

¹ SSEN Transmission is a trading name of Scottish Hydro Electric Transmission Plc

² Habitats Regulations Appraisal in Scotland; Habitats Regulations Assessment in England



(HRA) process, Marine Conservation Zone (MCZ) and Marine Protected Area (MPA) assessment, and the necessary information to support the application for European Protected Species (EPS) licences in both Scottish territorial/offshore waters and a Marine Wildlife Licence (MWL) exemption for English waters, if required.

The following documents, plans and application forms should be considered in conjunction with the SEI report:

- UXO Clearance Marine Mammal Mitigation Protocol (MMMP) (Appendix A; A-100744-S07-A-TECH-001);
- UXO Clearance Underwater Sound Assessment (Appendix B; A-100744-S07-A-ASMT-001); and
- Scottish Territorial Waters EPS Licence Form (A-100744-S07-A-FORM-001);
- Scottish Offshore Waters Offshore EPS Licence Form (A-100744-S07-A-FORM-002);
- Scottish Marine Licence Form (A-100744-S07-A-FORM-003);
- English waters Marine Licence application (submitted via Marine Case Management System (MCMS) online); and
- English waters MWL Exemption application (submitted via MCMS online / 'Get permission for Marine Work', as required).

The EGL2 project is currently in its pre-installation phase and has been conducting UXO target investigations (TIs) under the two main installation marine licences (Marine Directorate; MS-00011033 and the MMO; L/2023/00211/2). Following the completion of the UXO TIs, there may be a requirement to clear any cUXO identified from the Marine Scheme to enable installation of the subsea cable system. As noted in Section 1.1, new marine licences are being sought for the UXO clearance campaign, supported by this SEI. An overview of the UXO clearance activities is provided below:

- Clearance of up to 35 cUXO across Scottish (n = 15) and English (n = 20) waters, where avoidance of cUXO is not possible;
- Where clearance activities are required, Low Order Deflagration (LOD) using 0.25 kg trinitrotoluene equivalent (TNT_{eq}) will be utilised;
- This SEI considers a contingency of one High Order Detonation (HOD) (per jurisdiction) using a realistic worst-case scenario of 795 kg TNT_{eq}. It should be noted that LOD will be the only UXO clearance method used, and the preferred³ UXO contractor has demonstrated a 100% success rate using this technique. HOD has been assessed within this report only as an unplanned or accidental contingency measure; and
- Adherence to best practice mitigation measures (Section 3.2.6).

1.4 Structure of document

The structure of this SEI report is outlined in Table 1-1 below.

³ EGL2's preferred UXO clearance contractor is Helix Energy Solutions – further details are supplied in section 3.2 below.



Table 1-1 Summary of the Scope of this SEI Document

SECTION	HEADING	OVERVIEW
1	Introduction	Overview description of this document and the works to which it pertains.
2	Legislative context	Overview of the relevant legislation, policy and guidance of relevance to the MLA process
3	Description of proposed works	Details of the proposed UXO clearance works including relevant Health, Safety and Environment (HSE) requirements.
4	Environmental Impact Summary	Summary of the potential environmental impacts of the proposed UXO clearance works.
5	Environmental Appraisal	Environmental baseline and appraisal of the relevant potential impacts of the proposed UXO clearance works. Summary of embedded mitigation provided.
6	HRA	Likely Significant Effect (LSE) Screening for European sites followed by an appraisal to inform the Competent Authority's Appropriate Assessment (AA) where potential LSE is identified.
7	MCZ and MPA Assessment	MCZ / MPA screening and subsequent assessment stages as required.
8	Summary and Conclusions	Conclusion for the environmental considerations for the proposed UXO works as set out in this document.
9	References	List of references used in SEI.
Appendix A	UXO Clearance MMMP (A-100744-S07-A-TECH-001)	Details measures to minimise the potential impacts of the proposed UXO clearance activities on marine mammals. It includes mitigation measures including the use of Acoustic Deterrent Devices (ADD), Marine Mammal Observers (MMObs) and Passive Acoustic Monitoring (PAM).
Appendix B	UXO Clearance Underwater Sound Assessment (A-100744-S07-A-ASMT-001)	Provides predicted impact ranges using different UXO charges on cetaceans, seals, and fish.

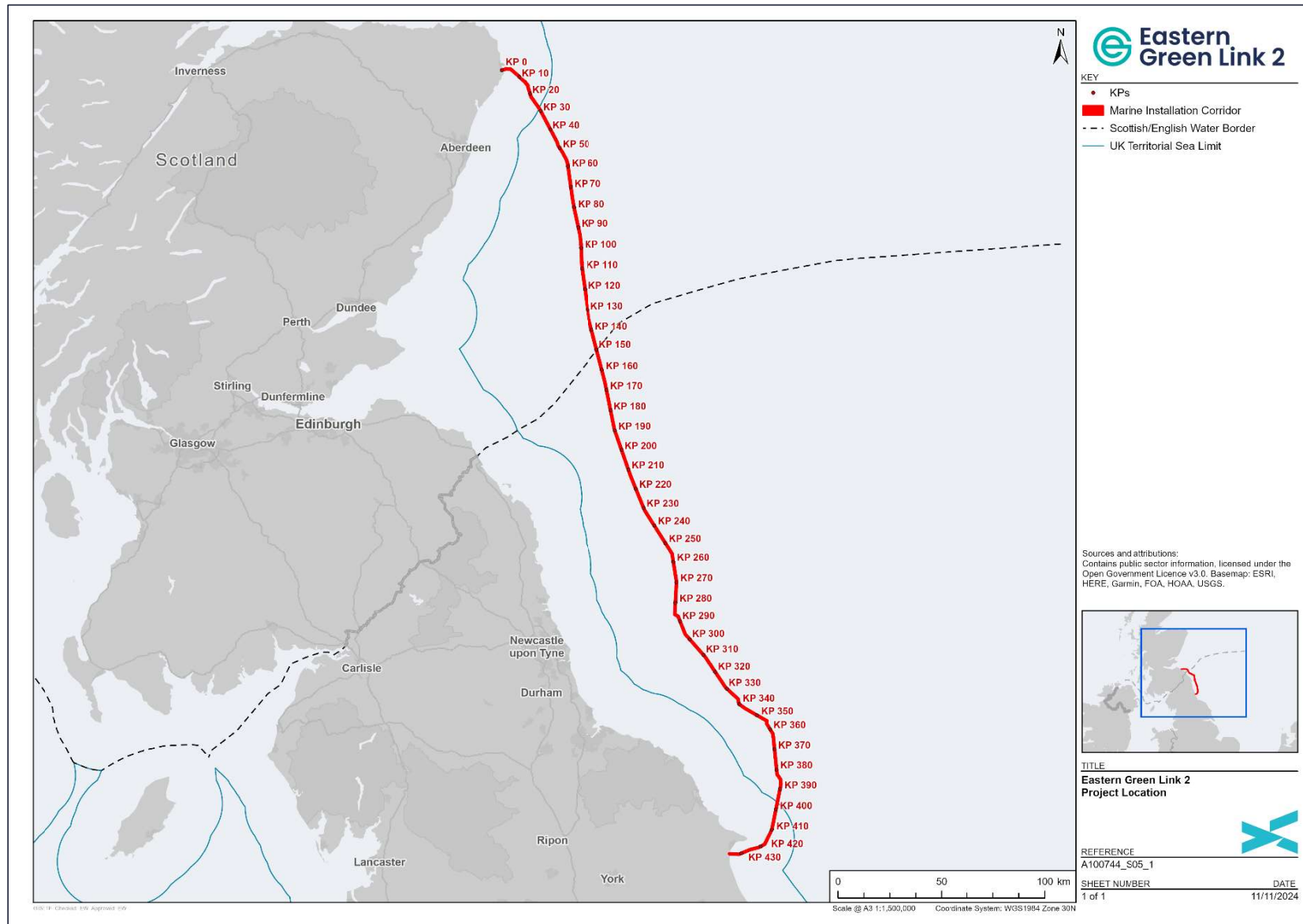


Figure 1-1 Location of the EGL2 cable route



2 LEGISLATIVE CONTEXT

2.1 The Marine Acts

The Marine Scheme is located in Scottish and English waters and is therefore, subject to the regulatory framework applicable in each jurisdiction. The Marine (Scotland) Act (MSA) 2010 and the Marine and Coastal Access Act (MCAA) 2009, collectively referred to as the "Marine Acts", establish the legal framework for marine licensing in United Kingdom (UK) waters.

2.1.1 Territorial (Inshore) Waters (<12 NM)⁴

Under the MSA 2010, the MD-LOT oversees licensing within Scottish Territorial Waters, extending from MHWS out to 12 NM. In England, the MMO is responsible for licensing activities within the territorial limit under the MCAA 2009.

As per Section 21 of the MSA 2010 and Section 66 of the MCAA 2009 ('licensable marine activities'), a marine licence is required for specific activities, these include:

- Deposit of any substance or object in the sea or on or under the seabed;
- Construct, alter or improve works on or over the sea or on or under the seabed;
- Remove substances or object from the seabed;
- Carry out dredging;
- Deposit and/or use explosives; and
- Incinerate substances or objects.

The MLAs for the UXO clearance activities relate to the deposit or use of any explosive substance or article within the UK marine licensing area.

2.1.2 Offshore Waters (>12 NM)

For Scottish and English offshore waters (12 NM to 200 NM), licensing and enforcement duties fall to MD-LOT and the MMO, respectively, under the MCAA 2009. Under Section 66 of the MCAA 2009, a marine licence is required for any activity which involves:

- Deposit of any substance or object within the UK marine licencing area, either in the sea or on or under the seabed;
- Construct, alter or improve works on or over the sea or under the seabed;
- Remove substances or object from the seabed;
- Carry out dredging;
- Deposit and/or use explosives; and
- Incinerate substances or objects.

The SEI has been prepared to cover Territorial (inshore) and Offshore waters, and MLAs for UXO clearance activities will be submitted to MD-LOT and the MMO for both Territorial (inshore) and Offshore waters.

2.2 The Habitats and Birds Directives

The Habitats Directive (92/43/EEC) requires the conservation of natural habitats and of wild fauna and flora, protects habitats and species of European nature conservation importance. The Birds Directive (2009/147/EC) requires the

⁴ Territorial waters in England is referred to as inshore waters. Both refer to the sea within 12 NM of the coastline (the territorial limit)



conservation of wild birds. Together they establish a network of internationally important sites, designated for their ecological status. This network of designated sites comprises the following:

- Special Areas of Conservation (SACs) are designated under the Habitats Directive and promote the protection of Annex II flora, fauna and Annex I habitats;
- Special Protection Areas (SPAs) are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds; and
- Ramsar sites which are wetlands designated as being of international importance under the Ramsar Convention 1971, an intergovernmental treaty for the conservation and sustainable use of wetlands. In the UK, Ramsar sites are protected in the same manner as European sites and are therefore included under the HRA process as a result of guidance in the National Planning Framework 4 (NPF4) (Scottish Government, 2023) and National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2024).

The Directives are transposed into UK law through the Habitats Regulations, of which there are several versions depending on the region of interest. In relation to the Marine Scheme, the Conservation (Natural Habitats, &c.) Regulations 1994 ("the 1994 Regulations"), the Conservation of Habitats and Species Regulations 2017 ("the 2017 Inshore Regulations") and The Conservation of Offshore Marine Habitats and Species Regulations 2017 ("the 2017 Offshore Regulations") apply. The Conservation of Habitats and Species (Amendment) (European Union (EU) Exit) Regulations 2019 (the '2019 Regulations') amended the 2017 Habitats Regulations and grants protection through the designation of a UK national site network, which was previously granted through European Sites.

Table 2-1 Applicability of the three versions of the Habitats Regulations in different marine regions

REGULATIONS	SCOTTISH WATERS	ENGLISH WATERS
Territorial (<12 NM)	1994 Regulations	2017 Inshore Regulations
Offshore (>12 NM)	2017 Offshore Regulations	

Under the Habitats Regulations, where a plan or project either alone or in combination with other plans or projects is likely to have a significant effect on a European site (a 'Likely Significant Effect' (LSE) and is not directly connected with or necessary for the site's conservation management, then the relevant Competent Authority is required to carry out an Appropriate Assessment (AA). This process is known as a Habitats Regulations Appraisal (in Scotland) / Assessment (in England) (HRA).

The purpose of this assessment is to determine whether the plan or project will adversely affect the integrity of the European site. This involves assessing the potential impacts on the site's qualifying features, such as habitats and species, and considering pathways such as disturbance, or habitat damage. The assessment must be based on the best available scientific information and consider both direct and indirect effects, as well as cumulative impacts from other existing or proposed activities. Where LSE cannot be ruled out, a HRA must be undertaken.

This SEI report contains a comprehensive assessment of LSE of the proposed UXO clearance works on designated sites (SACs, SPAs, Ramsar sites) within the UK National Site Network, as a result of impacts on the relevant qualifying features (Section 7). Where LSE cannot be excluded, these sites have been taken forward for the consideration of whether those effects could lead to an Adverse Effect on Site Integrity (AEoSI). This information has been presented in the information to inform an AA (Section 7.3) specifically for the proposed UXO clearance works.



2.3 European Protected Species (EPS) licensing

All species of cetacean (whale, dolphin, and porpoise) occurring in UK waters and otters are listed in Annex IV of the Habitats Directive as EPS, meaning that they are Species of Community Interest in need of strict protection, as directed by Article 12 of the Directive. As noted above, the Habitats Directive and the protection of EPS are transposed into UK law through the Conservation (Natural Habitats, &c.) Regulations 1994, the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017.

A UXO Clearance specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed to identify and describe the suite of measures that will be required to mitigate the risk of injury to marine mammals in the vicinity of the proposed UXO clearance works. The premise of a MMMP is to mitigate using best techniques, applied in line with the latest guidance, to reduce the probability of injurious effects to acceptable levels. Although MMMPs do not guarantee that animals will not be present during the proposed UXO clearance works, they reduce the magnitude of the residual impact to a level As Low As Reasonably Practicable (ALARP). This is reflected in the Joint Nature Conservation Committee (JNCC) guidance 'JNCC guidelines for minimising the risk of injury to marine mammals from using explosives' (JNCC, 2010; 2023c (draft); 2025a), which recognises the limitations of standard mitigation techniques.

The Applicant acknowledges that whilst the proposed mitigation measures follow current best practice and impacts are not expected to occur, it cannot be guaranteed that individuals will not experience disturbance (see Section 6.5.2). Therefore, an application for an Inshore EPS Licence (A-100744-S07-A-FORM-001) and an Offshore EPS Licence (A-100744-S07-A-FORM-002) for disturbance is being submitted to MD-LOT for Scottish territorial and offshore waters along with the UXO MLA.

2.4 Marine Wildlife Licensing

The requirement to consider EPS in developments in English inshore waters (< 12 NM) derives from Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora ("the Habitats Directive"), which has been transposed into law in England by the Conservation of Habitats and Species Regulations 2017 ("the Habitats Regulations"), and the Conservation of Offshore Marine Habitats and Species Regulations 2017 ("the Offshore Habitats Regulations").

A Marine Wildlife Licence authorises activities which would otherwise be unlawful under wildlife legislation in English waters. A Marine Wildlife Licence is required to carry out certain activities affecting a protected species; fulfilling the same function as an EPS Licence in Scotland (as detailed above in Section 2.3) but also covering other species protected under the Wildlife and Countryside Act 1981.

In the event it is deemed that a Marine Wildlife Licence is required, an application should be made to the MMO's Marine Conservation and Environment Team (MCET). In the event a Marine Wildlife Licence is *not* deemed to be required, the current established process for confirming this with the MMO is via submission of an Exemption via the MMO's MCMS / 'Get permission for Marine Work'⁵. This has been confirmed with the MMO via pre-application engagement held in 2025, as reported in section 3.3 below.

⁵ From the 18 November 2025, the MMO is transitioning to a new system called 'Get permission for marine work' - this operates in a similar manner to MCMS.



2.5 Wildlife and Countryside Act 1981

Section 9 of the Wildlife and Countryside Act 1981 provides comprehensive legal protection for a range of wild animals, mirroring obligations under EU and UK conservation law. Basking shark are protected under Section 9 of the Wildlife and Countryside Act 1981, which it states that it is an offence to:

- Kill or injure;
- Capture;
- Possess or keep;
- Damage or destroy place of shelter or protection;
- Disturb;
- Transport or possess for sale or offer or expose for sale or advertise for sale; and/or
- Use prohibited method to take or kill.

A basking shark derogation licence is only required where proposed activities are likely to result in offences (e.g., killing, injuring, or disturbing basking sharks). The likelihood of basking shark being present within the vicinity of the proposed UXO clearance activities is low, given their limited presence within the area (Section 6.4.1). Basking shark may be at increased risk as they are slow moving and typically feed close to the surface (Sims *et al.*, 2000). However, as detailed in Table 5-1, the addition of a single project vessel is not expected to increase vessel traffic beyond the existing baseline in an area that already experiences high volumes of marine traffic. Furthermore, the UXO Clearance vessel will be slow moving on site in adherence to the Scottish Marine Wildlife Watching Code (SMWWC), and a low-speed ship strike is less likely to result in serious injury or death (Sims *et al.*, 2000).

Elasmobranchs, which include basking shark, are also less vulnerable to extreme sound pressure changes compared to fish that have swim bladders (Popper *et al.*, 2014). Additionally, the UXO clearance activities will occur on the seabed, whereas basking shark spend a lot of time on sea's surface (Sims *et al.*, 2000). They are also a highly mobile species, and can move away from loud sound sources. As detailed in Table 5-1, basking shark are screened out of the Environmental Appraisal (Section 6) as there is no pathway of impact on underwater sound and basking shark.

Furthermore, LOD will be used as the UXO clearance method, which will be short-term and highly localised. Embedded mitigations are outlined in Table 3-1, which will further reduce potential disturbance to basking sharks.

It is therefore concluded that a basking shark derogation licence is not required for the UXO clearance activities, as it would not constitute an offence under Section 9 of the Wildlife and Countryside Act 1981.

2.6 Marine Protected Area (MPA) and Marine Conservation Zone (MCZ) Assessment

2.6.1 Marine (Scotland) Act 2010

Marine Protected Areas (MPAs) within Scottish territorial waters are designated under the MSA 2010. Marine Directorate (formerly Marine Scotland), the JNCC, Historic Environment Scotland (HES), the Scottish Environment Protection Agency (SEPA), and NatureScot (formerly Scottish Natural Heritage) developed Scotland's MPA network by identifying MPAs using a science-led approach⁶.

Under Section 82 of the Marine (Scotland) Act 2010, the competent authority (MD-LOT) is required to assess whether a proposed licensable activity could affect (other than insignificantly) a protected feature or the geomorphological

⁶ [Guidelines for Selecting & Developing MPAs](#)



processes which the protected features are dependent on within a Nature Conservation Marine Protected Area (NCMPA), or on a historic marine asset within a Historic Marine Protected Area (HMPA) within Scottish Territorial Waters. This includes assessing whether proposed activities may hinder the conservation objectives of these designated sites and ensuring that appropriate mitigation or management measures are in place, where necessary.

To aid the Competent Authority's assessment an MPA assessment is provided in Section 8 of this SEI.

2.6.2 Marine and Coastal Access Act 2009

MCZs in English territorial and offshore waters, and MPAs in Scottish offshore waters (beyond 12 NM), are designated under the MCAA 2009. These designations aim to protect a wide range of important marine habitats, species, and geological features. Together with other national and international designations, these sites form part of an ecologically coherent network of MPAs across the North East Atlantic and North Sea.

In English waters, MCZs were identified through the MCZ Project, established in 2008 and led by the JNCC and Natural England (NE). The objective was to identify and recommend sites to Government for formal designation.

In English waters, under Section 126 of the Marine and Coastal Access Act 2009, the public authority (MMO) must assess whether a proposed licensable activity could have more than an insignificant impact on the protected features of MCZ, or on any ecological processes essential to the conservation of those features. While in Scottish offshore waters, the public authority (MD-LOT) is required to assess whether a proposed licensable activity could affect (other than insignificantly) a protected feature within a Nature Conservation MPA, or on a historic marine asset within HMPA.

In 2022, Defra undertook consultation on a range of new Highly Protected Marine Areas (HPMAs) following completion of the Benyon Review. Like MCZs, HPMAs are designated under the powers of the MCAA 2009; they are marine areas designated for the protection and recovery of marine ecosystems. They prohibit extractive, destructive, and depositional uses, typically only permitting 'non-damaging' levels of other activities to the extent permitted by international law. Unlike MCZs, there is no published guidance relating to the assessment process for HPMAs; in the absence of formal guidance, they are typically assessed in the same process as MCZs (this approach has also been confirmed via routine EGL2 engagement with the MMO⁷).

To aid competent authority assessment an MCZ assessment is provided in Section 8 of this SEI.

2.7 Water Framework Directive (WFD) Assessment

2.7.1 Scottish waters

In Scotland, SEPA are the competent authority with respect to assessments against regulations relating to the WFD (Directive 2000/60/EC). From early November 2025, waste management activities are regulated under the Environmental Authorisation (Scotland) Regulations (EASR) 2018.

In the marine environment these activities are abstraction, discharges, building or engineering works in inland surface waters or wetlands, and any other activity that has (or is likely to have) a significant adverse impact on the water environment. A Controlled Activities Regulations (CAR) authorisation is required for activities on this list. However, as UXO clearance can be considered to be *engineering activities in coastal and transitional waters* (which are regulated by Scottish Government Marine Directorate) it is not a Controlled Activity regulated by SEPA, and therefore a WFD assessment is not required.

⁷ Undertaken and reported against ENQ/2024/00195 since November 2024.



2.7.2 English waters

For works within 1 NM of the coast in English Waters an assessment of potential impacts against the objectives of the WFD (Directive 2000/60/EC) is required. This Directive has been transposed into UK law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. However, as of December 2025, no UXO have been identified in the nearshore area at the English landfall. Therefore, any UXO clearance activities in English waters will occur beyond 1 NM of the coast and therefore the requirement for a WFD Assessment has been screened out.

2.8 Consideration of National and Regional Marine Plans

The development of marine plans has been delegated to Scottish Ministers (or Marine Planning Partnerships (MPPs)) and to the MMO, in Scottish and English waters respectively. The Marine Scheme overlaps with the following marine plan areas:

- National Marine Plan Area for Scotland – Scotland’s National Marine Plan (NMP) (Scottish Government, 2015);
- North East Inshore and North East Offshore Marine Plan (June 2021) (HM Government, 2021); and
- East Inshore Marine Plan Area – East Inshore and East Offshore Marine Plans (April 2014) (HM Government, 2014)⁸.

The MIC, where the UXO clearance activities will occur, is located approximately 13 km from the Eastern Offshore Marine Plan Area (AECOM, 2022a). Therefore, there will be no overlap. However, for completeness, the East Offshore Marine Plan Area has been considered below alongside the East Inshore Marine Plan.

2.8.1 Marine Policy Statement (MPS)

The Marine Policy Statement (MPS) (Defra, 2011) adopted by all UK administrations in March 2011 provides the policy framework for the preparation of Marine Plans, establishing how decisions affecting marine areas should be made to enable sustainable development. The MPS also provides an overview and summary of national policy relevant to marine planning and decision making in the marine area. Marine Plans are intended to guide developments and activities to ensure maximisation of the economic worth of the marine area in a sustainable way.

2.8.2 Scotland’s National Marine Plan (SNMP)

Marine planning in Scotland is managed by the Scottish Government, with delivery and coordination led by the Marine Directorate, in line with the requirements of the MSA 2010 and the MCCA 2009.

Scotland’s first NMP, published in 2015 (Scottish Government, 2015), provides the overarching framework for sustainable use of Scotland’s seas. It includes regional spatial baseline data to inform planning and assessment approaches. The objectives of the NMP are backed by a number of policies (as laid out in Section 2.8.5) to promote:

- Sustainable Development and Use;
- Environmental Protection;
- Economic Growth;
- Social and Cultural Wellbeing; and

⁸ In March 2023, as part of their three-year report on the East Inshore and East Offshore Marine Plan Areas, the MMO concluded that there is ‘compelling evidence’ to suggest that the East Marine Plans should be replaced. Public consultation on the draft plan is planned for summer 2026 (HM Government, 2025). At the time of the UXO clearance MLAs, the replacement East Marine Plan has not been adopted – the SEI report therefore considers the original plans above only.



- Good Governance and Science.

The Scottish Government has begun work on a new plan, NMP2. A draft was originally expected in autumn 2025, but consultation feedback has led to a postponement for further refinement.

Under the MSA 2010, Regional Marine Planning Partnerships were established to develop and implement marine plans tailored to the needs of local sea areas, known as Scottish Marine Regions. These partnerships enable more local ownership and decision-making on issues within 12 NMs of the coast. Their work supports the broader objectives of the NMP by addressing regional priorities, promoting sustainable development, and ensuring marine activities are balanced with environmental protection. Currently, there is no Marine Planning Partnership for the East Scotland Marine Region, so the National Marine Plan remains the primary policy framework for that area.

2.8.3 North East Inshore and Offshore Marine Plans

The proposed UXO clearance activities will occur within the North East Inshore and Offshore Marine areas within English Waters.

The North East Marine Plan has been developed in accordance with Section 51 of the MCAA 2009 (MMO, 2021b). This plan encompasses both the north east inshore area (between MHWS and 12 NM) and the offshore marine plan area (between 12 NM and the limits of English offshore waters) (MMO, 2021b). The North East Marine Plan covers an area of approximately 6,000 km² from Flamborough Head, Yorkshire to the Scottish Borders. The overall objectives of the plans are categorised into the following:

- Achieving a sustainable marine economy;
- Ensuring a strong, healthy and just society; and
- Living with environmental limits.

2.8.4 East Inshore Marine Plan

The East Inshore Marine Plan applies to territorial waters from Flamborough Head to Felixstowe, covering approximately 6,000 km². It sets out 11 core objectives focused on sustainable development, job creation, and unlocking the potential of renewable energy. The plan area includes the Humber's major port complex at Grimsby and Immingham and accounts for around 50% of all licensed aggregate extraction areas in English waters.

The East Offshore Marine Plan extends from the outer limit of the territorial sea to the boundary of the UK Exclusive Economic Zone (EEZ), encompassing maritime boundaries with the Netherlands, Belgium, and France, a total area of approximately 49,000 km². Published alongside the East Inshore Marine Plan in April 2014, this offshore area consists largely of open, shallow waters supporting oil and gas platforms and commercial activities such as shipping, aggregate extraction, and fishing. Designated shipping routes, subsea cable infrastructure, and oil and gas pipelines traverse this region, linking the UK to continental Europe.

2.8.5 Marine Plan Conformance Checklist

The Marine Plans set out priorities and provide direction for future development within a Marine Plan area. Table 2-2 demonstrates the conformance of the UXO clearance activities with the applicable marine plan policies for the relevant Scottish and English Marine Plans.



Table 2-2 The relevant objectives for the regional marine plans and how they have been considered within this SEI

POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
Scottish NMP		
<p>GEN 1 – General Planning Principle</p>	<p>There is a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of the Plan.</p>	<p>The EGL2 Marine Scheme is required in order to support the delivery of a new HVDC cable, intended for the distribution of energy predominantly derived from sustainable sources. This 2GW HVDC cable is connecting Peterhead in Aberdeenshire and Drax in North Yorkshire and once operational, will carry enough electricity to power two million homes. This check list demonstrates compliance with the policies of the Scottish Marine Plan.</p>
<p>GEN 2 – Economic Benefit</p>	<p>Sustainable development and use which provides economic benefit Scottish communities is encouraged when consistent with the objectives and policies of this Plan.</p>	<p>The overarching Project is for the reinforcement of electrical transmission infrastructure to facilitate increased renewable electricity generation and movement of that electricity between Scotland and England. More widely, the Marine Scheme represents significant investment in the UK low-carbon economy and is supportive of the wider transition to Net Zero by 2045 in Scotland. In addition, once operational EGL2 will provide enough electricity to power two million homes. As such the UXO clearance operations are critical to ensure delivery of the wider project.</p>
<p>GEN 4 - Coexistence</p>	<p>Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision-making processes, when consistent with policies and objectives of the Plan.</p>	<p>The UXO Clearance operations will be carried out within the EGL2 MIC, which has already been optimised to enhance co-existence with other marine users. For this UXO Clearance campaign, EGL2 will ensure co-existence through adherence to EGL2 approved plans including the Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129) and continued communications with other mariners through engagement meetings and notifications e.g.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
		<p>continued engagement with asset owners and promulgation of Notice to Mariners (NtM) aligned with best practice and in adherence to the EGL2 Marine Scheme Communications Strategy – Scotland (Document ID: EGL2-JV-EM-XX-PL-MC-115).</p>
<p>GEN 6 – Historic Environment</p>	<p>Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.</p>	<p>The EGL2 Marine Scheme has an approved Written Scheme of Investigation (WSI) and Protocol for Archaeological Discovery (PAD) in place (Document ID: EGL2-JV-EM-XX-PL-MC-128), with implementation supported by a retained archaeologist (Wessex Archaeology). The WSI incorporates findings from the 2021 geophysical surveys as well as additional data from the 2023–2025 potential UXO (pUXO) surveys, ensuring archaeological features in the MIC are identified and potential impacts are avoided through cable routeing. This includes the establishment of Archaeological Exclusion Zones (AEZs). Given this, the likelihood of UXO Clearance works in proximity to confirmed archaeological features is minimised, ensuring compliance with this policy.</p>
<p>GEN 9 – Natural Heritage</p>	<p>Development and use of the marine environment must: (a) Comply with legal requirements for protected areas and protected species (b) Not result in significant impact on the national status of Priority Marine Features. (c) Protect and, where appropriate, enhance the health of the marine area</p>	<p>Potential effects of the Marine Scheme on protected areas, protected species and Priority Marine Features have been appraised within Section 5 of this SEI. These appraisals have concluded no significant residual effects.</p> <p>A Habitats Regulation Assessment (Section 6) and Marine Protected Area Assessment (Section 7) have also been undertaken to demonstrate compliance with the legal requirements for protected areas and protected species. Together the SEI demonstrate protection of the health of the marine area.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>GEN 10 - Invasive Non-native Species</p>	<p>Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made.</p>	<p>Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (Ballast Water Management (BWM) Convention) to ensure the risk of MNNS are minimised. The regulator approved EGL2 Marine Scheme Marine Non-Native Species Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0006) will also be adhered to during UXO Clearance works to ensure compliance with this policy.</p>
<p>GEN 11 - Marine Litter</p>	<p>Developers, users and those accessing the marine environment must take measures to address marine litter where appropriate. Reduction of litter must be taken into account by decision makers.</p>	<p>As described in Section 3.2.3, the UXO Clearance works will remove debris arising from the clearance operations to ensure that no marine litter is generated through the activities. In addition, the UXO Clearance works will adhere to the EGL2 Marine Scheme Waste Management Plan (Document ID: PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004) to ensure compliance with this policy.</p>
<p>GEN 12 - Water Quality and Resource</p>	<p>Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.</p>	<p>The UXO Clearance operations will be undertaken in compliance with international standards e.g., MARPOL and in accordance with the approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), to ensure no deterioration in water quality and compliance with this policy.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>GEN 13 - Noise</p>	<p>Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.</p>	<p>The Applicant is also committed to using LOD techniques, significantly lowering the potential for high-intensity sound exposure. Underwater sound modelling was undertaken (Appendix B; A-100744-S07-A-ASMT-001) to assess potential impacts from UXO clearance activities. The modelling evaluated the risk of physiological damage (Permanent Threshold Shift (PTS)) and disturbance (Temporary Threshold Shift (TTS)) to marine mammals, as well as disturbance effects on fish species. Predicted impact ranges from this modelling informed the Environmental Appraisal presented in Section 5 of this SEI.</p> <p>In addition, EGL2 has developed a UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001), which will be implemented during UXO clearance to reduce underwater sound impacts to marine mammals.</p> <p>Based on these measures and the modelling results, and given UXO clearance activities will be short-term and temporary in nature, the Environmental Appraisal (Section 5) concludes that no significant residual underwater sound impacts on marine mammals or fish are expected, highlighting compliance with this policy.</p>
<p>GEN 18 - Engagement</p>	<p>Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.</p>	<p>Engagement has been undertaken with the MMO, NE and the JNCC to discuss the proposed UXO clearance activities and ensure alignment with regulatory requirements (Section 3.3). These discussions focused on the scope and methodology of the clearance process, as well as providing clarity on the MLA process, including supporting assessments and mitigation measures. This proactive engagement ensures that the project complies with relevant</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>FISHERIES 1-3</p>	<p>These planning policies aim to ensure fishing practices are safeguarded in so far as practicable from developers.</p>	<p>legislation and best practice guidance. Although regulatory capacity for engagement in Scottish waters has been limited, the pre-application engagement with MMO and NE / JNCC is seen as beneficial to both MLAs. In addition, the Applicant would welcome engagement with MD-LOT and key consultees if beneficial following application submission.</p> <p>The UXO Clearance activities will be undertaken in line with the Applicants strong commitments to co-existence between the EGL2 Marine Scheme and other users of the marine environment including commercial fisheries. In this respect, the UXO clearance activities will be undertaken in line with the approved EGL2 Marine Scheme Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129), including use of a dedicated Fisheries Liaison Officer (FLO) (Blackhall and Powis) and ensuring the promulgation of information via NtMs and continued engagement to safeguard fisheries activities as far as practicable. As such, the UXO clearance works are compliant with this policy.</p>
<p>WILD FISH 1</p>	<p>The impact of development and use of the marine environment on diadromous fish species should be considered in marine planning and decision-making processes. Where evidence of impacts on salmon and other diadromous species is inconclusive, mitigation should be adopted where possible and information on impacts on diadromous species from monitoring of developments should be used to inform subsequent marine decision making.</p>	<p>There is potential for diadromous fish species, including Atlantic salmon, to be present within the Marine Scheme. The potential impact on fish species has been considered within Section 6.4. The environmental assessment concluded that there were no significant residual impacts on diadromous fish, as such these works are compliant with this policy.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
North East Inshore and Offshore Marine Plan (England)		
Access: NE-ACC-1	<p>Proposals demonstrating appropriate enhanced and inclusive public access to and within the marine area, including the provision of services for tourism and recreation activities, will be supported. Proposals that may have significant adverse impacts on public access should demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse impacts so they are no longer significant.</p>	<p>UXO clearance activities comprise a single vessel operating for up to 90 days. Any impacts on public access will be very short lived and are not considered to be significant adverse impacts.</p>
Aggregates: NE-AGG-1	<p>Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised, unless it is demonstrated that the proposal is compatible with aggregate extraction.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on areas of high potential aggregate resource in or near the MIC.</p>
Aggregates: NE-AGG-2	<p>Proposals within an area subject to an Exploration and Option Agreement with The Crown Estate should not be supported unless it is demonstrated that the proposal is compatible with aggregate extraction.</p>	
Aggregates: NE-AGG-3	<p>Proposals in areas of high potential aggregate resource that may have significant adverse impacts on future aggregate extraction should demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - significant adverse impacts on future aggregate extraction so they are no longer significant. If it is not possible to mitigate</p>	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Air Quality and Emissions: NE-AIR-1</p>	<p>significant adverse impacts, proposals should state the case for proceeding.</p> <p>Proposals must assess their direct and indirect impacts upon local air quality and emissions of greenhouse gases. Proposals that are likely to result in increased air pollution or increased emissions of greenhouse gases must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- air pollution and/or greenhouse gas emissions in line with current national and local air quality objectives and legal requirements.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no significant adverse impacts on air quality in or near the MIC.</p>
<p>Aquaculture: NE-AQ-1</p>	<p>Proposals within existing or potential strategic areas of sustainable aquaculture production must demonstrate consideration of and compatibility with sustainable aquaculture production. Where compatibility is not possible, proposals that may have significant adverse impacts on sustainable aquaculture production must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse impacts on sustainable aquaculture production so they are no longer significant. If it is not possible to mitigate</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on any current or future aquaculture developments in or near the MIC.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>significant adverse impacts, proposals should state the case for proceeding.</p>	
<p>Aquaculture: NE-AQ-2</p>	<p>Proposals enabling the provision of infrastructure for sustainable aquaculture and related industries will be supported.</p>	
<p>Biodiversity: NE-BIO-1</p>	<p>Proposals that enhance the distribution of priority habitats and priority species will be supported. Proposals that may have significant adverse impacts on the distribution of priority habitats and priority species must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse impacts so they are no longer significant compensate for significant adverse impacts that cannot be mitigated.</p>	<p>Potential effects of the Marine Scheme on priority habitats and priority species and have been appraised within Section 5 of this SEI. These appraisals have concluded no significant residual effects.</p> <p>The Applicant is committed to using LOD as the UXO clearance. LOD is recognised as an environmentally responsible technique because it significantly reduces seabed disturbance and associated impacts on benthic habitats compared to HOD, as it does not leave seabed craters, therefore minimising sediment displacement and avoiding major habitat loss (Robinson <i>et al.</i>, 2020; Abad Oliva <i>et al.</i>, 2024). This also helps to minimise disturbance to important nursery and spawning ground for fish species. An MPA assessment has been undertaken and is presented in Section 7 and 8, with no adverse effects on site integrity or significant effects which could hinder the conservation objectives being concluded.</p>
<p>Biodiversity: NE-BIO-2</p>	<p>Proposals that enhance or facilitate native species or habitat adaptation or connectivity, or native species migration, will be supported. Proposals that may cause significant adverse impacts on native species or habitat adaptation or connectivity, or native species migration, must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse impacts so they are no longer significant d) compensate for significant adverse impacts that cannot be mitigated.</p>	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>NE-BIO-3</p>	<p>Proposals that conserve, restore or enhance coastal habitats, where important in their own right and/or for ecosystem functioning and provision of ecosystem services, will be supported. Proposals must take account of the space required for coastal habitats, where important in their own right and/or for ecosystem functioning and provision of ecosystem services, and demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a. avoid b. minimise c. mitigate d. compensate for <p>- net habitat loss</p>	
<p>Cables: NE-CAB-1</p>	<p>Preference should be given to proposals for cable installation where the method of protection is burial. Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant. Where burial or protection measures are not appropriate, proposals should state the case for proceeding without those measures.</p>	<p>EGL2 is a subsea cable project which is already licensed (MLA/2022/00273). UXO clearance activities will be undertaken within the MIC to allow the safe construction of the EGL2 project.</p>
<p>Cables: NE-CAB-2</p>	<p>Proposals demonstrating compatibility with existing landfall sites and incorporating measures to enable development of future landfall opportunities should be supported. Where this is not possible proposals will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate 	<p>EGL2 is a subsea cable project which is already licensed (MLA/2022/00273). UXO clearance activities will be undertaken within the MIC to allow the safe construction of the EGL2 project.</p>



POLICY/OBJECTIVE CODE

DETAIL

CONSIDERATION WITHIN THIS SEI

- adverse impacts on existing and potential future landfill sites so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.

Cables: NE-CAB-3

Where seeking to locate close to existing subsea cables, proposals should demonstrate compatibility with ongoing function, maintenance and decommissioning activities relating to the cable.

The UXO Clearance operations will be carried out within the EGL2 MIC, which has already been optimised to enhance co-existence with other marine users. The Applicant will continue to work proactively with third-party assets and developers to ensure minimal potential for disturbance whilst also observing the International Marine Contractors Association (IMCA) guidance on SIMOPS (IMCA M203, Version II 2021).

Cross-border Co-operation: NE-

CBC-1

Proposals must consider cross-border impacts throughout the lifetime of the proposed activity. Proposals that impact upon one or more marine plan areas or terrestrial environments must show evidence of the relevant public authorities (including other countries) being consulted and responses considered.

The EGL2 subsea cable project lies in both Scottish territorial and offshore waters, and English inshore and offshore waters. This Marine Licence application is submitted alongside a parallel application to Scottish Ministers, covering the Scottish section of the MIC. The Environmental Appraisal (Section 6 of the Supporting Environmental Information report) has considered environmental impacts in both Scottish and English waters. The information provided in the SEI report has been broken into information relating to Scotland, England, and both jurisdictions. There will be no impacts on other countries, i.e. beyond the UK.

- Other Marine Plans have been considered including:
- East Inshore and Offshore Marine Plans; and
 - SNIMP.

These are also detailed within this table.



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Climate Change: NE-CC-1</p>	<p>Proposals that conserve, restore or enhance habitats that provide flood defence or carbon sequestration will be supported. Proposals that may have significant adverse impacts on habitats that provide a flood defence or carbon sequestration ecosystem service must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant d) compensate for significant adverse impacts that cannot be mitigated. 	<p>EGL2 aims to upgrade the UK’s electricity transmission system, which will support the growing renewable energy developments and aims to achieve energy security and carbon reduction objectives.</p> <p>UXO clearance activities will take place over a short period and will therefore not be impacted by climate change over the lifetime of the activity.</p> <p>UXO clearance activities involve a single vessel for up to 90 days. The vessel will not be employed any longer than absolutely necessary, thus minimising greenhouse gas emissions.</p>
<p>Climate Change: NE-CC-2</p>	<p>Proposals in the north east marine plan areas should demonstrate for the lifetime of the project that they are resilient to the impacts of climate change and coastal change.</p>	
<p>Climate Change: NE-CC-3</p>	<p>Proposals in the north east marine plan areas, and adjacent marine plan areas, that are likely to have significant adverse impacts on coastal change, or on climate change adaptation measures inside and outside of the proposed project areas, should only be supported if they can demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. 	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
Carbon Capture Usage and Storage: NE-CCUS-1	Decommissioning programmes for oil and gas facilities should demonstrate that they have considered the potential for re-use of infrastructure.	Policy is not relevant to EGL2 UXO clearance activities as this is not a CCUS project.
Carbon Capture Usage and Storage: NE-CCUS-2	Carbon capture, usage and storage proposals incorporating the re-use of existing oil and gas infrastructure will be supported.	
Carbon Capture Usage and Storage: NE-CCUS-3	Proposals associated with the deployment of low carbon infrastructure for industrial clusters should be supported.	
Cumulative Effects: NE-CE-1	<p>Proposals which may have adverse cumulative effects with other existing, authorised, or reasonably foreseeable proposals must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse cumulative and/or in-combination effects so they are no longer significant.</p>	Potential impacts from the proposed UXO clearance activities have the potential to interact with those from other developments, plans, and activities, which may result in cumulative effects. A cumulative assessment was conducted in Section 6.7 for receptors identified within the Environmental Appraisal. An in-combination effects assessment was undertaken within the Habitats Regulations Appraisal / Assessment in Section 7.4, and within the Marine Protected Area Assessment in Section 8.3.
Co-existence: NE-CO-1	<p>Proposals that optimise the use of space and incorporate opportunities for co-existence and cooperation with existing activities will be supported. Proposals that may have significant adverse impacts on, or displace, existing activities must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) Avoid b) Minimise c) Mitigate 	The UXO Clearance operations will be carried out within the EGL2 MIC, which has already been optimised to enhance co-existence with other marine users. For this UXO Clearance campaign, EGL2 will ensure co-existence through adherence to EGL2 approved plans including the Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129) and continued communications with other mariners through engagement meetings and notifications e.g. continued engagement with asset owners and promulgation of NtMs aligned with best practice).



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>- Adverse impacts so that they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding.</p>	
<p>Dredging and Disposal: NE-DD-1</p>	<p>In areas of authorised dredging activity, including those subject to navigational dredging, proposals for other activities will not be supported unless they are compatible with the dredging activity.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as works will not occur within or adjacent to licensed dredging and disposal areas, and do not comprise the dredging and disposal of dredged material.</p>
<p>Dredging and Disposal: NE-DD-2</p>	<p>Proposals that cause significant adverse impacts on licensed disposal areas should not be supported. Proposals that cannot avoid such impacts must, in order of preference:</p> <ul style="list-style-type: none"> a) minimise b) mitigate or c) if it is not possible to mitigate the significant adverse impacts, proposals must state the case for proceeding. 	
<p>Dredging and Disposal: NE-DD-3</p>	<p>Proposals for the disposal of dredged material must demonstrate that they have been assessed against the waste hierarchy. Where there is the need to identify new dredge disposal sites, including for alternative use sites, proposals should be supported if they conform to best practice and guidance.</p>	
<p>Defence: NE-DEF-1</p>	<p>Proposals in or affecting Ministry of Defence areas should only be authorised with agreement from the Ministry of Defence.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as works are not planned in or near Ministry of Defence areas.</p>
<p>Disturbance: NE-DIST-1</p>	<p>Proposals that may have significant adverse impacts on highly mobile species through disturbance or displacement must demonstrate that they will, in order of preference:</p>	<p>Underwater sound modelling was carried out for marine mammals and fish (Appendix B; A-100744-S07-A-ASMT-001). The modelling</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>A) Avoid; B) Minimise; C) Mitigate; or adverse impacts so they are no longer significant.</p>	<p>considered disturbance outcomes of the modelling were used in the Environmental Appraisal (Section 6).</p> <p>Embedded mitigations, detailed in 3.2.6, will be implemented to during the UXO clearance activities, which will further reduce disturbance on marine mammals, including a UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) and adherence to the SMWWC for project vessels. Additionally, the UXO clearance activities will be short-term and temporary.</p> <p>Therefore, the Environmental Appraisal has concluded there will be no significant disturbance on marine mammals or fish due to the UXO clearance activities. Therefore, no further mitigation is required.</p>
<p>Employment: NE-EMP-1</p>	<p>Proposals that result in a net increase in marine-related employment will be supported, particularly where they meet one or more of the following: 1) are aligned with local skills strategies and support the skills available 2) create a diversity of opportunities 3) create employment in locations identified as the most deprived 4) implement new technologies - in, and adjacent to, the north east marine plan areas.</p>	<p>EGL2 is a collaborative effort with thousands of people from a range of organisations, which will create numerous skilled jobs within the local North East coast region.</p>
<p>Fisheries: NE-FISH-1</p>	<p>Proposals that support a sustainable fishing industry, including the industry's diversification, should be supported.</p>	<p>The UXO Clearance activities will be undertaken in line with the Applicants strong commitments to co-existence between the EGL2 Marine Scheme and other users of the marine environment including commercial fisheries. In this respect, the UXO clearance activities will be undertaken in line with the approved EGL2 Marine Scheme Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129), including use of a dedicated Fisheries Liaison</p>
<p>Fisheries: NE-FISH-2</p>	<p>Proposals that enhance access for fishing activities should be supported. Proposals that may have significant adverse impacts on access for fishing activities must demonstrate that they will, in order of preference: a) Avoid</p>	



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	b) Minimise c) Mitigate - adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	Officer (FLO) (Blackhall and Powis) and ensuring the promulgation of information via NtMs and continued engagement to safeguard fisheries activities as far as practicable. As such, the UXO clearance works are compliant with this policy.
Fisheries: NE-FISH-3	Proposals that enhance essential fish habitat, including spawning, nursery and feeding grounds, and migratory routes, should be supported. Proposals that may have significant adverse impacts on essential fish habitat, including spawning, nursery and feeding grounds, and migratory routes, must demonstrate that they will, in order of preference: a) Avoid b) Minimise c) Mitigate - adverse impacts so they are no longer significant.	<p>The UXO Clearance activities may cause temporary seabed disturbance which may affect essential fish habitats. Cable routing has avoided sensitive benthic habitats within the MIC through route optimisation, limiting the potential for adverse effects to the benthic environment where UXO clearance is required.</p> <p>The effects of the UXO Clearance activities on essential fish habitats are discussed in Table 5-1. With consideration given to the extensive availability of alternative habitats which support spawning and nursery grounds, the overall potential for significant adverse effects is considered to be negligible.</p> <p>There is potential for diadromous fish species, including Atlantic salmon, to be present within the Marine Scheme. The potential impact on fish species has been considered within Section 6.4. The environmental assessment concluded that there were no significant residual impacts on diadromous fish, as such these works are compliant with this policy.</p>
Heritage Assets: NE-HER-1	Proposals that demonstrate they will conserve and enhance the significance of heritage assets will be supported. Where proposals may cause harm to the significance of heritage assets, proponents must demonstrate that they will, in order of preference:	The EGL2 Marine Scheme has an approved Written Scheme of Investigation (WSI) and Protocol for Archaeological Discovery (PAD) in place (Document ID: EGL2-JV-EM-XX-PL-MC-128, produced to support MLA/2022/00273), with implementation supported by a retained archaeologist (Wessex Archaeology). The WSI incorporates



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<ul style="list-style-type: none"> a) Avoid b) Minimise c) Mitigate - Any harm to the significance of heritage assets. If it is not possible to mitigate, then public benefits for proceeding with the proposal must outweigh the harm to the significance of heritage assets. 	<p>findings from the 2021 geophysical surveys as well as additional data from the 2023–2025 potential UXO (pUXO) surveys, ensuring archaeological features in the MIC are identified and potential impacts are avoided through cable routing. This includes the establishment of Archaeological Exclusion Zones (AEZs). Given this, the likelihood of UXO Clearance works in proximity to confirmed archaeological features is minimised, ensuring compliance with this policy.</p> <p>EGL2 have already undertaken a detailed assessment of the potential impact on archaeology along the Marine Scheme route - although not inclusive of UXO clearance, much of this provides relevant baseline information, which has helped inform the refinement of the 80 m corridor described in Section 1.1 of the Supporting Environmental Information report.</p> <p>Additionally, EGL2’s retained archaeologist completed an archaeological assessment of recent high-resolution survey data (EGL2- NGET-MAR-XX-CO-MC-004; Wessex, 2025 (Section 3.2.6 of the Supporting Environmental Information report) – the MIC is well understood and the Applicant is continuing to have appropriate regard for archaeology.</p> <p>The ongoing UXO TIs are being undertaken in accordance with an approved archaeological method statement, agree with both Historic England (HE) and the MMO (EGL2- NGET-MAR-XX-CO-MC-003 (V5)).</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
		<p>The UXO clearance activities are temporary and highly localised, with no physical interaction expected or planned with heritage assets or designated landscapes.</p> <p>Further information on embedded mitigations are detailed in Section 3.2.5 of the Supporting Environmental Information report.</p>
<p>Infrastructure: NE-INF-1</p>	<p>Proposals for appropriate marine infrastructure which facilitates land-based activities, or land-based infrastructure which facilitates marine activities (including the diversification or regeneration of sustainable marine industries), should be supported.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as this is not a project to install marine infrastructure, nor is this a project at existing safeguarded landing facilities.. This was covered under MLA/2022/00273, the marine licence for the EGL2 cable itself.</p>
<p>Infrastructure: NE-INF-2</p>	<p>(1) Proposals for alternative development at existing safeguarded landing facilities will not be supported. (2) Proposals adjacent and opposite existing safeguarded landing facilities must demonstrate that they avoid significant adverse impacts on existing safeguarded landing facilities. (3) Proposals for alternative development at existing landing facilities (excluding safeguarded sites) should not be supported unless that facility is no longer viable or capable of being made viable for waterborne transport. (4) Proposals adjacent and opposite existing landing facilities (excluding safeguarded sites) that may have significant adverse impacts on the landing facilities should demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>- adverse impacts so they are no longer significant.</p>	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Invasive Non-Native Species: NE-INNS-1</p>	<p>Proposals that reduce the risk of introduction and/or spread of invasive non-native species should be supported. Proposals must put in place appropriate measures to avoid or minimise significant adverse impacts that would arise through the introduction and transport of invasive non-native species, particularly when: 1) moving equipment, boats or livestock (for example fish or shellfish) from one water body to another 2) introducing structures suitable for settlement of invasive non-native species, or the spread of invasive non-native species known to exist in the area.</p>	<p>Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (Ballast Water Management (BWM) Convention) to ensure the risk of MNNS are minimised. The regulator approved EGL2 Marine Scheme Marine Non-Native Species Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0006) will also be adhered to during UXO Clearance works to ensure compliance with this policy.</p>
<p>Invasive Non-Native Species: NE-INNS-2</p>	<p>Public authorities with functions to manage activities that could potentially introduce, transport or spread invasive non-native species should implement adequate biosecurity measures to avoid or minimise the risk of introducing, transporting or spreading invasive non-native species.</p>	
<p>Marine Litter: NE-ML-1</p>	<p>Public authorities must make adequate provision for the prevention, re-use, recycling and disposal of waste to reduce and prevent marine litter. Public authorities should aspire to undertake measures to remove marine litter within their jurisdiction.</p>	<p>As described in Section 3.2.3, the UXO Clearance works will remove debris arising from the clearance operations to ensure that no marine litter is generated through the activities. In addition, the UXO Clearance works will adhere to the EGL2 Marine Scheme Waste Management Plan (Document ID: PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004) to ensure compliance with these policies.</p>
<p>Marine Litter: NE-ML-2</p>	<p>Proposals that facilitate waste re-use or recycling to reduce or remove marine litter will be supported. Proposals that could potentially increase the amount of marine litter in the marine plan areas must include measures to, in order of preference:</p> <ul style="list-style-type: none"> A) Avoid B) Minimise; or 	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>C) Mitigate waste entering the marine environment.</p>	
<p>Marine Protected Areas: NE-MPA-1</p>	<p>Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported.</p> <p>Proposals that may have adverse impacts on the objectives of marine protected areas must demonstrate that they will, in order of preference:</p> <p>A) Avoid; B) Minimise; or C) Mitigate</p> <p>adverse impacts, with due regard given to statutory advice on an ecologically coherent network.</p>	<p>The route of the MIC has been carefully designed to avoid sensitive environmental receptors, including designated conservation sites such as North East of Farnes Deep MCZ (AECOM, 2022a). The UXO clearance activities will be confined entirely within the boundaries of the MIC, and therefore, will not occur within a protected area.</p> <p>In the first instance, avoidance strategies, such as routeing around cUXO will be used. Where avoidance is not feasible, the Applicant is committed to employing LOD clearance methods to minimise potential environmental impacts, including temporary seabed/habitat disturbance. LOD has demonstrated no seabed cratering following successful neutralisation (Robinson <i>et al.</i>, 2020; JNCC, 2025b). This approach reflects an environmentally responsible strategy aligned with the Marine Plans' objectives.</p>
<p>Marine Protected Areas: NE-MPA-2</p>	<p>Proposals that enhance a marine protected area's ability to adapt to climate change, enhancing the resilience of the marine protected area network, will be supported.</p> <p>Proposals that may have adverse impacts on an individual marine protected area's ability to adapt to the effects of climate change, and so reduce the resilience of the marine protected area network, must demonstrate that they will, in order of preference:</p> <p>A) Avoid; B) Minimise; or C) Mitigate</p> <p>adverse impacts.</p>	<p>Furthermore, an assessment on the potential impacts from the UXO clearance activities on MPAs (including SACs, SPAs, MCZs and HPMAAs) is detailed within Sections 7 and 8.</p> <p>The MPA assessment concludes that there is no significant residual impacts on MPAs in any Marine Plan region as a result of the UXO clearance activities.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Marine Protected Areas: NE-MPA-3</p>	<p>Where statutory advice states that a marine protected area site condition is deteriorating or that features are moving or changing due to climate change, a suitable boundary change to ensure continued protection of the site and coherence of the overall network should be considered.</p>	
<p>Marine Protected Areas: NE-MPA-4</p>	<p>Proposals that may have significant adverse impacts on designated geodiversity must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) Avoid b) Minimise c) Mitigate <p>adverse impacts so they are no longer significant.</p>	
<p>Oil and Gas: NE-OG-1</p>	<p>Proposals in areas where a licence for oil and gas has been granted or formally applied for should not be authorised unless it is demonstrated that the other development or activity is compatible with the oil and gas activity.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there are no licences for oil and gas production overlapping the MIC.</p>
<p>Oil and Gas: NE-OG-2</p>	<p>Proposals within areas of geological oil and gas extraction potential demonstrating compatibility with future extraction activity will be supported.</p>	
<p>Ports, Harbours and Shipping: NE-PS-1</p>	<p>In line with the National Policy Statement for Ports, sustainable port and harbour development should be supported. Only proposals demonstrating compatibility with current port and harbour activities will be supported. Proposals within statutory harbour authority areas or their approaches that detrimentally and materially affect safety of navigation, or the compliance by statutory harbour authorities with the Open Port Duty or the</p>	<p>Port authorities will be engaged with ahead of commencement of UXO Clearance operations to determine any specific requirements for works in proximity to harbour areas. Additionally, the UXO clearance vessel will follow Port bylaws and General Directions, including Vessel Traffic Services (VTS) communications from relevant port authorities including for example the piloting of large vessels when entering or leaving Harbour Areas.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>Port Marine Safety Code, will not be authorised unless there are exceptional circumstances. Proposals that may have a significant adverse impact upon future opportunity for sustainable expansion of port and harbour activities, must demonstrate that they will, in order of preference: a) avoid b) minimise c) mitigate - adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.</p>	
<p>Ports, Harbours and Shipping: NE-PS-2</p>	<p>Proposals that require static sea surface infrastructure or that significantly reduce underkeel clearance must not be authorised within or encroaching upon International Maritime Organization routing systems unless there are exceptional circumstances</p>	
<p>Ports, Harbours and Shipping: NE-PS-3</p>	<p>Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance which encroaches upon high density navigation routes, strategically important navigation routes, or that pose a risk to the viability of passenger services, must not be authorised unless there are exceptional circumstances.</p>	
<p>Ports, Harbours and Shipping: NE-PS-4</p>	<p>Proposals promoting or facilitating sustainable coastal and/or short sea shipping as an alternative to road, rail or air transport will be supported where appropriate.</p>	
<p>Renewables: NE-REN-1</p>	<p>Proposals that enable the provision of renewable energy technologies and associated supply chains, will be supported.</p>	<p>EGL2 supports the UK's need to upgrade its electricity infrastructure, in particular with relation to provision of secure, green energy by unlocking greater transmission capacity between Scotland and England.</p>
<p>Renewables: NE-REN-2</p>	<p>Proposals for new activity within areas held under a lease or an agreement for lease for renewable energy generation should</p>	



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>not be authorised, unless it is demonstrated that the proposed development or activity will not reduce the ability to construct, operate or decommission the existing or planned energy generation project.</p>	<p>The MLAs are for a discrete and highly limited campaign of UXO clearance, which has very limited potential to interrupt offshore wind energy activities. Notwithstanding, the Applicant will continue to work proactively with third-party assets and developers to ensure minimal potential for disturbance whilst also observing the International Marine Contractors Association (IMCA) guidance on SIMOPS (IMCA M203, Version II 2021).</p>
<p>Renewables: NE-REN-3</p>	<p>Proposals for the installation of infrastructure to generate offshore renewable energy, inside areas of identified potential and subject to relevant assessments, will be supported.</p>	
<p>Seascape and Landscape: NE-SCP-1</p>	<p>Proposals should ensure they are compatible with their surroundings and should not have a significant adverse impact on the character or visual resource of the seascape and landscape of the area. The location, scale and design of proposals should take account of the character, quality and distinctiveness of the seascape and landscape. Proposals that may have significant adverse impacts on the seascape and landscape of the area should demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid, b) minimise c) mitigate <p>adverse impacts so they are no longer significant. If it is not possible to mitigate, the public benefits for proceeding with the proposal must outweigh the significant adverse impacts to the seascape and landscape of the area. Proposals within or relatively close to nationally designated areas should have regard to the specific statutory purposes of the designated area. Great weight should be given to conserving and enhancing</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no significant adverse impacts on the character of the seascape of the MIC.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty.</p>	
<p>Social Benefits: NE-SOC-1</p>	<p>Those bringing forward proposals should consider and demonstrate how their development shall enhance public knowledge, understanding, appreciation and enjoyment of the marine environment as part of (the design of) the proposal.</p>	<p>Policy is not relevant to UXO clearance activities and is therefore not considered further.</p>
<p>Tourism and Recreation: NE-TR-1</p>	<p>Proposals that promote or facilitate sustainable tourism and recreation activities, or that create appropriate opportunities to expand or diversify the current use of facilities, should be supported. Proposals that may have significant adverse impacts on tourism and recreation activities must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> a) avoid b) minimise c) mitigate <p>adverse impacts so they are no longer significant.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no impacts (positive or negative) on tourism and recreation in or near the MIC.</p>
<p>Underwater noise: NE-UWN-1</p>	<p>Proposals that result in the generation of impulsive sound must contribute data to the UK Marine Noise Registry as per any currently agreed requirements. Public authorities must take account of any currently agreed targets under the Marine Strategy Part One Descriptor 11.</p>	<p>Underwater sound modelling was carried out (Appendix B; A-100744-S07-A-ASMT-001), which considered impacts resulting from underwater sound from UXO clearance on marine mammals. The predicted impact ranges from the modelling are used to inform the Environmental Appraisal (Section 6).</p> <p>A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed to mitigate potential impact from underwater sound on marine mammals. Additionally, as the Applicant is committed to using LOD, this significantly reduces the risk of PTS on</p>



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<p>Underwater noise: NE-UWN-2</p>	<p>Proposals that result in the generation of impulsive or non-impulsive noise must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> A) Avoid; B) Minimise; or C) Mitigate <p>adverse impacts on highly mobile species so they are no longer significant.</p> <p>If it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding.</p>	<p>marine mammals. Furthermore, the UXO clearance activities will be very short-term in duration and temporary.</p> <p>Therefore, the Environmental Appraisal (Section 6) concludes that there is no significant residual impacts of underwater sound on marine mammals.</p> <p>EGL2 will follow mitigation hierarchy to reduce potentially harmful high sound emissions in the marine environment, which includes avoidance, use of LOD UXO clearance, relocation, and repeated attempts (as outlined in Section 3.2.2).</p> <p>Embedded mitigations, detailed in Section 3.2.6, will also be implemented to during the UXO clearance activities, which will further reduce disturbance on marine mammals, including a UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) and adherence to the SMWWC for project vessels. Additionally, the UXO clearance activities will be short-term and temporary.</p> <p>Therefore, the Environmental Appraisal has concluded there were no significant disturbance from underwater sound on marine mammals or fish due to the UXO clearance activities. Therefore, no further mitigation is required.</p>
<p>Water Quality: NE-WQ-1</p>	<p>Proposals that protect, enhance and restore water quality will be supported. Proposals that cause deterioration of water quality must demonstrate that they will, in order of preference:</p> <ul style="list-style-type: none"> A) Avoid B) Minimise 	<p>The UXO Clearance operations will be undertaken in compliance with international standards e.g., MARPOL and in accordance with the approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004),</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	C) Mitigate deterioration of water quality in the marine environment.	to ensure no deterioration in water quality and compliance with this policy.
East Inshore and Offshore Marine Plan (England)		
Policy E-EC-1	Proposals that provide economic productivity benefits which are additional to Gross Value Added currently generated by existing activities should be supported.	<p>Strategically, EGL2 is for the reinforcement of electrical transmission infrastructure to facilitate increased renewable electricity generation and movement of that electricity between Scotland and England. More widely, the Marine Scheme represents significant investment in the UK low-carbon economy, and is supportive of the wider transition to Net Zero by 2050 in England. At a more granular level, there are substantial direct benefits arising from EGL2 in relation to GVA. Strategically, EGL2 is for the reinforcement of electrical transmission infrastructure to facilitate increased renewable electricity generation and movement of that electricity between Scotland and England. More widely, the Marine Scheme represents significant investment in the UK low-carbon economy, and is supportive of the wider transition to Net Zero by 2050 in England. At a more granular level, there are substantial direct benefits arising from EGL2 in relation to GVA, and this is explored further within this marine plan checklist.</p> <p>EGL2 is a collaborative effort involving numerous of people from a range of organisations, which will create a range of skilled jobs within the local East coast region, both directly and indirectly across the supply chain.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Policy E-EC-2</p>	<p>Proposals that provide additional employment benefits should be supported, particularly where these benefits have the potential to meet employment needs in localities close to the marine plan areas.</p>	<p>EGL2 is a collaborative effort with thousands of people from a range of organisations, which will create numerous skilled jobs within the local East coast region.</p>
<p>Policy E-EC-3</p>	<p>Proposals that will help the East marine plan areas to contribute to offshore wind energy generation should be supported.</p>	<p>EGL2 supports the UK's need to upgrade its electricity infrastructure, in particular with relation to provision of secure, green energy by unlocking greater transmission capacity between Scotland and England.</p> <p>The MLAs are for a discrete and highly limited campaign of UXO clearance, which has very limited potential to interrupt offshore wind energy activities. Notwithstanding, the Applicant will continue to work proactively with third-party assets and developers to ensure minimal potential for disturbance whilst also observing the International Marine Contractors Association (IMCA) guidance on SIMOPS (IMCA M203, Version II 2021).</p>
<p>Policy E-SOC-1</p>	<p>Proposals that provide health and social well-being benefits including through maintaining, or enhancing, access to the coast and marine area should be supported.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as these do not provide health and social well-being benefits.</p>
<p>Policy E-SOC-2</p>	<p>Proposals that may affect heritage assets should demonstrate, in order of preference:</p> <p>A) that they will not compromise or harm elements which contribute to the significance of the heritage asset</p> <p>B) how, if there is compromise or harm to a heritage asset, this will be minimised</p>	<p>EGL2 have already undertaken a detailed assessment of the potential impact on archaeology along the Marine Scheme route - although not inclusive of UXO clearance, much of this provides relevant baseline information, which has helped inform the refinement of the 80 m corridor described in section 1.1 above (AECOM, 2022a).</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>C) how, where compromise or harm to a heritage asset cannot be minimised it will be mitigated against or</p> <p>D) the public benefits for proceeding with the proposal if it is not possible to minimise or mitigate compromise or harm to the heritage asset</p>	<p>Additionally, EGL2's retained archaeologist completed an archaeological assessment of recent high-resolution survey data (EGL2- NGET-MAR-XX-CO-MC-004; Wessex, 2025 (Section 3.2.2) – the MIC is well understood and the Applicant is continuing to have appropriate regard for archaeology.</p> <p>The ongoing UXO TIs are being undertaken in accordance with an approved archaeological method statement, agree with both Historic England (HE) and the MMO (EGL2- NGET-MAR-XX-CO-MC-003 (V5)).</p> <p>The UXO clearance activities are temporary and highly localised, with no physical interaction expected or planned with heritage assets or designated landscapes.</p> <p>Further information on embedded mitigations are detailed in Section 3.2.6.</p>
<p>Policy E-SOC-3</p>	<p>Proposals that may affect the terrestrial and marine character of an area should demonstrate, in order of preference:</p> <p>a) that they will not adversely impact the terrestrial and marine character of an area</p> <p>b) how, if there are adverse impacts on the terrestrial and marine character of an area, they will minimise them</p> <p>c) how, where these adverse impacts on the terrestrial and marine character of an area cannot be minimised they will be mitigated against</p> <p>d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>The project aims to remove harmful debris from the marine environment; therefore, in the longer term, the outcomes will enhance the marine character of the area.</p>



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<p>Policy E-ECO-1</p>	<p>Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation.</p>	<p>Potential impacts from the proposed UXO clearance activities have the potential to interact with those from other developments, plans, and activities, which may result in cumulative effects. A cumulative assessment was conducted in Section 6.7, for receptors identified within the Environmental Appraisal. An in-combination effects assessment was undertaken within the Habitats Regulations Appraisal / Assessment in Section 7.4, and within the Marine Protected Area Assessment in Section 8.3. No significant adverse effects were concluded, either for the UXO clearance activities alone, or cumulatively with any other project, plan or development.</p>
<p>Policy E-ECO-2</p>	<p>The risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation.</p>	<p>The UXO Clearance vessel will follow the International Regulations for Preventing Collisions at Sea 1972 (COLREGS) and International Convention for the Safety of Life at Sea 1974 (SOLAS). The vessel will also display appropriate lights and shapes and will transmit their position and status using Automatic Identification System (AIS). In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required.</p>
<p>Policy E-BIO-1</p>	<p>Appropriate weight should be attached to biodiversity, reflecting the need to protect biodiversity as a whole, taking account of the best available evidence including on habitats and species that are protected or of conservation concern in the East marine plans and adjacent areas (marine, terrestrial).</p>	<p>Potential effects of the Marine Scheme on protected areas and protected species s have been appraised within Section 5 of this SEI. These appraisals have concluded no significant residual effects.</p> <p>A Habitats Regulation Assessment (Section 6) and Marine Protected Area Assessment (Section 7) have also been undertaken to demonstrate compliance with the legal requirements for protected</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Policy E-BIO-2</p>	<p>Where appropriate, proposals for development should incorporate features that enhance biodiversity and geological interests.</p>	<p>areas and protected species. Together the SEI demonstrate protection of the health of the marine area.</p> <p>The route of the MIC has been carefully designed to avoid sensitive environmental receptors. Additionally, the Applicant is committed to using LOD as the UXO clearance. LOD is recognised as an environmentally responsible technique because it significantly reduces seabed disturbance and associated impacts on benthic habitats compared to HOD, as it does not leave seabed craters, therefore minimising sediment displacement and avoiding major habitat loss (Robinson <i>et al.</i>, 2020; Abad Oliva <i>et al.</i>, 2024). This also helps to minimise disturbance to important nursery and spawning ground for fish species.</p>
<p>Policy E-MPA-2</p>	<p>Any impacts on the overall Marine Protected Area network must be taken account of in strategic level measures and assessments, with due regard given to any current agreed advice on an ecologically coherent network.</p>	<p>An assessment on the potential impacts from the UXO clearance activities on MPAs (including SACs, SPAs, MCZs and HPMA) is detailed within Sections 7 and 8.</p> <p>The MPA assessment concludes that there is no significant residual impacts on MPAs in any Marine Plan region as a result of the UXO clearance activities.</p>
<p>Policy E-CC-1</p>	<p>Proposals should take account of: how they may be impacted upon by, and respond to, climate change over their lifetime and how they may impact upon any climate change adaptation measures elsewhere during their lifetime.</p> <p>Where detrimental impacts on climate change adaptation measures are identified, evidence should be provided as to how the proposal will reduce such impacts.</p>	<p>EGL2 aims to upgrade the UK’s electricity transmission system, which will support the growing renewable energy developments and aims to achieve energy security and carbon reduction objectives.</p>



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<p>Policy E-CC-2</p>	<p>Proposals for development should minimise emissions of greenhouse gases as far as is appropriate. Mitigation measures will also be encouraged where emissions remain following minimising steps. Consideration should also be given to emissions from other activities or users affected by the proposal.</p>	<p>UXO clearance activities involve a single vessel for up to 90 days. The vessel will not be employed any longer than absolutely necessary, thus minimising greenhouse gas emissions.</p>
<p>Policy E-GOV-1</p>	<p>Appropriate provision should be made for infrastructure on land which supports activities in the marine area and vice versa.</p>	<p>Policy is not relevant to UXO clearance activities as no infrastructure on land is planned.</p>
<p>Policy E-GOV-2</p>	<p>Opportunities for co-existence should be maximised wherever possible.</p>	<p>The UXO Clearance operations will be carried out within the EGL2 MIC, which has already been optimised to enhance co-existence with other marine users. For this UXO Clearance campaign, EGL2 will ensure co-existence through adherence to EGL2 approved plans including the Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129) and continued communications with other mariners through engagement meetings and notifications e.g. continued engagement with asset owners and promulgation of NtMs aligned with best practice and in adherence to the EGL2 Marine Scheme Communications Strategy – Scotland (Document ID: EGL2-JV-EM-XX-PL-MC-115).</p>
<p>Policy E-GOV-3</p>	<p>Proposals should demonstrate in order of preference: a) that they will avoid displacement of other existing or authorised (but yet to be implemented) activities b) how, if there are adverse impacts resulting in displacement by the proposal, they will minimise them c) how, if the adverse impacts resulting in displacement by the proposal, cannot be minimised, they will be mitigated against or d) the case for proceeding with the</p>	<p>UXO clearance activities comprise a single vessel operating for up to 90 days. Any impacts on maritime co-existence will be very short lived and are not considered to be significant adverse impacts. Following the clearance of UXO, and the construction of the EGL2 cable project, there will be no displacement of other existing or authorised activities.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	proposal if it is not possible to minimise or mitigate the adverse impacts of displacement	
Policy E-DEF-1	Proposals in or affecting Ministry of Defence Danger and Exercise Areas should not be authorised without agreement from the Ministry of Defence.	Policy is not relevant to UXO clearance activities and is therefore not considered further.
Policy E-OG-1	Proposals within areas with existing oil and gas production should not be authorised except where compatibility with oil and gas production and infrastructure can be satisfactorily demonstrated.	Policy is not relevant to EGL2 UXO clearance activities as there is no existing oil and gas production in the vicinity of the MIC.
Policy E-OG-2	Proposals for new oil and gas activity should be supported over proposals for other development.	Policy is not relevant to EGL2 UXO clearance activities as there is no existing oil and gas production in the vicinity of the MIC.
Policy E-WIND-1	Developments requiring authorisation, that are in or could affect sites held under a lease or an agreement for lease that has been granted by The Crown Estate for development of an Offshore Wind Farm, should not be authorised unless they can clearly demonstrate that they will not compromise the construction, operation, maintenance, or decommissioning of the Offshore Wind Farm the lease/agreement for lease has been surrendered back to The Crown Estate and not been re-tendered the lease/agreement for lease has been terminated by the Secretary of State in other exceptional circumstances.	The MLAs are for a discrete and highly limited campaign of UXO clearance, which has very limited potential to interrupt offshore wind energy activities. Notwithstanding, the Applicant will continue to work proactively with third-party assets and developers to ensure minimal potential for disturbance whilst also observing the International Marine Contractors Association (IMCA) guidance on SIMOPS (IMCA M203, Version II 2021).
Policy E-WIND-2	Proposals for Offshore Wind Farms inside Round 3 zones, including relevant supporting projects and infrastructure, should be supported.	Policy is not relevant to UXO clearance activities and is therefore not considered further.



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Policy E-TIDE-1</p>	<p>In defined areas of identified tidal stream resource (see figure 16), proposals should demonstrate, in order of preference:</p> <ul style="list-style-type: none"> a) that they will not compromise potential future development of a tidal stream project b) how, if there are any adverse impacts on potential tidal stream deployment, they will minimise them c) how, if the adverse impacts cannot be minimised, they will be mitigated d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts 	<p>Policy is not relevant to UXO clearance activities and is therefore not considered further.</p>
<p>Policy E-CCS-1</p>	<p>Within defined areas of potential carbon dioxide storage,¹⁹¹ (mapped in figure 17) proposals should demonstrate in order of preference:</p> <ul style="list-style-type: none"> a) that they will not prevent carbon dioxide storage b) how, if there are adverse impacts on carbon dioxide storage, they will minimise them c) how, if the adverse impacts cannot be minimised, they will be mitigated d) the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts 	<p>Policy is not relevant to EGL2 UXO clearance activities as this is not a CCUS project.</p>
<p>Policy E-CCS-2</p>	<p>Carbon Capture and Storage proposals should demonstrate that consideration has been given to the re-use of existing oil and gas infrastructure rather than the installation of new infrastructure (either in depleted fields or in active fields via enhanced hydrocarbon recovery)</p>	<p>Policy is not relevant to UXO clearance activities and is therefore not considered further.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
<p>Policy E-PS-1</p>	<p>Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance should not be authorised in International Maritime Organization designated routes</p>	<p>Policy is not relevant to UXO clearance activities and is therefore not considered further.</p>
<p>Policy E-PS-2</p>	<p>Proposals that require static sea surface infrastructure that encroaches upon important navigation routes (see figure 18) should not be authorised unless there are exceptional circumstances. Proposals should: a) be compatible with the need to maintain space for safe navigation, avoiding adverse economic impact²⁰¹ b) anticipate and provide for future safe navigational requirements where evidence and/or stakeholder input allows and c) account for impacts upon navigation in-combination with other existing and proposed activities</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as no static sea surface infrastructure is proposed.</p>
<p>Policy E-PS-3</p>	<p>Proposals should demonstrate, in order of preference: that they will not interfere with current activity and future opportunity for expansion of ports and harbours how, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this how, if the interference cannot be minimised, it will be mitigated the case for proceeding if it is not possible to minimise or mitigate the interference</p>	<p>Port authorities will be engaged with ahead of commencement of UXO Clearance operations to determine any specific requirements for works in proximity to harbour areas. Additionally, the UXO clearance vessel will follow Port bylaws and General Directions, including Vessel Traffic Services (VTS) communications from relevant port authorities including for example the piloting of large vessels when entering or leaving Harbour Areas.</p>
<p>Policy E-DD-1</p>	<p>Proposals within or adjacent to licensed dredging and disposal areas should demonstrate, in order of preference that they will not adversely impact dredging and disposal activities how, if there are adverse impacts on dredging and disposal, they will minimise these how, if the adverse impacts cannot be minimised</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as works will not occur within or adjacent to licensed dredging and disposal areas.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	they will be mitigated the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts	
Policy E-AGG-1	Proposals in areas where a licence for extraction of aggregates has been granted or formally applied for should not be authorised unless there are exceptional circumstances	Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on areas of high potential aggregate resource in or near the MIC.
Policy E-AGG-2	Proposals within an area subject to an Exploration and Option Agreement with The Crown Estate should not be supported unless it is demonstrated that the other development or activity is compatible with aggregate extraction or there are exceptional circumstances	Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on areas of high potential aggregate resource in or near the MIC.
Policy E-AGG-3	Within defined areas of high potential aggregate resource, proposals should demonstrate in order of preference: that they will not, prevent aggregate extraction how, if there are adverse impacts on aggregate extraction, they will minimise these how, if the adverse impacts cannot be minimised, they will be mitigated the case for proceeding with the application if it is not possible to minimise or mitigate the adverse impacts	Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on areas of high potential aggregate resource in or near the MIC.
Policy E-CAB-1	Preference should be given to proposals for cable installation where the method of installation is burial. Where burial is not achievable, decisions should take account of protection measures for the cable that may be proposed by the applicant.	EGL2 is a subsea cable project which is already licensed (MLA/2022/00273). UXO clearance activities will be undertaken within the MIC to allow the safe construction of the EGL2 project.
Policy E-FISH-1	Within areas of fishing activity, proposals should demonstrate in order of preference: that they will not prevent fishing activities on, or access to, fishing grounds how, if there are adverse impacts on the ability to undertake fishing activities or access to	The UXO Clearance activities will be undertaken in line with the Applicant's strong commitments to co-existence between the EGL2 Marine Scheme and other users of the marine environment including commercial fisheries. In this respect, the UXO clearance



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	<p>fishing grounds, they will minimise them how, if the adverse impacts cannot be minimised, they will be mitigated the case for proceeding with their proposal if it is not possible to minimise or mitigate the adverse impacts.</p>	<p>activities will be undertaken in line with the approved EGL2 Marine Scheme Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129), including use of a dedicated Fisheries Liaison Officer (FLO) (Blackhall and Powis) and ensuring the promulgation of information via NtMs and continued engagement to safeguard fisheries activities as far as practicable. As such, the UXO clearance works are compliant with this policy.</p>
<p>Policy E-FISH-2</p>	<p>Proposals should demonstrate, in order of preference: that they will not have an adverse impact upon spawning and nursery areas and any associated habitat how, if there are adverse impacts upon the spawning and nursery areas and any associated habitat, they will minimise them how, if the adverse impacts cannot be minimised they will be mitigated the case for proceeding with their proposals if it is not possible to minimise or mitigate the adverse impacts</p>	<p>The UXO Clearance activities may cause temporary seabed disturbance which may affect essential fish habitats. Cable routing has avoided sensitive benthic habitats within the MIC through route optimisation, limiting the potential for adverse effects to the benthic environment where UXO clearance is required.</p> <p>The effects of the UXO Clearance activities on essential fish habitats are discussed in Table 5-1. With consideration given to the extensive availability of alternative habitats which support spawning and nursery grounds, the overall potential for significant adverse effects is considered to be negligible. As such, the UXO clearance works are compliant with this policy.</p>
<p>Policy E-AQ-1</p>	<p>Within sustainable aquaculture development sites (identified through research), proposals should demonstrate in order of preference: that they will avoid adverse impacts on future aquaculture development by altering the sea bed or water column in ways which would cause adverse impacts to aquaculture productivity or potential how, if there are adverse impacts on aquaculture development, they can be minimised how, if the adverse impacts cannot be minimised they will be</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no impact on any current or future aquaculture developments in or near the MIC.</p>



POLICY/OBJECTIVE CODE	DETAIL	CONSIDERATION WITHIN THIS SEI
	mitigated the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts	
<p>Policy E-TR-1</p>	<p>Proposals for development should demonstrate that during construction and operation, in order of preference: they will not adversely impact tourism and recreation activities how, if there are adverse impacts on tourism and recreation activities, they will minimise them how, if the adverse impacts cannot be minimised, they will be mitigated the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no significant adverse impacts on tourism and recreation in or near the MIC..</p>
<p>Policy E-TR-2</p>	<p>Proposals that require static objects in the East marine plan areas, should demonstrate, in order of preference: that they will not adversely impact on recreational boating routes how, if there are adverse impacts on recreational boating routes, they will minimise them how, if the adverse impacts cannot be minimised, they will be mitigated the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no static objects positioned in or near the MIC.</p>
<p>Policy E-TR-3</p>	<p>Proposals that deliver tourism and/or recreation related benefits in communities adjacent to the East marine plan areas should be supported.</p>	<p>Policy is not relevant to EGL2 UXO clearance activities as there will be no impacts (positive or negative) on tourism and recreation in or near the MIC.</p>



3 DESCRIPTION OF PROPOSED WORKS

3.1 Introduction

The presence of cUXO within the MIC Figure 1-1 presents a potential risk to human and environmental safety during installation of the EGL2 Marine Scheme and additionally presents further technical challenges for cable installation works.

In order to appropriately manage these risks, the Applicant will undertake a campaign to clear cUXO, where they cannot be avoided by micro-routing or micro-siting. Where required, LOD will be the selected UXO clearance method, in line with the UK Government (2025) policy. The Applicant will follow a hierarchical approach to management of UXO and mitigation of adverse effects, as described within Section 3.2.2 below. This approach is considered appropriate, aligned with regulatory guidance and industry best-practice; crucially, it is also fundamentally required in order to ensure movement toward ALARP⁹ Certification.

The following sections provide a description of the proposed UXO clearance activities which are currently proposed to take place during the spring-autumn months (between April—September) to allow for favourable weather conditions.

3.2 UXO clearance

3.2.1 UXO identification and inspection

A pUXO survey was undertaken by the Applicant between 2023 and 2025 to obtain new magnetometer, Side Scan Sonar (SSS), and Multi-Beam Echo Sounder (MBES) data across the full width of the refined 80 m cable route corridor, which sits entirely within the MIC. This survey provided a suite of high-resolution data, obtained for the primary aim of identifying pUXO targets for onward investigations. Approximately 300 pUXO targets were identified for further investigations.

At the time of this MLA, the UXO TI campaign is ongoing to investigate the pUXO target list and to confirm the presence of cUXO. This campaign is currently due to be completed by February 2026, subject to weather conditions.

3.2.2 Archaeological assessment of geophysical, magnetic anomaly and hydrographic data

EGL2's retained archaeologist completed an archaeological assessment of geophysical data acquired between January 2024 and March 2025 for the proposed Marine Scheme ahead of installation (EGL2- NGET-MAR-XX-CO-MC-004; Wessex Archaeology, 2025). New magnetometer, SSS, and MBES data were acquired covering the full width of the refined 80 m cable route corridor, which sits entirely within the Marine Scheme.

The newly acquired magnetometer data were collected with the primary objective of identifying any features that may be UXO. These data are of considerably higher density (~1.5 m line spacing) compared to the previous assessment (~50 - 250 m line spacing), and as such can detect much smaller anomalies and detect anomalies to a higher degree of positional accuracy and magnitude than is possible with the previously acquired data.

⁹ As Low as is Reasonably Practicable – the ultimate ALARP certificate will detail the appropriate steps taken to manage the risk of UXO.



This geophysical assessment follows on from a previous assessment conducted by Wessex Archaeology for the Marine Scheme (Wessex Archaeology, 2021). Previously identified anomalies have been re-assessed with respect to the UXO magnetometer data as part of this assessment.

The SSS, MBES and LiDAR data were used as a secondary data source to determine the presence of surface features associated with the magnetometer targets and supplemented the 2021 assessment (Wessex Archaeology, 2021).

A total of 187 seabed features of archaeological potential previously identified during the 2021 assessment are located within the 80 m refined cable corridor. These results have been merged with the newly identified magnetometer features of archaeological potential to form the results of this follow up assessment. The archaeological analysis of geophysical and hydrographic survey data was completed to respond to the wide remit of the MMO WSI condition in English waters (condition 5.2.4, L/2023/00211/2). However, as a best-practice and recognising the approach of the overarching WSI/PAD in Scottish and English waters respectively, the route was assessed on an end-to-end basis.

3.2.3 UXO clearance process

There are four stages of reducing the risk posed by UXO that may be employed during UXO clearance activities. These stages will be implemented in the following mitigation hierarchy, in order to reduce potentially harmful high sound emissions in the marine environment:

1. **Avoidance:** in the first instance, the EGL2 Marine Scheme subsea cables will be micro-sited or micro-routed away from UXO to avoid the need for use of explosives, and the location of cUXO will be reported to the relevant regulator i.e. MMO or MD-LOT (subject to jurisdiction of the cUXO), and also communicated more widely via a NtMs in line with EGL2 requirements;
2. **Use of low-noise UXO clearance:** where UXO is unavoidable and clearance of the UXO is required, low-noise intervention (i.e., LOD) will be used for clearance operations to minimise sound emissions. LOD uses a small (approximately 0.25 kg TNT_{eq} per UXO) charge close to the UXO which, when ignited, causes a rapid burn of the UXO explosives without detonation. Marine mammal mitigation measures will be applied in line with the JNCC (2025) guidelines throughout this process, as required. HOD is not being utilised, with the only potential for HOD through an extremely unlikely accidental event whereby an attempt to deflagrate a UXO may result in an unplanned detonation. Nonetheless, the preferred UXO clearance contractor has a 100% success rate of using LOD methods, with no accidental HOD having occurred to date;
3. **Relocation:** Consideration will be made to relocate a cUXO to a safe place prior to clearance if it is located in close proximity to sensitive features and it is deemed structurally sound and not significantly buried. Relocation will only be undertaken where absolutely necessary, such as due to proximity of a third-party asset or archaeological feature, and where deemed safe to do; and
4. **Repeated Attempts:** More than one LOD attempt may be required to fully neutralise a UXO. Where multiple LOD attempts are required, the Applicant will endeavour to conduct all attempts consecutively, where possible, to minimise the period of disturbance. All attempts will be documented and submitted to the relevant regulator to demonstrate that LOD has been successful, and in cases where LOD was not successful, why this was the case. As above, marine mammal mitigation measures will be applied in line with the JNCC (2025) guidelines throughout this process.

3.2.4 UXO debris removal

The Applicant will implement best practice for the removal of substances and objects following UXO clearance activities (Defra, 2025). This ensures that where practicable residual material from UXO clearance operations is removed to minimise environmental risk, including potential chemical contamination of the surrounding water column. This builds upon the existing approach followed by the Applicant as part of the ongoing UXO TI campaign,



during which substantial volumes of marine debris / litter have been recovered and taken ashore for appropriate disposal/ recycling via a suitably licenced facility.

A post-clearance survey will be undertaken to confirm the presence and location of any residual UXO clearance debris. The survey will cover a defined radius around the UXO clearance site, based on the expected debris field and LOD clearance method used. Debris will be recovered using a Remotely Operated Vehicle (ROV) equipped with appropriate tooling for safe collection.

Consistent with the approach followed for debris removal during the ongoing UXO TI campaign, recovered debris will be securely contained and transported to an approved onshore facility for disposal in accordance with the EGL2 Marine Scheme's approved Waste Management Plan and relevant waste management regulations.

3.2.5 Assessment approach

Approximately 300 pUXOs were identified within the MIC and are currently undergoing investigation. As informed by industry experience, it is typically assumed that roughly 5-10% of pUXO are cUXO. Therefore, it can be assumed that there would likely be in the region of 35 cUXO (taking a precautionary approach) within the MIC, across both English and Scottish waters.

Due to historical minefields, and the majority of the route length being in English waters, it is more likely that cUXO are present in the section of the MIC in English waters. On this basis, Marine Licences are being sought for:

- The LOD clearance of 15 cUXOs in Scottish waters (plus the assessment of one unplanned/accidental HOD as a worst-case scenario within this SEI report); and
- The LOD clearance of 20 cUXO in English waters (plus the assessment of one unplanned/accidental HOD as a worst-case scenario within this SEI report).

At the time of this MLA submission, EGL2's preferred UXO clearance contractor is Helix Energy Solutions¹⁰ who have a high success rate for neutralising UXO by using the Alford Technologies low order deflagration tool¹¹, without any HOD occurrences^{12,13}. Whilst no contract is currently in place, providing this preliminary information is seen as beneficial for the MLA, and helps provide a more detailed description of the proposed UXO clearance campaign (in line with the Defra joint position statement, which encourages the provision of detailed information (Defra, 2025). Notwithstanding the above, the MLA is considered to be broad enough to encompass minor deviations in methodology, in the event other similar contractor(s) are involved.

As noted above, the unplanned or accidental detonation of UXO cannot be entirely excluded; therefore, the following assessment will consider the potential for one HOD in Scottish waters and one HOD in English waters as contingency in the event of an unplanned, or accidental detonation. As HOD is not planned due to the preferred UXO clearance contractor's experience and 100% success rate to-date, noise abatement systems (i.e., bubble curtains) will not be used. This approach is also aligned with the Defra position statement (Defra, 2025), which:

- Confirms that LOD is the preferred method of UXO clearance;
- Encourages inclusion of comprehensive information, but also a worst-case basis of technical assessment; and
- Sets out that HOD should be a 'last resort', undertaken in exceptional circumstances (i.e. LOD has failed, all best-practice has been applied and there is prior agreement with the licensing authority).

¹⁰ [Explosive Ordnance Disposal \(EOD\) Services - Helix Energy Solutions](#)

¹¹ <https://www.explosives.net/low-order-deflagration-uxo-disposal/>

¹² [Offshore Wind - EODEX](#)

¹³ [MEMBER NEWS: Safe UXO disposal bolsters marine environment conservation at Moray West Offshore Wind Farm - Aberdeen Renewable Energy Group](#)



The Defra guidance (2025) sets out how licensing authorities may choose to process an application for UXO clearance, with "Category A" being the most preferred ('clearance using a low noise tool proposed; robust evidence provided from both controlled testing and at-sea clearances, supporting claims of reduced environmental impacts compared to high order clearance'). The Applicant's approach is considered to be fully-aligned with this most-preferred route.

The list of cUXO locations will be submitted to the regulators once the UXO TI surveys have been completed. There are approximately 300 pUXO targets that are being investigated, to confirm the presence of UXO.

3.2.6 Embedded mitigation

Table 3-1 details embedded mitigation measures relevant to the proposed UXO clearance works.

Table 3-1 Embedded Mitigation Relevant to the UXO Clearance Works

ID	MITIGATION MEASURE	DETAILS
1	Avoidance of cUXO	<p>In line with first principles of risk mitigation and operational feasibility, the primary approach to avoiding cUXO will be to re-route the cable, where technically feasible from a cable installation perspective. This prioritises the elimination of risk at source through design adaptation.</p> <p>Where re-routeing is implemented, the location of the cUXO will be accurately recorded, and the relevant regulators (MD-LOT/ MMO), will be formally notified. Additionally, Notices to Mariners (NtMs) will be issued to ensure appropriate communication to marine stakeholders.</p>
2	Application of LOD	<p>LOD is the selected UXO Clearance method where avoidance of the cUXO is not possible. This will minimise underwater sound emissions. These methods significantly reduce acoustic impacts on sensitive marine species such as marine mammals and fish. An experienced contractor with a high success rate of implementing LOD for UXO Clearance will be selected to undertake the works.</p>
3	Relocation of cUXO (Lift and Shift)	<p>Where sensitive features are noted at close proximity to a cUXO and where the cUXO is deemed structurally sound and not significantly buried, consideration will be made to relocate the cUXO to a safe place prior to clearance. Relocation will only be undertaken where absolutely necessary, such as due to proximity of a third-party asset or archaeological feature, and where deemed safe to do so following a threat and risk analysis by the Applicant and their Explosive Ordnance Disposal (EOD) contractor, in accordance with CIRIA C681. Clearance may still be required following relocation, in consultation with regulators.</p>
4	Safety Distances	<p>A 500 m safety exclusion zone will be implemented around UXO Clearance operations to protect nearby vessels and marine users. Clearance activities will be suspended if any non-operational vessel enters or approaches this zone.</p>
5	Notifications (Inc. NtMs / Navigational Warnings)	<p>NtMs (including Kingfisher Bulletins), Radio Navigational Warnings, NAVTEX and/or broadcast warnings as appropriate will be issued prior to the commencement of UXO Clearance operations.</p>



ID	MITIGATION MEASURE	DETAILS
6	Fisheries Liaison	A FLO is supporting the EGL2 Project (Blackhall and Powis) to ensure all fishers operating in the vicinity of the Marine Scheme will be proactively and appropriately communicated with in terms of the proposed Project operations. Fisheries Liaison for the UXO Clearance works will be undertaken in line with the MD-LOT-approved EGL2 Marine Scheme Fisheries Liaison Co-Existence Plan (Document ID: EGL2-JV-EM-XX-PL-MC-129).
7	Vessel Safety Operations	<p>The UXO Clearance vessel will follow the International Regulations for Preventing Collisions at Sea 1972 (COLREGS) and International Convention for the Safety of Life at Sea 1974 (SOLAS).</p> <p>The vessel will also display appropriate lights and shapes and will transmit their position and status using Automatic Identification System (AIS).</p>
8	Marine Pollution Mitigation	<p>The UXO Clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards, as required.</p> <p>In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required.</p>
9	Proactive engagement with Port Authorities	Port authorities will be engaged with ahead of commencement of UXO Clearance operations to determine any specific requirements for works in proximity to harbour areas. Additionally, the UXO clearance vessel will follow Port bylaws and General Directions, including Vessel Traffic Services (VTS) communications from relevant port authorities including for example the piloting of large vessels when entering or leaving Harbour Areas.
10	Waste Management	<p>Anthropogenic debris created through UXO Clearance operations (e.g. following neutralisation of a cUXO) will be recovered for appropriate onward disposal/ recycling above MHWS.</p> <p>Waste management will comply with the EGL2 Marine Scheme Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004).</p>
11	MMMP	A MMMP has been developed for the UXO Clearance activities and adheres to the JNCC (2025) Guidance. The measures included in this plan include use of Marine Mammal Observers (MMObs), PAM, ADDs etc to ensure impacts to marine mammals are minimised. Full details of the mitigation measures are included within the MMMP (Appendix A; A-100744-S07-A-TECH-001).
12	Vessel Speeds	The UXO Clearance vessel will operate at low speeds on site (typically ~4–8 knots) (except where transiting) allowing any rafts of birds to disperse naturally well in advance of an approaching vessel. This will minimise the



ID	MITIGATION MEASURE	DETAILS
		energy expended and avoid unnecessary flushing. Additionally, this reduces the potential for collision risk for marine mammals.
13	SMWWC (Scotland) and Marine and Coastal Wildlife Code (England)	The UXO Clearance vessel will adhere to the provisions of the SMWWC during the proposed works to ensure disturbance to wildlife is minimised. The equivalent of the SMWWC applicable to England is the Defra (2023) Marine and Coastal Wildlife Code.
14	Vessel Lighting	Lighting on the UXO Clearance vessel will be limited to the minimum required for safe operations. Lights will be shielded or directed downward to reduce disturbance to ornithological receptors, where safe and practicable to do so.
15	Greater Wash SPA Mitigations (English Inshore Waters Only)	The Red Throated Diver Vessel Best Practice Protocol (Joint SNCB, 2022) shall be followed to minimise disturbance to Red Throated Divers, when working in proximity to the Greater Wash SPA during the non-breeding season.
16	Marine Non-Native Species (MNNS)	Ballast water discharges from the UXO Clearance vessel will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 BWM Convention to ensure the risk of MNNS are minimised. The regulator approved EGL2 Marine Scheme Marine Non-Native Species Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0006) will also be adhered to during UXO Clearance works.
17	Avoidance of Sensitive Benthic Features	The EGL2 Marine Scheme MIC has been optimised to avoid sensitive benthic features based on the results of benthic surveys undertaken for the EGL2 Project in 2021 (NextGeosolutions, 2022) and 2024 (APEM, 2024). Given the avoidance of identified benthic areas for cable routeing, there will be no UXO Clearance required in areas of known sensitive seabed features e.g. Annex I Reefs. In addition, no UXO Clearance works are required landward of 11 mLAT (at Sandford Bay) or within 1 NM at Fraisthorpe Sands, therefore sensitive identified intertidal benthic features will not be impacted by the UXO Clearance works.
18	Archaeological Features Mitigation Measures	The EGL2 Marine Scheme has an approved Written Scheme of Investigation (WSI) and Protocol for Archaeological Discovery (PAD) in place (Document ID: EGL2-JV-EM-XX-PL-MC-128), with implementation supported by a retained archaeologist (Wessex Archaeology). The WSI incorporates findings from the 2021 geophysical surveys as well as additional data from the 2023–2025 pUXO surveys, ensuring archaeological features in the MIC are identified and potential impacts are avoided through cable routeing. This includes the establishment of AEZs. Given this, the likelihood of UXO Clearance works in proximity to confirmed archaeological features is minimised. Furthermore, if new archaeological features are identified in close proximity to cUXO, and where it is safe to do so, the cUXO will be relocated prior to clearance to prevent any loss to the archaeological record. In the event this is not possible, the Applicant



ID	MITIGATION MEASURE	DETAILS
		will defer to the hierarchical approach set out within the WSI/PAD, whilst engaging with the retained archaeologist and HES / HE as required.
19	Consultation with Asset Owners	The EGL2 Project will undertake consultation with asset owners should any cUXO be identified in proximity to third party assets. Discussions with the asset owners will ensure that any plans for UXO Clearance are agreed upon by all parties, including the potential for relocation of cUXO prior to clearance to safeguard third party assets.
20	Post Clearance Survey	MBES bathymetry surveys will be conducted after clearance to document any seabed changes.
21	HSE	The EGL2 Project operates a HSE management system for the Project activities which is also adhered to by all contractors. All works, including the UXO Clearance works, will be conducted in accordance with the HSE management systems, including approved Risk Assessments and Method Statements and ensuring works are conducted by Suitably Qualified and Experienced Personnel (SQEP). The EGL2 Project activities are also managed in accordance with the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974. The application of these safety measures ensures that HSE risks are minimised in so far as practicable during Project operations, including the UXO Clearance activities.

3.2.7 Programme and timing

UXO clearance works are anticipated to last a period of up to 90 days, with UXO clearance happening on a total of 35 days within that period (excluding an allowance for downtime), between 1 April—30 September 2026. To allow for contingencies, the Applicant will seek for a Marine Licence for the period 1 April 2026—31 October 2027, allowing flexibility should the works need to extend into 2027.

3.3 Stakeholder consultation

Since the original determination of the Marine Scheme, the Applicant has engaged with the consultees on a regular basis. In recent months, this has included coverage of the approach to and content of a forthcoming UXO clearance MLA with the MMO. Additionally, EGL2 held an in-person Marine Technical Forum (MTF) with the MMO on 17 September 2025 to discuss the proposed UXO clearance approach and address any outstanding queries. Key elements of this MTF are surmised below in Table 3-2.

EGL2 requested a meeting with NatureScot to discuss the proposed approach for ensuring oversight of the Scottish MLA and to confirm mutual understanding. Although NatureScot was unable to schedule a meeting before the submission deadline, EGL2 provided an overview of the UXO Clearance MLA approach. NatureScot subsequently confirmed that they had reviewed the approach and raised no significant concerns.



Table 3-2 Summary of MMO MTF (17 September 2025)

ITEM	CONSULTEE COMMENT	APPLICANT RESPONSE
1	<p>Approach: Following EGL2’s presentation of their approach to the UXO clearance MLA during the MTF, the MMO confirmed:</p> <ul style="list-style-type: none"> • Understanding of and adherence to the updated JNCC guidance (2025) is positive and will aid the MLA; • Development of an MLA on a precautionary basis is advisable. The MMO confirmed understanding of, and agreement, with the intent to include HOD on a worst-case basis, although did confirm this would have to be in exceptional circumstances; • Use of low-order techniques is the most-preferred option for UXO clearance, and commitment to this is likely to significantly benefit the MLA; and • EGL2 should include as much information as possible within the MLA to ensure consultees are fully-informed and to benefit the MLA generally. 	<p>EGL2 welcome the MMO’s support for the approach followed and wish to thank the MMO for their participation in pre-application engagement.</p> <p>As set out in Section 3, the Applicant is aligned with the JNCC guidance (2025).</p> <p>The MLA has been developed on a precautionary basis, both with respect to the estimated number of cUXO and also the inclusion of a contingency HOD event (unplanned, and not expected).</p> <p>The Applicant has committed to LOD.</p> <p>The MLA is detailed, and Section 3 in particular provides substantial detailed information regarding the nature of the UXO clearance process.</p>
2	<p>Marine Planning: MMO advise that NGET include Marine Policy Plan considerations (new requirement since original EAR/ML application). MMO advised EGL2 that a Marine Plan checklist / compliance check will likely require completion for the new MLA – this can be supported with documentation – cross referencing to the supporting document is encouraged, but a brief technical response to the checklist itself on MCMS will be needed.</p>	<p>The Applicant has undertaken a detailed assessment of relevant Marine Plan policies, as set out in Section 2.8 above. This assessment will be used to inform the Applicant’s completion of the MMO’s new compliance checklist at the time of the MLA.</p>
3	<p>Wildlife Licensing: MMO advise that a MWL submitted separately to MMO MCET (MMO took action to consult with MCET about upcoming submission).</p>	<p>As agreed in recent discussions with the MMO and as set out within Section 2.4 above, the Applicant will submit an Exemption submission to the MMO to confirm their position regarding the <i>lack</i> of requirement for an MWL. This is consistent with previous discussions with the MMO, and is supported by the industry-leading approach being followed by the Applicant regarding UXO clearance (i.e., LOD is the only intended clearance method).</p>



ITEM	CONSULTEE COMMENT	APPLICANT RESPONSE
4	<p>MCZ Assessment: MMO align with proposed NGET approach to MCZ assessment and request clear statement within SEI of why no MCZ assessment included.</p>	<p>The Applicant has fully considered relevant MCZs within this SEI report, as set out within Section 8.1 below. This clearly justifies why there is no requirement for a full (i.e., Stage 1) MCZ Assessment.</p>
5	<p>MMMP: MMO confirm that MMMP will be a live/working document.</p>	<p>At the time of the MLA, further guidance has not yet been received regarding the use of PAM. However, on a precautionary basis, and as a best-practice to fully align with interpretation of the JNCC guidance (2025), the Applicant is committed to adopting a MMMP inclusive of PAM as required (see Section 3.2.6 above for further details).</p> <p>It remains the case that the MMMP will be a 'live' document, with revision(s) submitted to MD-LOT and the MMO as required during the post-consent process.</p>
6	<p>Noise Monitoring Plan: MMO to confirm whether it's common practice to require UXO monitoring during UXO clearance scope.</p>	<p>No further correspondence was received from the MMO on the subject of a Noise Monitoring Plan.</p> <p>As explained above in Section 3.2.6, the Applicant is committed to LOD, and has additionally committed to a range of embedded mitigation and best-practice (including a MMMP) (Table 3-1).</p> <p>Implementing a Noise Monitoring Plan is not proposed, given the approach being followed (i.e., the selection of LOD).</p>
7	<p>Forward Planning: EGL2 committed to providing the MMO with indicative submission dates, which were given during the MTF. Following this, the MMO asked for EGL2 to provide more accurate dates ahead of formal MLA submission.</p>	<p>As agreed with the MMO, the case team have been contacted ahead of this MLA with an accurate timeline.</p>

Further consultation was undertaken with NE on 6 October 2025. NE supported the submission of a MMMP and that the assessment to support the MLA should use the most recent National Marine Fisheries Services (NMFS) (2024) thresholds and updated EDRs (JNCC, 2025b) alongside the impact ranges from the underwater sound modelling.

Further advice from NE (by email, 28 October 2025) included a request to screen in grey seal for Berwick and North Northumberland Coast SAC and Humber Estuary SAC, and that consideration should also be given to harbour seal in the Wash and North Norfolk Coast SAC, as well as bottlenose dolphin for the Moray Firth SAC. This has been considered further in Section 7.2.3.



4 UNDERWATER SOUND MODELLING RESULTS

4.1 Introduction

This section provides a summary of the underwater sound modelling undertaken in respect of marine mammals and fish species in support of the environmental appraisals within this SEI. The severity of underwater sound impacts is linked with the intensity of a sound generated and the distance of an animal to the sound source. The following sections summarise the modelling undertaken.

Full details of the underwater sound modelling methodology and results are provided in the UXO Clearance Underwater Sound Assessment (Appendix B; A-100744-S07-A-ASMT-001).

4.2 Marine Mammals

The sound pressure and exposure levels, and the distances at which auditory injury (PTS and TTS) in marine mammals is expected to occur, was modelled with respect to a range of UXO detonation charge sizes. For the purpose of this SEI those directly correlating from charge weights associated with LOD (0.25 kg TNT_{eq} charge weight) and a HOD (795 kg TNT_{eq} charge weight) are provided below in Table 4-1.

Table 4-1 Summary of predicted TTS and PTS impact ranges (m) for marine mammals using charge sizes of 0.25 kg (LOD) and 795 kg (HOD) TNT_{eq}, based on the weighted SEL and unweighted SPL_{peak} criteria from NMFS (2024).

MARINE MAMMAL GROUP	TNT _{eq} CHARGE WEIGHT (kg)	RANGE (m)			
		Sound Exposure Level (SEL)		Sound Pressure Level (SPL)	
		TTS	PTS	TTS	PTS
Low Frequency (LF) Cetaceans	0.25	1,675	298	264	143
	795	11,514	2,051	1,813	984
High Frequency (HF) Cetaceans	0.25	36	6	117	63
	795	249	44	802	435
Very High Frequency (VHF) Cetaceans	0.25	101	18	2,026	1,099
	795	695	124	13,912	7,549
Phocid Pinnipeds In Water	0.25	1	0	238	129
	795	8	1	1,637	889



4.3 Fish

The impact range for mortality of fish was modelled with respect to a range of UXO detonation charge sizes. For the purpose of this SEI predicted impact ranges directly correlating from charge weights associated with LOD (0.25 kg TNT_{eq} charge weight) and unplanned/accidental HOD (795 kg TNT_{eq} charge weight) are provided below in Table 4-2.

Table 4-2 Summary of predicted impact ranges (m) for fish using charge sizes of 0.25 kg (LOD) and 795 kg (HOD) TNT_{eq}, based on Peak Pressure Criteria from Popper et al. (2014).

THRESHOLD PEAK PRESSURE	TNT _{EQ} CHARGE WEIGHT (KG)	RADIUS OF EFFECT (m)
234 dB (upper boundary)	0.25	42
	795	291
229 dB (lower boundary)	0.25	70
	795	484



5 ENVIRONMENTAL APPRAISAL METHODOLOGY

5.1 Environmental appraisal screening

This section provides a summary of the potential environmental impacts resulting from the proposed UXO clearance works. A screening assessment¹⁴ of potential impact pathways with respect to specific receptors is provided in Section 5.2. Further assessment is provided in Section 6 for receptors that are considered likely to be impacted by the proposed works. Proposed embedded mitigation measures are set out in Table 3-1, which aim to minimise potential impacts.

A detailed description of the baseline environment is available from the EGL2 Marine Scheme Environmental Appraisal (AECOM, 2022a). The following sections provide an overview of the key receptors that may be potentially affected by the proposed UXO clearance works. As detailed in Section 1.2, the Marine Scheme is not considered an EIA development, but potential impacts from the UXO Clearance campaign have been screened to support the Environmental Appraisal provided within this SEI (Table 5-1) to support the MLAs.

Potential effects on environmental receptors associated with the clearance works may include:

- Disturbance effects due to the physical presence of vessels;
- Temporary seabed disturbance during UXO clearance works;
- Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance and accidental pollution events; and
- Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.

The same impact pathways have also been assessed for one unplanned, accidental HOD event (per MLA¹⁵) as a contingency worst-case scenario. Indirect effects have been considered throughout the assessment as required.

A screening exercise has been undertaken below to determine whether there is the potential for any adverse significant environmental effects to result from the proposed UXO works as presented in Table 5-1.

¹⁴ As confirmed with the regulators and as detailed in the Environmental Appraisal (AECOM, 2022a), the Marine Scheme is not considered an 'EIA Development' under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the Scottish EIA Regulations) and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) (the English EIA Regulations). This smaller, associated UXO clearance-specific MLA is similarly non-EIA development. In the context of this SEI report, 'Screening' is used to inform the subsequent potential impacts considered in further detail below (i.e., not to be confused with EIA Screening).

¹⁵ Although this SEI Report applies to two MLAs, one in Scottish waters and one in English waters, the impact assessed is a single HOD event per MLA, and does not consider two events per impact.



Table 5-1 Environmental Screening Appraisal

PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
PHYSICAL ENVIRONMENT (including Sediment Quality, Water Quality and Marine Physical Processes)			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened in (HOD Only)</p>	<p>The proposed UXO clearance activities may cause temporary effects on marine processes; however, no long-term adverse significant effects within the vicinity of the Marine Scheme are anticipated. Any seabed disturbance resulting from UXO clearance using LOD is expected to be highly localised and ecologically inconsequential (approximately <math><1\text{ m}^2</math> per UXO), with no crater formation and minor sediment disturbance for LOD methods (Robinson <i>et al.</i>, 2020; Abad Oliva <i>et al.</i>, 2024). Therefore, the seabed disturbance on the physical environment is considered negligible in the context of a dynamic environment and potential impacts from LOD are not considered further.</p> <p>HOD events are very unlikely, given the success of LOD methods demonstrated in real-life events (see Section 3.2.3). However, the contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may result in a crater with a radius of 15.5 m and to a depth of 5.2 m, i.e., a seabed footprint of approximately 755 m² (JNCC, 2025b).</p> <p>On this basis, for HOD, this impact pathway has been screened in and a precautionary assessment of potential effects to the physical environment from temporary habitat/seabed disturbance arising from accidental or unplanned HOD UXO clearance only has been undertaken.</p>	<p>An assessment of potentially significant adverse effects to the physical environment as a result of temporary habitat/seabed disturbance is provided within Section 6.2.2.</p> <p>Further consideration of physical environment in relation to HRA matters is provided in Section 7 and in relation to MPA/MCZs in Section 8.</p>
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>There are no identified impact pathways for vessel presence to affect the marine physical environment; therefore, this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened out</p>	<p>There are no identified impact pathways for underwater sound to affect the marine physical environment; therefore, this impact pathway is screened out and not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events</p>	<p>Screened out</p>	<p>The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to disturbance of an increased volume of sediment (seabed footprint of 755 m²). In the unlikely event that an unplanned/accidental HOD occurs, HOD clearance of UXO will cause minor, localised release of sediments.</p> <p>The MIC is located withing a highly dynamic marine environment, and any sediment resuspended into the water column from UXO Clearance activities will disperse rapidly through the water column and will therefore not result in an adverse change in water and sediment quality which could impact the physical environment. This impact pathway is screened out and not considered further.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from project vessels undertaking UXO clearance activities. As detailed in Section 3.2.6, primary UXO clearance vessels will follow SOPEPs and be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the primary UXO Clearance vessels will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
BENTHIC ENVIRONMENT			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened in (HOD Only)</p>	<p>The use of LOD UXO clearance methods will be applied where the avoidance of cUXO is not possible. Any potential temporary seabed disturbance associated with LOD UXO clearance will be highly localised and temporary, with no crater formation.</p> <p>The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may result in a crater with a radius of 15.5 m and to a depth of 5.2 m, i.e., a seabed footprint of approximately 755 m² (JNCC, 2025b). In the unlikely event that an unplanned/accidental HOD occurs, HOD clearance of UXO will cause minor, localised sediment disturbance.</p> <p>On this basis, for HOD, this impact pathway has been screened in and a precautionary assessment of potential effects to the benthic environment from temporary habitat/seabed disturbance arising from an unplanned/accidental HOD UXO clearance only has been undertaken.</p>	<p>An assessment of potentially significant adverse effects to the benthic environment as a result of temporary habitat/seabed disturbance is provided within Section 6.3.2.</p> <p>Further consideration of benthic ecology in relation to HRA matters is provided in Section 7 and in relation to MPA/ MCZs in Section 8.</p>
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>There are no identified impact pathways for vessel presence to affect the benthic ecological environment; therefore, this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened out</p>	<p>Benthic ecological receptors are not considered to be sensitive to high-amplitude impulsive sound, therefore there is no likelihood of a significant impact to benthic ecological features through the generation of underwater sound associated with UXO clearance activities. As such, this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment</p>	<p>Screened out</p>	<p>The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to disturbance of an increased volume of sediment (seabed footprint of 755 m²). In the unlikely event that an</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>and accidental pollution events</p>		<p>unplanned/accidental HOD occurs, HOD clearance of UXO will cause minor, localised release of sediments.</p> <p>The MIC is located withing a highly dynamic marine environment, and any sediment resuspended into the water column from UXO Clearance activities will disperse rapidly through the water column and will therefore not result in an adverse change in water and sediment quality which could impact benthic features. This impact pathway is screened out and not considered further.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from project vessels undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	
<p>FISH AND SHELLFISH ECOLOGY</p>			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened out</p>	<p>Seabed disturbance from UXO clearance using LOD will be highly localised and small-scale (approximately <1 m² per UXO), remaining within the overall UXO clearance footprint and therefore considered negligible in this dynamic environment.</p> <p>The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may result in the disturbance of seabed habitat within a radius of 15.5 m and to a depth of 5.2 m, i.e., a seabed footprint of 755 m².</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
		<p>Nonetheless, with consideration given to the extensive availability of alternative habitats which support spawning and nursery grounds, the overall potential for significant adverse effects is considered to be negligible. As such, this impact pathway is screened out and not considered further for fish species.</p> <p>As shellfish species have more limited mobility, their vulnerability to temporary habitat/seabed disturbance is potentially higher compared to marine fish. However, as detailed above, any seabed disturbance associated with UXO clearance activities will be highly localised and small-scale. It is expected that individuals will recolonise the area of seabed that recovers and only a small portion of available shellfish habitat will be disturbed at any one time. As such, this impact pathway is screened out and not considered further for shellfish.</p>	
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>Basking shark swim at slow speeds and typically feed close to the surface (Sims et al., 2000), which can make them more vulnerable to vessel collisions. Although it is difficult to quantify the impact of collisions, a study reported that the occurrence appears to be relatively low (Solandt & Chassin, 2013). Collisions are more likely to occur during instances of increased vessel presence.</p> <p>The addition of one project vessel for UXO clearance within an area already characterised by high vessel activity and dense traffic routes (Robbins et al., 2022) will not result in significant change from baseline vessel conditions. The vessel will also be slow moving on site, in adherence to the SMWWC. A low-speed ship strike is less likely to result in serious injury or death (Sims et al., 2000).</p> <p>Therefore, no significant effects are anticipated on fish and shellfish species, and this impact pathway is screened out and not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened in (fish)</p> <p>Screened out (shellfish, elasmobranchs)</p>	<p>LOD could cause sound-related disturbance to fish species, particularly those with swim bladders (Popper et al., 2014), as such there is potential for adverse effects to fish species and this impact pathway is screened in.</p> <p>As there are no published generalised thresholds for the assessment of potential underwater noise impacts on shellfish, it is assumed that because shellfish do not possess a swim bladder, they may be similar to group 1 fish species. As shellfish lack swim bladders, they are considered to be resilient against noise-induced barotrauma. Therefore, no adverse effects on shellfish are considered likely. Therefore, this impact pathway is screened out for shellfish and not considered further.</p> <p>Elasmobranchs, which include basking shark, are categorised as hearing group 1 in fish species (Popper et al., 2014). Therefore, they do not possess a swim bladder and are less vulnerable to extreme sound pressure changes compared to fish that have swim bladders. Additionally, the UXO clearance activities will occur on the seabed, whereas basking shark spend a lot of time on the sea surface (Sims et al., 2000). They are also a highly mobile species, and can move away from loud sound sources. For this reason, no adverse (significant) effects on basking shark are considered likely. Therefore, this impact pathway is screened out for elasmobranchs and not considered further</p>	<p>An assessment of significant adverse effects to fish receptors as a result of underwater sound resulting from UXO clearance activities is provided within Section 6.4.</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events</p>	<p>Screened out</p>	<p>The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to minor disturbance of an increased volume of sediment. Any suspended sediments from the UXO clearance will disperse rapidly through the water column and will therefore not result in an adverse change in water and sediment quality which could impact fish and shellfish species.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from project vessels undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEPs and be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>			
<p>MARINE MAMMALS</p>			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened out</p>	<p>The temporary disturbance to seabed habitats from the UXO clearance activities is expected to be highly localised, confined to the immediate vicinity of each UXO and within the footprint of seabed disturbance already assessed and licensed for the cable installation, and will have no direct effects on marine mammals.</p> <p>Consequently, indirect effects on marine mammals via impacts to prey species are not anticipated due to the negligible scale of this impact, and no significant effects are anticipated; this impact pathway is therefore screened out and not considered further.</p>	<p>N/A</p>
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>The addition of one project vessel for UXO clearance within an area already characterised by high vessel activity and dense traffic routes (Robbins et al., 2022) will not result in significant change from baseline vessel conditions. Therefore, no significant effects are anticipated from collision risk. In addition, the UXO clearance surveys will adhere to the SMWWC and as such the vessel will be slow moving on site which further minimise this risk. As such, this impact pathway is screened out and not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened in</p>	<p>For LOD (and in the contingency worst-case scenario of a single unplanned/accidental HOD (per MLA)) there is potential for marine mammal disturbance or injury due to underwater sound (i.e., TTS and PTS). As such, these impact pathways are screened in and assessed further.</p>	<p>An assessment of potentially significant adverse effects to marine mammals as a result of underwater sound resulting from UXO clearance activities is provided within Section 6.5. Further consideration of marine mammals in relation to HRA matters is provided in Section 7.</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events</p>	<p>Screened out</p>	<p>The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to disturbance of an increased volume of sediment. Any suspended sediments from the UXO clearance will disperse rapidly through the water column and will therefore not result in an adverse change in water and sediment quality which could impact marine mammals.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from the project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the primary UXO Clearance vessels will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
ORNITHOLOGY			
Temporary habitat/seabed disturbance	Screened out	There are no direct impact pathways for temporary seabed disturbance from UXO clearance to affect ornithological receptors. Indirect effects on seabirds via impacts to prey species are expected to be highly localised, confined to the immediate vicinity of each cUXO clearance operation, and therefore no significant effects are expected; this impact pathway is therefore screened out and not considered further.	N/A
Disturbance due to presence of vessels	Screened in	Potential adverse disturbance effects on offshore ornithology may arise from vessel presence, including lighting and noise given proximity to sensitive features. As such, this impact pathway is screened in and assessed further.	An assessment of potentially significant adverse effects to ornithology as a result of disturbance due to presence of vessels is provided within Section 6.6. Further consideration of ornithology in relation to HRA matters is provided in Section 7.
Underwater sound resulting from UXO clearance activities	Screened out	Underwater sound generated during UXO clearance activities does not transmit effectively into the air and is unlikely to exceed ambient airborne noise levels. As such, seabirds at the sea surface or onshore are not expected to be affected. Only diving seabirds present underwater at the moment of sound emission could be exposed, but the likelihood of significant numbers being in proximity to a clearance event is considered extremely low. Therefore, no adverse significant effects are anticipated, and this impact pathway is therefore screened out and not considered further.	N/A
Changes in water and sediment quality due to the suspension and	Screened out	The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to minor disturbance	N/A



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>deposit of sediment and accidental pollution events</p>		<p>of an increased volume of sediment (footprint of 755 m²). Any suspended sediments from the UXO clearance will disperse rapidly through the water column and will therefore not result in an adverse change in water and sediment quality which could impact ornithology features. As such, this impact pathway is therefore screened out and not considered further.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from the project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	
MARINE ARCHAEOLOGY			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened out</p>	<p>As detailed in Section 3.2.2, EGL2's retained archaeologist completed an archaeological assessment of geophysical data acquired based on the pUXO surveys and UXO TIs in order to identify and define archaeological features within the MIC. As such, the presence of archaeological features are well known to the Project and AEZs are in place to minimise the potential for damage to identified features.</p> <p>In addition, given the embedded mitigation measures outlined in Section 3.2.6 including adherence to the EGL2 WSI/PAD and the potential to relocate cUXO (if safe to do so) away from newly identified sensitive archaeological features prior to clearance, there is unlikely to be a significant effects to marine archaeology features as a result of temporary habitat/seabed disturbance. Therefore, this impact pathway is screened out and not considered further in this assessment.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
Disturbance due to presence of vessels	Screened out	As detailed above, the position of archaeological features is well known to the Project, therefore there will be no impact pathway for vessel presence to affect marine archaeology e.g. from anchor deployment etc. as features will be mapped and avoided in accordance with the EGL2 Marine Scheme WSI. Therefore, this impact pathway is screened out and not considered further.	N/A
Underwater sound resulting from UXO clearance activities	Screened out	There is no impact pathway for vessel presence to affect marine archaeology. Therefore, this impact pathway is screened out and not considered further.	N/A
Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events	Screened out	<p>There is no impact pathway for changes in water and sediment quality from suspended sediments to affect marine archaeology. Therefore, this impact pathway is screened out and not considered further.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	N/A
SHIPPING AND NAVIGATION			
Temporary habitat/seabed disturbance	Screened out	There is no direct impact pathway for temporary seabed disturbance from UXO clearance to affect shipping and navigation, therefore this impact pathway is screened out and not considered further.	N/A



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>Vessel density throughout the Marine Scheme varies, with higher activity expected around ports and harbours. Therefore, the temporary addition of one project vessel for the short duration of works (up to 90 days) is not expected to cause any significant interference with shipping or navigation.</p> <p>As detailed within Section 3.2.6, a series of embedded mitigation measures will be in place for the EGL2 UXO clearance works, including advance notice of works via consultation and NtM (including Kingfisher Bulletins, Radio Navigational Warnings, NAVTEX and/or broadcast warnings as appropriate). In addition, the vessel used will adhere to COLREGs, appropriate lighting on the Project vessel will be in effect and 500 m safety zones will be in place throughout the operations. As such, no significant effects are anticipated on shipping and navigation, and this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened out</p>	<p>There is no impact pathway for underwater sound to affect shipping and navigation, therefore this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events</p>	<p>Screened out</p>	<p>There is no impact pathway for changes in water and sediment quality from suspended sediments to affect shipping and navigation. Therefore, this impact pathway is screened out and not considered further.</p> <p>Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from the project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>			
<p>COMMERCIAL FISHERIES</p>			
<p>Temporary habitat/seabed disturbance</p>	<p>Screened out</p>	<p>As detailed above, seabed disturbance from UXO clearance using LOD will be highly localised and small-scale (approximately <math><1\text{ m}^2</math> per UXO), remaining within the overall UXO clearance footprint and therefore considered negligible in this dynamic environment. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may result in the disturbance of seabed habitat within a radius of 15.5 m and to a depth of 5.2 m, i.e., a seabed footprint of 755 m².</p> <p>Although there is the potential for temporary seabed disturbance during UXO clearance to affect the species targeted by commercial fisheries, the overall potential for significant adverse effects is considered to be negligible, with any seabed disturbance associated with UXO clearance activities considered to be highly localised and small-scale. It is expected that fish and shellfish will recolonise the area of seabed and only a small portion of available fish and shellfish habitat will be disturbed at any one time.</p> <p>As there is no foreseeable adverse effects to commercially valuable fish and shellfish species as a result of temporary habitat/seabed disturbance, this impact pathway is therefore screened out and not considered further.</p>	<p>N/A</p>
<p>Disturbance due to presence of vessels</p>	<p>Screened out</p>	<p>Fishing grounds located near UXO clearance locations will be temporarily excluded by one project vessel operating within 500 m safety zones. The vessel will only be present in the vicinity of specific UXO locations for the short duration of clearance activities, which represent a very small proportion of available sea space for a short period.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
		<p>There will be advance notifications to commercial fisheries via NtM and the Kingfisher bulletin. A FLO will maintain communication with local fishing communities and work in accordance with the good practice guidance on the approach to fisheries liaison and mitigation (e.g., FLOWW, 2014; 2015 as relevant to cable projects as far as practicable). These measures will be implemented in adherence with the approved EGL2 Marine Scheme Fisheries Liaison Co-Existence Plan.</p> <p>As such, in light of the short duration of works and the limited spatial footprint, together with the embedded mitigation measures, the UXO clearance works are not anticipated to cause significant interference with commercial fisheries and this impact pathway is therefore screened out and is not considered further.</p>	
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened out</p>	<p>There is no impact pathway for underwater sound to directly affect commercial fisheries.</p> <p>Although there is the potential for effects of underwater sound generated during UXO clearance to affect the species targeted by commercial fisheries, any impacts will be highly localised, therefore there is no likelihood of a significant adverse effect on commercial fisheries resulting from underwater sound to fish species. This impact pathway is therefore screened out and is not considered further.</p>	<p>N/A</p>



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
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Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events

Screened out

The use of LOD UXO clearance methods will result in the release of a small quantity of sediments, on a highly localised spatial scale into the water column. The contingency worst-case scenario of a single unplanned/accidental HOD (per MLA) may lead to disturbance of an increased volume of sediment. Any suspended sediments from the UXO clearance will disperse rapidly through the water column and will therefore not result in adverse significant effects to commercial fisheries receptors and this impact pathway has been screened out and is not considered further.

Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from the project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.

N/A

OTHER SEA USERS

Temporary seabed disturbance

Screened out

There is no direct impact pathway for temporary seabed disturbance from UXO clearance to affect other users of the marine environment. However, there remains a potential for cUXO to be located in close proximity to existing seabed assets, where there is a potential for a significant adverse effect on existing infrastructure. In any such instance, no UXO clearance activities would occur at proximity to an existing asset and if a cUXO is identified at close proximity, the asset will be safeguarded by the relocation of the cUXO to a safe location (if safe to do so) prior to clearance, and in consultation with the asset owner to seek agreement prior to activities commencing (Section 3.2.5). Therefore, this impact pathway is screened out and not considered further.

N/A



PATHWAY	SCREENED IN / OUT	JUSTIFICATION	ASSESSMENT SECTION
<p>Presence of vessels</p>	<p>Screened out</p>	<p>Potential adverse effects on other sea users may arise through the presence of UXO clearance vessels in the vicinity of assets undertaking operations, such as cables or pipelines. However, the presence of one project vessel over a short duration will change baseline conditions within the MIC.</p> <p>Additionally, as detailed within Section 3.2.6, a series of embedded mitigation measures will be in place for the Marine Scheme, including advance notice of works via consultation and NtM (including Kingfisher Bulletins, Radio Navigational Warnings, NAVTEX and/or broadcast warnings as appropriate). The UXO Clearance vessel will also adhere to COLREGs, have appropriate lighting in effect, and 500 m safety zones will be in place throughout the operations. As such, no significant effects are anticipated on other sea users, and this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Underwater sound resulting from UXO clearance activities</p>	<p>Screened out</p>	<p>There is no impact pathway for underwater sound to affect other sea users, therefore this impact pathway is screened out and not considered further.</p>	<p>N/A</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment and accidental pollution events</p>	<p>Screened out</p>	<p>There is no impact pathway for changes in water and sediment quality from suspended sediments to affect other sea users. Therefore, this impact pathway is screened out and not considered further. Any accidental pollution events to the marine environment will be limited to chemical or hydrocarbon released from the project vessel undertaking UXO clearance activities. As detailed in Section 3.2.6, the UXO clearance vessel will follow a SOPEP and be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards, as required. In addition, the UXO Clearance vessel will comply with the regulator approved EGL2 Marine Scheme Marine Pollution Contingency Plan (PHWH-EGL2-PRYSM-MCM-SMPLN-Z-0003) and Waste Management Plan (PHWH-EGL2-PRYSM-MCM-SM-PLN-Z-0004), as required. This impact pathway is therefore screened out and not considered further.</p>	<p>N/A</p>



5.2 Assessment methodology

The Environmental Appraisal follows a systematic approach to the identification of potential impacts arising from the UXO clearance activities on relevant receptors and an appraisal of subsequent effects in a robust and transparent manner. The approach to UXO clearance activities has been developed in consideration of best practice (as detailed in Section 1.3) and, where possible, environmental considerations have been integrated into the fundamental approach to UXO clearance.

The Environmental Appraisal has been undertaken using a Sensitivity-Magnitude matrix approach which has been used to assess the likelihood of significant adverse effects arising from UXO clearance activities. This approach uses the best available evidence and expert judgment to combine the sensitivity of the receptor with the magnitude of the impact after taking into account elements of the project design and embedded mitigation, to provide a final assessment of the significance of the effect.

5.2.1 Receptor sensitivity

As part of the assessment of significance of effects it is necessary to determine the receptor sensitivity. The sensitivity of a receptor is defined as the degree to which a receptor is affected by an impact, which will be specific to the nature of the particular receptor under consideration.

Within this SEI, the overall receptor sensitivity is determined by considering a combination of value, vulnerability, adaptability, tolerance and recoverability of the particular receptor. This is achieved through applying the best available evidence on the status and sensitivity of the receptor under consideration coupled with professional judgement and experience. Table 5-2 outlines the sensitivity criteria used in the Environmental Appraisal (Section 6).

Table 5-2 Sensitivity criteria for Environmental Appraisal

SENSITIVITY OF RECEPTOR	DEFINITION
<p style="text-align: center;">High</p>	<ul style="list-style-type: none"> • Receptor is of high importance or rarity and / or is an interest feature designated to be of national or international importance, legally protected, or located within a designated site; • Receptor has no ability to recover from an effect, or to adapt behaviour so that individual vital rates (survival and reproduction) are highly likely to be significantly affected; and • Receptor with a very limited spatial distribution, that is highly dependent on a specific area or location.
<p style="text-align: center;">Moderate</p>	<ul style="list-style-type: none"> • Receptor is of moderate importance or rarity and / or is an interest feature designated at a national-level and not located within a designated site; • Receptor with moderate capacity to accommodate a particular effect, and/or a moderate ability to adapt behaviour or to recover from an effect; • Receptor with a limited distribution which is dependent on a limited area; and • Receptor provides a pathway for indirect impacts to a high sensitivity receptor (e.g., a prey species or critical habitat for a top predator which is considered of high sensitivity).



SENSITIVITY OF RECEPTOR	DEFINITION
Low	<ul style="list-style-type: none"> • Receptor has some ability to adapt behaviour, and/or tolerance to accommodate and recover from a particular effect. Receptor is of low importance or rarity and / or is not a feature of a designated site or legally protected; • Receptor with extensive distribution, that is able to utilise a wide area/range of habitats; and • Receptor marginally and temporarily provides a pathway which modifies the supporting mechanism of receptors that are considered to have moderate to high sensitivity.
Negligible	<ul style="list-style-type: none"> • Receptor is generally tolerant of a particular effect without the need to recover or adapt behaviourally. Receptor is of low importance or rarity and is generally abundant and/or widespread within its range, and is able to utilise a wide area/range of habitats; • Receptor is not of high conservation value or of conservation concern; and • Receptor has minimal influence on the supporting mechanisms of receptors that are considered to have moderate to high sensitivity.

5.2.2 Magnitude of impact

Defining impact magnitude requires consideration of how the following factors will impact on the baseline conditions:

- Spatial Extent – the area over which the impact will occur;
- Duration – the period of time over which the impact will occur;
- Frequency – the number of times the impact will occur over the Project’s lifespan;
- Intensity – the severity of the impact;
- Likelihood – the probability that the impact will occur and also the probability that the receptor will be present; and
- Reversibility – the ability for the receiving environment/ exposed receptor to return to baseline conditions.

An overarching description on the assignment of magnitude criteria is provided in Table 5-3, with the definitions amended on a receptor-specific case-by-case basis within topic-specific assessments based on specific guidance, legislation and/ or expert judgement.

Table 5-3 Magnitude of impact criteria for Environmental Appraisal

MAGNITUDE	CRITERIA
High	<ul style="list-style-type: none"> • The impact occurs over a large spatial extent (relative to the distribution or extent of the receptor) resulting in widespread, long term, permanent or irreversible changes in baseline conditions; • The impact affects a large proportion of the receptor / receptor population (e.g. species, habitat); • The impact is very likely to occur and / or will occur at a high frequency or intensity.
Moderate	<ul style="list-style-type: none"> • The impact occurs over a local to medium extent (relative to the distribution or extent of the receptor), resulting in a short- to medium-term and/or partially reversible change to baseline conditions (e.g. relative to the reproductive cycle of a species);



MAGNITUDE	CRITERIA
	<ul style="list-style-type: none"> The impact will affect a moderate proportion of the receptor / receptor population; and The impact is likely to occur and / or will occur at a moderate frequency or intensity.
Low	<ul style="list-style-type: none"> The impact is localised and temporary, short term or highly reversible, leading to only a small detectable change in baseline conditions; The impact will affect only a small proportion of the receptor / receptor population (relative to the distribution or extent of the receptor); and The impact is unlikely to occur or may occur but at low frequency or intensity.
Negligible	<ul style="list-style-type: none"> The impact is highly localised, short-term and reversible, with full rapid recovery expected to result in very slight or imperceptible changes to baseline conditions; The impact will affect only a very small proportion of the receptor / receptor population; and The impact is very unlikely to occur, and if it does will occur at very low frequency or intensity.
No Change	<ul style="list-style-type: none"> No change from baseline conditions.

5.2.3 Consequence of impact

The consequence of potential impact has been determined by a combination of the sensitivity and value of a receptor and the magnitude of an effect. The general framework for assessing the consequence, and ultimately the significance of potential effects is outlined below in Table 5-4.

In general, moderate or major impacts are classified as significant and will require additional mitigation in order to reduce the magnitude of effect to an acceptable level. Where a range of potential effects are identified, expert judgement will be used to determine the final significance.

Table 5-4 Impact consequence assessment matrix

IMPACT SIGNIFICANCE ASSESSMENT MATRIX					
Receptor Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Moderate	High
Negligible	No change	Negligible	Negligible	Negligible	Negligible
Low	No change	Negligible	Minor	Minor	Minor
Moderate	No change	Negligible	Minor	Moderate	Moderate
High	No change	Negligible	Minor	Moderate	Major



6 ENVIRONMENTAL APPRAISAL

6.1 Overview

This section provides a summary of the baseline for the relevant receptors identified, followed by a consideration of the potential effects from the UXO clearance works as informed by the screening of impacts (Table 5-1). Information to inform these sections is drawn from the EGL2 Marine Scheme Environmental Appraisal (AECOM, 2022b) or, where relevant, from more recent or alternative sources.

6.2 Physical environment

This section presents the assessment of potential adverse significant effects of UXO clearance activities on the physical environment, with consideration given to sediment quality, water quality and marine physical processes. A summary of the baseline environment is provided (informed by the Marine Scheme Environmental Appraisal (AECOM, 2022b)), followed by a summary of potential effects from a single unplanned/accidental HOD (per MLA).

Impacts to the physical environment may also be interrelated with potential adverse effects on ecological receptors, and therefore should be read in conjunction with the assessment of significant adverse effects to the benthic environment (Section 6.3), fish and shellfish ecology (Section 6.4) and the HRA and MPA/MCZ assessments (Sections 7 and 8).

6.2.1 Summary of baseline

The physical environment refers to the bathymetry, geology, seabed sediments (including contamination), currents and water quality. The description of the baseline conditions has been sub-divided based on the Territorial and Offshore waters, and Scottish and English waters, through which the MIC passes.

The bathymetry within the MIC in UK waters is influenced by geological processes and sediment deposition from glacial times. This has resulted in significant features like sandbanks and sandwave fields, which influence the bathymetric profiles (AECOM, 2022b). Studies using high-resolution bathymetry and survey data identified large, quasi-static sandwaves up to 12 m high, constrained by geological and hydrological factors. Comparisons of MBES data from 2012 and 2021 showed minimal changes in seabed levels, indicating stability and suggesting that the sandwaves are static features (AECOM, 2022b).

Within Scottish Territorial Waters, the water depths range from 19 m to 65.4 m, with varying slopes (AECOM, 2022b). The seabed morphology includes smooth areas, megaripples, sandwave fields, and low-density boulder fields. Further offshore, the seabed is mostly featureless, with some undulating sandwaves and megaripples. Water depths reach a maximum depth of 101.2 m in the Scottish Offshore Waters. The seabed morphology features large undulating sandwaves, megaripples, and intermittent boulder fields (AECOM, 2022b).

In English Territorial Waters, depths gradually decrease from 0 m at the landfall to 9.8 m at KP426.9, with features including shallow sandwaves, megaripples, and localised boulder fields (AECOM, 2022b). The water depths in English Offshore Waters range from 55.1 m to 94.6 m across KP150.2–KP396.5, with generally flat seabed interspersed with smooth undulations, megaripples, sandwaves, occasional bedrock outcrops (AECOM, 2022b).

Along the length of the MIC, there are a number of protected sites designated for the conservation of physical process features. Within Scottish Territorial Waters the MIC does not directly interact with any site designated for the conservation of physical process features. The Southern Trench MPA, located within the outer Moray Firth, is approximately 2 km to the north of the MIC. This site is designated for the conservation of minke whale (*Balaenoptera acutorostrata*), burrowed muds, fronts, Quaternary of Scotland, shelf deeps and submarine mass movement



(NatureScot, 2025a; AECOM, 2022b). The Firth of Forth Banks Complex MPA lies adjacent to the MIC between KP84 and KP118. This site is designated for the conservation of ocean quahog (*Arctica islandica*) aggregations, offshore subtidal sands and gravels, Quaternary of Scotland and shelf banks and mounds (NatureScot, 2025a; AECOM, 2022b).

Within English Territorial Waters there are a number of MCZs located within 10 km of the MIC, including:

- **North East of Farnes Deep MCZ** (also now a Highly Protected Marine Area (HPMA)) which is designated for Subtidal coarse sediment, Subtidal mixed sediments, Subtidal sand, Subtidal mud and Ocean quahog. The HPMA component is designated for the 'the marine ecosystem of the area' (i.e. all marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in or on the seabed, water column and the surface of the sea).
- **Farnes East MCZ** which is designated for Moderate energy circalittoral rock, Subtidal coarse sediment, Subtidal mixed sediments, Subtidal sand, Subtidal mud, Sea-pen and burrowing megafauna communities and Ocean quahog;
- **Holderness Offshore MCZ** which is designated for Intertidal sand and muddy sand, Moderate energy circalittoral rock, High energy circalittoral rock, Subtidal coarse sediment, Subtidal mixed sediments, Subtidal sand, Subtidal mud and Spurn head (subtidal geological feature); and
- **Holderness Inshore MCZ** which is designated for North Sea glacial tunnel valleys, ocean quahog, Subtidal coarse sediment, Subtidal mixed sediments and Subtidal mixed sediments.

There are also a number of sites designated for the conservation of Annex I features within the vicinity of the MIC, including the Flamborough Head SSSI (located ~4.3 km from the MIC) and Flamborough Head SAC (located 0.1 km from the MIC). However, the only physical feature designated at Flamborough Head SAC are vegetated sea cliffs and sea caves, which would have no pathway for effect.

Smithic Bank is a potential Annex I sandbank feature which is located within the Bridlington Bay, south of Flamborough Head (presently undesignated); whilst located within the wider MIC, UXO TIs have been completed in this sector and there are no cUXO present.

6.2.2 Assessment of potential effects

Temporary habitat and seabed disturbance from accidental HOD

As detailed within Section 3.2, any UXO clearance via HOD will be unplanned/accidental, with LOD being the adopted method of UXO clearance within the MIC.

The MIC is located within a highly dynamic environment. As such, the existing physical environment receptors within the MIC are regularly subject to conditions which will result in temporary habitat or seabed disturbance arising from the natural movement of tidal flows. It is therefore considered that the sensitivity of the receptor to HOD will be **low**.

In the absence of project-specific modelling of seabed disturbance for a 795 kg TNT_{eq} HOD scenario, the example provided in JNCC guidance (2025b) provides a useful indication of potential effects from a HOD scenario of 720 kg TNT_{eq}, which has been used in this assessment. An accidental/unplanned HOD event (720 kg TNT_{eq}) has the potential to generate a crater of an estimated maximum radius of 15.5 m and a depth of 5.2 m (footprint of 755 m²) in water depths between 13.5 m and 15.2 m (JNCC, 2025b). If the UXO was located in deeper waters, the crater would be expected to be smaller and shallower. It is noted that no pUXO have been identified within 1 NM of the shore in English Territorial waters, however, pUXO are present in nearshore areas in Scottish Territorial waters, with UXO TI ongoing to confirm presence of UXO.

The realistic worst-case scenario in UK North Sea waters is a German 'Luftmine B' (LMB) mine, an air-dropped naval charge with a NEQ of ~700 kg (similar to the size of UXO that was reported in the crater assessment by JNCC, 2025b).



This has been informed by existing UXO risk assessment(s) commissioned by the Applicant, recent regional experience held by the Applicant and wider delivery team as well as independent advice from an EOD specialist. However, the more likely scenario is anticipated to be much smaller, i.e., air dropped munitions which are consistent with previous UXO findings. The seabed footprint presents a precautionary worst-case scenario for seabed footprint disturbance based on an accidental/unplanned HOD within the MIC. The total worst-case scenario is predicted to be 755 m² for a single unplanned/accidental HOD (JNCC, 2025b). This equates to 1,510 m² (0.0015 km²) in total when considering the possibility of a single HOD event in Scottish and English waters within the MIC.

Given the limited extent of the potential unplanned/accidental HOD seabed impact footprint aligned with the very low likelihood of this event occurring, the magnitude of the impact is considered to be **low** for HOD.

Assessment of Impact Significance

Overall, the sensitivity of the physical environment considered is to be **low** due to the highly dynamic existing environment throughout the MIC. Additionally, UXO clearance activities will affect only a very small proportion of the total seabed area of the MIC for a very short duration. The environmental appraisal (AECOM, 2022b) assessed much larger-scale activities such as route clearance and trenching activities throughout that length of the cable (436 km). The outcome of the Marine Scheme Environmental Appraisal (AECOM, 2022b) concluded that these activities would not result in significant effects on the physical environment. Furthermore, the HOD seabed impact footprint is highly precautionary, given that LOD is the chosen clearance method and unplanned/accidental HOD events are only included as a contingency. Given the substantially smaller spatial and temporal scale of UXO clearance compared to wider construction activities, the magnitude of impact is assessed as **low** for accidental HOD.

It can therefore be concluded that the proposed works will result in at worst a **minor** consequence and **not cause significant adverse effects**

SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
Low	Low	Minor

Impact Significance – **NOT SIGNIFICANT**

6.3 Benthic environment

This section presents the assessment of potential adverse significant effects of UXO clearance activities on the benthic environment. A summary of the baseline environment (informed by the Marine Scheme Environmental Appraisal (AECOM, 2022c) followed by an assessment of potential adverse effects arising from UXO clearance activities, as-per the screening undertaken in section 5.1 above.

Impacts to the benthic environment may also be interrelated with potential adverse effects on the physical environment, and therefore should be read in conjunction with the assessment of potential significant adverse effects to the physical environment (Section 6.26.2).

6.3.1 Summary of baseline

Subtidal habitats along the MIC are dominated by muddy sand, coarse sediment, rippled sand, and mixed sediments. The Scottish nearshore area has cobble and boulder matrices with associated fauna and areas of sand-dominated mixed sediment. No infralittoral or circalittoral rock habitats were identified at the English landfall, with sediments generally homogeneous with coarse sands nearshore and finer sediments further east (AECOM, 2022c).



The MIC primarily consists of sediment-based habitats. Key sublittoral sediment habitats include:

- Sand (MD521);
- Mixed sediments (MD42);
- Coarse sediment (MC32); and
- Muddy sand (MC52).

In 2021 geophysical and benthic surveys were undertaken by NextGeosolutions for the MIC to support the development of the Environmental Assessment Report. The subtidal section of the MIC identified macrofaunal communities dominated by polychaetes, molluscs, and crustaceans (NextGeosolutions, 2022). The survey recorded between five and 2,188 individuals per grab sample, with polychaetes being the most common. The number of individuals was positively correlated with depth and mean particle size, indicating that sediment type, particularly gravel content, is crucial for community composition.

Habitats with coarse or mixed sediments had higher taxonomic abundance and species richness compared to sand habitats, partly due to the presence of diverse epifaunal species and *S. spinulosa*. Characteristic species of coarse or mixed sediment habitats included polychaetes, sea urchins, and encrusting fauna, while sand habitats were characterised by brittlestars, polychaetes, and bivalves.

Macrofauna diversity ranged from six to 135 species per grab sample, with annelids (mostly polychaete worms) being the most dominant group. Crustaceans, molluscs, and echinoderms were also well-represented. Epifaunal richness was generally higher in shallower, nearshore areas, particularly around the Scottish and English landfalls, where gravel was a common sediment component.

Several sensitive habitats and species have been identified within the MIC, as detailed in Table 6-1.

Table 6-1 Summary of Sensitive Benthic Habitats and Species (AECOM, 2022c)

PROTECTED FEATURE	DESCRIPTION
Subtidal sands and gravels	Broad scale habitat
Sandbanks which are slightly covered by seawater all the time	Sandbanks
Mud habitats in deep water	Broad scale habitat
Sea pens and burrowing megafauna communities	Broad scale habitat
<i>Modiolus modiolus</i> beds	Horse mussel Biogenic reef
<i>Arctica islandica</i>	Ocean quahog

In addition, due to conditions on the EGL2 Marine Licence (MS-00011033), additional benthic surveys were undertaken by Reach Subsea in December 2024 to identify the presence of *Sabellaria spinulosa* to ensure the avoidance of this feature in so far as practicable during routeing due to the initial 2021 NextGeosolutions benthic survey (2022), which found an area of low to medium resemblance *S. spinulosa* reef within the MIC between KP 2.7 and KP 4.2 (see Figure 1-1). During this 2024 survey campaign, the results of the survey highlighted that despite *S. spinulosa* being recorded throughout the survey area, no formations met the Annex I reef classification criteria. Nonetheless, the 2024 survey did identify areas of potential Annex I stony reef along four transects in the western portion of the survey area between KP 2.7 and KP 2.9 based on the stony reef assessment, which was conducted in accordance with JNCC



guidelines (Irving, 2009; Golding, 2020). However, of these four transects only one identified a very discrete area of Annex I medium stony reef resemblance whilst the others were recorded as low Annex I stony reef resemblance (APEM, 2024).

Along the length of the MIC there are a number of protected sites designated for the conservation of benthic features. Within Scottish offshore waters the Southern Trench MPA located 2 km from the MIC is designated for the conservation of burrowed mud, a Scottish Priority Marine Feature (PMF) (as well as other PMFs not linked to benthic ecology; NatureScot, 2025a). The MIC runs directly adjacent to the Firth of Forth Banks Complex MPA. This site is designated for the conservation of Ocean quahog aggregations, offshore subtidal sands and gravels, Quaternary of Scotland and shelf banks and mounds (NatureScot, 2025a).

Within English waters the Flamborough Head SAC is located within 0.1 km of the MIC. This site is designated for the conservation of Annex I reefs, vegetated sea cliffs of the Atlantic and Baltic Coasts and submerged or partially submerged sea caves (JNCC, 2025c). The North East of Farnes Deep MCZ, Farnes East MCZ, Holderness Offshore MCZ, and Holderness Inshore MCZ are also located within 10 km from the MIC and are designated for benthic habitats and species (Section 6.2.1).

6.3.2 Assessment of potential effects

Temporary habitat and seabed disturbance from unplanned/accidental HOD

As detailed within Section 5.1, any UXO clearance via HOD will be unplanned/accidental. LOD is the adopted method of UXO clearance within the MIC.

Temporary seabed disturbance from the proposed UXO clearance activities may affect benthic and epibenthic communities. The sensitivity of the benthic environment to temporary disturbance varies between habitats and receptors, however for many of the benthic habitats and features present with the MIC (as identified within Table 6-1) receptors are anticipated to have some ability to tolerate temporary disturbance and are likely to recover rapidly following the cessation of UXO clearance activities. Benthic species that inhabit sandy sediments, particularly in shallow waters, are expected to have some tolerance to natural disturbance arising from waves and tidal movements. As such the sensitivity of the receptor is generally considered to be **low** or locally **moderate** in the areas of identified Annex I reef.

As detailed within Section 5.4.1 above, JNCC (2025b) indicates that the largest crater resulting from HOD measured up to 15.5 m in diameter and 5.2 m depth. The total worst-case seabed disturbance footprint is estimated at approximately 1,510 m² for two accidental/unplanned HOD throughout the whole MIC in both English and Scottish waters. Whilst this may cause damage and disturbance to the habitats present in the immediate vicinity, the overall potential footprint will affect a very small percentage of the wider area of available habitat for a very short period of time.

In the event of an unplanned/accidental UXO clearance using HOD, the moderate to high tidal currents within the MIC will likely remobilise sediments and return the affected benthic environment to its natural state rapidly following the cessation of the activity. Owing to the highly localised, temporary and unlikely impact associated with HOD, and with consideration given to the embedded mitigation measures detailed within Section 2.2.4, the overall magnitude of the impact is considered to be **low** for HOD.

Summary of assessment

Overall, the sensitivity of benthic habitats and species is considered to be **low** or locally **moderate** in the areas of identified Annex I reef, due to the ability of benthic receptors to tolerate and rapidly recover from temporary disturbance. Additionally, temporary habitat disturbance from unplanned/accidental HOD is anticipated to be limited



to an area of approximately 1,510 m². Cable routing has avoided sensitive benthic habitats within the MIC through route optimisation, limiting the potential for adverse effects to the benthic environment where UXO clearance is required. The magnitude of the impact is assessed as **low** for unplanned/accidental HOD.

It can therefore be concluded that the proposed works will result in at worst a **minor** consequence and **not cause significant adverse effects**.

SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
Low - Moderate	Low	Minor
Impact Significance – NOT SIGNIFICANT		

6.4 Fish and shellfish ecology

This section presents the assessment of potential adverse significant effects of UXO clearance activities on fish and shellfish ecology. A summary of the baseline environment (informed by the Marine Scheme Environmental Appraisal (AECOM, 2022d)) followed by a summary of potential effects for LOD and HOD is provided.

Impacts to fish and shellfish ecology may also be interrelated with potential adverse effects on the physical and benthic environment, and therefore should be read in conjunction with the assessment of potential significant adverse effects to the physical environment (Section 6.2) and benthic environment (Section 6.3).

6.4.1 Summary of baseline

There are several species of fish and commercially important invertebrates (“shellfish”) that are known to be present in the marine environment, which are protected under international and national conservation legislation. All species listed are also considered to be of wider ecological value as well as commercial value within the MIC.

Key fish species identified during baseline characterisation consisted of a mix of pelagic, demersal and diadromous fish species including: Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*), European eel (*Anguilla anguilla*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), herring (*Clupea harengus*), mackerel (*Scomber scombrus*), haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), whiting (*Merlangius merlangus*), plaice (*Pleuronectes platessa*), sandeel species (*Ammodytidae*), thornback ray (*Raja clavate*), and spotted ray (*Raja montagui*).

Basking shark (*Cetorhinus maximus*) observations are concentrated around the west and south west coasts of the UK, with very low numbers of observations recorded in the North Sea (Witt *et al.*, 2012). There have been some sightings close to both the Scottish and English landfalls, but overall, the presence of basking shark within the vicinity of the MIC is very low (AECOM, 2022d) and therefore are not considered to be at risk from the Marine Scheme.

There are no shellfish species which are afforded conservation protection known to be present within the vicinity of the MIC, however, Norway lobster (*Nephrops norvegicus*), European lobster (*Homarus gammarus*), brown crab (*Cancer pagarus*) and scallops (*Pecten* spp.) are considered economically valuable as they are commercial species. There are also important spawning and nursery grounds for Norway lobster which overlap with the MIC.

Cod, whiting, and plaice are pelagic spawners, meaning their eggs disperse throughout the water column after spawning. As a result, they are carried by ocean currents, often far from the MIC, making them unlikely to be affected by UXO clearance activities other than in the immediate vicinity of UXO clearance activities where sound pressure waves could damage eggs and larvae.

Herring spawn on the seabed in specific habitats like gravel, coarse sand, maerl, and shell, where the water is well-oxygenated and has low fine sediment. There are several geographically distinct herring stocks within UK waters



(Tappin *et al.*, 2011), notably the Buchan population in Scotland and the Banks population off the ‘coast of northeast England. Atlantic herring within the Central and Southern North Sea have varied spawning strategies, both in terms of timing and geography. The sensitive spawning months for these two geographic populations have been separated within Table 6-2. The ‘Banks’ population spawns within the wider Humber region (south of Middlesbrough to the Wash), for which spawning activity occurs in a southerly direction from August–October (inclusive) (ICES, 2024). Peak spawning activity is considered to occur in the northern extent of the spawning grounds during August–September, moving southwards towards the Wash from September–October. The Buchan subcomponent, spawn between August and September (Barreto and Bailey, 2014), once per annum, over a short timeframe, and across multiple waves. Herring gather together and each female produces a single clutch of eggs, resulting in an ‘egg carpet’ which may have several layers and may cover a large area. The timeframe for eggs to hatch is dependent on the temperature of the sea but will usually last two to three weeks.

Surveys conducted as part of the wider International Herring Larval Survey (IHLS) have targeted the Banks population 0-ringer larvae from 1972-present (ICES, 2024). During this time, survey effort has fluctuated, with three surveys conducted (where possible) during three distinct periods over each total ‘annual’ spawning period: 1–15 September (first), 16–30 September (second), and 1–15 October (third). The first and third survey have been discontinued since 2003, such that 2004-present data are recorded in the period 16th–30th September only. When comparing the three survey periods in pre-2004 data, larval abundance is consistently higher in the second period (16–30 September), with the exception of 1990–1991, where the first period recorded a substantially higher abundance than the second. Furthermore, abundances are generally higher in more recent data (from 2003-present than in historic data (pre-2003)). As such, it can be concluded from the historic and recent IHLS data that the peak in larval abundance occurs within the second survey period (16–30 September).

Sandeels spawn on the seabed in specific sandy habitats, with their eggs remaining on the seabed, making them sensitive to seabed impacts. They prefer depths between 30 m and 70 m but can be found from 15 m to 120 m. Suitable habitats consist of medium to coarse sand with less than 10% mud content, and gravel is also suitable (Wright *et al.*, 2000; Holland *et al.*, 2005). The MIC passes through both low and high intensity spawning grounds for sandeels. Of 63 subtidal sampling locations, only eight were identified as prime or sub-prime spawning habitats, with six considered prime (NextGeosolutions, 2022). Most prime habitats are offshore, with three in shallow waters near the Scottish landfall, suggesting limited potential for prime spawning grounds across the MIC.

Given the nature of demersal spawning species, and with consideration of the potential effects which may arise as a result of UXO clearance, only herring and sandeel have been taken forward for further consideration as part of the assessment of significant adverse effects. Table 6-2 details the sensitive spawning months for herring and sandeel.

Table 6-2 Overall spawning times for sensitive demersal spawners in the MIC

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Herring (Buchan)							■	■				
Herring (Banks)								■	■	■		
Sandeel	■	■										■



Within Scottish Territorial Waters the closest designated site for fish species is Turbot Bank Nature Conservation MPA (24.4 km away), designated for the conservation of sandeel. Several SACs in Scotland are designated for the conservation of diadromous fish species such as Atlantic salmon and lamprey species, including the River Dee SAC, River South Esk, River Tay SAC, and River Teith SAC.

Within English waters the North East of Farnes Deep MCZ, (also now a HPMA), is the closest protected site to the MIC in English Waters, located 3.1 km away. This MCZ is designated for the conservation of ocean quahog aggregations; the HPMA component is designated for 'the marine ecosystem of the area' (i.e. all marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in or on the seabed, water column and the surface of the sea).

6.4.2 Assessment of potential effects

Underwater Sound from LOD

As detailed within Section 5.1 the only pathways which has been screened in for further assessment for fish and shellfish ecology is underwater sound from UXO clearance activities. As detailed in Table 5-1, shellfish and elasmobranchs have been screened out of the assessments.

Sound plays a major role in the lives of fish species, particularly for communication, prey location and avoiding predators (Fay & Popper, 2000). For fish species which use a swim bladder for sound detection (including herring) the response to sound depends on the presence and amplitude/frequency of sound with a series of frequency ranges to which the animal is most sensitive (AECOM, 2022d). Herring fall within the high hearing sensitivity range and are therefore considered susceptible to barotrauma (i.e., physical injury) as a result of a rapid change in pressure (e.g., following an intense impulsive sound within the marine environment) (Popper *et al.*, 2014). As such herring are considered to have a **moderate** sensitivity to underwater sound from UXO clearance activities. As sandeel do not have a swim bladder, they are considered to have a **negligible** sensitivity to underwater sound from UXO clearance activities.

There has been limited research on the effects of underwater sound on salmonids. Harding *et al.* (2016) exposed Atlantic salmon post-smolts and adults to impulsive (piling) sound in an aquarium experiment and found no significant behavioural or physiological response. Salmon are therefore considered to have a **low** sensitivity to underwater sound from UXO clearance activities.

Underwater sound modelling has been conducted with respect to a range of UXO detonation charge sizes and is presented in Table 4-2, using Popper *et al.* (2014) thresholds. The underwater sound propagation modelling undertaken for the UXO clearance activities indicates that the potential for mortal injury to fish as a result of LOD UXO clearance is up to a distance of 70 m, based on the 0.25 kg TNT_{eq} charges weight. A summary of this underwater sound modelling is provided within Section 3, with full details provided in Appendix B (A-100744-S07-A-ASMT-001).

For species which are less reliant on benthic habitats for spawning, any potential effects associated with underwater sound arising from UXO clearance will impact a small fraction of their available spawning (and nursery) habitat. For demersal spawning species, such as herring and sandeel, which rely on consistent/fixed spawning grounds, UXO clearance activities and associated underwater sound have the potential to harm fish and their eggs at a very localised scale (including small scale mortality of eggs and larvae).

Additionally, underwater sound from UXO clearance activities could cause disturbance or mortality in adult fish, particularly bony species with swim bladders such as herring. However, the sound generated from LOD is significantly lower than HOD, as demonstrated in the underwater sound modelling outputs which show a maximum of 70 m injury/mortality radius (Table 4-2). Moreover, sound also attenuates rapidly underwater, limiting the area of impact.



Given the highly localised and temporary nature of underwater sound associated with LOD UXO clearance methods and the maximum injury/mortality radius of 70 m (based on the 0.25 kg TNT_{eq} charges weight), any individual fish would have to be within the immediate vicinity of UXO clearance works for significant adverse effects to occur. Fish are highly mobile species which can exhibit avoidance behaviour to anthropogenic activities within the marine environment (AECOM, 2022d). It is therefore considered that fish will move away from UXO clearance works (greater than 70 m) and will therefore remain outside the radius of mortal injury for LOD UXO clearance.

UXO clearance activities are anticipated to occur during the summer months in 2026, over a relatively short period of time, i.e., a total of 35 days of UXO clearance activity (see Section 3.2.7). Therefore, there is potential for the clearance activities to overlap with spawning times for herring, both for the Banks and Buchan North Sea autumn-spawning populations. However, works are less likely to overlap with spawning times for sandeels (although this cannot be ruled out). Nonetheless, for demersal species that depend on fixed or constrained spawning grounds, these habitats are distributed patchily across the MIC. Furthermore, as detailed within Section 3.2.6, a series of embedded mitigation measures have been adopted for the UXO clearance activities, including the avoidance of cUXO as the primary mitigation approach.

Taking the above into consideration, the overall magnitude of the impact from underwater sound associated with LOD for all fish species is therefore considered to be **low**.

Underwater Sound from unplanned/accidental HOD

As detailed within Section 5.1, any UXO clearance via HOD will be unplanned/accidental. LOD is the adopted method of UXO clearance within the MIC.

As detailed above, the sensitivity of the receptor is considered to be **moderate** for herring, **negligible** for sandeel and **low** for salmon.

The underwater sound propagation modelling indicates that the potential for mortal injury to fish as a result of an unplanned/accidental HOD is up to a distance of 484 m, based on the largest 795 kg TNT_{eq} charge weight. The maximum contingency for an unplanned/accidental HOD UXO clearance event is one HOD in Scottish water and one HOD in English waters. UXO clearance will be undertaken during a maximum 35-day period in the summer months.

Any accidental/unplanned HOD UXO clearance (with a maximum potential mortal injury range of 484 m based on a 795 kg TNT_{eq} charge weight) will occupy a very small spatial footprint of the marine environment and will affect a very small overall percentage of the wider marine area and habitat available for fish species. In order for mortal injury to occur as a result of HOD, fish species would have to be within close proximity to the detonation (i.e., less than 484 m).

Furthermore, a series of embedded mitigation measures (as detailed in Section 3.2.6) have been adopted for the UXO clearance activities. These measures, in addition to utilising LOD as the selected UXO clearance method, have been developed to minimise potential environmental effects of UXO clearance works. The overall magnitude of the impact for all fish species is therefore considered to be **low**.

Summary of assessment

Overall, injury and disturbance to fish species as a result of underwater sound from UXO clearance activities is considered to be highly localised and temporary in nature, with underwater sound modelling concluding a maximum potential mortal injury range of 70 m at a 0.25 kg TNT_{eq} charge weight and 484 m at a 795 kg TNT_{eq} charge weight. With evidence of avoidance behaviour in response to anthropogenic activities within the marine environment, it is considered unlikely that fish species would remain within the mortal injury impact ranges for either LOD or HOD during UXO clearance activities.



For demersal spawning species, while LOD and unplanned/accidental HOD have the potential to harm both spawning fish and their eggs at a very localised scale, given the patchy distribution of spawning grounds throughout the MIC, as such, the magnitude of the impact is assessed as **low**. Similarly, given the localised impact ranges noted above in conjunction with the embedded mitigation measures, it is considered that there will be a **low** magnitude of impact to salmonoids.

It can therefore be concluded that the proposed works will result in at worst a **minor** consequence and would **not** cause significant adverse effects.

SPECIES	SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
Herring	Moderate	Low	Minor
Sandeel	Negligible	Low	Minor
Salmon	Low	Low	Minor

Impact Significance – NOT SIGNIFICANT

6.5 Marine mammals

This section presents the assessment of potential adverse significant effects of UXO clearance activities on marine mammals. A summary of the baseline environment (informed by the Marine Scheme Environmental Appraisal (AECOM, 2022e) followed by a summary of potential effects for LOD and HOD is provided.

Impacts to marine mammals may also be interrelated with potential adverse effects on other ecological receptors, and therefore should be read in conjunction with the assessment of potential significant adverse effects to the benthic environment (Section 6.3), fish and shellfish ecology (Section 6.4) and the HRA (Section 7).

6.5.1 Summary of baseline

Cetaceans

A total of 28 cetacean species have been observed in UK waters, although many of these species are occasional visitors to the Greater North Sea Ecoregion¹⁶.

Within the Greater North Sea Ecoregion, the four most commonly occurring or resident cetacean species (ICES, 2019) are:

- Harbour porpoise (*Phocoena phocoena*);
- Bottlenose dolphin (*Tursiops truncatus*);
- White-beaked dolphin (*Lagenorhynchus albirostris*); and
- Minke whale (*Balaenoptera acutorostrata*).

A further five species, the short-beaked common dolphin (*Delphinus delphis*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), long-finned pilot whale (*Globicephala melas*), killer whale (*Orcinus orca*), and Risso's dolphin (*Grampus griseus*) occur regularly but are less common. Other species may also be occasional visitors, these include humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter catodon*), and beaked whales (e.g. *Mesoplodon spp.*). Of the four most commonly occurring cetacean species (relevant Management Units (MU) shown in Figure 6-1), abundance and densities are outlined in Table 6-3.

¹⁶The Greater North Sea ecoregion includes the North Sea, English Channel, Skagerrak, and Kattegat.

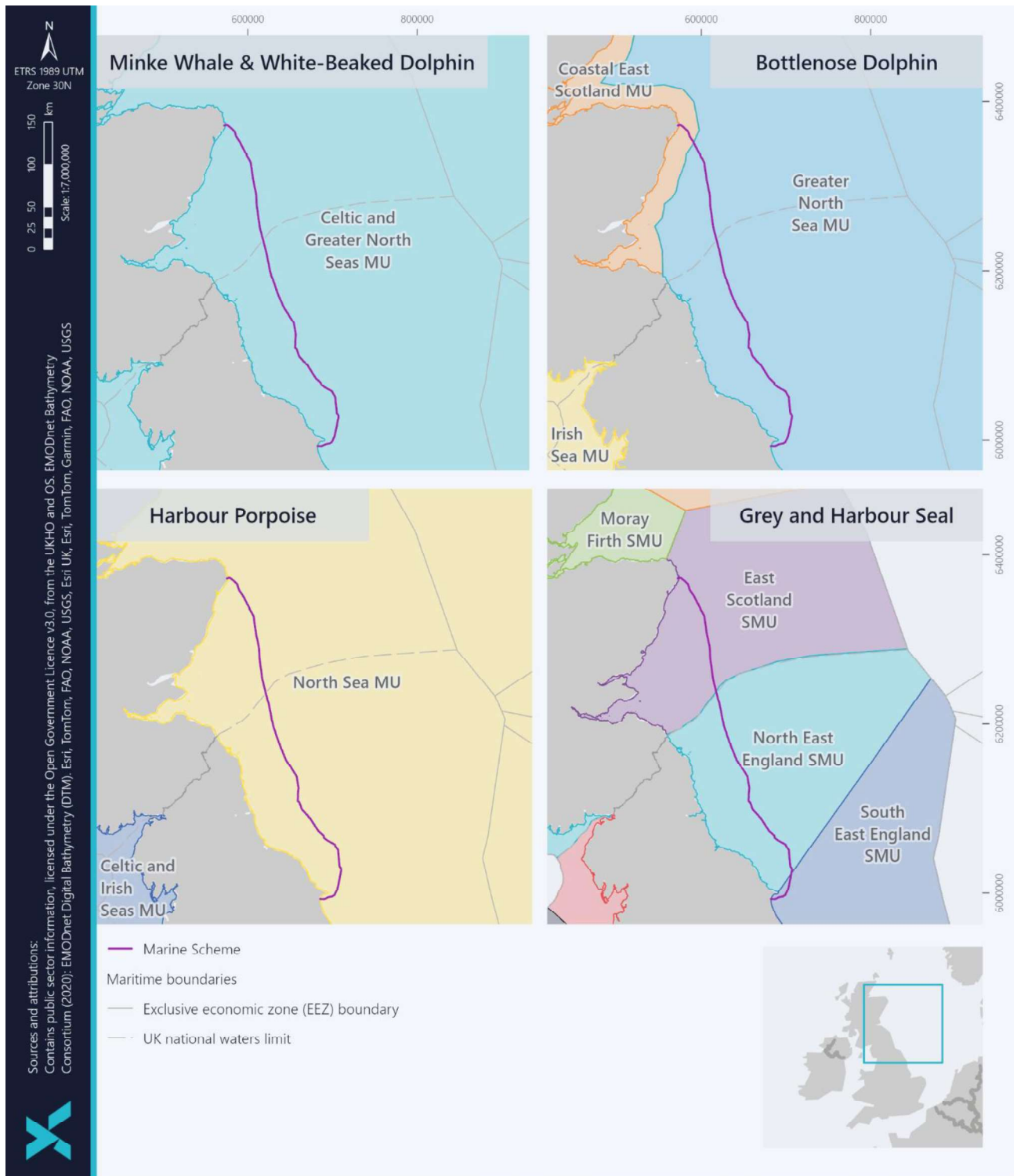


Figure 6-1 Marine mammal Management Units overlapping the MIC



Table 6-3 Abundance and density estimates of four most commonly occurring cetacean species present within the vicinity of the MIC. Bold values indicate the highest density overlapping the MIC from SCANS IV surveys, and these values were carried through the impact assessment as a precautionary measure.

SPECIES	SCANS-IV BLOCK	DENSITY (INDIVIDUALS /km ²)	ABUNDANCE PER BLOCK	ABUNDANCE OF ANIMALS IN RELEVANT MU (UK PORTION OF MU)
Harbour porpoise	NS-D (East of Scotland and north-east of England)	0.5985	38,577	North Sea MU 346,601 (159,632)
	NS-C (East of England)	0.6027	36,286	
Bottlenose dolphin	NS-D (East of Scotland and north-east of England)	0.030*	1,924	Greater North Sea (GNS) MU: 2,022 (1,885)
	NS-C (East of England)	0.0419	2,520	Coastal East Scotland (CES) MU: 226**
White-beaked dolphin	NS-D (East of Scotland and north-east of England)	0.0799	5,149	Celtic and Greater North Seas (CGNS) MU: 43,951 (34,025)
	NS-C (East of England)	0.0149	894	
Minke whale	NS-D (East of Scotland and north-east of England)	0.0419	2,702	CGNS MU: 20,118 (10,288)
	NS-C (East of England)	0.0068	412	

Source: Gilles et al. (2023).

* Where no species were recorded during Small Cetaceans in European Atlantic waters and the North Sea (SCANS) IV, data from SCANS III (Hammond et al., 2017) was used

**Updated abundance (NatureScot, 2025a).

All cetaceans are EPS, listed on Annex IV of the Habitats Directive and protected throughout their range in UK waters. Bottlenose dolphin and harbour porpoise are also listed on Annex II of the Habitats Directive requiring the designation of SACs, and are thus afforded protection through the Habitats Regulations.

The following designated sites with cetacean qualifying features are present within the vicinity of the MIC (Figure 6-2):

- The Southern Trench MPA (located 2 km to the north of the MIC) is designated for the conservation of minke whale;
- The Southern North Sea SAC (located 19 km to the southeast of the MIC) is designated for the conservation of harbour porpoise; and
- The Moray Firth SAC is designated for the conservation of bottlenose dolphin (located 92 km from the MIC) Bottlenose dolphins from this SAC range widely around eastern Scotland and NE England and therefore may occur within the MIC.

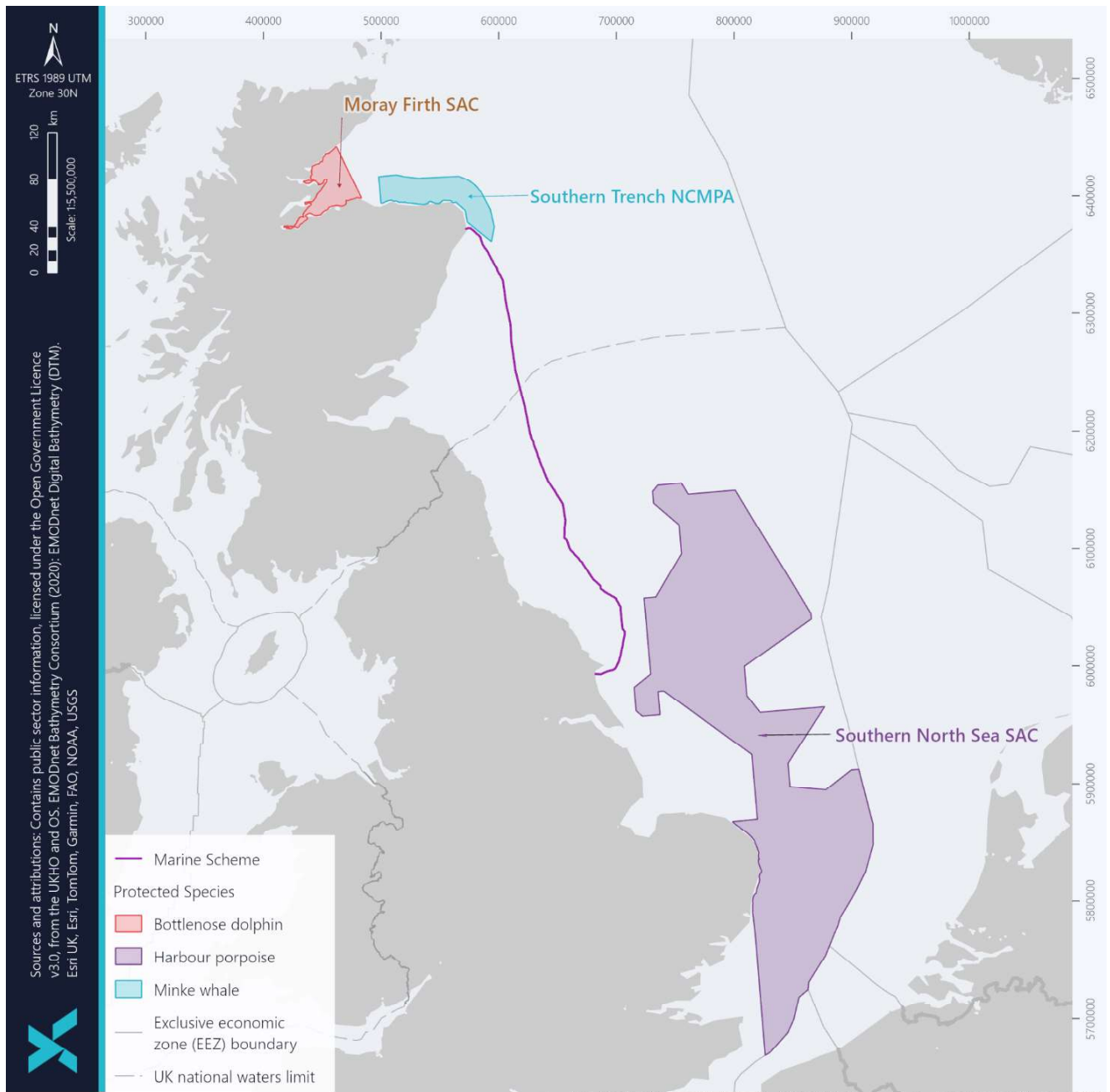


Figure 6-2 Cetacean SACs and NCMPAs within the MUs located in close proximity to the MIC

Seals

Harbour Seal

Harbour seals (*Phoca vitulina*) are one of two seal species breeding in UK waters, with around 32% of the European population found in the UK, 85% of which are in Scotland (Special Committee on Seals (SCOS), 2024). Following significant population decline over the past 25 years, their distribution along Scotland’s east coast is constrained to major estuaries like the Firth of Tay and inner Moray Firth. The MIC crosses three Seal Management (or Monitoring) Units (SMU): East Scotland, Northeast England, and Southeast England. Recent counts recorded 276 harbour seals in East Scotland (mostly around the firths of Tay and Forth), 106 in Northeast England (predominantly around the Tees estuary), and approximately 3,361 in Southeast England (SCOS, 2024). Harbour seals typically remain within 50 km of



the coast, using haul-out sites for breeding and moulting, and foraging nearby (NatureScot, 2025b). Although some individuals travel farther (Carter *et al.*, 2022), such long-distance foraging is rare. At-sea usage within the corridor is very low (<1 individuals km⁻²). Harbour seal numbers in the North Sea have declined in recent years, particularly in the East Scotland SMU, including the Firth of Tay and Eden Estuary SAC. However, the global conservation status of harbour seal is of Least Concern (International Union for Conservation of Nature (IUCN), 2025).

As an Annex II species under the EU Habitats Directive, harbour seals are a qualifying feature of 16 SACs within UK waters (SCOS, 2020). Within the North Sea, the Firth of Tay and Eden Estuary SAC, located off the east coast of Scotland (approximately 93.5 km from the MIC), and the Wash and North Norfolk Coast SAC, located in southeast England (approximately 100 km from the MIC), are designated for the conservation of nationally important harbour seal breeding colonies (~7% of the UK population of harbour seal) (AECOM, 2022e) (Figure 6-3).

Grey Seal

Grey seals (*Halichoerus grypus*) breeding in the UK represents about 36% of the global population, with 86% found in Scottish waters. While the largest breeding colonies are found in the Hebrides and Orkney, breeding colonies also occur along the east coast of Scotland and England. The latest UK population is estimated at ~168,400 grey seals (SCOS, 2024). The MIC crosses three SMU: East Scotland, Northeast England, and Southeast England. Recent counts recorded 1,584 grey seals in East Scotland, 5,446 in Northeast England, and approximately 10,692 in Southeast England (SCOS, 2024). Grey seals use haul-out sites for breeding, resting, and moulting. The estuary of the River Ythan, about 25 km from the corridor, supports ~2,000 seals and is a key haul-out site on the Scottish east coast. However, no designated haul-out sites lie within 2 km of the corridor, so disturbance of designated haul-outs is not anticipated. There are no designated seal haul-out sites in England.

Grey seal are listed as an Annex II species under the EU Habitats Directive, requiring the designation of SACs for protection. There are 13 SACs within the UK that have grey seal as a primary qualifying feature. Several SACs, including the Isle of May and Berwickshire and North Northumberland Coast, support important breeding colonies near the MIC (Figure 6-3). Grey seals can forage up to 135 km from haul-out sites and typically dive to depths of 100 m (Carter *et al.*, 2022). At-sea usage varies along the MIC, with the highest densities occurring near the Scottish landfall (KP0–KP8) and around the Humber Estuary (KP417–KP435.7). Usage is lower in the offshore section off the coast of NE England (AECOM, 2022e).

Grey seal and harbour seals are listed on Annex II of the Habitats Directive, requiring the designation of SACs, and are thus afforded protection through the Habitats Regulations, as well as the MSA 2010, the Conservation of Seals Act 1970 and the Wildlife and Countryside Act 1981. The abundance and densities of the seal species are outlined in Table 6-4.

Table 6-4 Abundance and density estimates of each seal species present within the vicinity of the MIC

SPECIES	DENSITY (INDIVIDUALS/km ²) (Carter <i>et al.</i> , 2022; 2025)	ABUNDANCE OF ANIMALS WITHIN RELEVANT SMU (SCOS, 2024)
Harbour seal	<0.0001- 0.04	East Scotland: 276 Northeast England: 106 Southeast England: 3,361
Grey seal	0.172- 0.699	East Scotland: 1,584 Northeast England: 5,446 Southeast England: 10,692

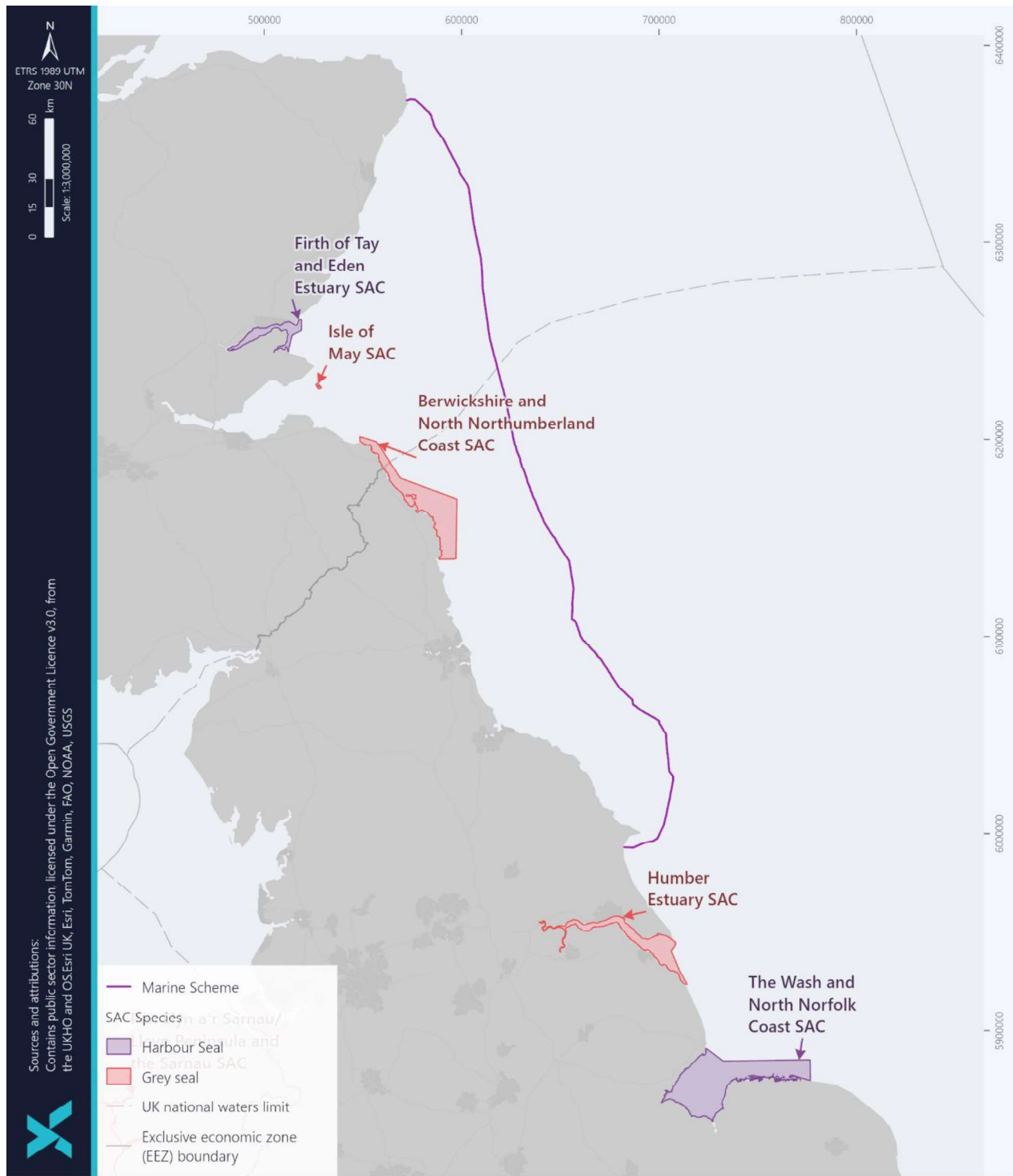


Figure 6-3 Seal SACs within Seal Monitoring Units overlapping the MIC

6.5.2 Assessment of potential effects

As detailed within Section 5.1 the only impact pathways which have been screened in for further assessment for marine mammals is underwater sound from UXO clearance activities.



Underwater Sound from LOD

The primary impact of UXO clearance on marine mammals arises from the underwater sound generated during clearance. Exposure to high amplitude impulsive sound can lead to various effects, including physical injury or mortality, temporary or permanent hearing loss, behavioural disturbances, and acoustic masking. However, given the short duration of UXO clearance activities (approximately 35 days), significant behavioural disruption or masking effects at the population level are considered unlikely.

UXO clearance mainly generates low-frequency sound, with most acoustic energy below a 1 kHz (von Benda-Beckmann *et al.*, 2015; Salomons *et al.*, 2021). This is below the peak hearing range for most marine mammals, except baleen whales, which are sensitive to low frequencies and are, therefore, grouped as LF cetaceans (NMFS, 2024). For dolphins (HF), porpoises (VHF), and phocid seals, PTS at these frequencies is expected to cause only minor changes to hearing and minimal consequential impact on vital rates.

As outlined in the UXO Clearance Underwater Sound Assessment (Appendix B; A100744-S07-A-ASMT-001), the marine mammal assessment uses the most recent, updated thresholds by NMFS (2024) (Table 6-5). These thresholds indicate the risk of PTS and TTS in different marine mammal hearing groups that are likely to be present within the MIC.

The NMFS (2024) thresholds are dual criteria, in that both unweighted peak SPL and frequency weighted SEL impact ranges should be calculated, with the resulting assessment being based on the larger of the two in the context of potential impact ranges. The SEL criteria are weighted, which corrects the sound level based on the sensitivity of the receiver. For example, harbour porpoise are less sensitive to low frequency sound than minke whales, and the weighting takes that difference into account.

Table 6-5 Summary of marine mammal hearing groups and impact thresholds for impulsive sound sources, NMFS (2024)

MARINE MAMMAL HEARING GROUP	TYPE OF SOUND	THRESHOLD	
		TTS	PTS
LF cetaceans (includes minke whale)	Peak Pressure, dB re 1 µPa (unweighted)	216	222
	SEL, dB re 1 µPa2s (weighted)	168	183
HF cetaceans (includes bottlenose dolphin, white-beaked dolphin)	Peak Pressure, dB re 1 µPa (unweighted)	224	230
	SEL, dB re 1 µPa2s (weighted)	178	193
VHF cetaceans (includes harbour porpoise)	Peak Pressure, dB re 1 µPa (unweighted)	196	202
	SEL, dB re 1 µPa2s (weighted)	144	159
Phocid Seals in Water (includes grey seal, harbour seal)	Peak Pressure, dB re 1 µPa (unweighted)	217	223
	SEL, dB re 1 µPa2s (weighted)	168	183



The Underwater Sound Assessment (Appendix B; A100744-S07-A-ASMT-001) modelled SPL_{peak} levels at the source for a range of TNT_{eq} charge weights which were used to calculate impact ranges through propagation modelling (

Table 4-1). These predicted impact ranges have been used to inform this underwater sound marine mammal assessment. Therefore, the results below are thought to be highly conservative. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed which describes mitigation measures that align with relevant JNCC (2025) guidance and include the use of MMObs and PAM operators, which will be implemented during the UXO clearance activities. The use of ADDs to deter marine mammals from the UXO clearance location is also included.

Assessing TTS is not typically considered a requirement, unlike PTS, when presenting the impacts of UXO clearance on marine mammals. However, as there are no agreed thresholds for sound levels that may elicit behavioural effects, particularly for single sound pulses like those generated from UXO clearance, disturbance responses have been assumed to occur at a similar sound pressure level to TTS onset (Southall *et al.*, 2007).

Because of their high conservation value all marine mammal species are considered of **moderate** sensitivity to auditory injury (PTS), and of **low** sensitivity to behavioural disturbance due to UXO clearance.

The table below (Table 6-6) presents the number of individuals subject to PTS and TTS from a single LOD clearance (using 0.25 kg TNT_{eq}), and cumulative LOD clearance events throughout the MIC in both Scottish and English waters. As the MIC overlaps with several cetacean MUs and SMUs, the assessment uses the highest density value and, where applicable, the smallest MU population, to present a worst-case scenario.



Table 6-6 Table of marine mammal impacts for LOD, by species, impact and jurisdiction.

SPECIES	DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT (RADIUS OF IMPACT; km)	SCENARIO *	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED **	% OF MU	% OF UK PORTION OF MU
Harbour porpoise	D = 0.6027; MUA = 346,601; UKA = 159,632	PTS (1.1)	Single LOD	3.79	3	<0.001	<0.01
			Scotland	56.9	35	0.01	<0.1
			England	75.9	46	<0.1	<0.1
		TTS (2.0)	Single LOD	12.6	8	<0.01	<0.1
			Scotland	188.5	114	<0.1	<0.1
			England	251.3	152	<0.1	<0.1
		Effective Deterrent Range (EDR) (5.0)	Single LOD	78.5	48	<0.1	<0.1
			Scotland	1,178.1	711	0.21	0.45
			England	1,570.8	947	0.27	0.59
Bottlenose dolphin	D = 0.0419; CES MUA = 226 ¹	PTS (0.06)	Single LOD	0.011	<0.001	<0.001	-
			Scotland	0.17	<0.01	<0.01	-
			England	0.23	<0.01	<0.01	-
		TTS (0.12)	Single LOD	0.045	<0.01	<0.01	-
			Scotland	0.68	<0.1	<0.1	-
			England	0.90	<0.1	<0.1	-
		EDR (5.0)	Single LOD	78.5	4	1.46	-
Scotland	1,178.1	50	21.8	-			



SPECIES DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT (RADIUS OF IMPACT; km)	SCENARIO *	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED **	% OF MU	% OF UK PORTION OF MU
		England	1,570.8	66	29.1	-
White-beaked dolphin D = 0.0799; MUA = 43,951; UKA = 34,025	PTS (0.06)	Single LOD	0.011	<0.001	<0.000 1	<0.0001
		Scotland	0.17	<0.1	<0.000 1	<0.0001
		England	0.23	<0.1	<0.000 1	<0.0001
	TTS (0.12)	Single LOD	0.045	<0.01	<0.000 1	<0.0001
		Scotland	0.68	<0.1	<0.001	<0.001
		England	0.90	<0.1	<0.001	<0.001
	EDR (5.0)	Single LOD	78.5	7	<0.1	<0.1
		Scotland	1,178.1	95	0.22	0.28
		England	1,570.8	126	0.29	0.37
	Minke whale D = 0.0419; MUA = 20,118; UKA = 10,288	PTS (0.3)	Single LOD	0.28	<0.1	<0.000 1
Scotland			4.24	<1	<0.001	<0.01
England			5.65	<1	<0.01	<0.01
TTS		Single LOD	9.1	<1	<0.01	<0.01
		Scotland	136.2	6	<0.1	<0.1



SPECIES DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT (RADIUS OF IMPACT; km)	SCENARIO *	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED **	% OF MU	% OF UK PORTION OF MU
<p>Grey seal</p> <p>D = 0.699</p> <p>ES SMU = 1,584 ²</p> <p>NEE SMU = 5,446 ²</p> <p>SEE SMU = 10,692</p>	(1.7)	England	181.6	8	<0.1	<0.1
	EDR	Single LOD	78.5	4	<0.1	<0.1
		Scotland	1,178.1	50	0.25	0.48
	(5.0)	England	1,570.8	66	0.33	0.64
	PTS	Single LOD	0.05	<0.1	<0.01	-
		Scotland	0.78	<1	<0.1	-
	(0.13)	England	1.05	<1	<0.1	-
	TTS	Single LOD	0.24	<1	<0.01	-
		Scotland	2.67	2	<1	-
	(0.24)	England	3.56	3	<1	-
	EDR	Single LOD	78.5	55	3.47	-
		Scotland	1,178.1	824	52.0	-
(5.0)	England	1,570.8	1,098	20.2	-	
<p>Harbour seal</p> <p>D = 0.04</p> <p>ES SMU = 276 ³</p> <p>NEE SMU = 106 ³</p> <p>SEE SMU = 3,361</p>	PTS	Single LOD	0.05	<0.01	<0.01	-
		Scotland	0.78	<0.1	<0.1	-
	(0.13)	England	1.05	<0.1	<0.1	-
	TTS	Single LOD	0.24	<0.1	<0.01	-
		Scotland	2.67	<1	<1	-
	(0.24)	England	3.56	<1	<1	-



SPECIES DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT (RADIUS OF IMPACT; km)	SCENARIO *	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED **	% OF MU	% OF UK PORTION OF MU
	EDR (5.0)	Single LOD	78.5	4	2.96	-
		Scotland	1,178.1	48	17.4	-
		England	1,570.8	63	59.4	-

* 'Scotland' scenario is the sum of impacts from 15 LOD events. 'England' scenario is the sum of impacts from 20 LOD events.

** Values >0.1 are rounded up to nearest whole animal

¹ As a conservative assessment, it is assumed that any bottlenose dolphin impacted is part of the Coastal East Scotland (CES) MU population; the boundaries of this MU lie entirely within UK waters

² As a conservative assessment, it is assumed that any grey seal impacted in Scottish waters is part of the East Scotland SMU population; and any grey seal impacted in English waters is part of the NEE SMU

³ As a conservative assessment, it is assumed that any harbour seal impacted in Scottish waters is part of the East Scotland SMU population; and any harbour seal impacted in English waters is part of the NEE SMU



Risk of auditory injury (PTS) from LOD

Table 6-6 shows that the species to most likely be impacted by the LOD UXO clearance activities is harbour porpoise. PTS onset from a single LOD clearance may occur in up to 3 harbour porpoises (<0.01% of UK proportion of the North Sea MU). Cumulatively, 46 harbour porpoise may experience PTS onset impact in English waters (<0.1% of the UK portion of the North Sea MU), and up to 35 harbour porpoise may experience PTS onset in Scottish waters (<0.1% of the UK portion of the North Sea MU). For all other cetacean species, less than one individual is likely to experience PTS as a result of either a single LOD clearance, or cumulatively in each jurisdiction, resulting in <0.01% of the UK proportion of each relevant MU experiencing PTS.

Table 6-6 also shows that less than one harbour or grey seal will experience PTS as a result of a single or cumulative LOD scenario (<0.1% of their respective SMUs). The estimates for seals presented represent a conservative approach, as calculations for seals assume that all animals are below the water during sound exposure. Overall, this is unlikely to cause population-level effects on any marine mammal species identified in the vicinity of the MIC.

Furthermore, LOD UXO clearance will be undertaken with a suite of mitigation measures including the use of MMO, PAM device, and an ADD (such as Lofitech AS Seal Scarer, or Ace Aquatech MMD). Studies show ADDs effectively deter marine mammals at significant distances. For example, Lofitech ADDs have displaced harbour porpoises up to 7.5 km (Brandt *et al.*, 2012; 2013; Dähne *et al.*, 2017), with aerial surveys indicating a 90% density reduction within 15 km during operation. Grey and harbour seals effectively respond at much shorter ranges of about 1 km (Gotz and Janik, 2010; Gordon *et al.*, 2015), whilst minke whales exhibit strong avoidance behaviours (McGarry *et al.*, 2017).

The ADD will be activated for up to 13 minutes during the hour-long MMO pre-watch prior to UXO clearance. The disturbance potentially caused by the ADD will be of a short duration and will occur at a relatively small scale, when compared to the potential impacts of the UXO clearance event itself. As previously mentioned in Section 3.2.5, noise-abatement (e.g., the use of bubble curtains) is not proposed because HOD is not anticipated.

Following the implementation of mitigation, the risk of auditory injury (PTS) will be reduced to a magnitude of **negligible** levels. As a result, the numbers of cetaceans and seals experiencing PTS described above are highly precautionary.

The onset criteria for PTS are the standard method for predicting auditory injury, however, there is considerable uncertainty about its likelihood, severity, and ecological consequences. For example, studies have estimated that the probability of an individual experiencing PTS at the PTS-onset threshold is around 18% (calculated from an approximation of the TTS-onset curve in Finneran *et al.* (2005) as presented in Donovan *et al.* (2017)), meaning not all animals within the predicted range will be affected. Even when PTS occurs, it may only be minor or in frequencies that do not significantly impair behaviours, such as foraging, communication, or survival. Studies suggest PTS typically manifests as a small hearing notch (6–24 dB) in non-critical frequency bands (Booth and Heinis, 2018). Given these uncertainties and conservative assumptions in impact range calculations, UXO clearance is very unlikely to affect survival or reproduction, and thus, a significant population-level effect on any species is unlikely.

The application of mitigation measures as described in the MMMP (Appendix A; A-100744-S07-A-TECH-001), aligned with JNCC (2025) guidelines, will reduce the risk of auditory injury to ALARP.

Therefore, the residual risk of auditory injury from LOD is considered to be **negligible** consequence for all marine mammal species.

Risk of disturbance from LOD

Using TTS onset as a proxy for disturbance, the greatest impact on harbour porpoise from a single LOD occurrence would result in disturbance to approximately 8 individuals (up to 0.1% of the UK portion of the North Sea MU). Table



6-6 indicates that dolphin species and minke whale are less likely to be affected by a single LOD, with less than one individual experiencing TTS from a single LOD.

In Scottish waters approximately 114 harbour porpoises (<0.1% of the UK portion of the North Sea MU) may experience TTS based on the cumulative (15 LOD clearances) scenario. In English waters, 152 harbour porpoises (<0.1% of the UK portion of the North Sea MU) may experience TTS from the cumulative (20 LOD clearances) scenario. Table 6-6 shows that less than one individual bottlenose dolphin (<0.1% of Coastal East Scotland (CES) MU) and less than one white-beaked dolphin (<0.001% of UK portion of Celtic and Greater North Sea (CGNS) MU) are predicted to experience TTS in both Scottish and English waters. For minke whale, six individuals in Scottish waters (<0.1% of UK portion of CGNS MU), and eight individuals in English waters (<0.1% of UK portion of CGNS MU), are predicted to experience TTS.

For TTS in seals, less than one individual of each species is expected to experience TTS from a single LOD clearance, equivalent to <0.01% of their relevant SMUs. In Scottish waters, two grey seals (<1% of relevant SMU) and <1 harbour seal (<1% of relevant SMU) are predicted to experience TTS; and in English waters, three grey seals (<1% of relevant SMU) and <1 harbour seal (<1% of relevant SMU) are predicted to experience TTS.

The JNCC guidance (2025b) highlights that the impact ranges for LOD UXO clearance advises a precautionary EDR of 5 km (approximately 78.5 km²) for harbour porpoise. Table 6-6 shows that 48 harbour porpoise may experience disturbance, equating to <0.1% of the UK portion of the North Sea MU. The EDR approach also predicts that up to 711 and 947 individuals may experience disturbance cumulatively in Scottish and English waters, equating to 0.45% and 0.59% of the North Sea MU, respectively.

The EDRs have been defined for harbour porpoise and are not intended to be applied to other marine mammal species; nonetheless the disturbance estimates based on EDRs have also been presented. Table 6-6 shows that 50 bottlenose dolphin in Scottish waters, and 66 in English waters, could be disturbed based on the EDR approach; whereas 95 white-beaked dolphin in Scottish waters, and 126 white-beaked dolphin in English waters, could be disturbed based on the EDR approach. For minke whale, 50 individuals in Scottish waters and 66 individuals in English waters could be disturbed based on the EDR approach.

For the seals, applying the EDR approach to assess disturbance results in 55 grey seals, and 4 harbour seals, experiencing disturbance from a single LOD event. For grey seals, the cumulative prediction is that 824 individuals in Scottish waters (52.0% of relevant SMUs) and 1,098 individuals in English waters (20.2% of relevant SMU) may experience disturbance. For harbour seals, the cumulative prediction is that 48 individuals in Scotland (17.4% of relevant SMUs) and 63 individuals in English waters (59.4% of relevant SMU) may experience disturbance.

While applying the EDR approach to species other than harbour porpoise represents the most conservative approach, the associated impact area is still relatively small compared to available sea space, and the short duration of disturbance makes significant population-level effects on any species unlikely. However, given that other cetacean species are not considered as sensitive as harbour porpoise (for which the EDRs were defined), the EDR approach is considered overly precautionary.

With regard to potential disturbance effects, it is important to highlight that each UXO clearance event produces a single sound pulse, meaning animals are exposed to only a brief disturbance each time. These short events are unlikely to cause changes in behaviour that could be considered as significant disturbance and may elicit a momentary startle response. Consequently, survival and reproductive rates of individual animals are expected to remain unaffected, and thus, population trajectories are highly unlikely to change.

Overall, whilst there may be some short-term, temporary and reversible disturbance to marine mammals, as only a very small proportion of the reference population of each species is expected to be disturbed by UXO clearance,



there is not likely to be significant shift away from baseline conditions. Therefore, the magnitude of effect of disturbance from LOD on all marine mammal species is considered to be **low**, and the residual risk of disturbance from LOD is considered to be of **minor** consequence for all marine mammal species.

Underwater Sound from unplanned/accidental HOD

As detailed within Section 1.3, any HOD events will be unplanned/accidental. LOD is the adopted method of UXO clearance within the MIC. However, as the risk of HOD cannot be excluded entirely, a single HOD event, per jurisdiction (two in total), has been assessed as a worst-case scenario.

Unplanned/accidental HOD scenario: auditory injury

Table 6-7 shows that harbour porpoise is the species most likely to experience PTS from a single HOD with 108 individuals potentially being affected (<0.1% of the UK portion of the North Sea MU). Less than one minke whale (<0.1% of UK portion of the CGNS MU) will experience PTS due to a single HOD. Less than one bottlenose dolphin (<0.1% of CES MU) and less than one white-beaked dolphin (<0.001% of UK portion of CGNS MU) are predicted to experience PTS due to a single HOD. Table 6-7 shows that two grey seal may experience PTS and <1 harbour seal may experience PTS from a single HOD. This represents approximately 0.1% of their relevant SMUs.

The application of mitigation measures as described in the MMMP (Appendix A; A-100744-S07-A-TECH-001), aligned with JNCC (2025) guidelines, will reduce the risk of auditory injury to ALARP.

Therefore, the residual risk of auditory injury is considered to be of **negligible** magnitude, resulting in a **negligible** consequence for all marine mammal species.

Unplanned/accidental HOD scenario: disturbance

Based on TTS as a proxy for disturbance, Table 6-7 shows that harbour porpoise is also the species most likely to be disturbed by a single HOD, with 367 individuals (0.23% of the UK portion of the North Sea MU) predicted to be affected. For minke whale, 18 individuals (0.17% of the UK portion of the CGNS MU) are predicted to experience TTS. Less than one bottlenose dolphin (<0.1% of CES MU) and less than one white-beaked dolphin (<0.001% of UK portion of CGNS MU) are expected to experience TTS. Six grey seal (0.37% of SMU), and less than one harbour seal (0.32% of SMU) are predicted to experience TTS.

Under the highly precautionary EDR scenario, harbour porpoise remains the most affected cetacean species, with 758 individuals (0.47% of the UK portion of the North Sea MU) predicted to experience disturbance. Fifty-three bottlenose dolphins (23.3% of the CES MU) and 101 white-beaked dolphins (0.3% of the UK portion of the CGNS MU) are predicted to be disturbed based on the EDR approach. For minke whale, 53 individuals (0.5% of the UK portion of the CGNS MU) are predicted to experience disturbance from a single HOD.

Based on the EDR approach, 879 grey seals (55% of the relevant SMU) will be disturbed, and 51 harbour seals (47.4% of the relevant SMU) will be disturbed.

While applying the EDR approach to species other than harbour porpoise represents the most conservative approach, the associated impact area is still relatively small compared to available sea space, and the short duration of disturbance makes significant population-level effects on any species unlikely. However, given that other cetacean species are not considered as sensitive as harbour porpoise (for which the EDRs were defined), the EDR approach is considered overly precautionary.

With regard to potential disturbance effects, it is important to highlight that a UXO clearance event produces a single sound pulse, meaning animals are exposed to only a brief disturbance each time. These short events are unlikely to cause changes in behaviour that could be considered as significant disturbance and may elicit a momentary startle



response. Consequently, survival and reproductive rates of individual animals are expected to remain unaffected, and thus, population trajectories are highly unlikely to change.

Overall, whilst there may be some short-term, temporary and reversible disturbance to marine mammals, as only a very small proportion of the reference population of each species is expected to be disturbed by UXO clearance and so there is not likely to be significant shift away from baseline conditions. Therefore, the magnitude of impact on all marine mammal species resulting from disturbance due to accidental/unplanned HOD is considered to be **low**, and the overall consequence is considered to be **minor**.



Table 6-7 Table of marine mammal impacts for HOD, by species and impact

SPECIES DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT* (RADIUS OF IMPACT; km)	SCENARIO	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED**	% OF MU	% OF UK PORTION OF MU
Harbour porpoise D = 0.6027; MUA = 346,601; UKA = 159,632	PTS (7.56)	Single HOD	179.0	108	<0.1	<0.1
	TTS (13.9)	Single HOD	608.0	367	0.11	0.23
	EDR (20.0)	Single HOD	1,257	758	0.22	0.47
Bottlenose dolphin D = 0.0419; CES MUA = 226 ¹	PTS (0.44)	Single HOD	0.59	<0.1	<0.1	-
	TTS (0.80)	Single HOD	2.02	<0.1	<0.1	-
	EDR (20.0)	Single HOD	1,257	53	23.3	-
White-beaked dolphin D = 0.0799; MUA = 43,951; UKA = 34,025	PTS (0.44)	Single HOD	0.59	<0.1	<0.001	<0.001
	TTS (0.80)	Single HOD	2.02	<1	<0.001	<0.001
	EDR (20.0)	Single HOD	1,257	101	0.23	0.30



SPECIES DENSITY (D; IND/km ²); MU ABUNDANCE (MUA); ABUNDANCE IN UK PORTION OF MU (UKA)	IMPACT* (RADIUS OF IMPACT; km)	SCENARIO	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED**	% OF MU	% OF UK PORTION OF MU
Minke whale D = 0.0419; MUA = 20,118; UKA = 10,288	PTS (2.05)	Single HOD	13.2	<1	<0.1	<0.1
	TTS (11.5)	Single HOD	417	18	<0.1	0.17
	EDR (20.0)	Single HOD	1,257	53	0.26	0.51
Grey seal D = 0.699 ES SMU = 1,584 ² NEE SMU = 5,446 ² SEE SMU = 10,692	PTS (0.89)	Single HOD	2.48	2	0.11	-
	TTS (1.64)	Single HOD	8.42	6	0.37	-
	EDR (20.0)	Single HOD	1,257	879	55.5	-
Harbour seal D = 0.04 ES SMU = 276 ³ NEE SMU = 106 ³ SEE SMU = 3,361	PTS (0.89)	Single HOD	2.48	<1	<0.1	-
	TTS (1.64)	Single HOD	8.42	<1	0.32	-
	EDR (20.0)	Single HOD	1,257	51	47.4	-

* Radius of impact is for a single HOD. The worst-case scenario assessed is one accidental/unplanned HOD in Scottish waters and one accidental/unplanned HOD in English waters.

** Values >0.1 are rounded up to nearest whole animal

¹ As a conservative assessment, it is assumed that any bottlenose dolphin impacted is part of the Coastal East Scotland MU population; the boundaries of this MU lie entirely within UK waters

² As a conservative assessment, it is assumed that any grey seal impacted in Scottish waters is part of the East Scotland SMU population; and any grey seal impacted in English waters is part of the NEE SMU

³ As a conservative assessment, it is assumed that any harbour seal impacted in Scottish waters is part of the East Scotland SMU population; and any harbour seal impacted in English waters is part of the NEE SMU



Summary of Assessment

Overall, the risk of PTS and TTS to marine mammals as a result of underwater sound from UXO clearance activities is considered to be highly localised and temporary in nature. The underwater sound modelling concluding a maximum potential PTS range of 1.1 km at a 0.25 kg TNT_{eq} charge weight and in the worst-case scenario of an accidental/unplanned HOD event, 7.5 km at a 795 kg TNT_{eq} charge weight. Marine mammals are highly mobile species, with the ability to move away from UXO clearance activities. Additionally, mitigation measures (Table 3-1) will be implemented to reduce the risk of PTS and TTS on marine mammals further. Mitigation measures include the adherence to a UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001), which details the role of ADDs, MMObs, and PAM operators in reducing the risk of injury to marine mammals. Therefore, it is considered unlikely that marine mammals would remain within injury range for either LOD or HOD during UXO clearance activities. Furthermore, any disturbance effects would be short-lived and are unlikely to elicit population-level effects.

For auditory injury from either planned LOD or accidental HOD, in light of the **moderate** sensitivity of marine mammals to auditory injury, and the **negligible** magnitude of impact given the embedded mitigations, the overall consequence is **negligible** and **will not cause significant adverse effects**. For disturbance for LOD and HOD, given the **low** sensitivity of marine mammals to disturbance from UXO clearance, together with the **low** magnitude of impact, the overall consequence from disturbance is **minor** and it can be concluded that the proposed works will **not cause significant adverse effects**.

TYPE OF IMPACT	SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
Auditory injury (PTS)	Moderate	Negligible	Negligible
Disturbance (TTS)	Low	Low	Minor
Impact Significance – NOT SIGNIFICANT			

EPS / Marine Wildlife Licensing conclusions

As mentioned in Sections 2.3 and 2.4, EPS Licences and Marine Wildlife Licences authorise activities which would otherwise be unlawful under wildlife legislation in Scottish and English waters. The licences should be sought for undertaking certain activities, which may affect a protected species, protected under the Habitats regulations.

Based on the assessment above, the predicted impacts from the UXO clearance activities are considered low-negligible at the population level for all EPS species. While short-term, temporary, and reversible disturbance may occur, the proportion of individuals affected within each MU is extremely small, even under precautionary EDR assumptions. No significant risk of injury or mortality is anticipated, and the likelihood of PTS is very low, and reduced through implementing the proposed mitigation measures (Table 3-1), including the development of a MMMP and adherence to JNCC (2025) guidelines, are expected to ensure residual risk is managed responsibly and appropriately.

Based on this and the assessment above, EPS / Wildlife Licensing conclusions are surmised below for Scottish and English Waters:

- **EPS - Scottish Inshore Waters:** no EPS licence for injury is required, as supported by the assessment above and underpinned by the Applicant’s commitment to mitigation, as set out within Section 3.2.6. However, an EPS licence for disturbance will be sought on the basis of the numbers of individuals that will experience disturbance, under the Conservation (Natural Habitats, &c.) Regulations 1994;



- **EPS – Scottish Offshore Waters:** as per Scottish Inshore Waters; although the assessment concludes that population-level effects will not occur, an EPS licence for disturbance will be sought on a precautionary basis, under the Conservation of Offshore Marine Habitats and Species Regulations 2017; and
- **Marine Wildlife Licence – English Inshore & Offshore Waters:** based on the assessment above and the Applicant's commitment to mitigation, as set out within Section 3.2.6, the potential for injury or disturbance, where the Favourable Conservation Status of each species would be adversely impacted, is considered to have been ruled out, therefore a Marine Wildlife Licence is not considered to be required. Notwithstanding, a formal request for a Marine Wildlife Licence Exemption will be submitted to the MMO MCET to confirm this, with reference to this SEI and associated documents, such as the MMMP.

6.6 Marine ornithology

This section presents the assessment of potential adverse significant effects of MIC UXO clearance activities on marine ornithology features. A summary of the baseline environment (informed by the Marine Scheme Environmental Appraisal (AECOM, 2022f)) followed by an assessment of potential effects is provided.

Impacts to ornithology may also be interrelated with potential adverse effects on other ecological receptors, and therefore should be read in conjunction with the assessment of potential significant adverse effects to the benthic environment (Section 6.3), fish and shellfish ecology (Section 6.4) and the HRA (Section 7).

6.6.1 Summary of baseline

The MIC is located within waters which may be used by foraging seabirds, including those considered designated features of protected sites. The breeding season for seabirds varies between species, however, broadly occurs between the months of April and August, with core breeding periods between May and July (NatureScot, 2020). During the breeding season the distribution of seabirds offshore is constrained by their requirements to return to colonies and breeding sites. Following breeding, seabirds migrate away from breeding sites to their wintering areas (often west into the Atlantic or southwards through the North Sea) (AECOM, 2022f). Along the length of the MIC, higher concentrations of seabirds are typically associated with significant breeding colonies, including those associated with the Buchan Ness to Collieston Coast SPA and the Flamborough and Filey Coast SPA (AECOM, 2022f).

Based on boat-based visual tracking surveys for foraging birds undertaken between 2006 and 2008 (Natural England and JNCC, 2016), the species of foraging seabirds which are likely to be present within the waters across the MIC include: kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), shag (*Gulosus aristotelis*), herring gull (*Larus argentatus*), gannet (*Morus bassanus*), razorbill (*Alca torda*) and fulmar (*Fulmarus glacialis*).

While the MIC has the potential to support a variety of non-breeding seabirds and seaduck, these species are considered unlikely to occur within the MIC in significant concentrations, with only infrequent, transitory individuals likely to be present (AECOM, 2022f). Aerial surveys undertaken for non-breeding populations of waterbirds and seabirds were carried out over five winter seasons (2003 to 2008) (Natural England and JNCC, 2016). As part of these surveys, the highest densities of red-throated diver were recorded off the east coast of England in what is now designated as the Greater Wash SPA (Natural England and JNCC, 2016).

Figure 6-4 below shows SPAs and Ramsar sites within 150 km of the MIC which have a seabird qualifying feature. The MIC directly overlaps with the Buchan Ness to Collieston Coast SPA, a 15 km stretch of cliffs in Aberdeenshire, Scotland, designated for the protection of 21 seabird and waterbird species. The MIC intersects the northernmost edge of the marine extension of the SPA, covering 2.3 km and 2.1% of the total SPA area. Additionally, there are three other seabird protection sites in close proximity to the MIC:



-
- Bullers of Buchan Coast Site of Special Scientific Interest (SSSI) which is a component site of the Buchan Ness to Collieston Coast SPA. The SSSI is approximately 2 km from the MIC;
 - Flamborough and Filey Coast SPA, which is located approximately 2 km from the MIC; and
 - Greater Wash SPA, located approximately 4 km from the MIC.

A detailed assessment of site designated for ornithological features, including those identified above and presented within Figure 6-4 is provided within the HRA (Section 7).



6.6.2 Assessment of potential effects

Disturbance from vessel presence

As detailed within Section 5.1 the only pathways which has been screened in for further assessment for ornithology is disturbance due to the presence of vessels.

Seabirds are considered most vulnerable to potential disturbance from vessels during the breeding season as the time spend away from breeding colonies needs to be optimised for energy expenditure and foraging. With consideration given to the likely presence of a number of breeding seabirds within the MIC, and the proximity of several designated sites for breeding seabird colonies, seabirds are considered to have a **moderate** sensitivity to disturbance due to the presence of vessels.

As detailed in the baseline description for ornithology above, seabird densities present within the MIC are relatively lower than densities in coastal areas and SPAs (AECOM, 2022f). Disturbance from vessel lighting, or vessel noise is expected to be minimal, short-term, and reversible. The vessel will be present for a maximum of 90 days depending on weather within the summer months, with all of the UXO clearance activities undertaken within 35 days using one stationary or slow-moving vessel transiting only between UXO locations along the MIC, which does not constitute a deviation to baseline vessel traffic conditions in the MIC.

The MIC overlaps with Buchan Ness to Collieston Coast SPA, where the designated species breed in the summer months. Therefore, there may be temporal overlap between the breeding seasons of the bird species and the UXO clearance activities. Investigations of pUXOs to confirm UXO presence within Scottish nearshore waters are still underway. However, as above it is noted that only one vessel will be in operation and given the proximity of Sandford Bay to the Peterhead Harbour Limits, this will not represent a deviation from baseline conditions in the area.

As detailed within Section 3.2.6, a series of embedded mitigation measures have been adopted to limit potential vessel disturbance to seabird species. These measures include the adherence to the SMWWC and the Red Throated Diver Vessel Best Practice Protocol (when the vessel is within the Greater Wash SPA) as well as ensuring the vessel is slow moving on site and implements directional lighting in periods of darkness to reduce disturbance.

With consideration given to the highly localised, temporary nature of proposed works, and with the implementation of identified embedded mitigation measures, the overall magnitude of the effect is considered to be **low**.

Summary of assessment

Overall, the sensitivity of marine ornithology features is considered to be **moderate** due to the proximity of several designated breeding seabird colonies to the MIC and to the potential for vessel disturbance to impact birds while they are foraging at sea. The vessel may be present for up to 90 days depending on weather within the summer months (Section 3.2.7), with all of the UXO clearance activities undertaken using one stationary or slow-moving vessel transiting only between UXO locations within the MIC. Given the highly localised and temporary nature of works, the magnitude of the impact is assessed a **low**.

It can therefore be concluded that the proposed works will result in at worst a **minor** consequence and **not cause significant adverse effects**

SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
Moderate	Low	Minor

Impact Significance – NOT SIGNIFICANT



6.7 Cumulative assessment

Potential impacts from the proposed UXO clearance activities have the potential to interact with those from other developments, plans, and activities, which may result in cumulative effects on the receptors outlined in Section 6. The Zones of Influence (ZOI) for each receptor and potential impacts are outlined in Table 6-8, which were used to identify the relevant developments for inclusion in this cumulative assessment.

Table 6-8 Zones of Influence for cumulative assessment

RECEPTOR GROUP	MAXIMUM ZOI (km)	POTENTIAL IMPACTS
Physical environment	1.5	<ul style="list-style-type: none"> Temporary seabed disturbance during UXO clearance works.
Benthic environment	1.5	<ul style="list-style-type: none"> Temporary seabed disturbance during UXO clearance works.
Fish and shellfish	1.5	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.
Marine mammals	50	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.
Ornithology	10	<ul style="list-style-type: none"> Disturbance effects due to the physical presence of vessels.

Summary of Assessment

The Southern North Sea (SNS) Activity Tracker¹⁷ provides up-to-date information on current and planned noisy activities occurring within the Southern North Sea. It was specifically developed to support cumulative and in-combination effects assessments and is regularly updated. The Marine Noise Registry (MNR)¹⁸ records noisy anthropogenic activities that produce loud, low to medium frequency (10Hz – 10kHz) impulsive noise in UK waters. The Marine Scotland website¹⁹ lists current and historical applications and licence details for projects in Scottish waters, and the MMO MCMS²⁰ portal catalogues marine licence applications and active licences in English waters. These portals were reviewed to identify activities that could overlap spatially and temporally with the EGL2 UXO clearance activities. A desk-based review of the projects within a 50 km radius was undertaken to identify any other developments or plans with the potential to result in cumulative effects with the UXO clearance activities (Table 6-9).

¹⁷ [SNS Activity Tracker w.c. 10.11.2025.xlsx](#)

¹⁸ [Marine Noise Registry | Home](#)

¹⁹ [Marine Scotland - Marine Licence applications](#)

²⁰ [MMO MCMS portal](#)



Table 6-9 List of developments considered for the cumulative effect assessment

DEVELOPMENT	DISTANCE	LICENCE NUMBER	ACTIVITY	TIMELINE	RECEPTOR	TAKEN FORWARD TO ASSESSMENT
OFFSHORE WIND FARM CONSTRUCTION						
Inch Cape Offshore Wind Farm	50 km	MS-00010140	Percussive pile driving of 72 offshore wind turbines.	01/12/2025 to 31/10/2026	<ul style="list-style-type: none"> All marine mammal species. 	Yes
GEOPHYSICAL SURVEYS AND UXO INVESTIGATIONS						
Netherton Corridor	4 km	EPS-00011077	Geophysical, benthic and geotechnical surveys	25/07/2025 to 26/06/2030	<ul style="list-style-type: none"> All marine mammal species. 	Yes
Eastern Green Link 3	6 km	EPS/BS-00011260	Geophysical surveys, including the use of USBL.	03/08/2025 to 03/08/2026	<ul style="list-style-type: none"> All marine mammal species; and Seabird species. 	Yes
Moray Firth Spittal to Peterhead	13 km	EPS-00010441	Geophysical and geotechnical surveys	19/08/2025 to 11/09/2025	<ul style="list-style-type: none"> All marine mammal species. 	Yes
Flora Offshore Wind Farm	23 km	EPS/BS-00010686	Geophysical/geotechnical surveys	01/06/2024 to 31/05/2028	<ul style="list-style-type: none"> All marine mammal species. 	Yes
Inch Cape Offshore Wind Farm	50 km	00011249	UXO clearance	01/05/2025 to 31/12/2027	<ul style="list-style-type: none"> All marine mammal species. 	Yes



Marine Mammals

The offshore construction and UXO clearance activities for the Inch Cape offshore wind farm and the proposed geophysical surveys may occur concurrently with the potential EGL2 UXO clearance activities. However, there is unlikely to be a cumulative adverse effect as a result of underwater sound on the cetacean species outlined in Section 6.5, due to the mitigation measures implemented in the EGL2 UXO Clearance works and the developments listed in Table 6-9, which are required by condition of their consent. All geophysical survey activity will take place from vessels moving at low speeds, with the implementation of mitigation measures including MMObs and PAM protocols as required by JNCC (2017), as conditioned in their EPS licences. Furthermore, marine mammals are highly mobile and will move away from loud sound sources. The impacts will be limited to short-term, temporary, and reversible disturbance effects which will be of a **negligible** magnitude.

Therefore, no significant cumulative effects are expected to occur.

Ornithology

It is anticipated that one project vessel may be involved in the UXO clearance activities over a period of 90-days in the summer months, depending on weather conditions. The addition of this project vessel in an area already characterised by high vessel activity and dense traffic routes (Robbins *et al.*, 2022) will not result in significant change from baseline vessel conditions. The EGL2 project vessel will be slow-moving and will adhere to the embedded mitigation measure outlined in Table 3-1. All geophysical survey activity will take place from a vessel moving at low speeds, implementing required mitigation measures, as conditioned in their EPS licences. The impacts will be limited to short-term, temporary, reversible disturbance effects which will be of a **negligible** magnitude.

Therefore, no significant cumulative effects are expected to occur.

Conclusion

As there are no developments with construction activities occurring concurrently with EGL2's proposed UXO clearance activities within 1.5 km of the MIC, no cumulative effects are expected to occur on the physical environment, benthic environment, or fish and shellfish receptors.

The development activities identified in Table 6-9 may overlap with EGL2's proposed UXO clearance activities, however, cumulative impacts on marine mammals and ornithology receptors are considered unlikely. All activities will be short-term and temporary and mitigation measures will be adhered to. Given the transient nature of the activities and the negligible magnitude of potential disturbance, no significant cumulative effects are anticipated, and it can be concluded that the proposed works will **not cause significant adverse cumulative effects**.



7 HABITATS REGULATIONS APPRAISAL / ASSESSMENT

7.1 Approach to HRA

The following sections of the report provide information to inform the HRA process for the proposed UXO clearance works. This comprises the following two stages:

- (i) Screening of designated sites (i.e., SACs, SPAs, Ramsar sites) where an LSE, either for the Project alone or in combination with other plans or projects, cannot be excluded and which may compromise the conservation objectives of the features for which a site has been designated (Section 7.2); and
- (ii) For those sites where it is not possible to conclude that there will be no LSE, the competent authority (Marine Directorate in Scotland; MMO in England) is required to undertake an AA to consider whether the LSE caused by the project (either alone or in combination) would have an adverse effect on the integrity of a designated site, given due consideration of the conservation objectives. Information to aid the competent authorities in undertaking an AA is provided by the Applicant (Section 7.3).

Whilst the mitigation measures contained in Section 3.2.6 are considered within the environmental screening (Section 5.1), for the avoidance of doubt, mitigation has not been considered as part of the LSE stage of this report (per caselaw (the 'People over Wind' ruling²¹) and NatureScot (2025c) and UK Government (2019) guidance).

It should be noted that advice provided by NatureScot in reference to other recent HRAs suggests that as there is limited knowledge of distribution and behaviour of diadromous fish in the marine environment, available evidence is not sufficient to carry out an assessment for diadromous fish to the level required under HRA. For this reason, Scottish European sites that are designated for diadromous fish have not been considered within the HRA. Furthermore, as outlined in Section 6.4, diadromous fish exhibit avoidance behaviour and are unlikely to be affected by underwater sound. Therefore, underwater sound from UXO clearance has not been considered further for European sites that are designated for migratory fish species.

7.2 Screening for Likely Significant Effects

7.2.1 Pre-screening of designated sites with potential connectivity with the MIC

The MIC lies within the North Sea, which hosts a large number of SACs, SPAs and Ramsar sites designated for the conservation of marine species and habitats.

An initial pre-screening step was undertaken to identify those sites designated for mobile species (birds, mammals and fish) with the potential for connectivity with the MIC to produce a more refined list of sites to consider against the screening criteria in Section 7.1. As UXO clearance activities occur below MHWS, all wholly terrestrial designated sites (including sites with coastal components where the qualifying features do not occur below MHWS) were screened out.

Due to the highly mobile and wide-ranging nature of seabird, marine mammal and diadromous fish species for which SPAs and SACs have been designated, some of these species may be connected to the MIC beyond the boundaries of their respective designated sites. Additionally, SACs designated for geomorphological (physical) and Annex I habitat features were also subjected to pre-screening, whereby due to the highly localised physical footprint of UXO

²¹ [CJEU C-323/17 People Over Wind and Peter Sweetman vs Coillte Teoranta](#)



clearance (see Table 5-1) a screening range of 1.5 km from the Marine Scheme was applied. The pre-screening criteria each species group is detailed below in Table 7-1.

Table 7-1 Pre-screening criteria for SACs, SPAs and Ramsar sites

TAXONOMIC GROUP (TYPE OF DESIGNATION)	PRE-SCREENING CRITERIA
<p>Terrestrial birds (SPAs and Ramsar sites)</p>	<p>As UXO clearance activities occur below MHWS, all wholly terrestrial SPAs (and sites with coastal components where the qualifying features do not occur below MHWS) do not have connectivity and have been screened out.</p>
<p>Terrestrial SACs</p>	<p>All wholly terrestrial designated sites (including sites with coastal components where the qualifying features do not occur below MHWS) do not have connectivity and have been screened out.</p>
<p>Seabirds and waterfowl (SPAs, Ramsar sites)</p>	<p>SPAs and Ramsar sites that are designated for breeding or wintering seabirds and waterfowl that lie within 10 km of the MIC.</p> <p>Although Woodward <i>et al.</i> (2019) published seabird foraging ranges to determine the potential for connectivity between developments and SPAs, these have been incorporated into guidance for offshore wind farm assessments and are not intended as screening criteria for all plans and projects. The only relevant impact pathway to ornithological qualifying features resulting from the proposed UXO clearance operations is disturbance due to vessel presence. The UXO clearance activities will take place from a single vessel operating at low speeds, which does not constitute a material change from baseline vessel traffic conditions within the MIC. Therefore, UXO clearance activities only have the potential to undermine the conservation objectives of SPA and Ramsar sites if the areas designated as important breeding sites or foraging areas are in close proximity to the MIC. A range of 10 km acknowledges this limited connectivity between SPAs and the proposed UXO clearance activities.</p>
<p>Cetaceans (SACs)</p>	<p>SACs with cetacean features that lie within 20 km of (or have clear connectivity to) the MIC.</p> <p>Evidence of disturbance to harbour porpoise from underwater explosions (e.g. UXO clearance) have recently been reviewed by Majewska <i>et al.</i> (2025) and the outcomes of this review used to update the EDRs advised by JNCC (2025b). This indicates that LSE on harbour porpoise from LOD will occur where a 5 km EDR overlaps with a porpoise SAC (20 km EDR for HOD). While the EDRs are defined for harbour porpoise, they can be applied similarly for other cetacean species (see Section 6.5.2), therefore a likelihood of significant effects exists where a cetacean SAC lies within 20 km of UXO clearance activities in the MIC.</p> <p>The Moray Firth SAC, although located more than 20 km from the MIC, has been screened in for assessment due to known wide ranging coastal movements of bottlenose dolphin (see Table 7-4).</p>



TAXONOMIC GROUP (TYPE OF DESIGNATION)	PRE-SCREENING CRITERIA
<p>Pinnipeds (SACs)</p>	<p>Screening ranges of 50 km for harbour seal and 20 km for grey seal have been used.</p> <p>Grey seal SACs are principally breeding sites. Grey seals congregate for pupping and mating and then disperse. Grey seals are at the breeding sites for a relatively short period of the year, do not tend to make long foraging trips while there and then disperse widely. A screening range of 20 km is therefore appropriate when considering the likely significant effects on grey seal SACs.</p> <p>Harbour seals are relatively loyal to a SAC site and often remain local to a relatively discrete area, including outside the breeding season, so connectivity with the SAC is stronger for this species all year round than is indicated for grey seals. Therefore, a screening range of 50 km is appropriate when considering the likely significant effects on harbour seal SACs.</p> <p>At the request of Natural England, the Wash and North Norfolk Coast SAC for harbour seal was also screened in, as well as the Berwickshire and North Northumberland Coast SAC and Humber Estuary SAC for grey seal.</p>
<p>Eurasian otter (<i>Lutra lutra</i>) (SACs)</p>	<p>Otter SACs that lie within 1 km of the MIC, due to the highly coastal distribution and limited range of otters in the marine environment.</p>
<p>Diadromous fish (SACs)</p>	<p>Although they could be exposed to underwater sound during marine migrations, the diadromous fish likely species to occur in the MIC are not considered to be sensitive to loud impulsive sounds (Harding et al., 2016; Popper et al., 2014). Therefore, while there may be spatial connectivity between diadromous fish qualifying features of SACs and the proposed UXO clearance operations, the impact pathways do not have the potential to undermine the conservation objectives of any SAC designated for diadromous fish. As such, diadromous fish SACs have been screened out, and will not be considered further in this assessment.</p>
<p>Geomorphological (physical) / Annex I habitat features (SACs)</p>	<p>SACs that are designated for geomorphological and Annex I habitat features that lie within 1.5 km of the MIC.</p>

After applying the pre-screening criteria, a list of 10 sites were carried forward for consideration against the screening criteria described in Section 7.2.2 for the determination of LSE. These sites included two SACs designated for cetaceans, three SACs designated for seals Table 7-2, one SAC designated for geomorphological features/Annex I habitat, and four SPAs designated for the conservation of seabirds (Table 7-2).



Table 7-2 SACs, SPAs and Ramsar sites with potential connectivity to the MIC.

SITE NAME	RELEVANT QUALIFYING FEATURES	DISTANCE TO THE MIC (km)
SCOTLAND		
Buchan Ness to Collieston Coast SPA	Ornithological features	0
Ythan Estuary, Sands of Forvie and Meikle Loch SPA *	Ornithological features	8
Moray Firth SAC**	Marine mammal features	90
SCOTLAND AND ENGLAND (CROSS-BORDER)		
Berwickshire and North Northumberland Coast SAC***	Marine mammal features	37
ENGLAND		
Flamborough Head SAC	Physical / Annex I features	<1
Flamborough and Filey Coast SPA	Ornithological features	2
Greater Wash SPA	Ornithological features	4
Southern North Sea SAC	Marine mammal features	19
Humber Estuary SAC***	Marine mammal features	35
The Wash and North Norfolk Coast SAC***	Marine mammal features	108

* Overlapping Ythan Estuary, Sands of Forvie and Meikle Loch Ramsar site screened out based on distance

** Due to known wide ranging coastal movements of bottlenose dolphin, the Moray Firth SAC, has been screened in for assessment despite being beyond 20 km pre-screening range

*** At the request of Natural England, additional grey seal and harbour seal SACs in England (beyond 20 km/50 km pre-screening range) were also screened in.

7.2.2 Consideration of impact pathways

The impact pathways detailed in Section 5.1 were considered as potential sources of LSE resulting from the UXO clearance activities. The conclusions of the impact assessments in Section 6 were used to implement a suite of screening criteria to refine the list of designated sites with potential connectivity to the MIC and identify the sites where there was potential for LSE (Table 7-2).

Table 7-3 details the criteria used to screen sites for LSE. The assessment of potential LSE on European sites that may have likely connectivity to the MIC provided in Table 7-4.



Table 7-3 Criteria used to screen sites for LSE

IMPACT PATHWAY AND EFFECT	SPAs AND RAMSAR SITES FOR SEABIRDS AND SHOREBIRDS	SACs WITH MARINE MAMMAL FEATURES	SACs WITH GEOMORPHOLOGICAL (PHYSICAL) / ANNEX I HABITAT FEATURES
<p>Disturbance effects due to the physical presence of vessels</p>	<p>Screening range 10 km</p> <p>It is anticipated that only one project vessel will be involved in the UXO clearance activities. The potential impacts on seabirds from this vessel are expected to arise primarily from noise and artificial lighting, and the physical presence of the vessel. These effects would be temporary and limited to the duration of the clearance activities. It is therefore determined that a likely significant effect would only exist in close proximity (<10 km) to SPAs for seabirds.</p>	<p>No LSE</p> <p>Although marine mammals are generally considered to be largely resilient to disturbance by vessels, and some (e.g. dolphin species) are known to approach vessels to bowride, other species, including harbour porpoise, appear to be disturbed and avoid the area where vessels are operating (Fernandez-Betelu <i>et al.</i>, 2024; Pigeault <i>et al.</i>, 2024).</p> <p>Collision between Annex II marine mammal species and vessels is not a realistic impact pathway and thus is not considered to lead to LSE. Disturbance from a single project vessel is expected to be localised, short-term, and reversible, and vessel movements will be within baseline levels of shipping in the vicinity of the MIC. It is therefore determined that there will be no likely significant effect due to the physical presence of vessels on marine mammal features of SACs.</p>	<p>No LSE</p> <p>There is no identified pathway for impacts from vessel physical presence to have a likely significant effect on geomorphological (physical) or Annex I habitat features of SACs.</p>
<p>Habitat loss due to temporary seabed disturbance</p>	<p>No LSE</p> <p>Indirect effects on seabirds via impacts to prey species are not anticipated due to the negligible scale of temporary seabed disturbance, therefore there will be no likely significant effect on seabird features of SPAs.</p>	<p>No LSE</p> <p>Indirect effects on marine mammals via impacts to prey species are not anticipated due to the negligible scale of temporary seabed disturbance, therefore there will be no likely significant effect on marine mammal features of SACs.</p>	<p>Screening range 1.5 km</p> <p>UXO clearance will result in highly localised and recoverable effects in the immediate vicinity of the UXO, with a maximum disturbance area of 755 m². It is therefore determined on a precautionary basis that a likely significant effect would only exist in close proximity (<1.5 km) to geomorphological (physical) / Annex I habitat features of SACs.</p>
<p>Changes in water and sediment quality due to the suspension and deposit of sediment or pollution incidents resulting from UXO clearance</p>	<p>No LSE</p> <p>There is no identified pathway to impact for changes in water and sediment quality due to the suspension and deposit of sediment or pollution (given adherence to legal requirements) resulting from UXO clearance to have a likely significant effect on seabird features of SPAs.</p>	<p>No LSE</p> <p>There is no identified pathway to impact for changes in water and sediment quality due to the suspension and deposit of sediment or pollution (given adherence to legal requirements) resulting from UXO clearance to have a likely significant effect on marine mammal features of SACs.</p>	<p>No LSE</p> <p>Any short-term, temporary changes to water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance will be highly localised and pollution incidents are highly unlikely (given adherence to legal requirements). It is therefore determined that there is no likely significant effect on geomorphological (physical) or Annex I habitat features of SACs.</p>



IMPACT PATHWAY AND EFFECT	SPAs AND RAMSAR SITES FOR SEABIRDS AND SHOREBIRDS	SACs WITH MARINE MAMMAL FEATURES	SACs WITH GEOMORPHOLOGICAL (PHYSICAL) / ANNEX I HABITAT FEATURES
<p>Physical injury and/or disturbance as a result of the underwater sound arising from the UXO clearance process</p>	<p>No LSE</p> <p>There is no identified impact pathway for physical injury and/or disturbance as a result of underwater sound arising from the UXO clearance process to have a likely significant effect on seabird features of SPAs.</p>	<p>Screening ranges:</p> <ul style="list-style-type: none"> • 20 km for harbour porpoise and bottlenose dolphin • 50 km for harbour seal ²² • 20 km for grey seal ²³ <p>The potential for LSE on the marine mammal qualifying features of SACs from the UXO clearance activities will primarily relate to the direct impacts of physical injury or disturbance to marine mammals from underwater sound emissions. However, the selection of LOD means that impacts will be relatively small.</p> <p>The worst-case scenario of accidental/unplanned HOD is also covered through consideration of the 20 km EDR for HOD, therefore the 20 km/50 km screening ranges remain appropriate for both LOD and HOD as a worst case.</p>	<p>No LSE</p> <p>There is no identified impact pathway for physical injury and/or disturbance as a result of underwater sound arising from the UXO clearance process to have a likely significant effect on geomorphological (physical) or Annex I habitat features of SACs.</p>

²² At the request of Natural England, The Wash and North Norfolk Coast SAC for harbour seal was also screened in.

²³ At the request of Natural England, Berwickshire and North Northumberland Coast SAC and Humber Estuary SAC for grey seal were also screened in.



Table 7-4 Summary of the European sites and their relevant qualifying features that may have connectivity to the MIC

EUROPEAN SITE	DISTANCE (km)	RELEVANT QUALIFYING FEATURES	IMPACT PATHWAY	LSE ASSESSMENT	SCREENING DECISION
SCOTLAND					
Buchan Ness to Collieston SPA (Scotland)	MIC partially overlaps the SPA for approx. 2.3 km	<ul style="list-style-type: none"> Northern fulmar (<i>Fulmarus glacialis</i>); Black-legged kittiwake (<i>Rissa tridactyla</i>); Common guillemot (<i>Uria aalge</i>); European shag (<i>Phalacrocorax aristotelis</i>); Herring gull (<i>Larus argentatus</i>); and Seabird assemblage. 	Disturbance effects due to the physical presence of vessels	It is anticipated that one project vessel may be involved in the UXO clearance activities over a period of 90-days in the summer months, depending on weather conditions. Due to the overlap/proximity of the MIC to this site, potential for LSE cannot be excluded and as such it has been taken forward for determination of AEoSI in Section 7.3.1.	Screened in
Ythan Estuary, Sands of Forvie and Meikle Loch SPA (Scotland)	8	<ul style="list-style-type: none"> Little tern (<i>Sternula albifrons</i>); Common tern (<i>Sterna Hirundo</i>); Pink-footed goose (<i>Anser brachyrhynchus</i>); Sandwich tern (<i>Sterna sandvicensis</i>); and Waterfowl assemblage. 	Disturbance effects due to the physical presence of vessels	<p>It is anticipated that up to one project vessel may be involved in the UXO clearance activities which does not constitute a deviation from existing baseline shipping levels in the vicinity of the MIC.</p> <p>Although the MIC is within the potential foraging range of sandwich tern and common tern (Woodward <i>et al.</i>, 2019), it does not overlap with the core foraging areas for either species (Scottish Natural Heritage, 2016). All other waterbird species, which are designated features of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA, primarily forage in coastal or terrestrial habitats and do not forage out a sea and are unlikely to be present within the MIC.</p> <p>Given that the MIC is either outside the foraging range of most qualifying species or outside the core foraging areas, it is considered there is no likelihood of undermining the conservation objectives of the SPA and therefore no potential for LSE. Consequently, this site is screened out for further consideration.</p>	Screened out
Moray Firth SAC (Scotland)	90	<ul style="list-style-type: none"> Bottlenose dolphin. 	Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process	<p>Although the Moray Firth SAC is located more than 90 km from the MIC, there are known to be wide ranging coastal movements of bottlenose dolphin, including a southward migration toward the Firth of Forth and Berwick-upon-Tweed (Hague, Sinclair, & Sparling, 2020; Arso-Civil, <i>et al.</i>, 2021). As mentioned in Chapter 10 – Marine Mammals of the EGL2 Marine Scheme Environmental Appraisal (AECOM, 2022a), the range of the bottlenose dolphin population has extended south beyond the boundary of the Moray Firth SAC, and animals considered to be connected with the SAC have been observed off the Yorkshire coast.</p> <p>Consequently, there is potential for LSE on the bottlenose dolphin population of the Moray Firth SAC which may be present within the MIC. Therefore, bottlenose dolphin as a qualifying feature of the Moray Firth SAC is considered for determination of AEoSI in Section 7.3.2.</p>	Screened in
SCOTLAND/ENGLAND (CROSS-BORDER)					
Berwickshire and North Northumberland Coast SAC (Scotland / England)	37	<ul style="list-style-type: none"> Grey seal 	Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process	There is a potential for grey seal to be affected by underwater sound resulting from the UXO clearance activities. Grey seals forage in the open sea, regularly returning to land to rest, moult and breed (SCOS, 2024). Although grey seal SACs are designated to protect important breeding populations of the species, during a period when they are generally constrained to remain <20 km from their breeding sites, grey seals are capable of foraging far from their haul-out sites, with evidence showing they can travel over 100 km offshore for durations up to 30 days. Additional tracking data also indicates that some individuals feed several hundred kilometres from land	Screened in



EUROPEAN SITE	DISTANCE (km)	RELEVANT QUALIFYING FEATURES	IMPACT PATHWAY	LSE ASSESSMENT	SCREENING DECISION
<p>(Carter <i>et al.</i>, 2022). Even when assessment adopts the most precautionary EDR approach for an unplanned/accidental HOD event, there is no overlap between a 20 km EDR at the closest point of proximity of the MIC and the boundary of the SAC, therefore there is no likelihood of undermining the conservation objectives of the SAC and no potential for LSE.</p> <p>Although the intervening distance indicates no LSE on grey seals of the Berwickshire and North Northumberland Coast SAC as a result of underwater sound associated with UXO clearance activities, at the request of Natural England this site is taken forward for determination of AEoSI in Section 7.3.3.</p>					
ENGLAND					
Flamborough Head SAC (England)	<1	<ul style="list-style-type: none"> Reefs 	Habitat loss due to temporary seabed disturbance	<p>For this site, reefs are the only potentially relevant feature, owing to the nearshore characteristics of the other designated features, as per the site designation and conservation advice package (Natural England, 2012).</p> <p>It is anticipated that approximately 20 UXOs may be present within the MIC located in English Waters. Of these, 19 are expected to be cleared using LOD, with one unplanned/accidental HOD allowed for as contingency. However, no cUXO have been identified during the TI campaign in the nearshore areas close to the English landfall and the Flamborough Head SAC. On this basis, it is highly unlikely for there to be a realistic likely pathway between UXO clearance operations and reef features of this SAC. In the unlikely event that unexpected UXO clearance was required adjacent to the SAC, the intervening distance – whilst relatively limited – would be adequate to ensure no physical damage to ‘reefs’ directly, with indirect effects considered ecologically inconsequential and impossible to discern, given the isolated nature of temporary sediment disturbance.</p> <p>Consequently, it is unlikely that the qualifying features of the Flamborough Head SAC will be subject to temporary habitat/seabed disturbance due to the UXO clearance activities that could undermine the conservation objectives of the SAC. There is therefore no potential for LSE. As such the SAC is screened out of further consideration.</p>	Screened out
Flamborough and Filey Coast SPA (England)	2	<ul style="list-style-type: none"> Northern gannet (<i>Morus bassanus</i>); Common guillemot (<i>Uria aalge</i>) Black-legged kittiwake (<i>Rissa tridactyla</i>); Razorbill (<i>Alca torda</i>); and Seabird assemblage. 	Disturbance effects due to the physical presence of vessels	It is anticipated that one project vessel may be involved in the UXO clearance activities over a period of 90-days in the summer months, depending on weather conditions. Due to the proximity of the MIC to this site, potential for LSE cannot be excluded and as such it has been taken forward for determination of AEoSI in Section 7.3.4.	Screened in
Greater Wash SPA (England)	4	<ul style="list-style-type: none"> Red-throated diver (<i>Gavia stellata</i>); Little gull (<i>Hydrocoloeus minutus</i>); Common scoter (<i>Melanitta nigra</i>); Sandwich tern (<i>Sterna sandvicensis</i>); and Common tern (<i>Sterna hirundo</i>). 	Disturbance effects due to the physical presence of vessels	It is anticipated that one project vessel may be involved in the UXO clearance activities over a period of 90-days in the summer months, depending on weather conditions. Due to the proximity of the MIC to this site, potential for LSE cannot be excluded and as such it has been taken forward for determination of AEoSI in Section 7.3.5.	Screened in
Southern North Sea SAC (England)	19	<ul style="list-style-type: none"> Harbour porpoise. 	Physical injury and/or disturbance as a result of the underwater sound	The Southern North Sea SAC is designated for harbour porpoise as the qualifying feature. This species is highly sensitive to underwater sound and activities such as UXO clearance, particularly HOD, can generate impulsive sound, which has the potential to disturb marine mammals that are present within close proximity.	Screened out



EUROPEAN SITE	DISTANCE (km)	RELEVANT QUALIFYING FEATURES	IMPACT PATHWAY	LSE ASSESSMENT	SCREENING DECISION
			<p>produced during the UXO clearance process</p>	<p>Based on updated guidance provided by JNCC (2025b) the EDRs for harbour porpoise in response to UXO clearance activities are:</p> <ul style="list-style-type: none"> • 5 km for LOD; and • 20 km for HOD. <p>The MIC is located approximately 19 km from the eastern boundary of the Southern North Sea SAC. As outlined in Section 3.2.2 the Applicant is committed to using LOD as the primary UXO clearance method, with HOD only assessed as a contingency to cover the risk of unplanned/accidental event. Therefore, HOD is not anticipated, and the likelihood of spatial overlap between an unplanned/accidental HOD event and the Southern North Sea SAC would require an accidental/unplanned HOD event to occur where the MIC is closest to the SAC.</p> <p>Therefore, there is a negligible potential for underwater sound from UXO clearance to undermine the conservation objectives of the Southern North Sea SAC, even under a precautionary worst-case scenario involving HOD. In line with the precautionary approach and the updated JNCC guidance (2025b), therefore there is considered to be no potential for LSE and the Southern North Sea SAC is screened out.</p>	
<p>Humber Estuary SAC (England)</p>	<p>35</p>	<ul style="list-style-type: none"> • Grey seal. 	<p>Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process</p>	<p>There is a potential for grey seal to be affected by underwater sound as a result of the UXO clearance activities. Grey seals forage in the open sea, regularly returning to land to rest, moult and breed (SCOS, 2024). Although grey seal SACs are designated to protect important breeding populations of the species, during a period when they are generally constrained to remain <20 km from their breeding sites, grey seals are capable of foraging far from their haul-out sites, with evidence showing they can travel over 100 km offshore for durations up to 30 days. Additional tracking data also indicates that some individuals feed several hundred kilometres from land (Carter <i>et al.</i>, 2022). Even basing an assessment on the most precautionary EDR approach for a HOD event, there is no overlap between a 20 km EDR at the closest point of proximity of the MIC and the boundary of the SAC, therefore there is no likelihood of undermining the conservation objectives of the SAC and therefore no potential for LSE.</p> <p>Although the intervening distance indicates no LSE on grey seal of the Humber Estuary SAC as a result of UXO clearance activities, at the request of Natural England this site is taken forward for determination of AEoSI in Section 7.3.6.</p>	<p>Screened in</p>
<p>The Wash and North Norfolk Coast SAC</p>	<p>108</p>	<ul style="list-style-type: none"> • Harbour seal 	<p>Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process</p>	<p>Harbour seals usually stay within 50 km of the shore (Russell, Jones, & Morris, 2017; Russell & McConnell, 2014). When assessment adopts the most precautionary EDR approach for an unplanned/accidental HOD event, there is no overlap between a 20 km EDR at the closest point of proximity of the MIC and the boundary of the SAC, therefore there is no likelihood of undermining the conservation objectives of the SAC and no potential for LSE.</p> <p>Although the intervening distance indicates no LSE on the harbour seals of The Wash and North Norfolk Coast SAC as a result of UXO clearance activities, at the request of Natural England this site is taken forward for determination of AEoSI in Section 7.3.7.</p>	<p>Screened in</p>



7.2.3 Conclusion of LSE Screening

Following the LSE screening above, seven designated sites have been taken forward to the determination of AEoSI (Table 7-5).

Table 7-5 LSE screening conclusions

DESIGNATED SITE SCREENED IN FOR DETERMINATION OF AEOSI	QUALIFYING FEATURES FOR WHICH LSE COULD NOT BE EXCLUDED	IMPACT PATHWAY
SCOTLAND		
Buchan Ness to Collieston Coast SPA	<ul style="list-style-type: none"> Northern fulmar Black-legged kittiwake Common guillemot European shag Herring gull Seabird assemblage. 	<ul style="list-style-type: none"> Disturbance effects due to the physical presence of vessels
Moray Firth SAC	<ul style="list-style-type: none"> Bottlenose dolphin 	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process
SCOTLAND/ENGLAND (CROSS-BORDER)		
Berwickshire and North Northumberland Coast SAC	<ul style="list-style-type: none"> Grey seal 	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process
ENGLAND		
Flamborough and Filey Coast SPA	<ul style="list-style-type: none"> Northern gannet Common guillemot Black-legged kittiwake Razorbill Seabird assemblage. 	<ul style="list-style-type: none"> Disturbance effects due to the physical presence of vessels
Greater Wash SPA	<ul style="list-style-type: none"> Red-throated diver Little gull Common scoter Sandwich tern Common tern 	<ul style="list-style-type: none"> Disturbance effects due to the physical presence of vessels
Humber Estuary SAC	<ul style="list-style-type: none"> Grey seal 	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process



DESIGNATED SITE SCREENED IN FOR DETERMINATION OF AEOSI	QUALIFYING FEATURES FOR WHICH LSE COULD NOT BE EXCLUDED	IMPACT PATHWAY
The Wash and North Norfolk Coast SAC	<ul style="list-style-type: none"> • Harbour seal 	<ul style="list-style-type: none"> • Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process

7.3 Determination of AEoSI

7.3.1 Buchan Ness to Collieston Coast SPA - Scotland

The Buchan Ness to Collieston Coast SPA, on the east coast of Aberdeenshire, has been designated to protect five species of breeding seabirds, a seabird breeding assemblage and their supporting habitats. Buchan Ness and Collieston Coast SPA protects nationally important numbers of seabirds during the breeding season including kittiwake (around 6.2% of the Great Britain (GB) population), guillemot (around 1.2% of the GB population), herring gull (around 2.7% of the GB population), shag (around 2.7% of the GB population), and fulmar (around 0.3% of the GB population). It also serves to protect important waters immediately surrounding the seabird breeding colony, which birds use for resting, preening and other maintenance activities; important cliff habitats where the seabird protected features can nest; and waters with rich marine habitats, including important shelf waters with areas of high productivity, that support a diversity of pelagic and demersal fish, bivalve molluscs, gastropods and crustaceans where the seabirds can feed (NatureScot, 2024).

The qualifying features of Buchan Ness to Collieston Coast SPA are:

- Kittiwake (breeding);
- Common guillemot (breeding);
- European shag (breeding);
- Herring gull (breeding);
- Northern fulmar (breeding); and
- The seabird assemblage (breeding).

The relevant conservation objectives of the Buchan Ness to Collieston Coast SPA are to ensure that the qualifying features are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status. To ensure that the integrity of the Buchan Ness to Collieston Coast SPA is restored in the context of environmental changes by ensuring that:

- The populations of the qualifying features are viable components of the Buchan Ness to Collieston Coast SPA; and
- The distribution of the qualifying features is maintained throughout the site by avoiding significant disturbance of the species.

Assessment of AEoSI: disturbance effects due to the physical presence of vessels

LSE could not be excluded for disturbance of breeding seabird (species and assemblage) and qualifying features from Buchan Ness to Collieston Coast SPA, due to the physical presence of vessels.

The MIC overlaps with Buchan Ness to Collieston Coast SPA, where the designated species breed in the summer months. Therefore, there may be temporal overlap between the breeding seasons of the bird species and the UXO clearance activities.



Seabirds are considered most vulnerable to potential disturbance from vessels during the breeding season as the time spend away from breeding colonies needs to be optimised for energy expenditure and foraging. Seabirds breeding at Buchan Ness and Collieston Coast SPA are likely to occur within the MIC, and could be disturbed due to the presence of vessels. The likelihood of any significant effect will decrease with increasing distance from the SPA.

However, disturbance from the vessel, lighting, or noise is expected to be of a negligible magnitude, i.e., reversible and of a short duration. The works are anticipated to last up to 90 days and are likely to take place during the summer months (Section 3.2.7), throughout the whole MIC and not solely within the SPA, with the UXO clearance activities undertaken using one stationary or slow-moving vessel within the MIC.

As detailed within Section 3.2.6, a number of embedded mitigation measures have been adopted to limit potential vessel disturbance to seabird species. These measures include the adherence to the SMWWC, and directional vessel lighting during periods of darkness to be limited within the requirements for safe operations. Furthermore, the vessel required for UXO clearance activities will not constitute a deviation to baseline levels of shipping in the vicinity of the MIC, particularly given the proximity of the designated site to the Peterhead Harbour area.

The conservation and management advice for the site states that pressures associated with boat use during commercial activities can be mitigated through:

- Following the SMWWC;
- Seasonal restrictions to avoid sensitive time periods for those protected features most susceptible to disturbance; and/or
- Production of vessel management plans associated with activities that require a marine licence. This may include agreed routes and for boats, potential seasonal speed restrictions.

Given that UXO clearance needs to occur during favourable weather conditions for safety reasons, seasonal restrictions are not appropriate for the activities. However, due to a single vessel conducting UXO clearance activities, the low operating speeds of this vessel, adherence to the SMWWC, plans for directional lighting during periods of darkness and the lack of change from baseline levels of shipping, disturbance to breeding seabirds will be negligible.

Consequently, there is considered to be no AEoSI on Buchan Ness to Collieston Coast SPA with respect to the qualifying features or the Conservation Objectives of the SPA.

7.3.2 Moray Firth SAC - Scotland

The Moray Firth SAC lies approximately 92 km from the MIC at its closest point. It is designated for the protection of bottlenose dolphins and subtidal sandbanks (NatureScot, 2024). Classified in 2005, the site covers 151,274 hectares (ha) and supports the only known resident population of bottlenose dolphins in the North Sea (JNCC, 2024a). The Moray Firth SAC has an estimated population of around 226 individuals across the east coast of Scotland (Cheney *et al.*, 2024). The bottlenose dolphin qualifying feature of the Moray Firth SAC is currently in favourable, maintained condition. During the LSE Screening (Section 7.2) it was concluded that there is no LSE on the subtidal sandbanks feature, therefore only the bottlenose dolphin qualifying features is taken forward for determination of AEoSI.

The conservation objectives for the Moray Firth SAC and its qualifying features are as follows:

1. To ensure that the qualifying features of the Moray Firth SAC are in favourable conditions and make an appropriate contribution to achieving Favourable Conservation Status; and
2. To ensure that the integrity of the Moray Firth SAC is maintained or restored in the context of environmental changes by meeting the following objective for the bottlenose dolphin qualifying feature:
 - a. The population of bottlenose dolphin is a viable component of the site;



- b. The distribution of bottlenose dolphin throughout the site is maintained by avoiding significant disturbance; and
- c. The supporting habitats and processes relevant to bottlenose dolphin and the availability of prey for bottlenose dolphin are maintained.

There will be no UXO clearance activity within the SAC itself, i.e. no LSE from physical disturbance of the seabed, or from disturbance from the single UXO Clearance vessel, which will be within baseline levels of shipping in the MIC. Therefore, there is considered to be no AEOsI on the habitats and processes that support bottlenose dolphin and on the availability of prey, thus conservation objectives 2b and 2c are not considered relevant to the assessment of AEOsI.

Assessment of AEOsI

As concluded in Section 7.2.3, there is potential LSE to the bottlenose dolphin qualifying feature of the Moray Firth SAC as a result of physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.

Specifically, there is potential for the following impacts from underwater sound:

- Auditory injury (PTS) from underwater sound during UXO clearance activities; and
- Disturbance (TTS) resulting from the underwater sound associated with the clearance of UXO.

The section below considers the potential for an AEOsI on the Moray Firth SAC from the two impacts listed above. In determining the potential for an AEOsI, specific reference is made to the Conservation Objectives of the Moray Firth SAC.

Risk of injury (PTS) and disturbance (TTS) to the Moray Firth bottlenose dolphin population

Exposure to underwater sound from UXO clearance activities can result in a range of effects on marine mammals, including physical injury or mortality, changes in hearing thresholds (either permanent or temporary), masking of biologically important sounds, and behavioural disturbances. A detailed assessment of underwater sound impacts on cetaceans is provided in Section 6.5. A summary of the data used to inform this assessment in relation to underwater sound from UXO clearance is presented in Table 7-6.

This assessment is based on worst-case scenarios for LOD and unplanned/accidental HOD, using the underwater sound assessment predicted impact radii for HF cetaceans, as well as suggested EDRs (JNCC, 2025b). Table 7-6 presents the estimated number of bottlenose dolphin from the Moray Firth SAC population that may potentially be impacted using the highest modelled TNT_{eq} of 795 kg and the 0.25 kg TNT_{eq} LOD charge weight, and the EDRs from JNCC guidance (2025b). As previously mentioned, the underwater sound modelling was undertaken based on the worst-case scenario for maximum predicted unmitigated impact ranges. In a precautionary manner, it is assumed that any bottlenose dolphin experiencing auditory injury (PTS) or disturbance (considering either TTS as a proxy for disturbance, or the EDR approach) is part of the Moray Firth SAC population.



Table 7-6 Estimated number of bottlenose dolphins from the Moray Firth SAC potentially impacted based on PTS and TTS criteria using LOD and a contingency for a single unplanned/accidental HOD event (JNCC, 2025b)

SPECIES DENSITY (D; IND/km ²);	EVENT	IMPACT (RADIUS OF IMPACT; km)	SCENARIO	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED*	% OF SAC POP.	
Bottlenose dolphin D = 0.699 Moray Firth SAC population estimate = 226 (Cheney <i>et al.</i> , 2024)	LOD	PTS (0.13)	Single LOD	0.012	<0.001	<0.0001	
			Scotland	0.19	<0.01	<0.01	
			England	0.25	<0.01	<0.01	
		TTS (0.24)	Single LOD	0.043	<0.01	<0.01	
			Scotland	0.7	<0.1	<0.1	
			England	0.9	<0.1	<0.1	
	HOD	EDR (5.0)	Single LOD	78.5	4	1.46	
			Scotland	1,178.1	50	21.8	
			England	1,570.8	66	29.1	
		PTS (0.89)	Single HOD	0.59	<0.1	<0.1	
			TTS (1.64)	Single HOD	2.02	<0.1	<0.1
				EDR (20.0)	Single HOD	1,257	53

Using the worst-case scenario for the underwater sound assessment, it is predicted that less than one individual (<0.01% of the SAC population) of the Moray Firth SAC bottlenose dolphin abundance could experience PTS, and less than one individual (<0.01% of the SAC population) could experience TTS (as a proxy for disturbance) in Scottish and English waters. Based on the EDR approach for LOD derived for harbour porpoise, approximately 50 individuals (21.8% of the SAC population) in Scottish waters, and 66 individuals (29.1% of the SAC population) in English waters could be disturbed by LOD, but it should be noted that bottlenose dolphin are considered less susceptible to disturbance than porpoises, so this is likely a large overestimate and TTS is a better representation of behavioural disturbance for bottlenose dolphins.

In the case of an unplanned/accidental HOD, less than one individual (<0.1% of the SAC population) could experience PTS and two individuals could experience TTS (<0.1% of the SAC population). When considering the highly precautionary EDR impact range for HOD up to 23.3% of the SAC population would experience disturbance.

The values presented in Table 7-6 present a conservative scenario and illustrates the benefits of selecting LOD as the clearance method. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed and aims to reduce the numbers of individuals that will be at risk from PTS and TTS through the implementation of MMObs and PAM protocols as outlined in the JNCC (2025) guidelines, and the use of ADD (details in Table 3-1). As a result, the risk of auditory injury will be reduced to ALARP, i.e., to negligible levels, with only a minimal residual risk.

Based on the information in Section 6.5 and above, there is no evidence to suggest that underwater sound from the UXO clearance activities would cause permanent changes to the viability of the bottlenose dolphin population of the Moray Firth SAC, nor the species' distribution within its range, which is a Conservation Objective of the SAC.



Consequently, there is considered to be no AEoSI on the Moray Firth SAC in relation to bottlenose dolphin qualifying features and the Conservation Objectives of the SAC.

7.3.3 Berwickshire and North Northumberland Coast SAC – Scotland & England

The Berwickshire and North Northumberland Coast SAC encompasses a broad and varied stretch of coastline. It is located in both Scotland and England and is characterised mainly by rocky shores, it also features several notable sediment-rich bays, including Budle Bay, Beadnell Bay, and Embleton Bay. The SAC incorporates multiple SSSIs, such as Bamburgh Coast and Hills, Burnmouth Coast, Howick to Seaton Point, Lindisfarne, Northumberland Shore, St Abb's Head to Fast Castle, and The Farne Islands. The grey seal population is considered to be in a favourable maintained condition (JNCC, 2024c).

The relevant conservation objectives of the Berwickshire and North Northumberland Coast SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

LSE screening (Section 7.2) concluded that there would be no LSE on the geomorphological (physical) features of Berwickshire and North Northumberland Coast SAC, therefore only the grey seal qualifying feature is taken forward for determination of AEoSI.

Assessment of AEoSI

Although the intervening distance indicates no LSE on grey seals of the Berwickshire and North Northumberland Coast SAC (as discussed in Table 7-4), at the request of Natural England, this site is taken forward for determination of AEoSI from underwater sound from UXO clearance activities.

Specifically, the following impacts from underwater sound have been considered further as requested:

- Auditory injury (PTS) from underwater sound during UXO clearance activities; and
- Disturbance (TTS) resulting from the underwater sound associated with the clearance of UXO.

The sections below consider the potential for an AEoSI on the Berwickshire and North Northumberland Coast SAC from the two impacts listed above.

Risk of injury (PTS) and disturbance (TTS) to grey seal qualifying feature of the Berwickshire and North Northumberland SAC

Exposure to underwater sound from UXO clearance activities can result in a range of effects on marine mammals, including physical injury or mortality, changes in hearing thresholds (either permanent or temporary), masking of biologically important sounds, and behavioural disturbances. A detailed assessment of underwater sound impacts on pinnipeds is provided in Section 6.5 A summary of the data used to inform this assessment in relation to underwater sound from UXO clearance is presented in Table 7-7.

This assessment is based on worst-case scenarios for LOD and unplanned/accidental HOD, using the underwater sound assessment predicted impact radii for grey seal, as well as the suggested EDRs (JNCC, 2025b). Table 7-7 presents the estimated number of grey seals from the Berwickshire and North Northumberland SAC population that may potentially be impacted using the highest modelled TNT_{eq} of 795 kg and the 0.25 kg TNT_{eq} LOD charge weight,



and the EDRs from JNCC guidance (2025b). As previously mentioned, the underwater sound modelling was undertaken based on the worst-case scenario for maximum predicted unmitigated impact ranges. These data assume that any grey seal affected by UXO clearance is associated with Berwickshire and North Northumberland Coast SAC.

Table 7-7 Estimated number of grey seal within the Berwickshire and North Northumberland Coast SAC potentially impacted based on PTS and TTS criteria using LOD and a contingency for a single unplanned/accidental HOD event (JNCC, 2025b)

SPECIES DENSITY (D; IND/km ²);	EVENT	IMPACT (RADIUS OF IMPACT; km)	SCENARIO*	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED*	% OF SAC POP.	
Grey seal D = 0.699 Berwickshire and North Northumberland Coast SAC population estimate = 2,668 (SCOS, 2024)	LOD	PTS (0.13)	Single LOD	0.05	<0.1	<0.01	
			Scotland	0.80	<1	<0.1	
			England	1.06	<1	<0.1	
		TTS (0.24)	Single LOD	0.18	<1	<0.01	
			Scotland	2.71	2	<1	
			England	3.56	3	<1	
	HOD	EDR (5.0)	Single LOD	78.5	55	2.1	
			Scotland	1,177.5	824	30.8	
			England	1,570.8	1,098	41.2	
		PTS (0.89)	Single HOD	2.48	2	<0.1	
			TTS (1.64)	Single HOD	8.42	6	0.22
				EDR (20.0)	Single HOD	1,257	879

* England scenario is based on 20 LODs. Scotland scenario is based on 15 LODs.

Based on the LOD approach, it is predicted that less than one grey seal (<0.01% of the SAC population) would experience PTS for all LOD scenarios. In terms of TTS (as a proxy for behavioural disturbance), three grey seals may experience disturbance (<0.1% of the SAC population) in English waters and two grey seals (<0.1% of the SAC population) may experience disturbance in Scottish waters.

Based on the EDR derived for harbour porpoise (JNCC, 2025b), 1,098 grey seals could experience disturbance (41.2% of the SAC population) based on a cumulative LOD scenario in English waters; and 824 grey seals could experience disturbance (30.8% of the SAC population) based on a cumulative LOD scenario in Scottish waters. However, note that (1) this assumes that all grey seals affected are grey seals from the Berwickshire and North Northumberland Coast SAC population, which is highly unlikely; and (2) EDRs were defined for harbour porpoises and not for grey seals, so using the EDR approach is likely to result in a large overestimate and the TTS values are more appropriate as a proxy for behavioural effects.

Considering the unplanned/accidental HOD worst-case scenario, it is predicted that 2 grey seal individuals (<0.1% of the Berwickshire and North Northumberland Coast SAC grey seal population) could experience PTS, and 6 individuals could experience TTS (equating to 0.22% of the SAC) in both English and in Scottish waters. Based on the EDR



approach for HOD, approximately 879 individuals (32.9% of the Berwickshire and North Northumberland Coast SAC population) could be disturbed in both English and in Scottish waters in this highly precautionary scenario, although as above, the EDRs are defined for harbour porpoise, and not for grey seal, therefore the TTS values are more appropriate as a proxy for behavioural effects.

The values presented in Table 7-7 presents a conservative scenario and illustrates the benefits of selecting LOD as the clearance method. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed and aims to reduce the numbers of individuals that will be at risk from PTS and TTS through the implementation of MMObs and PAM protocols as outlined in the JNCC (2025) guidelines, and the use of ADD to deter seals from injury zones (Table 3-1). As a result, the risk of auditory injury will be reduced to ALARP, i.e., to negligible levels, with only a minimal residual risk.

Grey seals are considered to be less sensitive to high-frequency sounds compared to cetaceans but can still be affected by low-frequency and mid-frequency sounds (Southall *et al.*, 20219), such as those generated from LOD. Seals generally considered unlikely to be significantly affected by short-term displacement from foraging areas caused by temporary increases in anthropogenic noise. This is due to their ability to store energy in a thick blubber layer, allowing them to tolerate fasting periods while hauled out during resting, breeding, or moulting. A single UXO clearance event per day means that any impacts will be temporary and of short duration and immediately reversible following the completion of the clearance works with any displaced seals expected to return to normal behaviour once works cease. The intervening distance between the MIC and Berwickshire and North Northumberland Coast SAC means that any effects will occur outwith the site boundary.

Based on the information in Section 6.5.2 and above, there is no evidence to suggest that underwater sound from the UXO clearance activities would cause permanent changes to the grey seal population or its distribution within Berwickshire and North Northumberland Coast SAC, which is a Conservation Objective of the SAC. Additionally, there is no indication that other factors necessary to maintain the site in favourable condition would be adversely affected.

Consequently, it is considered that there will be no AEoSI on the Berwickshire and North Northumberland Coast SAC in relation to grey seal qualifying features and the Conservation Objectives of the SAC.

7.3.4 Flamborough and Filey Coast SPA - England

The Flamborough and Filey Coast SPA straddles the border of East Yorkshire and North Yorkshire at the western coast of the North Sea. Previously known as Flamborough Head and Bempton Cliff SPA, the site was classified in 1998, after being designated as a pSPA in 1993. The site is highly protected both for its wildlife and unique chalk cliff habitats and the numerous ledges, crevices and caves provide ideal nesting and roosting sites for seabirds, supporting a colony of national and international importance, currently the largest mainland seabird colony in England. The waters adjacent to the colonies are used by large numbers of seabirds for a wide range of activities, including bathing, preening, displaying, loafing and local foraging.

The qualifying features of Flamborough and Filey Coast SPA are:

- Gannet (breeding);
- Guillemot (breeding);
- Kittiwake (breeding);
- Razorbill (breeding); and
- Seabird assemblage (breeding).

The relevant conservation objectives of Flamborough and Filey Coast SPA are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;



- The extent and distribution of the habitats of the qualifying features;
- The population of each of the qualifying features; and,
- The distribution of the qualifying features within the site.

Assessment of AEoSI: disturbance effects due to the physical presence of vessels

LSE could not be excluded for disturbance of breeding seabird (species and assemblage) and qualifying features from Flamborough and Filey Coast SPA, due to the physical presence of vessels associated with the UXO clearance activities.

The MIC is located 2 km from the Flamborough and Filey Coast SPA, where the designated species breed in the summer months. Therefore, there may be temporal overlap between the breeding seasons of the bird species and the UXO clearance activities. However, target investigation of pUXO close to the landfall has been completed, and no cUXO were found, therefore it is unlikely that UXO clearance activities will take place in proximity to the SPA.

Seabirds are considered most vulnerable to potential disturbance from vessels during the breeding season as the time spent away from breeding colonies needs to be optimised for energy expenditure and foraging. Seabirds breeding at Flamborough and Filey Coast SPA are likely to forage within the MIC, and could be disturbed due to the presence of vessels. The likelihood of any significant effect will decrease with increasing distance from the SPA.

However, disturbance from the vessel, lighting, or noise is expected to be of a negligible magnitude, i.e., reversible and of a short duration. The works are anticipated to last up to 90 days, likely during the summer months (Section 3.2.7), throughout the whole MIC and not solely within the SPA, with the UXO clearance activities undertaken using one stationary or slow-moving vessel within the MIC.

As detailed within Section 3.2.6, a number of embedded mitigation measures have been adopted to limit potential vessel disturbance to seabird species. These measures include the adherence to the Marine and Coastal Wildlife Code, and vessel lighting during periods of darkness to be limited within the limits for safe operations. Furthermore, the single additional vessel required for UXO clearance activities will be within the baseline levels of shipping within and in the vicinity of the MIC.

Given the single additional vessel required for UXO clearance activities, the low operating speed of this vessel, adherence to the Marine and Coastal Wildlife Code and the lack of change from baseline levels of shipping, disturbance to breeding seabirds will be negligible.

Consequently, there is considered to be no AEoSI on Flamborough and Filey Coast SPA with respect to the qualifying features and Conservation Objectives of the SPA.

7.3.5 Greater Wash SPA - England

The Greater Wash SPA is located off the east coast of England. It is situated in the middle of the southern North Sea and its boundary stretches from Bridlington Bay in the north to the existing boundary of the Outer Thames Estuary SPA in the south. The Greater Wash SPA was designated in 2018 to protect important areas of sea used by waterbirds during the non-breeding period, and for foraging in the breeding season.

The qualifying features of the Greater Wash SPA are:

- Common scoter (non-breeding);
- Common tern (breeding);
- Little gull (non-breeding);
- Little tern (breeding);
- Red-throated diver (non-breeding); and
- Sandwich tern (breeding).



The relevant Conservation Objectives of the Greater Wash SPA are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- The extent and distribution of the habitats of the qualifying features;
- The populations of each of the qualifying features; and
- The distribution of qualifying features within the site.

Assessment of AEOsI: disturbance effects due to the physical presence of vessels

LSE could not be excluded for disturbance of breeding and non-breeding seabird species qualifying features from the Greater Wash SPA, due to the physical presence of vessels associated with UXO clearance activities.

The MIC does not overlap with the Greater Wash SPA, although the boundary of the site lies approximately 4 km to the south of the MIC close to the English landfall. However, target investigation of pUXO close to the English landfall has been completed, and no cUXO are found, therefore it is unlikely that UXO clearance activities will take place in proximity to the boundary of the SPA.

Although seabirds are considered most vulnerable to potential disturbance from vessels during the breeding season (due to time spent away from breeding colonies being optimised for energy expenditure and foraging) for some species, disturbance during the winter period is considered critical. Although the breeding seabird qualifying features of the Greater Wash SPA (tern species) are generally coastal in their distribution, and thus unlikely to experience significant disturbance from UXO clearance activities, red-throated divers are considered highly sensitive, and could be disturbed due to vessel presence. Because the SPA is designated to protect key winter habitat for this species, the likelihood of any significant effect will decrease outside the boundary of (and with increasing distance from) the SPA.

Disturbance from the vessel, lighting, or noise is expected to be of a negligible magnitude, i.e., reversible and of a short duration. The works are anticipated to last up to 90 days within the summer months, with the UXO clearance activities undertaken using one stationary or slow-moving vessel within the MIC. Furthermore, as UXO clearance activities are proposed for the summer months, this is highly-likely to avoid the most sensitive period for red-throated diver which runs from 1 Nov – 31 March.

As detailed within Section 3.2.6, a number of embedded mitigation measures have been adopted to limit potential vessel disturbance to seabird species. These measures include the adherence to the Marine and Coastal Wildlife Code, and vessel lighting to be limited to the minimum required for safe operations. Furthermore, the additional vessel required for UXO clearance activities will be within the baseline levels of shipping.

With specific reference to red-throated diver, the Red Throated Diver Vessel Best Practice Protocol (Joint SNCB, 2022) shall be followed to minimise disturbance to Red Throated Divers, when working in proximity to the Greater Wash SPA during the non-breeding season. This includes the following measures:

- Where possible avoid works during the over winter period 1st Nov – 31st March inclusive;
- Selecting routes that avoid known aggregations of birds;
- Restricting (to the extent possible) vessel movements to existing navigation routes (where the densities of divers are typically relatively low);
- Maintaining direct transit routes (to minimise transit distances through areas used by divers);
- Avoidance of over-revving of engines (to minimise noise disturbance); and
- Briefing of vessel crew on the purpose and implications of these vessel management practices (through, for example, tool-box talks).

Given the single additional vessel required for UXO clearance activities, the low operating speeds of this vessel, adherence to the Marine and Coastal Wildlife Code and the lack of change from baseline levels of shipping, together



with red-throated diver-specific mitigation measures listed above, disturbance to seabirds, including red-throated diver, will be negligible. This approach and the resultant conclusion is consistent with the consented EGL2 Marine Scheme, and the supporting advice from NE and the MMO.

Consequently, there is considered to be no AEOsI on the Greater Wash SPA with respect to the qualifying features and Conservation Objectives of the SPA.

7.3.6 Humber Estuary SAC - England

The Humber is the UK's second-largest coastal plain estuary, covering approximately 370 km² and supporting extensive wetland and coastal habitats. On the North Lincolnshire coast, saltmarsh areas are backed by low sand dunes interspersed with marshy slacks and brackish pools. The inner estuary contains large reedbeds, while the middle and outer sections feature mature and developing saltmarsh bordered by grazing marsh (Defra, 2019). Grey seal qualifying feature of the Humber Estuary SAC are in favourable condition (Natural England, 2018a). The Humber Estuary SAC is the only grey seal SAC that is located within the Southeast England SMU.

The relevant conservation objectives of the Humber Estuary SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

LSE screening (Section 7.2) concluded that there would be no LSE on the any other qualifying feature of the Humber Estuary SAC, therefore only the grey seal qualifying feature is taken forward for determination of AEOsI.

Assessment of AEOsI:

Although the intervening distance indicates no LSE on grey seal of the Humber Estuary SAC as a result of UXO clearance activities, at the request of Natural England this site is taken forward for determination of AEOsI, for the consideration of underwater sound as a result of the UXO clearance activities, specifically:

- Auditory injury (PTS) from underwater sound during UXO clearance activities; and
- Disturbance (TTS) resulting from the underwater sound associated with the clearance of UXO.

The sections below consider the potential for an AEOsI on the Humber Estuary SAC from the two impacts listed above.

Risk of injury (PTS) and disturbance (TTS) to grey seal qualifying feature of the Humber Estuary SAC

Exposure to underwater sound from UXO clearance activities can result in a range of effects on marine mammals, including physical injury or mortality, changes in hearing thresholds (either permanent or temporary), masking of biologically important sounds, and behavioural disturbances. A detailed assessment of underwater sound impacts on pinnipeds is provided in Section 6.5. A summary of the data used to inform this assessment in relation to underwater sound from UXO clearance is presented in Table 4-1.

This assessment is based on worst-case scenarios for LOD and unplanned/accidental HOD, using the underwater sound assessment predicted impact radii for grey seal, as well as the suggested EDRs (JNCC, 2025b). Table 7-8 presents the estimated number of grey seal from the Humber Estuary SAC population that may potentially be impacted using the highest modelled TNT_{eq} of 795 kg and the 0.25 kg TNT_{eq} LOD charge weight, and the EDRs from JNCC guidance (2025b). As previously mentioned, the underwater sound modelling was undertaken based on the



worst-case scenario for maximum predicted unmitigated impact ranges. These data assume that any grey seal affected by UXO clearance are associated with Humber Estuary SAC.

Table 7-8 Estimated number of grey seals within the Humber Estuary SAC potentially impacted based on PTS and TTS criteria using LOD and a contingency for a single unplanned/accidental HOD event (JNCC, 2025b)

SPECIES DENSITY (D; IND KM ²);	EVENT	IMPACT (RADIUS OF IMPACT; KM)	SCENARIO	AREA OF IMPACT (KM ²)	INDIVIDUALS AFFECTED*	% OF SAC POP.	
Grey seal D = 0.699 Humber Estuary SAC population estimate = 2,632 (SCOS, 2024)	LOD	PTS (0.13)	Single LOD	0.05	<0.1	<0.01	
			England	1.05	<1	<0.1	
		TTS (0.24)	Single LOD	0.24	<1	<0.01	
			England	3.56	3	<1	
		EDR (5.0)	Single LOD	78.5	55	2.1	
			England	1,570.8	1,098	41.7	
	HOD	PTS (0.89)	Single HOD	2.48	2	<0.1	
			TTS (1.64)	Single HOD	8.42	6	0.23
			EDR (20.0)	Single HOD	1,257	879	33.4

Based on the LOD approach, it is predicted that less than one grey seal (0.1% of the SAC population) would experience PTS, and three grey seals (<1% of the SAC population) would experience TTS (as a proxy for behavioural disturbance). Based on the EDR derived for harbour porpoise, cumulative LOD could result in 1,098 grey seals experiencing disturbance (41.7% of the SAC population), however note that (1) this assumes that all grey seals affected in English waters are grey seals from the Humber Estuary SAC population, which is highly unlikely; and (2) grey seals are considered less susceptible to disturbance than porpoises, and the TTS values are more appropriate as a proxy for behavioural effects.

Considering the unplanned/accidental HOD worst-case scenario, it is predicted that 2 individuals and <0.1% of the Humber Estuary SAC grey seal population could experience PTS, and 6 individuals, equating to 0.23% of the SAC, could experience TTS. Based on the EDR approach for unplanned/accidental HOD, approximately 879 individuals (33.4% of the Humber Estuary SAC population) could be disturbed in this highly precautionary scenario, although as noted above the EDRs are defined for harbour porpoise, and not for grey seal, therefore the TTS values are more appropriate as a proxy for behavioural effects. .

The values presented in Table 7-8 present a conservative scenario and illustrates the benefits of selecting LOD as the clearance method. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed and aims to reduce the numbers of individuals that will be at risk from PTS and TTS through the implementation of MMObs and PAM protocols as outlined in the JNCC (2025) guidelines, and the use of ADD. As a result, the risk of auditory injury will be reduced to ALARP, i.e., to negligible levels, with only a minimal residual risk.

Grey seal are considered to be less sensitive to high-frequency sounds compared to cetaceans but can still be affected by low-frequency and mid-frequency sounds (Southall *et al.*, 20219), such as those generated from LOD. Seals are unlikely to be significantly affected by short-term displacement from foraging areas caused by temporary increases



in anthropogenic sound. This is due to their ability to store energy in a thick blubber layer, allowing them to tolerate fasting periods while hauled out during resting, breeding, or moulting. A single UXO clearance event per day means that any impacts will be temporary and of short duration (approximately one day per UXO), immediately reversible following the completion of the clearance works and any displaced seals are expected to return to normal behaviour once works cease. The distance between the MIC and Humber Estuary SAC means that any effects will occur outwith the site boundary.

Based on the information in Section 6.5.2 and above, there is no evidence to suggest that underwater sound from the UXO clearance activities would cause permanent changes to the grey seal population or its distribution within Humber Estuary SAC, which is a key Conservation Objective of the SAC. Additionally, there is no indication that other factors necessary to maintain the site in favourable condition would be adversely affected.

Consequently, it is considered that there will be no AEOsI on the Humber Estuary SAC in relation to grey seal qualifying features or the Conservation Objectives of the SAC.

7.3.7 The Wash and North Norfolk Coast SAC - England

The Wash and North Norfolk Coast SAC lies more than 100 km from the MIC. It was formally designated in 2005, covers 107,718 ha, and encompasses the UK's largest embayment and extensive intertidal and subtidal habitats, including sandbanks, mudflats, saltmarsh, and coastal lagoons (JNCC, 2024b). The Wash also includes the haul-out, breeding and foraging area of a large subpopulation of harbour seal (Marine Mammal Protected Areas Task Force, 2022). Otters are also present but are not a primary reason for designation (Natural England, 2018b).

The relevant conservation objectives of the Wash and North Norfolk Coast SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

LSE screening (Section 7.2.3) concluded that there would be no LSE on the geomorphological (physical) features of the Wash and North Norfolk Coast SAC, therefore only the harbour seal qualifying feature is taken forward for determination of AEOsI.

Assessment of Adverse Effect on Site Integrity

Although the distance (>100 km) between the MIC and the SAC indicates no LSE on harbour seal of the Wash and North Norfolk Coast SAC as a result of UXO clearance activities, at the request of Natural England this site is taken forward for determination of AEOsI, for the consideration of underwater sound as a result of the UXO clearance activities, specifically:

- Auditory injury (PTS) from underwater sound during UXO clearance activities; and
- Disturbance (TTS) resulting from the underwater sound associated with the clearance of UXO.

The sections below consider the potential for an AEOsI on the Wash and North Norfolk Coast SAC from the two impacts listed above.

Risk of injury (PTS) and disturbance (TTS) to harbour seal qualifying feature of The Wash and North Norfolk Coast SAC

Exposure to underwater sound from UXO clearance activities can result in a range of effects on marine mammals, including physical injury or mortality, changes in hearing thresholds (either permanent or temporary), masking of



biologically important sounds, and behavioural disturbances. A detailed assessment of underwater sound impacts on pinnipeds is provided in Section 6.5. A summary of the data used to inform this assessment in relation to underwater sound from UXO clearance is presented in

Table 4-1.

This assessment is based on worst-case scenarios for LOD and unplanned/accidental HOD, using the underwater sound assessment predicted impact radii for grey seal, as well as the suggested EDRs (JNCC, 2025b). Table 7-9 presents the estimated number of harbour seal from The Wash and North Norfolk Coast SAC population that may potentially be impacted using the highest modelled TNT_{eq} of 795 kg and the 0.25 kg TNT_{eq} LOD charge weight, and the EDRs from JNCC guidance (2025b). As previously mentioned, the underwater sound modelling was undertaken based on the worst-case scenario for maximum predicted unmitigated impact ranges. These data assume that any harbour seal affected by UXO clearance in English waters is associated with the Wash and North Norfolk Coast SAC. The estimated number of harbour seal within the Wash and North Norfolk Coast SAC potentially impacted from the proposed UXO clearance activities is detailed in Table 7-9.

Table 7-9 Estimated number of harbour seals within the Wash and North Norfolk Coast SAC potentially impacted based on PTS and TTS criteria using LOD and a contingency for a single unplanned/accidental HOD event (JNCC, 2025b)

SPECIES DENSITY (D; IND/km ²)	EVENT	IMPACT (RADIUS OF IMPACT; km)	SCENARIO	AREA OF IMPACT (km ²)	INDIVIDUALS AFFECTED*	% OF SAC POP.
Harbour seal D = 0.04 The Wash and North Norfolk Coast SAC population estimate = 2,675 (SCOS, 2024)	LOD	PTS (0.13)	Single LOD	0.05	<0.01	<0.0001
			England	1.05	<0.1	<0.01
		TTS (0.24)	Single LOD	0.24	<0.01	<0.0001
			England	3.56	<1	<0.1
	EDR (5.0)	Single LOD	78.5	4	0.15	
		England	1,570.8	63	2.36	
HOD	PTS (0.89)	Single HOD	2.48	<1	<0.1	
		TTS (1.64)	Single HOD	8.42	<1	<0.1
			EDR (20.0)	Single HOD	1,257	51

Based on the LOD approach, it is predicted that less than one harbour seal (<0.01% of the SAC population) would experience PTS, and less than one harbour seal (<0.1% of the SAC population) would experience TTS (as a proxy for behavioural disturbance). Based on the EDR for cumulative LOD derived for harbour porpoise, 63 harbour seals could experience disturbance (2.36% of the SAC population), however note that (1) this assumes that all harbour seals affected in English waters are harbour seals from the Wash and North Norfolk Coast SAC population; and (2) harbour seals are considered less susceptible to disturbance than porpoises, and the TTS values are more appropriate as a proxy for behavioural effects.

Considering the unplanned/accidental HOD worst-case scenario, it is predicted that less than one individual harbour seal (<0.1% of the Wash and North Norfolk Coast SAC harbour seal population) could experience PTS and TTS. Based



on the EDR approach for unplanned/accidental HOD, approximately 51 individuals (1.91% of the Humber Estuary SAC population) could be disturbed in this highly precautionary scenario, although note that the EDRs are defined for harbour porpoise, and not for harbour seal, therefore the TTS values are more appropriate as a proxy for behavioural effects. .

The values presented in Table 7-9 indicates a conservative scenario and illustrates the benefits of selecting LOD as the clearance method. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed and aims to reduce the numbers of individuals that will be at risk from PTS and TTS through the implementation of JNCC (2025) guidelines, and the use of ADD to deter seals from injury zones. As a result, the risk of auditory injury will be reduced to ALARP, i.e., to negligible levels, with only a minimal residual risk.

Although harbour seals may occur within the MIC area while foraging offshore, they typically forage within coastal regions (around 50 km from shore) (Carter *et al.*, 2022) and regularly return to land to haul out (SCOS, 2024). Given that the Wash and North Norfolk Coast SAC is located more than 100 km from the MIC, it is unlikely that a high abundance of harbour seal associated with this SAC will be present in the MIC.

Seals, in general, are less sensitive to underwater sounds than cetaceans but may be affected by low-frequency and mid-frequency sound (Southall *et al.*, 2019). Seals have substantial blubber reserves, which enables them to withstand fasting periods while hauled out during resting, breeding, or moulting. Therefore, they are less likely to be impacted by short-term displacement from foraging areas. UXO clearance activities will be short-term and temporary (approximately one day per UXO), and any displaced seals are expected to return to normal behaviour once operations cease. The distance between the MIC and the Wash and North Norfolk Coast SAC means that any effects will occur outwith the site boundary.

Based on the information in Section 6.5.2 and above, there is no evidence to suggest that underwater sound from UXO clearance would result in permanent changes to the harbour seal population or its distribution within the Wash and North Norfolk Coast SAC, which is a key conservation objective of the site. Furthermore, there is no indication that other factors essential for maintaining the SAC in favourable condition would be adversely affected.

In conclusion, there is considered to be no AEoSI on the Wash and North Norfolk Coast SAC in relation harbour seal qualifying features or the conservation objectives.

7.4 In-combination Effects

There is potential for a greater magnitude of effect from UXO clearance activities, when considering the works in combination with other plans and projects. In addition to UXO clearance activities, other activities from other developments that could also contribute to disturbance effects due to the physical presence of vessels (on seabird SPAs) and physical injury and/or disturbance as a result of the underwater sound (on marine mammal SACs) include:

- General marine construction;
- Dredging and spoil disposal;
- Seabed (e.g. geotechnical) investigations;
- Geophysical and seismic surveys;
- Seismic surveys; and
- Pile driving.

This in-combination assessment therefore focuses on the potential for significant disturbance effects on the species and sites listed above (Section 7.2).



7.4.1 In-combination project list

The SNS Activity Tracker²⁴ provides up-to-date information on current and planned noisy activities occurring within and close to the Southern North Sea SAC. It was specifically developed to support cumulative and in-combination effects assessments and is regularly updated. The MNR²⁵ records noisy anthropogenic activities that produce loud, low to medium frequency (10Hz – 10kHz) impulsive noise in UK waters. The Marine Scotland website²⁶ lists current and historical applications and licence details for projects in Scottish waters, and the MMO Marine Case Management System²⁷ (MCMS) portal catalogues marine licence applications and active licences in English waters. These portals were reviewed to identify activities that could overlap spatially and temporally with the EGL2 UXO clearance activities. A desk-based review of the projects within a 50 km radius was undertaken to identify any other developments or plans with the potential to result in in-combination effects with the UXO clearance activities (Table 7-10).

7.4.2 In-combination assessment

The in-combination assessment is provided below in Table 7-10, the assessment concludes that there is not considered to be any potential for effects resulting from the EGL2 UXO Clearance activities in combination with the other plans and projects assessed, which could result in AEoSI on the screened in European Sites (and their qualifying features or the associated conservation objectives).

²⁴ [SNS Activity Tracker w.c. 10.11.2025.xlsx](#)

²⁵ [Marine Noise Registry | Home](#)

²⁶ [Marine Scotland - Marine Licence applications](#)

²⁷ [MMO MCMS portal](#)



Table 7-10 In-combination assessment

DEVELOPMENT	DISTANCE	LICENCE NUMBER	ACTIVITY	TIMELINE	RELEVANT DESIGNATED SITE (QUALIFYING INTERESTS)	CONSIDERATION OF IN-COMBINATION AEoSI
OFFSHORE WIND FARM CONSTRUCTION						
Inch Cape Offshore Wind Farm	52.0 km	MS-00010140	Percussive pile driving of 72 offshore wind turbines.	01/12/2025 to 31/10/2026	<ul style="list-style-type: none"> Moray Firth SAC (bottlenose dolphin). 	<p>No AEoSI: Although the offshore construction of Inch Cape offshore wind farm may occur concurrently with the potential EGL2 UXO clearance activities, there is unlikely to be an in-combination adverse effect as a result of underwater sound on the bottlenose dolphin qualifying feature of the Moray Firth SAC, due to the mitigation measures implemented for both the EGL2 UXO Clearance works and at Inch Cape wind farm pile driving, required by condition of their consent. Additionally, Inch Cape wind farm lies ca. 15 km offshore, outside of core bottlenose dolphin habitat, and therefore impacts on this species will be negligible. Therefore, it is concluded that there will be no AEoSI on the Moray Firth SAC as a result of the UXO clearance works in combination with Inch Cape Offshore Wind Farm pile driving.</p>



DEVELOPMENT	DISTANCE	LICENCE NUMBER	ACTIVITY	TIMELINE	RELEVANT DESIGNATED SITE (QUALIFYING INTERESTS)	CONSIDERATION OF IN-COMBINATION AEOsI
GEOPHYSICAL SURVEYS AND UXO CLEARANCE						
Flora Offshore Wind Farm	23.1 km	EPS/BS-00010686	Geophysical/Geotechnical Surveys	01/06/2024 to 31/05/2028	<ul style="list-style-type: none"> • Moray Firth SAC (bottlenose dolphin); and • Buchan Ness to Collieston Coast SPA (seabird species and assemblage). 	<p>No AEOsI: although the proposed geophysical surveys may occur concurrently with the EGL2 UXO clearance activities, there is unlikely to be an adverse effect on any SAC or SPA as a result of disturbance due to vessel movements or auditory injury/disturbance due to underwater sound.</p> <p>All other projects are required to act in a similar manner to EGL2, with mitigation measures embedded in both the project design and as part of environmental management plans to reduce effects on protected species.</p> <p>All geophysical survey activity will take place from vessels utilising low speeds, with the implementation of mitigation measures including MMObs and PAM protocols as required by JNCC (2017), which are required by condition of their EPS licences. In addition to the short-term and temporary nature of the EGL2 proposed UXO clearance, any in-combination impacts will be limited to short-term, temporary, reversible</p>
Inch Cape Offshore Wind Farm	52.0 km	00011249	UXO clearance	01/05/2025 to 31/12/2027	<ul style="list-style-type: none"> • Moray Firth SAC (bottlenose dolphin). 	
Eastern Green Link 3	0 km	EPS/BS-00011260	Geophysical surveys, including the use of USBL.	03/08/2025 to 03/08/2026	<ul style="list-style-type: none"> • Moray Firth SAC (bottlenose dolphin); • Berwickshire and North Northumberland Coast SAC (grey seal); • Buchan Ness to Collieston Coast SPA (seabird species and assemblage); and • Flamborough and Filey Coast SPA (seabird species and assemblage). 	



DEVELOPMENT	DISTANCE	LICENCE NUMBER	ACTIVITY	TIMELINE	RELEVANT DESIGNATED SITE (QUALIFYING INTERESTS)	CONSIDERATION OF IN-COMBINATION AEoSI
Moray Firth Spittal to Peterhead	12.3 km	EPS-00010441	Geophysical and geotechnical surveys	19/08/2025 to 11/09/2025	<ul style="list-style-type: none"> • Moray Firth SAC (bottlenose dolphin); and • Buchan Ness to Collieston Coast SPA (seabird species and assemblage). 	<p>disturbance effects which will be of a negligible magnitude overall.</p> <p>Therefore, it is concluded that there will be no AEoSI on the Moray Firth SAC, Berwickshire and North Northumberland Coast SAC, Humber Estuary SAC, The Wash and North Norfolk Coast SAC or any seabird SPA, as a result of the UXO clearance works in combination with other geophysical survey activity.</p>
Eastern Green Link 5 Netherton Corridor	0 km	EPS-00011077	Geophysical, benthic and geotechnical surveys	25/07/2025 to 26/06/2030	<ul style="list-style-type: none"> • Moray Firth SAC (bottlenose dolphin); and • Buchan Ness to Collieston Coast SPA (seabird species and assemblage). 	



7.5 HRA Conclusions

A total of 10 designated sites (SACs and SPAs) were assessed for the potential of LSE. Seven designated sites for which the potential for LSE could not be ruled out were taken forward for the determination of AEOsI.

Three of these sites were SPAs for seabirds (Buchan Ness to Collieston Coast SPA, Flamborough and Filey Head SPA, Greater Wash SPA), for which there was potential LSE due to disturbance effects from physical vessel presence; and four marine mammal SACs (Berwickshire and North Northumberland Coast SAC, Humber Estuary SAC, The Wash and North Norfolk Coast SAC and the Moray Firth SAC) for which there was potential for LSE from physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.

It was concluded that there would be no AEOsI on any designated site via any impact pathway associated with UXO clearance activities in the MIC. Consideration of the effects of the EGL2 UXO Clearance works in combination with other plans or projects also resulted in a conclusion of no in-combination AEOsI on any designated site.

Consequently, no AEOsI are anticipated, either for the UXO clearance works alone or in combination with other plans or projects.

8 MARINE CONSERVATION ZONE AND MARINE PROTECTED AREA ASSESSMENT

The following Section of the report provides information which will be used to inform the MCZ and MPA Assessment process. In the absence of formal guidance from MD-LOT in relation to the assessment of Scottish MPAs during the licence decision making process, the MMO guidance (2013) for English MCZ assessments has been applied to Scottish MPAs following the MMO (2013) MCZs and marine licensing guidance. This approach is consistent to that which has been followed before for the wider EGL2 Marine Scheme and is aligned with feedback provided to EGL2 historically from MD-LOT.

8.1 Screening and Stage 1 Assessment Overview

The MCAA 2009 established provisions for managing a new network of marine designated sites known as MCZs. According to Section 126 of the Act, licensing authorities (such as the MMO) must assess whether the proposed licensable activity could significantly impact a protected feature within an MCZ, MPA, or any ecological or geomorphological process essential for the conservation of such features.

The MSA 2010 requires that any licensable marine activity in Scottish waters must be assessed for its potential impact on MPAs. Authorities cannot grant consent unless it is demonstrated that the activity will not significantly hinder the conservation objectives of the MPA.

Application of the Screening Stage for the proposed UXO clearance activities included a review of MCZs and MPAs from a wide search area, and then applying the same screening criteria as applied to SPAs and SACs as described in Table 7-3.

The MIC does not overlap with any MCZs or MPAs. The closest MCZ or MPA is located less than 1 km to the east of the MIC. Table 8-1 lists the four MCZ and two MPAs that were taken through this screening process.



Table 8-1 Screening for the MCZ and MPA assessment

SITE NAME	PROTECTED FEATURES	DISTANCE (km)	POTENTIAL IMPACT PATHWAY	CONSERVATION OBJECTIVES	LIKELIHOOD FOR POTENTIAL INTERACTION
Firth of Forth Banks Complex MPA (Scotland)	Ocean quahog aggregations (<i>Arctica islandica</i>); Offshore subtidal sands and gravels; Quaternary of Scotland; and Shelf banks and mounds	<1	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance. 	The conservation objectives of the Firth of Forth Banks Complex MPA are that the protected features: (a) so far as already in favourable condition, remain in such condition; and (b) so far as not already in favourable condition, be brought into such condition, and remain in such condition.	Screened in: all qualifying features Due to the close proximity of the MPA to the MIC (<100 metres) the site is screened in for Stage 1 assessment.
Southern Trench MPA (Scotland)	Minke whale; Burrowed mud; Fronts; Shelf deeps; Quaternary of Scotland; and Submarine mass movement.	2.0	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process; and Habitat loss due to temporary seabed disturbance. 	The conservation objectives of the Southern Trench MPA are that the protected features: (a) so far as already in favourable condition, remain in such condition; and (b) so far as not already in favourable condition, be brought into such condition, and remain in such condition.	Screened in: minke whale Although the MIC does not overlap the Southern Trench MPA, due to the potential for UXO clearance activities to occur in close proximity (<2 km) to the MPA, and the potential for impulsive underwater sound to propagate to the MPA at levels that could elicit disturbance in marine mammals, the site is screened in for Stage 1 MPA assessment. Screened out: all other qualifying features (distance) Only minor habitat disturbance is likely when implementing LOD which would result in highly localised and recoverable effects in the immediate vicinity of the UXO, with no crater formation. An unplanned/accidental HOD event results in a worst-case radius for an extremely large NEQ of 795 kg TNT _{eq} of 15.5 m (with a disturbance area of 755m ²). However, impacts will be contained within the immediate area of detonation and recoverable given the dynamic sea conditions, with sediment quickly resettling and seabed recovery. It is therefore determined that the likelihood for potential interaction exists only in close proximity (<1.5 km) to benthic ecology and physical environment features of MPAs, with this site situated beyond this impact area. As such these features of the MPA have been screened out and do not require a Stage 1 assessment.
North East of Farnes Deep MCZ / HPMA (England)	MCZ: Subtidal coarse sediment; Subtidal mixed sediments; Subtidal sand Subtidal mud; and Ocean quahog HPMA: 'The marine ecosystem of the area'	3.1	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance; and Changes in water and sediment quality due to the suspension and deposit of sediment or pollution resulting from UXO clearance 	With respect to Subtidal coarse sediment, subtidal sand, subtidal mixed sediments and subtidal mud within the North East of Farnes Deep MCZ, this means that: <ul style="list-style-type: none"> Extent is stable or increasing; and Structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating. 'High-level' conservation advice is available for HPMA's (JNCC, 2022), and in July 2023 JNCC published site-specific conservation advice for this specific HPMA (JNCC, 2023). The conservation objective for the HPMA component is as follows: (a) achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the North East of Farnes Deep Highly Protected Marine Area, to a natural state, and	Screened out: all qualifying features (distance) Only minor habitat disturbance is likely when implementing LOD which would result in highly localised and recoverable effects in the immediate vicinity of the UXO, with no crater formation. An accidental HOD event results in a worst-case radius for an extremely large NEQ of 795 kg TNT _{eq} of 15.5 m (with a disturbance area of 755m ²). However, impacts will be contained within the immediate area of detonation and recoverable given the dynamic sea conditions, with sediment quickly resettling and seabed recovery. It is therefore determined that the likelihood for potential interaction exists only in close proximity (<1.5 km) to benthic ecology and physical environment features of MCZs/HPMA's, with this site situated beyond this impact area. As such this MCZ/HPMA has been screened out and does not require a Stage 1 assessment.



SITE NAME	PROTECTED FEATURES	DISTANCE (km)	POTENTIAL IMPACT PATHWAY	CONSERVATION OBJECTIVES	LIKELIHOOD FOR POTENTIAL INTERACTION
				(b) prevent further degradation and damage to the protected feature, subject to natural change.	
Farnes East MCZ (England)	Moderate energy circalittoral rock; Subtidal coarse sediment; Subtidal mixed sediments; Subtidal sand; Subtidal mud; Sea-pen and burrowing megafauna communities; and Ocean quahog	4.9	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance 	<p>Subject to natural change, the moderate energy circalittoral rock, subtidal coarse sediment, subtidal sand, subtidal mud, subtidal sediment, subtidal mixed sediments and sea-pen and burrowing megafauna communities' features are to remain in or be brought into favourable condition, such that their:</p> <ul style="list-style-type: none"> Extent is stable or increasing; and Structures and functions, quality, and the composition of their characteristic biological communities are such as to ensure that they are in a condition where they are not deteriorating. <p>Subject to natural change, the ocean quahog feature is to recover to favourable condition, such that:</p> <ul style="list-style-type: none"> The quality and extent of its habitat is stable or increasing; and The population structure allows numbers to be maintained. 	<p>Screened out: all qualifying features (distance)</p> <p>Only minor habitat disturbance is likely when implementing LOD which would result in highly localised and recoverable effects in the immediate vicinity of the UXO, with no crater formation. An unplanned/accidental HOD event results in a worst-case radius for an extremely large NEQ of 795 kg TNT_{eq} of 15.5 m (with a disturbance area of 755 m²). However, impacts will be contained within the immediate area of detonation and recoverable given the dynamic sea conditions, with sediment quickly resettling and seabed recovery. It is therefore determined that the likelihood for potential interaction exists only in close proximity (<1.5 km) to benthic ecology and physical environment features of MCZs, with this site situated beyond this impact area. As such this MCZ has been screened out and does not require a Stage 1 assessment.</p>
Holderness Offshore MCZ (England)	Intertidal sand and muddy sand; Moderate energy circalittoral rock; High energy circalittoral rock; Subtidal coarse sediment; Subtidal mixed sediments; Subtidal sand; Subtidal mud; and Spurn head (subtidal geological feature).	5.5	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance 	<p>With respect to subtidal coarse sediment, subtidal sand and subtidal mixed sediments within the Holderness Offshore MCZ, this means that:</p> <ul style="list-style-type: none"> Its extent is stable or increasing; and Its structures and functions, its quality and the composition of its characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat) are such as to ensure that it remains in a condition which is healthy and not deteriorating. <p>With respect to the ocean quahog within the Holderness Offshore MCZ, this means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.</p>	<p>Screened out: all qualifying features (distance)</p> <p>Only minor habitat disturbance is likely when implementing LOD which would result in highly localised and recoverable effects in the immediate vicinity of the UXO, with no crater formation. An unplanned/accidental HOD event results in a worst-case radius for an extremely large NEQ of 795 kg TNT_{eq} of 15.5 m (with a disturbance area of 755 m²). However, impacts will be contained within the immediate area of detonation and recoverable given the dynamic sea conditions, with sediment quickly resettling and seabed recovery. It is therefore determined that the likelihood for potential interaction exists only in close proximity (<1.5 km) to benthic ecology and physical environment features of MCZs, with this site situated beyond this impact area. As such this MCZ has been screened out and does not require a Stage 1 assessment.</p>
Holderness Inshore MCZ (England)	North Sea glacial tunnel valleys; Ocean quahog; Subtidal coarse sediment; Subtidal mixed sediments; and Subtidal mixed sediments.	7.7	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance 	<p>The conservation objective of the Holderness Inshore MCZ is that the protected features:</p> <ul style="list-style-type: none"> So far as already in favourable condition, remain in such condition; and So far as not already in favourable condition, be brought into such condition, and remain in such condition. 	<p>Screened out: all qualifying features (distance)</p> <p>Only minor habitat disturbance is likely when implementing LOD which would result in highly localised and recoverable effects in the immediate vicinity of the UXO, with no crater formation. An unplanned/accidental HOD event results in a worst-case radius for an extremely large NEQ of 795 kg TNT_{eq} of 15.5 m (with a disturbance area of 754.8m²). However, impacts will be contained within the immediate area of detonation and recoverable given the dynamic sea conditions, with sediment quickly resettling and seabed recovery. It is therefore determined that the likelihood for potential interaction exists only in close proximity (<1.5 km) to benthic ecology and physical environment features of MCZs, with this site situated beyond this impact area. As such this MCZ has been screened out and does not require a Stage 1 assessment.</p>



8.1.1 Outcome of screening for MCZ and MPA Assessment

The Firth of Forth Banks Complex MPA is designated for ocean quahog aggregations, as well as offshore subtidal sands and gravels, quaternary of Scotland, and shelf banks and mounds. The MPA is located <100 m from the MIC. Due to the potential for localised seabed habitat loss due to UXO clearance in close proximity to the Firth of Forth Banks Complex MPA, this site has been taken forward for Stage 1 MPA Assessment.

Minke whale are the only marine mammal qualifying feature of any MPA considered in the screening (Table 8-1). Minke whale is a qualifying feature of the Southern Trench MPA, approximately 2 km from the MIC. As underwater sound can propagate over large distances underwater, it is possible that UXO clearance in close proximity to the Southern Trench MPA could affect minke whales in the site, and the Southern Trench MPA has been taken forward for Stage 1 MPA Assessment.

There is no significant risk of the UXO clearance activities hindering achievement of the conservation objectives of any MCZ (or HPMA) in English waters (other than insignificantly). Consequently, all MCZ sites included in the screening (Table 8-1) have been screened out of the MCZ assessment and do not require a Stage 1 assessment.

8.2 Stage 1 MPA Assessment

8.2.1 Firth of Forth Banks Complex MPA

The Firth of Forth Banks Complex MPA is a large offshore NCMPA in the North Sea, designated in 2014 to protect sand and gravel sea banks and their associated biodiversity. It is situated off southeast Scotland, in the outer Firth of Forth, and covers around 2,130 km² and includes the Berwick, Scalp, Wee Bankie, and Montrose Banks.

The Firth of Forth Banks Complex MPA is designated for the conservation of ocean quahog, a long-lived bivalve mollusc; and several geomorphological features. It is considered an important fish spawning ground, and it represents an important foraging ground for seabirds and seals.

The MPA lies <100 m from the MIC. In spite of this close proximity, there is no likelihood of an effect (other than insignificant) on this site, due to the use of LOD clearance methods which generate minimal seabed disturbance and sediment plume (see Table 5-1). In the event of an accidental or unplanned HOD event occurring at the closest point to the MPA, the impact on the seabed (crater) that would be produced would not overlap with the MPA, although the resulting sediment plume would be greater than for LOD. Nonetheless, the majority of suspended sediment would settle rapidly out of suspension, and any residual fines in suspension which may reach the boundary of the MPA would have negligible impacts on the features of the site. Note that this would also require the unplanned/accidental HOD of a UXO at the closest point between the MPA and the MIC, and impacts would be reduced further with increasing distance from that closest point.

It is therefore considered that any physical effects arising from UXO clearance are not capable of affecting (other than insignificantly) any qualifying feature of the Firth of Forth Banks Complex MPA, and will not hinder the conservation objectives of the site.

8.2.2 Southern Trench MPA

For the Southern Trench MPA, the screening assessment above has screened in the potential impacts from underwater sound generated by UXO clearance activities to affect minke whale qualifying features of the MPA. No other qualifying features or impacts have been taken forward to the Stage 1 MPA assessment.



The Southern Trench MPA provides a key seasonal feeding ground for minke whale from spring to autumn, where the whales feed on fish species, such as sandeel, herring, and mackerel. The MPA consistently supports minke whale densities that are higher than average observed throughout Scottish waters (NatureScot, 2025). Figure 8-1 illustrates the modelled persistence of minke whales within and around the Southern Trench MPA. The highest densities occur within the Moray Firth, in the northern extent of the MPA (i.e., not close to the southern extent of the site which is at closer proximity to the MIC), and densities are low within the MIC.

UXO clearance will produce underwater sound that may cause physiological (PTS) and disturbance (TTS) to marine mammals. A marine mammal assessment for individual species was conducted and presented in Section 6.5.

Under a worst-case scenario, the UXO clearance involves an accidental/unplanned HOD of an extremely large charge size of 795 kg of TNT_{eq} (Table 4-1). Based on the underwater sound modelling undertaken, the predicted impact range is approximately 1 km for injury and up to 1.8 km for disturbance (using TTS as a proxy). The injury range will not overlap with the MPA, although the range of disturbance could overlap with the MPA if the highly precautionary EDR approach is used.

The Southern Trench MPA lies approximately 2 km from the MIC in nearshore waters. This distance exceeds both the PTS and TTS thresholds (Table 4-1), indicating that minke whales within the MPA boundary are unlikely to experience auditory injury or significant disturbance from the UXO clearance activities. Nevertheless, the EDRs derived for harbour porpoise (and applied in a precautionary manner to minke whales in this assessment) for both LOD and HOD do overlap with the site boundary, where UXO clearance may occur close to the Southern Trench MPA. Note that the greatest area of overlap would require the unplanned/accidental HOD of a UXO at the closest point between the MPA and the MIC, and impacts on the MPA would be reduced further with increasing distance from that closest point.

As mentioned previously, the underwater sound modelling results are based on a highly precautionous, worst-case scenario. LOD is the only method of UXO clearance, with a likely charge size of 0.25 kg. A UXO-specific MMMP (Appendix A; A-100744-S07-A-TECH-001) has been developed and aims to reduce the numbers of individuals that will be at risk from PTS and TTS through the implementation of MMObs and PAM protocols as outlined in the JNCC (2025) guidelines, and the use of ADD (details in Table 3-1). As a result, the risk of auditory injury to minke whales will be reduced ALARP, i.e., to negligible levels, with only a minimal residual risk.

It is therefore considered that any effects of underwater sound originating from UXO clearance are not capable of affecting (other than insignificantly) the minke whale (or any other) feature of the Southern Trench MPA, and will not hinder the conservation objectives of the site.

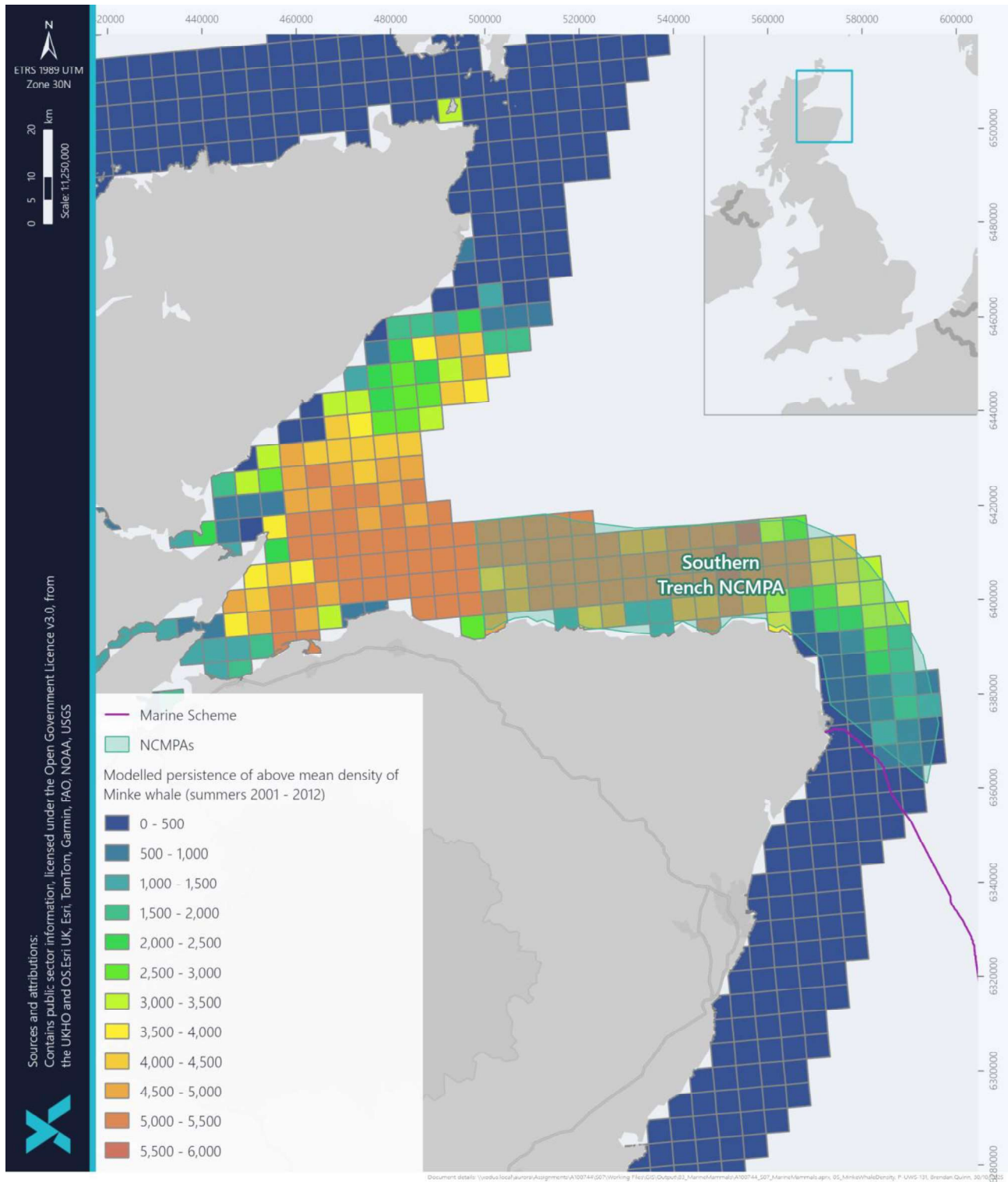


Figure 8-1 Relative persistence (numbers represent the relative metric, and not numbers of minke whales) of above-mean density of minke whale in and around the Southern Trench MPA (from Paxton et al., 2014)



8.3 MPA Cumulative assessment

The UXO clearance works is not capable of affecting (other than insignificantly) the features of any MCZ/HPMA in English waters. Furthermore, the intervening distance between the MIC and any MCZ/HPMA in English waters is so great that there will be no discernible change to features of those sites as a result of UXO clearance works. Nonetheless, in a precautionary manner, other third-party activities (i.e., planned, potential or proposed projects and developments) which are adjacent to/in the vicinity of MCZs/HPMAs were reviewed, where potential impact pathways were similar to those assessed for UXO clearance in the MIC, and this did not change the conclusions. Therefore, there will be no cumulative effects on any MCZ (including HPMAs).

The projects in Table 8-2 overlap (or take place in close proximity to) the two MPAs in Scottish waters which were screened in for the project-alone Stage 1 MPA assessment. An assessment of effects for the UXO clearance works cumulatively with these projects is provided within this table.

8.3.1 Conclusions

The UXO clearance activities will occur wholly within the MIC and not inside the Southern Trench MPA or the Firth of Forth Banks Complex MPA. Given the minimal overlap between either physical environmental effects or underwater sound effects, and the short-term nature of UXO clearance, any cumulative effects with any other projects are highly unlikely, particularly given the embedded mitigations already in place for the EGL2 UXO clearance works (Table 3-1). Additionally, each project considered in Table 8-2 will have developed their own mitigation measures, which will further reduce the potential for adverse effects on either the Southern Trench MPA or the Firth of Forth Banks Complex MPA and their respective qualifying features.

It is therefore concluded that the UXO clearance activities, both alone and cumulatively with other projects, is not capable of affecting (other than insignificantly) the qualifying features of any MPA, or hindering its conservation objectives.

8.4 MPA/MCZ Assessment Summary and Conclusions

Scottish MPAs and English MCZs (including HPMAs) were screened based on the likelihood that the UXO clearance activities could have an impact on each designated site in close proximity to the MIC. Following a screening assessment, only two sites were taken forward for Stage 1 MPA Assessment: the Firth of Forth Banks Complex MPA, and the Southern Trench MPA.

Having considered the relevant impact pathways capable of interacting with those sites, it was concluded that the UXO clearance activities alone was not capable of hindering the conservation objectives of either site. Taking into consideration other projects cumulatively, it was also concluded that there would be no hindrance to achieving the conservation objectives of the sites as a result of the proposed UXO clearance works.



Table 8-2 MPA Assessment cumulative projects list

DEVELOPMENT	LICENCE NUMBER	DISTANCE	ACTIVITY	TIMELINE	SPECIES/PROTECTED SITE	POTENTIAL FOR CUMULATIVE EFFECTS
Inch Cape Offshore Wind Farm	MS-00010140	52.0 km	Percussive pile driving of 72 offshore wind turbines.	01/12/2025 to 31/10/2026	<ul style="list-style-type: none"> Firth of Forth Banks Complex MPA (ocean quahog; geomorphological features) 	No potential for cumulative effects (other than insignificant): although the Inch Cape Offshore Wind Farm lies <2 km from the boundary of the Firth of Forth Banks Complex MPA, there is no direct overlap; therefore, the intervening distance means that effects of turbine foundation pile driving or UXO clearance will be insignificant on ocean quahog (not sensitive to high amplitude underwater sound) or any other geomorphological feature of the site.
Inch Cape Offshore Wind Farm	00011249	52.0 km	UXO clearance	01/05/2025 to 31/12/2027	<ul style="list-style-type: none"> Firth of Forth Banks Complex MPA (ocean quahog; geomorphological features) 	Therefore, it is concluded that the UXO clearance activities cumulatively with pre-construction and construction works at Inch Cape Offshore Wind Farm, are not capable of affecting (other than insignificantly) the features of the Firth of Forth Banks Complex MPA.
Flora Offshore Wind Farm	EPS/BS-00010686	23.1 km	Geophysical/ Geotechnical Surveys	01/06/2024 to 31/05/2028	<ul style="list-style-type: none"> Southern Trench MPA (minke whale). 	No potential for cumulative effects (other than insignificant): although the proposed geophysical surveys may occur concurrently with the EGL2 UXO clearance activities, there is unlikely to be an adverse effect on either Southern Trench MPA or Firth of Forth Banks Complex MPA as a result of disturbance
Eastern Green Link 3	EPS/BS-00011260	0 km	Geophysical surveys	03/08/2025 to 03/08/2026	<ul style="list-style-type: none"> Southern Trench MPA (minke whale). 	



DEVELOPMENT	LICENCE NUMBER	DISTANCE	ACTIVITY	TIMELINE	SPECIES/PROTECTED SITE	POTENTIAL FOR CUMULATIVE EFFECTS
Moray Firth Spittal to Peterhead	EPS-00010441	12.3 km	Geophysical and geotechnical surveys	19/08/2025 to 11/09/2025	<ul style="list-style-type: none"> Southern Trench MPA (minke whale). 	<p>of the seabed, or injury/disturbance due to underwater sound.</p> <p>All other projects are required to act in a similar manner to EGL2, with mitigation measures embedded in both the project design and as part of environmental management plans to reduce effects on protected species.</p>
Eastern Green Link 5 Nethererton Corridor	EPS-00011077	0 km	Geophysical, benthic and geotechnical surveys	25/07/2025 to 26/06/2030	<ul style="list-style-type: none"> Southern Trench MPA (minke whale). 	<p>All geophysical survey plans and projects will take place from a slow-moving vessel, implementing mitigation measures including MMObs and PAM protocols as required by JNCC (2017), which are required by condition of their EPS licences. In addition to the short-term and temporary nature of the EGL2 proposed UXO clearance, any in-combination impacts will be limited to short-term, temporary, reversible disturbance effects which will be of a negligible magnitude overall.</p> <p>Therefore, it is concluded that the UXO clearance activities cumulatively with other geophysical and geotechnical surveys, is not capable of affecting (other than insignificantly) the features of any MPA, after the application of industry-standard mitigation measures.</p>



9 OVERALL CONCLUSION AND SUMMARY

This SEI report accompanies the Marine Licence applications for the UXO clearance works required to enable construction of the EGL2 Marine Scheme. Two MLAs are required – one to the Marine Directorate for activities in Scottish waters, and one to the MMO for activities in English waters. The information presented in this SEI report also supports the application for EPS licences in both Scottish territorial/offshore waters and a MWL Exemption for English waters.

The following sections provide a summary of the environmental assessment outcomes within this report.

9.1 Environmental Appraisal

A detailed Environmental Appraisal was undertaken (Section 6) for receptors that may potentially be affected from the following impact pathways due to the UXO clearance activities:

- Disturbance effects due to the physical presence of vessels;
- Temporary habitat/ seabed disturbance during UXO clearance works;
- Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance and accidental pollution events; and
- Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.

A summary of the assessment outcomes from the screened in receptors and impact pathway is detailed in Table 9-1.

Table 9-1 Summary of potential impacts from the Environmental Appraisal

RECEPTOR	IMPACT PATHWAY	ASSESSMENT OUTCOME
Physical environment (including sediment quality, water quality and marine physical processes)	<ul style="list-style-type: none"> • Temporary habitat/seabed disturbance 	No adverse significant effects.
Benthic environment	<ul style="list-style-type: none"> • Temporary habitat/seabed disturbance 	No adverse significant effects.
Fish and shellfish ecology	<ul style="list-style-type: none"> • Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No adverse significant effects.
Marine mammals	<ul style="list-style-type: none"> • Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No adverse significant effects.
Marine ornithology	<ul style="list-style-type: none"> • Disturbance due to presence of vessels 	No adverse significant effects.



9.2 HRA

Seven designated sites were taken forward to the determination of AEoSI, following a pre-screening exercise (Section 7.2.1). The following impact pathways were identified:

- Disturbance effects due to the physical presence of vessels; and
- Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process.

A summary of the determination of AEoSI is detailed in Table 9-2.

Table 9-2 Summary of potential impacts from the determination of AEoSI

DESIGNATED SITE	IMPACT PATHWAY	ASSESSMENT OUTCOME
Buchan Ness to Collieston Coast SPA	<ul style="list-style-type: none"> • Disturbance effects due to the physical presence of vessels. 	No AEoSI on Buchan Ness to Collieston Coast SPA either from the project alone or in-combination with other plans or projects with respect to the breeding seabird species and assemblage qualifying features of the site or the conservation objectives.
Moray Firth SAC	<ul style="list-style-type: none"> • Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No AEoSI is predicted for the Moray Firth SAC either from the project alone or in-combination with other plans or projects in relation to potential injury or behavioural disturbance of bottlenose dolphin as a qualifying feature or the conservation objectives.
Berwickshire and North Northumberland Coast SAC	<ul style="list-style-type: none"> • Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No AEoSI is predicted for the Berwickshire and North Northumberland Coast SAC either from the project alone or in-combination with other plans or projects in relation to potential injury or behavioural disturbance of grey seal as a qualifying feature or the conservation objectives.
Flamborough and Filey Coast SPA	<ul style="list-style-type: none"> • Disturbance effects due to the physical presence of vessels. 	No AEoSI on Flamborough and Filey Coast SPA either from the project alone or in-combination with other plans or projects with respect to the breeding seabird species and assemblage qualifying features of the site or the conservation objectives.
Greater Wash SPA	<ul style="list-style-type: none"> • Disturbance effects due to the physical presence of vessels. 	No AEoSI on the Greater Wash SPA either from the project alone or in-combination with other plans or projects with respect to the breeding and non-breeding seabird species qualifying features of the site or the conservation objectives.



DESIGNATED SITE	IMPACT PATHWAY	ASSESSMENT OUTCOME
Humber Estuary SAC	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No AEoSI is predicted for the Humber Estuary SAC either from the project alone or in-combination with other plans or projects in relation to potential injury or behavioural disturbance of grey seal as a qualifying feature or the conservation objectives.
The Wash and North Norfolk Coast SAC	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process. 	No AEoSI is predicted for the Wash and North Norfolk Coast SAC either from the project alone or in-combination with other plans or projects in relation to potential injury or behavioural disturbance of harbour seal as a qualifying feature or the conservation objectives.

9.3 MCZ/MPA Assessment

The MIC does not overlap with any MCZs or MPAs. The closest MCZ or MPA is located approximately less than 1 km from the MIC. Four MCZ and two MPAs were taken through the screening process. The following potential impact pathways were identified:

- Physical injury and/or disturbance as a result of the underwater sound produced during the UXO clearance process;
- Habitat loss due to temporary seabed disturbance; and
- Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance and accidental pollution.

The outcome of the MCZ/MPA assessment is summarised in Table 9-3.

Table 9-3 Summary of potential impacts MCZ/MPA assessment

DESIGNATED SITE	IMPACT PATHWAY	ASSESSMENT OUTCOME
Firth of Forth Banks Complex MPA	<ul style="list-style-type: none"> Habitat loss due to temporary seabed disturbance; and Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance 	<p>Screened in: all qualifying features</p> <p>Any physical effects arising from UXO clearance are not capable of affecting (other than insignificantly) any qualifying feature of the Firth of Forth Banks Complex MPA, and will not hinder the conservation objectives of the site.</p>
Southern Trench MPA	<ul style="list-style-type: none"> Physical injury and/or disturbance as a result of the underwater sound produced 	Screened in: minke whale



DESIGNATED SITE	IMPACT PATHWAY	ASSESSMENT OUTCOME
	during the UXO clearance process; <ul style="list-style-type: none"> • Habitat loss due to temporary seabed disturbance; and • Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance 	Any effects of underwater sound originating from UXO clearance activities are not capable of affecting (other than insignificantly) the minke whale (or any other) feature of the Southern Trench MPA, and will not hinder the conservation objectives of the site. Screened out: all other qualifying features (distance)
North East of Farnes Deep HPMA	<ul style="list-style-type: none"> • Habitat loss due to temporary seabed disturbance; and • Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance 	Screened out: all qualifying features (distance)
Farnes East MCZ	<ul style="list-style-type: none"> • Habitat loss due to temporary seabed disturbance; and • Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance 	Screened out: all qualifying features (distance)
Holderness Offshore MCZ	<ul style="list-style-type: none"> • Habitat loss due to temporary seabed disturbance; and • Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance. 	Screened out: all qualifying features (distance)
Holderness Inshore MCZ	<ul style="list-style-type: none"> • Habitat loss due to temporary seabed disturbance; and • Changes in water and sediment quality due to the suspension and deposit of sediment resulting from UXO clearance 	Screened out: all qualifying features (distance)



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APPENDIX A UXO CLEARANCE MARINE MAMMAL MITIGATION PROTOCOL (MMMP)



Eastern Green Link 2

Eastern Green Link 2: Construction Phase Marine Support

UXO Clearance Marine Mammal Mitigation Protocol

ASSIGNMENT A100744-S07
DOCUMENT A-100744-S07-A-TECH-001



Aberdeen
5th Floor Capitol Building
429-431 Union Street . Aberdeen
AB11 6DA . UK

T +44 (0)1224 628 322
E [Redacted]

www.xodusgroup.com



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REV	DATE	DESCRIPTION	ISSUED	CHECKED	APPROVED	CLIENT
A02	03/12/2025	Re-issued for Use	SM	EE	EE	EGL2
A01	25/11/2025	Issued for Use	SM	EE	EE	EGL2
R02	31/10/2025	Issued for review	SM	EE	EE	EGL2
R01	08/10/2025	Issued for review	SM	EE	EE	EGL2



CONTENTS

GLOSSARY	4
ACRONYMS	6
1 INTRODUCTION	8
1.1 Project Background	8
1.2 Purpose and Scope of this Document	10
1.3 Description of UXO clearance activities	10
1.4 Marine mammal mitigation approaches	11
1.5 Potential effects of UXO clearance on marine mammals	11
1.6 Low Order Deflagration	12
2 MITIGATION MEASURES	13
2.1 Marine Mammal Observer (MMOb) protocol	13
2.2 Passive Acoustic Monitoring (PAM)	14
2.3 Pre-clearance search	15
2.3.1 Visual search procedure	15
2.3.2 PAM search procedure	15
2.4 Acoustic Deterrent Devices	16
2.5 During and post-clearance search	16
2.6 Incomplete neutralisation	16
2.7 Mitigation Summary	16
3 COMMUNICATION AND RESPONSIBILITIES	18
3.1 Roles and Responsibilities	18
4 DATA COLLECTION AND REPORTING	20
4.1 Data Collection	20
4.2 Reporting to JNCC	20
4.3 Reporting to Regulatory Bodies	21
4.4 Details of issues or challenges which occurred during the activity. Internal Reporting	21
5 REFERENCES	22



GLOSSARY

TERM	DEFINITION
Auditory injury	Damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory nerve damage. Auditory injury may or may not result in a Permanent Threshold Shift (PTS).
Confirmed UXO (cUXO)	An object that has been positively identified as unexploded military ordnance, such as a bomb, mine, shell, or grenade, and is verified to pose a potential risk of detonation. In marine and terrestrial environments, confirmed UXO typically requires formal mitigation measures, such as clearance or avoidance, due to its hazardous nature.
Decibel	Decibel (dB) is a relative unit of measurement equal to one tenth of a bel (B) and is used to measure the intensity of a sound.
Eastern Green Link 2	A joint venture comprised of National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission. Known collectively as 'the Applicant'.
High Order Detonation	A clearance method that occurs at or near the maximum stable velocity of an explosive, resulting in the full intended energy release of the ordnance. In the context of UXO clearance, this typically involves initiating the main charge of the munition, producing a powerful shock wave, significant acoustic energy, and often substantial seabed disturbance
Low Order Deflagration	A controlled explosive technique used during UXO clearance where the ordnance burns or partially detonates without achieving its full designed explosive yield. This method is intended to reduce the acoustic and physical impacts on the marine environment compared to high-order detonations.
Marine Scheme	Elements of the Eastern Green Link (EGL) 2 transmission link between Scotland and England which are seaward of Mean High Water Springs (MHWS). This is comprised of approximately 436 km of submarine High Voltage Direct Current (HVDC) cable of which 150 km is in Scottish waters and 286 km is in English waters.
Mean High Water Springs	The height of mean high water springs is the average of the heights of two successive high waters during spring tides in each month.
Marine Management Organisation (MMO)	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
Marine Mammal Mitigation Protocol	A Marine Mammal Mitigation Protocol (MMMP) is a written and finalised document listing appropriate mitigation measures during offshore activities that are likely to produce underwater noise and vibration levels capable of potentially causing injury or disturbance to marine mammals.
Marine Directorate Licensing Operations Team (MD-LOT)	The regulator on behalf of Scottish Ministers for marine licence applications in the Scottish inshore region (between 0 and 12 NM) under the Marine (Scotland) Act 2010 and in the Scottish offshore region (between 12 and 200 NM) under the Marine and Coastal Access Act 2009
Permanent Threshold Shift	A long-term change in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the non-



TERM	DEFINITION
	recoverable reduction in hearing sensitivity that can occur as a result of exposure to high-amplitude sounds generated by underwater explosions.
Potential UXO (pUXO)	Any object suspected to be unexploded military ordnance, such as bombs, mines, shells, or grenades, which may pose a risk due to the possibility of detonation. In environmental and marine contexts, pUXO refers to items identified during surveys or operations that exhibit characteristics consistent with explosive remnants but have not yet been confirmed or safely disposed of.
Sound Exposure Level (SEL)	Sound Exposure Level (SEL) is a measure of energy that takes into account both received level and duration of exposure.
Cumulative SEL (SELcum)	The cumulative sound exposure level combines the relative energies of ambient, shipping, and seismic sounds.
Sound Pressure Level (SPL)	Sound Pressure Level (SPL) is the pressure level of a sound, measured in decibels (dB).
Temporary Threshold Shift	A short-term, recoverable reduction in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the reversible auditory impairment caused by high-amplitude sounds generated by underwater explosions. Hearing sensitivity typically returns to baseline levels after a period of recovery.
TNT equivalent	A common reference point for assessing the relative power of explosive materials, using the energy released by the explosive 2,4,6-Trinitrotoluene (TNT) as a reference point.
UXO clearance	The neutralisation of UXO, which could include destructive intervention methods such as High Order Detonation and/or Low Order Deflagration.



ACRONYMS

ACRONYM	DEFINITION
ADD	Acoustic Deterrent Device
cUXO	Confirmed Unexploded Ordnance
dB	Decibel
Defra	Department for Environment, Food and Rural Affairs
DPR	Daily Progress Report
EGL	Eastern Green Link
HF	High Frequency
HOD	High-Order Detonation
HVDC	High voltage direct current
HSE	Health, Safety, and Environment
JNCC	Joint Nature Conservation Committee
kg	Kilograms
KP	Kilometre Point
LF	Low Frequency
LOD	Low Order Deflagration
MD-LOT	Marine Directorate Licensing Operations Team
MHWS	Mean High Water Springs
MIC	Marine Installation Corridor
ML	Marine Licence
MLA	Marine Licence Application
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MMOA	Marine Mammal Observer Association
MMObs	Marine Mammal Observer
MNR	Marine Noise Registry
MZ	Mitigation Zone
NGET	National Grid Electricity Transmission
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NtM	Notice to Mariners
PAM	Passive Acoustic Monitoring



ACRONYM	DEFINITION
PTS	Permanent Threshold Shift
PW	Phocid Pinnipeds in Water
pUXO	Potential Unexploded Ordnance
SEL	Sound Exposure Level
SELcum	Cumulative Sound Exposure Level
SPL	Sound Pressure Level
SPLpeak	Peak Sound Pressure Level
SSEN	Scottish and Southern Electricity Networks
TNT	Trinitrotoluene
TNT _{eq}	Trinitrotoluene equivalent
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency



1 INTRODUCTION

1.1 Project Background

National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission¹ (hereafter collectively referred to as 'the Applicant') are jointly developing the Eastern Green Link 2 (EGL2) Marine Scheme.

The EGL2 Marine Scheme comprises a submarine High Voltage Direct Current (HVDC) link which extends from Mean High Water Springs (MHWS) at the Scottish Landfall in Sandford Bay, Peterhead, Aberdeenshire, to MHWS at the English Landfall at Fraisthorpe Sands, Bridlington, East Yorkshire. The EGL2 Marine Scheme comprises a Marine Installation Corridor (MIC) of approximately 436 kilometres (km) in length and 500 metres (m) in width. The MIC extends from Kilometre Point (KP) 0 at its landfall in Scotland, to KP 436 at its landfall in England. The EGL2 Marine Scheme is located within both Scottish and English territorial waters (within 12 nautical miles (NM) of the coast) and offshore waters (beyond 12 NM), as shown in Figure 1-1.

The EGL2 Marine Scheme has been granted two Marine Licences (ML) for the installation phase of the project by the Marine Directorate (MS-00011033) and the Marine Management Organisation (MMO) (L/2023/00211/2). In addition, the project may require clearance of confirmed Unexploded Ordnance (cUXO) within a refined 80 m corridor within the MIC to enable installation of the cable. Given this, separate MLs are being sought by the Applicant for these activities.

¹ SSEN Transmission is trade name of Scottish Hydro Electric Transmission Plc.

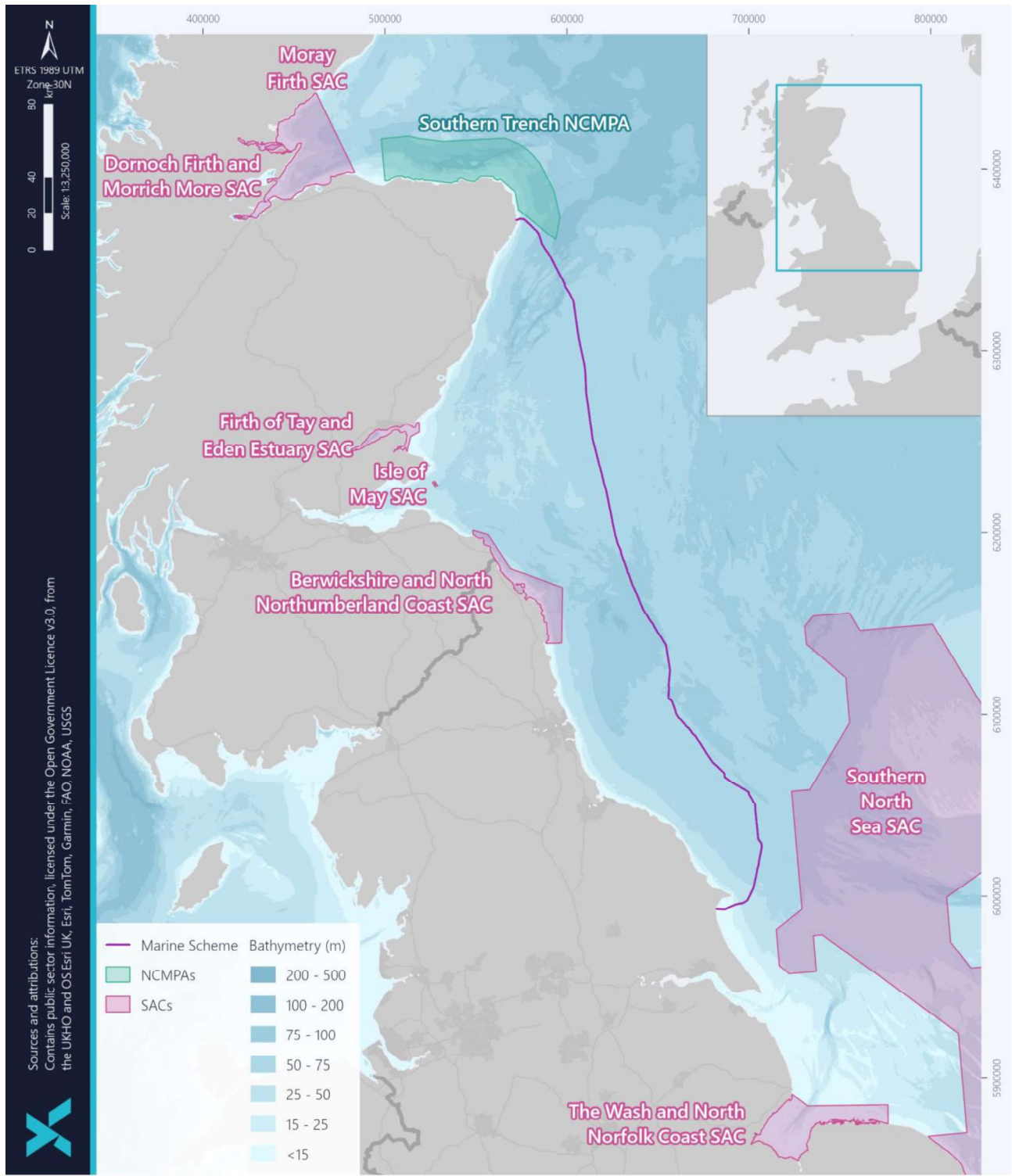


Figure 1-1 Location of the EGL2 cable route and marine mammal designated sites within the vicinity of the Marine Scheme



1.2 Purpose and Scope of this Document

This Unexploded Ordnance (UXO) Clearance Marine Mammal Mitigation Protocol (MMMP) sets out the overarching principles of the UXO clearance campaign using Low Order Deflagration (LOD).

Clearance of UXO has historically relied on High Order Detonation (HOD) of potential UXO (pUXO) or cUXO, where avoidance is not possible. In this document, the LOD of UXO (plus consideration of HOD as a contingency), are collectively referred to as UXO clearance. HOD is not a planned activity, and any accidental/unplanned HOD events are very unlikely (see Section 1.5).

This MMMP has been drafted in line with industry and best practice guidance, specifically:

- Joint Nature Conservation Committee (JNCC) guidelines for minimising the risk of injury to marine mammals from using explosives in the marine environment (JNCC, 2025);
- The joint position statement from the Department of Environment, Food and Rural Affairs (Defra) and other government bodies regarding clearance of UXOs in the marine environment (Defra *et al.*, 2025); and
- JNCC Guidelines for minimising the risk of injury to marine mammals from UXO clearance in the marine environment (JNCC, 2025).

1.3 Description of UXO clearance activities

The most likely type of UXO to be found along the MIC are historical munitions from World War II (e.g., sea mines and air-dropped bombs).

There are four primary measures to reduce the risk posed by underwater sound that may be employed during UXO clearance activities. These measures will be implemented in the following mitigation hierarchy, in order to reduce potentially harmful high sound emissions in the marine environment:

1. **Avoidance:** in the first instance, the EGL2 Marine Scheme subsea cables will be micro-sited or micro-routed away from UXO to avoid the need for use of explosives, and the location of cUXO will be reported to the MMO, Marine Directorate Licensing Operations Team (MD-LOT), and communicated more widely via a Notice to Mariners (NtM) in line with EGL2 requirements;
2. **Use of low-noise UXO clearance:** where a cUXO is unavoidable and clearance of the UXO is required, low-noise intervention (i.e., LOD) will be used for clearance operations to minimise sound emissions. LOD uses a small (approximately 0.25 kilograms (kg) Trinitrotoluene equivalent TNT_{eq} per UXO) charge close to the UXO which, when ignited, causes a rapid burn of the UXO explosives without detonation. Marine mammal mitigation measures will be applied in line with the JNCC (2025) guidelines throughout this process, as required. HOD is not being utilised, with the only potential for HOD through an extremely unlikely accidental event whereby an attempt to deflagrate a UXO may result in an unplanned detonation. Nonetheless, the preferred UXO clearance contractor has a 100% success rate of using LOD methods, with no accidental HOD having occurred to date;
3. **Relocation:** Consideration will be made to relocate a cUXO to a safe place prior to clearance, if it is located in close proximity to sensitive features and it is deemed structurally sound and not significantly buried. Relocation will only be undertaken where absolutely necessary, such as due to proximity of a third-party asset or archaeological feature, and where deemed safe to do; and
4. **Repeated LOD attempts:** More than one LOD attempt may be required to fully neutralise a UXO. Where multiple LOD attempts are required, the Applicant will endeavour to conduct all attempts consecutively, where possible, to minimise the duration of disturbance. All attempts will be documented and submitted to the relevant



regulator² to demonstrate that LOD has been successful, and in cases where LOD was not successful, why this was the case. As above, marine mammal mitigation measures will be applied in line with the JNCC (2025) guidelines throughout this process.

1.4 Marine mammal mitigation approaches

A short review of general mitigation measures for all UXO clearance activities is provided below, with full details of the proposed mitigation provided in Sections 2.1 to 2.4. The mitigation which will be implemented includes:

- Marine Mammal Observation implementing the JNCC Marine Mammal Observer (MMO) protocol (JNCC, 2025), whereby two MMOs will visually observe a 1 km Mitigation Zone (MZ) for a minimum of 60 minutes before the planned UXO clearance event (one of the MMOs can also act as the passive acoustic monitoring (PAM) operator);
- PAM will be conducted alongside MMOs during the pre-clearance searches, for example, during daytime periods of reduced (meteorological) visibility or twilight. With regard to the JNCC (2025) guidelines, because PAM is only likely to be effective in the detection of dolphins and porpoise (and of minimal benefit for seals or non-echolocating cetaceans), PAM will not act as the sole mitigation approach. Similar to visual observations, PAM will begin a minimum of 60 minutes before the planned UXO clearance event; and
- The deployment and activation of an Acoustic Deterrent Device (ADD) prior to the UXO clearance. The ADD will be deployed for 13 minutes prior to the LOD clearance activities. This duration accounts for the time taken for marine mammals to traverse the largest range at which marine mammals may experience Permanent Threshold Shift (PTS), estimated at 1,099 m from use of the 0.25 TNT_{eq.} donor charge, assuming a swimming speed of 1.5 m/s (Herschel *et al.*, 2014).

It is important to note that no single measure can guarantee the complete mitigation of all risks to marine mammals, due to uncertainty regarding sound energy produced during UXO clearance, as well as individual behavioural responses to mitigation measures. However, the combination of approaches presented here will reduce the risk to marine mammals to as low as reasonably practicable.

1.5 Potential effects of UXO clearance on marine mammals

UXO clearance occurs on the seabed, which has the potential to cause various localised and non-localised impacts. Localised impacts, such as crater formation and sediment displacement are not considered to pose a risk to marine mammals. EGL2's preferred UXO clearance contractor is Helix Energy Solutions³ who have a high success rate for neutralising UXO by using the Alford Technologies LOD tool⁴, without any (planned or unplanned/ accidental) detonation occurrences^{5,6}. Helix Energy Solutions have demonstrated a 100% LOD success rate; therefore, the Applicant is committed to using LOD as the UXO clearance method. HOD is only included as contingency in the case of an accidental/unplanned event. LOD generates lower underwater sound levels (as demonstrated in the underwater sound modelling outputs Table 1-1) and is expected to result in a significantly smaller seabed disturbance footprint compared to HOD, as LOD is unlikely to result in a crater on the seabed (Robinson *et al.*, 2020; Abad Oliva *et al.*, 2024).

² MD-LOT in Scotland; the MMO in England.

³ [Explosive Ordnance Disposal \(EOD\) Services - Helix Energy Solutions](#)

⁴ <https://www.explosives.net/low-order-deflagration-uxo-disposal/>

⁵ [Offshore Wind - EODEX](#)

⁶ [MEMBER NEWS: Safe UXO disposal bolsters marine environment conservation at Moray West Offshore Wind Farm - Aberdeen Renewable Energy Group](#)



Non-localised impacts, such as the propagation of underwater sound, can pose a significant risk to marine mammals during UXO clearance (albeit these risks are much lower for LOD than HOD). The high-amplitude shock wave and associated pressure waves generated by explosive detonations (including those produced by LOD donor charges) have the potential to cause non-recoverable auditory injuries such as PTS, and recoverable impacts such as Temporary Threshold Shift (TTS), the effects of which typically abate within a few hours of exposure. National Marine Fisheries Service (NMFS) (2024) defines the sound levels at which onset of TTS and PTS may occur are defined for different marine mammal hearing groups based on their auditory capability using a dual-criteria system. These criteria assess both the single-instance sound levels and the sound exposure accumulated within a 24-hour period which may result in auditory impacts.

Sound levels below the PTS onset thresholds are more typically associated with temporary physical effects and/or behavioural responses.

Behavioural disturbance (such as fleeing), and changes to feeding, mating, and resting behaviours, are more commonly associated with continuous or repetitive noise sources, rather than single isolated sound pulses associated with UXO clearance events. Although sound emitted during UXO clearance may elicit a startle response, the acute and intermittent nature of the sound exposure is unlikely to lead to disruption to normal behaviour over an extended period (National Academies of Sciences, Engineering, and Medicine, 2017).

The spatial extent of any potential disturbance or injury depends primarily on the size and method of UXO clearance, as well as the receiving animal and other physical factors, including bathymetry. The underwater sound modelling undertaken for EGL2 UXO clearance assumes that clearance takes place in open water, thereby pressure waves can propagate without obstruction and thus sound propagation predictions are considered precautionary.

1.6 Low Order Deflagration

As mentioned in Section 1.3, UXO avoidance is the first step of the mitigation hierarchy. Where avoidance is not possible, LOD is the proposed clearance method, in line with the JNCC guidance (2025), as it significantly reduces sound emissions, compared to HOD. However, there is still a potential for LOD to result in a degree of disturbance and injury to marine mammals.

The sound levels and the distances at which PTS in marine mammals is expected to occur in relation to the UXO charge size were modelled for the purpose of the Marine Licence Application (MLA) for UXO Clearance for the EGL2 Marine Scheme and are presented in Table 1-1 below and within the EGL2 UXO Clearance Underwater Sound Assessment (Document ID: A-100744-S07-A-ASMT-001).

These impact ranges are based on the detonation of a range of charge sizes. However, as previously mentioned, the Applicant will utilise LOD, where the donor charges to be used are not expected to exceed 0.25 kg TNT_{eq} (Moray West used charges between 0.1 – 0.25 kg TNT_{eq} to clear UXOs up to 94 kg TNT_{eq}; Abad Oliva *et al.*, 2024). Modelling results indicate that PTS ranges for this size of charge will not exceed 1,099 m (Table 1-1). Evidence indicates that recorded sound levels from LOD are the result of the donor charge only, and not from the full or partial detonation of the UXO (Abad Oliva *et al.*, 2024).



Table 1-1 Predicted PTS impact ranges (m) for marine mammals hearing groups associated with LOD clearance of UXOs⁷. Predictions represent sound source levels generated by the detonation of a 0.25 kg TNTeq donor charge weight (SEL 240.1 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$; peak Sound Pressure Level (SPL_{peak}) 271 dB re 1 μPa). PTS impact ranges are based on the weighted Sound Exposure Level (SEL) and unweighted SPL_{peak} noise criteria from NMFS (2024).

HEARING GROUP	PTS ONSET CRITERIA	PTS IMPACT RANGE
Very High Frequency (VHF) cetaceans	SPL_{peak}	1,099 m
	SEL	18 m
High Frequency (HF) cetaceans	SPL_{peak}	63 m
	SEL	6 m
Low Frequency (LF) cetaceans	SPL_{peak}	143 m
	SEL	298 m
Phocid pinnipeds in water (PW)	SPL_{peak}	129 m
	SEL	Not exceeded

2 MITIGATION MEASURES

This section of the UXO Clearance MMMP details the operational steps during the UXO clearance activities and considers mitigation measures which will be utilised to reduce the potential for injury to marine mammals from UXO clearance to as low as reasonably practicable.

The Applicant will use LOD as the intervention method in line with industry best practice guidelines and requirements (Defra *et al.*, 2022 and JNCC, 2025). HOD will not be used although it is not possible to conclude zero risk of an accidental occurrence. The EGL2 UXO clearance contractor has a 100% LOD success rate and no accidental HOD have occurred to date. Because of the commitment to utilise LOD where UXO clearance is required, noise abatement systems (such as bubble curtains) are not proposed. In the unlikely event that an accidental HOD occurs, the regulator (MMO or MD-LOT) will be informed.

2.1 Marine Mammal Observer (MMObs) protocol

The Applicant will ensure that at a minimum of two qualified MMObs will be present during the UXO clearance and will undertake a pre and post clearance search (described in Sections 2.3 and 2.5). MMObs will have undertaken formal training approved by the JNCC, have knowledge and experience in identifying United Kingdom (UK) marine mammal species and working with ADDs. At least one of the MMObs will fulfil the role of Lead MMObs, and will be experienced, i.e., have a minimum of 20 weeks experience of implementing JNCC noise mitigation guidelines in UK waters within the last 10 years. The conditions in which the search can take place together with procedures to be followed are listed below, and are aligned to the protocol provided in the JNCC guidelines for minimising the risk of injury to marine mammals from UXO clearance in the marine environment (JNCC, 2025).

⁷ Impact ranges being the results of modelling documented in EGL2 UXO Clearance Underwater Sound Assessment (Document ID: A-100744-S07-A-ASMT-001)



Prior to the commencement of the MMObs protocol, there will be consideration of the environmental (e.g., meteorological) conditions, that may limit the successful application of visual monitoring, which will contribute to the decision on whether to proceed with UXO clearance. Visual pre-clearance searches and the subsequent UXO clearance, will be undertaken only when environmental conditions allow effective monitoring of the MZ by MMObs, which are (JNCC, 2025):

- Daylight hours defined as a period between sunrise and sunset when sufficient light is available to effectively conduct visual observations and the MZ is clearly visible in its entirety without the aid of artificial light;
- Good meteorological visibility to allow visual observations and the MZ is clearly visible in its entirety; and
- Sea state \leq Beaufort 3 (or JNCC sea state 'c' (choppy with many white caps).

However, it is recognised that by augmenting visual monitoring with PAM, it may still be possible to conduct an effective pre-clearance search in marginal conditions. Therefore, if the Lead MMObs confirms that an effective search of the MZ can be conducted by a visual monitoring augmented with PAM, a combined visual and PAM pre-clearance searches and subsequent UXO clearance can be undertaken under the following marginal conditions:

- Twilight – the period shortly after/before astronomical sunset/sunrise, where there may still be sufficient light to conduct effective monitoring of the MZ when a visual search is augmented with PAM;
- Sea state Beaufort ≤ 4 – visual detection of harbour porpoise is most likely to be compromised in marginal sea states, since they are the smallest cetacean potentially present in the MIC. Harbour porpoise are readily detectable by PAM, therefore, it may be possible to conduct effective monitoring of the MZ using a visual search augmented by PAM; and
- Reduced (meteorological) visibility – visual detection of harbour porpoises is most likely to be compromised by reduced visibility, therefore, by using PAM to augment visual searches, it may be possible to conduct effective monitoring of the MZ, even if the visibility in the periphery of the MZ is compromised.

If the environmental (i.e., daylight, sea state or weather) conditions do not allow for effective monitoring of the MZ using a visual search (augmented by PAM as required) at the Lead MMObs' discretion, then the UXO clearance activities will be delayed until conditions improve.

MMObs will be equipped with a copy of the agreed MMMP, an up-to-date copy of the JNCC mitigation guidelines (JNCC, 2025), binoculars, a method of range estimation suitable for the MZ, and relevant recording forms on which to record details of all sightings and mitigation undertaken. The MMObs will be located on the UXO clearance, with at least one of the MMObs situated on an elevated platform with good all-round visibility of the MZ (e.g., the bridge of a ship) during pre-clearance searches. The MMObs will maintain direct verbal (e.g., VHF radio) communication with the offshore UXO clearance manager during the pre-clearance search and will confirm when the search is completed, before authorising to proceed with the UXO clearance.

2.2 Passive Acoustic Monitoring (PAM)

The PAM operator will be a qualified operator with a documented minimum 20 weeks experience applying PAM for mitigation and implementing any of the JNCC noise mitigation guidelines in UK waters over the previous five to ten years, and experience in identifying marine mammal species acoustically (JNCC, 2023). One of the MMObs with relevant qualifications can also serve as a PAM Operator in the event of conditions that mean that PAM is required (as described in Sections 1.4 and 2.1), however, they should not act in a dual MMO/PAM Operator role at the same time. The PAM system to be used will be chosen in accordance with the JNCC (2023) PAM Guidance, taking into account species that might be present in the area, in particular harbour porpoise.



As the effective detection range for harbour porpoise by PAM is around 200-300 m (Marine Mammal Observer Association (MMOA) Executive Committee 2022), the PAM will be deployed in the vicinity of the UXO location, enabling the detection of vocally active marine mammal species in the area. PAM will be deployed from the UXO clearance vessel at least 60 minutes before the planned clearance (similar to the requirement for visual pre-clearance search). The PAM Operator will have direct verbal (e.g., VHF radio) communication with the offshore UXO clearance manager and will confirm when the pre-clearance search is completed, before authorising to proceed with the UXO clearance.

The PAM Operator will record all marine mammal detections and associated mitigation requirements as per JNCC guidelines (2025).

2.3 Pre-clearance search

2.3.1 Visual search procedure

The MMObs will follow the JNCC guidelines and observe a minimum MZ extending to a radius of 1 km centred upon the cUXO target. Prior to undertaking clearance activities, the MMObs will conduct a pre-clearance search over the MZ for 60 minutes. This pre-clearance search will continue throughout the clearance activities in line with JNCC (2025) guidelines. If any marine mammals are recorded within the MZ during the pre-watch period, UXO clearance will be delayed for either:

- The remainder of the pre-watch period where >20 minutes of the initial pre-watch period remains; or
- A minimum of 20 minutes where <20 minutes of the of the initial pre-watch period remains.

This will allow sufficient time for the marine mammals to move out of the MZ. The MMObs will monitor and track the marine mammal(s) until all individuals have vacated the MZ. The UXO clearance activities will only occur after no marine mammals have been detected within the MZ for a minimum of 20 minutes (Figure 2-1). It is preferable if UXO clearance commences shortly (<30 minutes) after the completion of the pre-clearance search to ensure the greatest efficacy of the mitigation measures.

Observation of the MZ will be maintained for the duration of the clearance operations.

2.3.2 PAM search procedure

The PAM Operator will deploy and operate the PAM system in accordance with JNCC guidelines (2023; 2025) to ensure that the system covers as much of the 1 km MZ as possible. The PAM monitoring should begin at least 60 minutes prior to the planned UXO clearance event.

If marine mammals are acoustically detected within the MZ during the PAM pre-search, UXO clearance will be delayed for either:

- The remainder of the pre-watch period where > 20 minutes of the initial pre-watch period remains; or
- A minimum of 20 minutes where < 20 minutes of the of the initial pre-watch period remains.

Similarly to the visual pre-search procedure (section 2.3.1), UXO clearance will only occur after no marine mammals have been detected within the MZ for a minimum of 20 minutes (Figure 2-1). ADDs will also be used alongside PAM (see Section 2.4 below). It is preferable if UXO clearance commences within 30 minutes after the completion of the PAM Operator's pre-clearance search.



2.4 Acoustic Deterrent Devices

An ADD (for example, Lofitech AS Seal Scarer, or Ace Aquatech MMD; to be agreed with the regulator prior to deployment in line with the advice in Phillips *et al.*, 2025) will be used to mitigate the risk of injury to marine mammals during planned UXO clearance. EGL2 will utilise a trained ADD operator during LOD of UXOs. Prior to any ADD being used at the UXO clearance location, the ADD will be calibrated by the manufacturer and an additional calibration check carried out by the ADD operator prior to being brought onto the vessel. An additional dry sound test will be undertaken on the vessel prior to deploying the ADD.

The ADD will be deployed in midwater, as near as is reasonably practicable to the UXO that is undergoing clearance, and a minimum of 2 m below the keel of the vessel from which it is deployed. The ADD activation will start 47 minutes after the commencement of the MMObs (or PAM) pre-clearance search and the MMObs (or PAM operator) should confirm that no marine mammal is within 100 m radius of the ADD deployment location when the ADD is switched on. If a marine mammal is within 100 m of the ADD location at this time, activation should be delayed until the animal is >100 m from the device.

The duration of ADD operation has been proposed based on the predicted range of PTS onset for a VHF cetacean (harbour porpoise) for LOD using 0.25 kg donor charge as a worst-case scenario, assuming an animal flees at 1.5 m/s (Herschel *et al.*, 2014) with a minimum ADD activation duration of 10 minutes. The maximum duration of ADD operation is 13 minutes, concurrent with visual MMObs (or PAM), provided that no marine mammals are observed in the MZ during this period. If an animal is sighted within the MZ while ADD is active, there is no need to deactivate the ADD, and other mitigation measures (e.g., visual/PAM pre-clearance search) should continue for a minimum of 20 minutes.

If a delay is required due to an animal being present within the MZ while an ADD is active, the ADD should remain switched on for the duration of the delay. The delay should be recorded in the mitigation forms and reported to the relevant regulator (i.e., MD-LOT/MMO). The clearance can commence once no marine mammals have been detected in the MZ for a minimum of 20 minutes.

2.5 During and post-clearance search

Visual monitoring (augmented by PAM as required) will continue during the UXO clearance activity and upon completion of the UXO clearance, the MMObs will conduct a post-clearance search recording any notable information. This search will be conducted for a minimum of 20 minutes and will record any instances of death, injury, or distress in marine life, including fish. Any notable observations made by the MMObs will also be recorded and provided with the results in the close out reporting for submission to the MD-LOT, the MMO and the JNCC.

2.6 Incomplete neutralisation

In the event that a UXO is not fully neutralised by a single LOD attempt, if further attempts are to be made within 30 minutes, visual monitoring of the MZ (and PAM as required) should continue, and the ADD should remain active.

Where the initial LOD attempt is unsuccessful and a delay of >30min to the next clearance attempt is anticipated, and/or a subsequent attempt at LOD has also failed to fully neutralise the UXO, the pre-clearance search and ADD procedures (described above) should be repeated in full (see Figure 2-1).

2.7 Mitigation Summary

The UXO clearance marine mammal mitigation protocol is outlined in Figure 2-1.

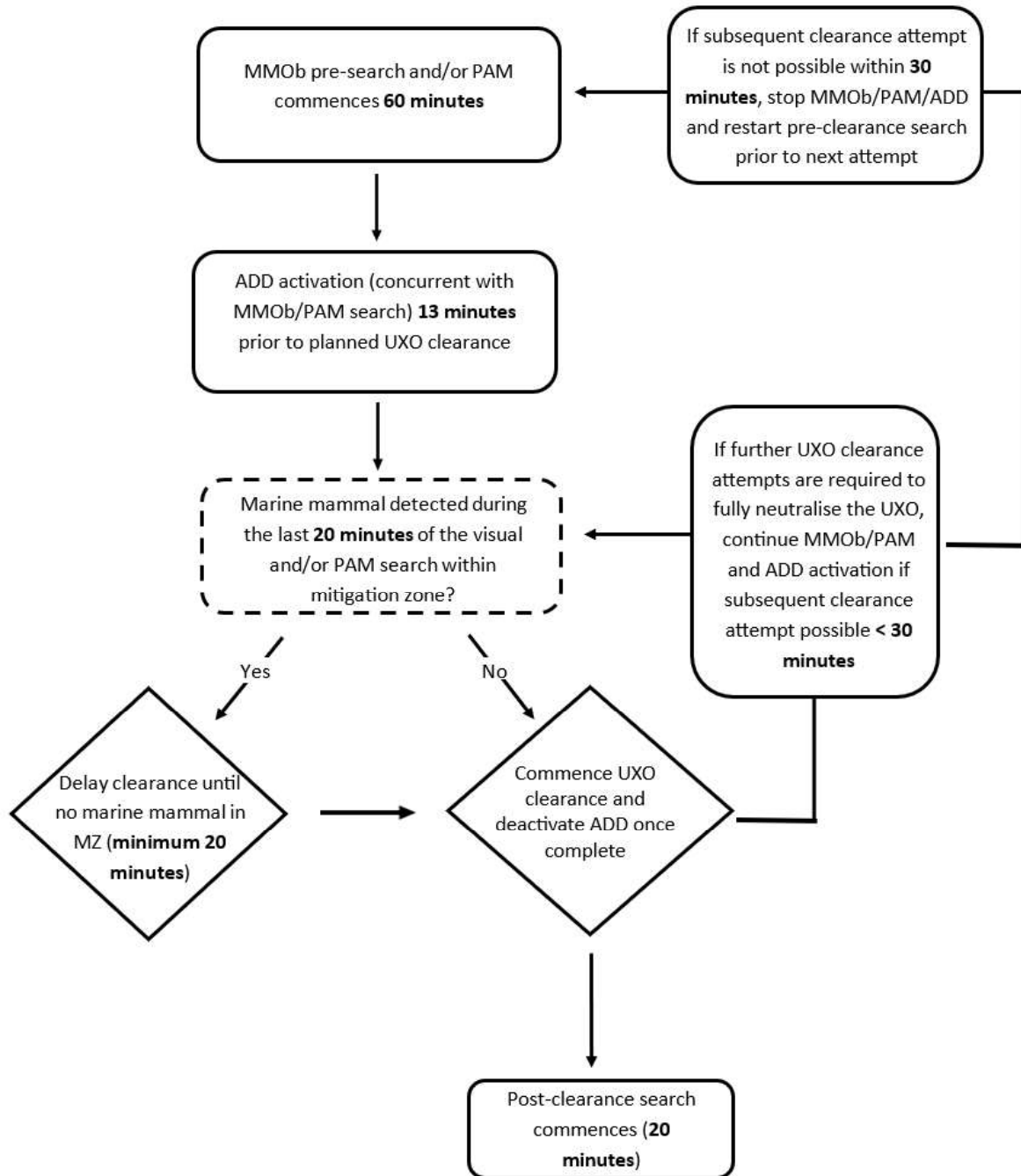


Figure 2-1 Decision making flowchart for an MMObs/PAM operator if any marine mammals have been detected during the pre-intervention search a delay to the intervention sequence will be implemented. Following any UXO clearance, a post-intervention search will be conducted (adapted from JNCC (2025) guidance).



3 COMMUNICATION AND RESPONSIBILITIES

3.1 Roles and Responsibilities

Table 3-1 details the chain of communication and communication strategy that will be implemented during UXO clearance operations.

Table 3-1 Key personnel during UXO clearance activities and their responsibilities

KEY PERSONNEL	RESPONSIBILITIES
<p>EGL2 Marine Project Manager</p>	<ul style="list-style-type: none"> Allocate suitable resources to assure the effective implementation of the MMMP; and Supports the Marine Consent and Environment Manager(s) in engaging with authorities, regulators, UXO clearance contractor, and fisheries.
<p>UXO Clearance Manager (Contractor)</p>	<ul style="list-style-type: none"> Will be present during offshore works and responsible for compliance to this MMMP throughout the UXO works and responsible for all other personnel implementing this MMMP. This includes confirming and agreeing this protocol with the MMOBs; Will be responsible for communicating with the MMOBs during works and notifying them about planned UXO clearance minimum 90 minutes in advance; Will communicate with the ADD Operator about accurate timings of the intervention and charge weights to be used; and Will provide the survey data and report following completion of the UXO clearance campaign to the lead MMOBs.
<p>EGL2 Marine Consent and Environment Manager(s)</p>	<ul style="list-style-type: none"> Obtain and communicate project consents to the Contractor and project personnel to enable UXO Clearance activities, as well as manage compliance with associated licences and their conditions; Liaise closely with the EGL2 Marine Project Manager, UXO Clearance Manager, and the EGL2 Client Representative to assist them in the interpretation, understanding and delivery of all consents and their conditions; Lead engagement with authorities, regulators, and fisheries, supported by the EGL2 Marine Project Manager; Attending, start-up, and progress meetings where required and advising on consenting and environmental aspects; and Escalate consenting issues to the EGL2 Marine Project Manager to ensure appropriate action can be taken.
<p>EGL2 Client Representative</p>	<ul style="list-style-type: none"> Represents EGL2 on board vessels to ensure they have a presence on-site; and The Client Representative role includes the responsibility for ensuring work on board the vessel is carried out properly and in compliance with the approved project documentation, including the MMMP. This also includes ensuring that the MMMP is actioned in a safe and effective manner, consistent with Health, Safety, and Environment (HSE) requirements by providing and facilitating open lines of communication with the vessel crew and EGL2 team (mainly the Marine Project Manager) shoreside. This ensures that any operational issues can be quickly and effectively communicated to all relevant parties, and appropriate actions taken as required.



KEY PERSONNEL	RESPONSIBILITIES
<p>Lead MMObs</p>	<ul style="list-style-type: none"> • Will be an experienced observer, and is responsible for visual searches, PAM, and data collection and reporting; • Will determine if visual searches augmented by PAM can facilitate effective monitoring of the MZ in marginal environmental conditions (light/weather/sea state), and inform the UXO Clearance Manager if delays are required due to poor environmental conditions; • Will communicate with the UXO Clearance Manager to enable clearance activities to commence and to notify the UXO Clearance Manager when a delay or cessation in operations is required e.g. in the event that a marine mammal is observed with the MZ. They will be supported by a second MMObs, in line with the JNCC guidelines (2025); and • Will communicate to the ADD Operator when the MMObs watch may be conducted and when the ADD may be activated.
<p>MMObs / PAM Operator</p>	<ul style="list-style-type: none"> • A second MMObs will also be an experienced PAM Operator, noting that an individual should not act in a dual MMObs/PAM operator role at the same time; • Will be required to set up and deploy the equipment; • Will record and log all detections, including species (where possible), time, and location, in accordance with JNCC guidelines (2023; 2025); • Will communicate any detections within the MZ with the Lead MMObs (if conducted simultaneously) and UXO Clearance Manager, to delay UXO clearance activities; • Will maintain communication with the ADD Operator and Lead MMObs to ensure mitigation measures are coordinated effectively; and • Will complete post-survey reports.
<p>ADD Operator</p>	<ul style="list-style-type: none"> • The ADD Operator will be responsible for the appropriate use and deployment of the ADD, including testing, deploying, monitoring, and retrieving the ADD at the appropriate time; • Will communicate with the Lead MMObs to ensure watches and ADD deployments are coordinated; • Following the go-ahead from the Lead MMObs, the ADD Operator will activate the ADD for the required duration, and confirm activation with the Lead MMObs/MMObs; and • Following instruction from the Lead MMObs, the ADD Operator will deactivate the ADD, and confirm deactivation with the Lead MMObs/MMObs.



4 DATA COLLECTION AND REPORTING

This section outlines the procedures and responsibilities for collecting, managing, and reporting data related to MMObs, PAM operators, and mitigation activities to ensure compliance with the regulatory requirements and accurate monitoring procedures.

4.1 Data Collection

Data submissions to the JNCC Marine Noise Registry (MNR), and where required, the Southern North Sea Activity Tracker, are not the responsibility of the MMObs/PAM operators offshore but will be required to be completed by the Applicant, informed by information provided by the Lead MMObs.

4.2 Reporting to JNCC

The Lead MMObs will be responsible for completing data reporting in line with JNCC guidelines (2025) requirements, including recording form in a spreadsheet and a mitigation report. As a minimum, this report will include the following:

- Operator details and contractor details together with licence number;
- Operational details:
 - Dates and locations of all interventions, if possible, including a map;
 - Type of device cleared and expected charge in TNT_{eq};
 - Clearance method, TNT equivalent of a donor charge or disposal tool; and
 - Any activities or circumstances which influenced when the clearance took place.
- Mitigation requirements:
 - MZ applied and the area visually/acoustically searched with search durations;
 - If any of the interventions took place in or in the vicinity of a protected area; if so, what additional mitigation measures were applied to mitigate impacts;
 - Summary of planned MMObs activities (number of personnel and their experience, personnel location including vessel and MMObs location during searches on the vessel, confirmation that at least one MMObs had 360° field of view, vessel location relative to clearance location and whether vessel position changed prior to clearance);
 - Summary of planned PAM activities (number of PAM operators and their experience, details of PAM equipment, location of PAM system relative to vessel position, confirmation of continuous monitoring during searches, description of data logging, communication protocol with UXO manager and MMObs, and any contingency measures, such as for equipment failure.
 - Type of ADD used and its specification (frequency, source level) together with Details of the timing of activation and cessation (therefore duration) of ADD deployment at each UXO site including deployment location and personnel involved;
 - An overview of communication channels established between vessel crew and the mitigation team, including the procedure used if a delay was needed; and
 - A flow diagram presenting mitigation procedure.
- Application of mitigation procedures:
 - A summary of all mitigation searches and the number of occasions when specified durations were not met (specific times for each search will be provided in the excel recording forms);



- Evidence to demonstrate the PAM system was able to detect vocalisations above background sound levels, and that the PAM system was working effectively throughout the mitigation period;
- A summary table of acoustic effort and detections, containing time, date, species, length of acoustic detection and a brief description of any action taken;
- Sightings and marine mammal behavioural observations together with information on delays to UXO clearance due to sightings and the duration of delays;
- Discussion of any differences in the data observed (e.g., whether visual observations coincided with acoustic detections); and
- Details of technical problems or instances of non-compliance, with explanation of any deviation from the proposed mitigation plan, and lessons learned.

Where relevant, the final report will include recommendations of how the protocol could be improved in the future.

4.3 Reporting to Regulatory Bodies

A Marine Licence Close-Out report will be produced by the lead MMObs and the UXO Clearance Manager and submitted to the MMO and MD-LOT. The intention of the Marine Licence close-out reporting will not be to duplicate the MMObs reporting to JNCC, however the JNCC report will also be sent to the MMO and MD-LOT for information. The Marine Licence Close-Out report will include:

- Date and location of the activity;
- Information on number of UXOs that could be avoided, and how decisions were made on the actions taken;
- Information on the type of UXO clearance;
 - UXO details (TNT_{eq}, estimated burial depth, sediment conditions);
 - UXO clearance method selected;
 - Size of charge (where relevant);
 - Number of LOD clearance attempts;
 - Date and time of intervention; and
 - Nature and quantity of UXO debris recovered following clearance.
- Any other relevant information to further benefit industry understanding and good practice, such as lessons learned and recommendations to regulators and statutory nature conservation bodies for future monitoring procedures.

4.4 Details of issues or challenges which occurred during the activity. Internal Reporting

The UXO Clearance contractor will organise regular Vessel HSE meetings between all relevant parties. As a minimum, Daily Vessel Meetings will be undertaken with all appropriate personnel, including those identified in Table 3-1. The purpose of the meetings is to discuss, co-ordinate and resolve all HSE and consents matters of concern on site and examine readiness for current and future activities to ensure a consistently high standard is maintained.

In terms of the MMMP, a MMObs will be present during the meetings and will provide an update to the EGL2 project on the watches conducted during the UXO Clearance operations and any pertinent events or issues encountered relevant to the MMMP during the previous 24 hours of operations. The minutes shall be recorded in a Daily Progress Report (DPR) and distributed following the meeting to all the relevant project personnel.



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APPENDIX B UXO CLEARANCE UNDERWATER SOUND ASSESSMENT



Eastern Green Link 2

Eastern Green Link 2: Marine Scheme Installation Support

UXO Clearance
Underwater Sound
Assessment

ASSIGNMENT A100744-S07
DOCUMENT A-100744-S07-A-ASMT-001



Aberdeen
5th Floor Capitol Building
429-431 Union Street , Aberdeen
AB11 6DA
UK

T +44 (0)1224 628 322
[Redacted]

www.xodusgroup.com



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			[Redacted]	[Redacted]	[Redacted]	
A02	03/12/2025	Re-issued for Use	PB	SM	EE	EGL2
A01	25/11/2025	Issued for Use	PB	DR	EE	EGL2
R02	31/10/2025	Issued for Review	PB	BO	EE	EGL2
R01	13/10/2025	Issued for Review	PB	BO	PB	EGL2
REV	DATE	DESCRIPTION	ISSUED	CHECKED	APPROVED	CLIENT



CONTENTS

GLOSSARY	4
ACRONYMS	5
1 INTRODUCTION	7
2 UNDERWATER SOUND ASSESSMENT	8
2.1 Methodology	8
2.2 Impact Criteria	9
2.2.1 Evidence Base for Impact Criteria	9
2.2.2 Impact Criteria	12
3 IMPACT RANGES	14
4 CONCLUSIONS	18
5 REFERENCES	19



GLOSSARY

TERM	DEFINITION
Confirmed UXO (cUXO)	An object that has been positively identified as unexploded military ordnance, such as a bomb, mine, shell, or grenade, and is verified to pose a potential risk of detonation. In marine and terrestrial environments, confirmed UXO typically requires formal mitigation measures, such as clearance or avoidance, due to its hazardous nature.
Eastern Green Link 2	A joint venture comprised of National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission. Known collectively as 'the Applicant'.
Marine Scheme	Elements of the Eastern Green Link (EGL) 2 transmission link between Scotland and England which are seaward of Mean High Water Springs (MHWS). This is comprised of approximately 436 kilometres (km) of submarine High Voltage Direct Current (HVDC) cable of which 150 km is in Scottish waters and 286 km is in English waters.
Mean High Water Springs	The height of mean high water springs is the average of the heights of two successive high waters during spring tides in each month.
Marine Management Organisation (MMO)	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
Marine Directorate Licensing Operations Team (MD-LOT)	The regulator on behalf of Scottish Ministers for marine licence applications in the Scottish inshore region (between 0 and 12 Nautical Miles (NM)) under the Marine (Scotland) Act 2010 and in the Scottish offshore region (between 12 and 200 NM) under the Marine and Coastal Access Act 2009.
Permanent Threshold Shift	A long-term change in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the non-recoverable reduction in hearing sensitivity that can occur as a result of exposure to high-amplitude sounds generated by underwater explosions.
Sound Exposure Level (SEL)	Sound Exposure Level (SEL) is a measure of energy that takes into account both received level and duration of exposure.
Sound Pressure Level (SPL)	Sound Pressure Level (SPL) is the pressure level of a sound, measured in decibels (dB).
Temporary Threshold Shift	A short-term, recoverable reduction in the hearing sensitivity of an animal following exposure to intense sound. In the context of UXO intervention, this typically refers to the reversible auditory impairment caused by high-amplitude sounds generated by underwater explosions. Hearing sensitivity typically returns to baseline levels after a period of recovery.
TNT equivalent	A common reference point for assessing the relative power of explosive materials, using the energy released by the explosive 2,4,6-Trinitrotoluene (TNT) as a reference point.
Unexploded Ordnance (UXO)	Explosive devices that did not detonate when they were deployed and can still pose a risk of detonation
UXO clearance	The neutralisation of UXO, which could include destructive intervention methods (e.g., detonation, deflagration), such as High Order Detonation and/or Low Order Deflagration (LOD).



ACRONYMS

ACRONYM	DEFINITION
cUXO	confirmed Unexploded Ordnance
dB	Decibels
EGL2	Eastern Green Link 2
HF	High Frequency
HOD	High Order Detonation
HVDC	High Voltage Direct Current
Hz	hertz
I	Impulse
kHz	Kilohertz
km	Kilometre
KP	Kilometre point
LF	Low Frequency
LOD	Low Order Deflagration
m	Metre
MD-LOT	Marine Directorate Licensing Operations Team
MF	Mid Frequency
MHWS	Mean High Water Springs
MIC	Marine Installation Corridor
NM	Nautical Miles
MMO	Marine Management Organisation
NGET	National Grid Electricity Transmission
NM	Nautical Mile
NMFS	National Marine Fisheries Service
OW	Otariids in Water
P_{max}	Maximum Peak Pressure
Pa	Pascal
Pa^{-s}	Pascal-seconds
PTS	Permanent Threshold Shift (of hearing)
PW	Phocid seals in Water
R	Radius
rms	Root Mean Square
SEL	Sound Exposure Level



Eastern Green Link 2: Marine Scheme Installation Support

UXO Clearance Underwater Sound Assessment

ACRONYM	DEFINITION
SPL	Sound Pressure Level
SPL _{peak}	Peak Sound Pressure Level
SEEN	Scottish and Southern Electricity Networks
TNT	Trinitrotoluene
TNTeq	TNT equivalence
TTS	Temporary Threshold Shift (of hearing)
UK	United Kingdom
UXO	Unexploded ordnance
VHF	Very High Frequency
W	TNT charge weight
μPa	Micro Pascals



1 INTRODUCTION

National Grid Electricity Transmission (NGET) and Scottish and Southern Electricity Networks (SSEN) Transmission¹ (hereafter collectively referred to as 'the Applicant') are jointly developing the Eastern Green Link 2 (EGL2) Marine Scheme.

The EGL2 Marine Scheme comprises a submarine High Voltage Direct Current (HVDC) link which extends from Mean High Water Springs (MHWS) at the Scottish Landfall in Sandford Bay, to MHWS at the English Landfall at Fraisthorpe Sands. The EGL2 Marine Scheme comprises a Marine Installation Corridor (MIC) of approximately 436 kilometres (km) in length and 500 metres (m) in width. The MIC extends from kilometre point (KP) 0 at landfall in Scotland, to KP 436 at landfall in England. The EGL2 Marine Scheme is located within both Scottish and English territorial waters (within 12 Nautical Miles (NM) of the coast) and offshore waters (beyond 12 NM).

The EGL2 Marine Scheme has been granted two Marine Licences for the installation phase of the project by the Marine Directorate (MS-00011033) and the Marine Management Organisation (MMO) (L/2023/00211/2). Additional Marine Licences are now being sought by the Applicant to enable clearance of confirmed UXO (cUXO) within a refined 80 m corridor within the MIC to enable installation of the cables.

This Technical Note presents an assessment of underwater sound propagation to ascertain the potential impacts to marine mammals and fish during the planned unexploded ordnance (UXO) clearance operations. The assessment has used a range of potential Trinitrotoluene (TNT) equivalent (TNTeq) weights (0.1, 0.15, 0.25, 2, 6, 12, 20.7, 50, 70, 155, 270, 290 and 795 kilograms (kg)) to determine potential impact scenarios.

This assessment is based on the injury criteria for marine mammals and fish proposed by the United States National Marine Fisheries Service (NMFS) (2024) and Popper *et al.* (2014), respectively.

The Technical Note supports the Marine Licence applications to enable the EGL2 Marine Scheme's UXO clearance activities.

¹ SSEN Transmission is a trading name of Scottish Hydro Electric Transmission Plc.



2 UNDERWATER SOUND ASSESSMENT

2.1 Methodology

There is considerable literature on the peak pressures that arise due to underwater explosive operations (e.g., Richardson *et al.*, 1995; Barrett, 1996; Urick, 1983; Nedwell and Edwards, 2004; Nedwell and Howell, 2004). The method used in this assessment to determine the peak pressure level is that set forward in Urick (1983) for an unconstrained TNT charge in deep water. Peak pressure is used for UXO clearance sound assessments because it represents the maximum instantaneous acoustic energy released during clearance activities, creating a short, impulsive sound wave. The equations below are one set of the various equations available to model the peak sound pressure and the attenuation. The expression for estimating the value of peak pressure (in Pa) is given as:

$$\text{Peak Pressure, } P_{\max} = 5 \times 10^7 \left(\frac{W^{0.27}}{R^{1.13}} \right)$$

$$\text{Impulse, } I = 6 \times 10^3 \left(\frac{W^{0.63}}{R^{0.89}} \right)$$

Where P_{\max} is the maximum pressure in Pascals (Pa), I is the impulse in Pascal-seconds (Pa-s), W is the TNT charge weight in kilograms and R is the radius of effect from the explosive in metres.

As the criteria for assessing physiological damage due to peak sound levels are based on un-weighted overall levels, there is no need to take the frequency content into account in this calculation. However, when assessing physiological damage using the hearing weighted Sound Exposure Level (SEL) criteria, it is necessary to account for frequency. For this purpose, a reference frequency spectrum has been taken from Nedwell and Howell (2004) and applied to the calculated source levels. The sound attenuation due to molecular absorption in the water at various distances has also been accounted for; this being frequency dependant.

The only (known) reference that gives a specific relationship between values of underwater SEL and peak pressure is that associated with the Hay Point Coal Terminal (Duncan and McCauley, 2009). This document, prepared by Curtin University of Technology, Centre for Marine Science and Technology, sets forward a best-fit curve between SEL and peak Sound Pressure Levels (SPL_{peak}) for the development, based upon measurements made by the Curtin University using "small explosive charges" made in 6 – 11 m water depth. The specific relationship is given by the expression:

$$SEL = K \times SPL_{\text{peak}}$$

Where $K = 0.8859$ and SPL_{peak} = Peak pressure level in dB re 1 μ Pa. This reference advises the standard deviation in the estimate of K as 0.0143.

These equations do not account for parameters such as the bathymetry or seabed and, therefore, are non-site specific and represent an open water source. This approach was taken as it uses broad UXO location estimates of pUXO located within the MIC and is based on best available data, which has been applied in line with the joint position statement from the Department of Environment, Food and Rural Affairs (Defra) and other government bodies regarding clearance of UXOs in the marine environment (Defra *et al.*, 2025).

EGL2 is committed to using Low Order Deflagration (LOD) as the chosen clearance method, and High Order Detonation (HOD) is not being utilised, with the only potential for HOD to occur being through an extremely unlikely



accidental/unplanned event whereby LOD may trigger an HOD. Nonetheless, the preferred UXO clearance contractor has a 100% success rate of using LOD methods with no accidental/unplanned HOD having occurred to date.

2.2 Impact Criteria

Underwater sound has the potential to affect marine life in different ways depending on its level and characteristics. Richardson *et al.* (1995) defined four zones of sound influence which vary with distance from the source and the source level. These are:

- **The zone of audibility:** this is the area within which the animal can detect the sound. Audibility itself does not implicitly mean that the sound will have an effect on the marine mammal;
- **The zone of responsiveness:** this is defined as the area within which the animal responds either behaviourally or physiologically. The zone of responsiveness is usually smaller than the zone of audibility because, as stated previously, audibility does not necessarily evoke a reaction;
- **The zone of masking:** This is defined as the area within which sound can interfere with detection of other sounds such as communication or echolocation clicks. This zone is very hard to estimate due to a paucity of data relating to how marine mammals detect sound in relation to masking levels (for example, humans are able to hear tones well below the numeric value of the overall sound level); and
- **The zone of injury / hearing loss:** this is the area where the sound level is high enough to cause tissue damage in the ear. This can be classified as either a Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS) of hearing. At even closer ranges, and for very high intensity sound sources (e.g., underwater explosions), physical trauma or even death are possible.

For this study, it is the zones of injury and disturbance (i.e., responsiveness) that are of concern (there is insufficient scientific evidence to properly evaluate masking). To determine the potential spatial range of injury and disturbance, a review has been undertaken of available evidence, including international guidance and scientific literature. The following sections summarise the relevant thresholds for onset of effects and reference the evidence base used to derive them.

2.2.1 Evidence Base for Impact Criteria

Marine Mammals

The NMFS (2018) provides details of the acoustic thresholds at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute, incidental exposure to all underwater anthropogenic sound sources. These thresholds reflect updated scientific information that has demonstrated differences between the marine mammal hearing groups first categorised in Southall *et al.* (2007).

The work undertaken by Southall *et al.* (2007) was revaluated in light of subsequent scientific advances and as a result, revised sound exposure criterion to predict the onset of auditory effects in marine mammals were published (Southall *et al.*, 2019). The only significant difference between Southall *et al.* (2019) and NMFS (2018) is the renaming of categories of Mid Frequency (MF) and High Frequency (HF) groups to HF and Very High Frequency (VHF), respectively.

In 2024 NMFS published an update to their technical guidance which proposed new sound exposure thresholds for the onset of TTS and PTS from both Impulsive and non-impulsive sound sources (NMFS, 2024). This provided updates to the sound exposure thresholds for the onset of TTS and PTS from both Impulsive and non-impulsive sound sources. The update also adopted the marine mammal categorisation adopted by Southall *et al.*, (2019). The hearing



weighting functions used in NMFS (2024) are designed to represent the bandwidths of each group within which acoustic exposures may have auditory effects. This study uses the NMFS (2024) hearing group frequency categories:

- Low Frequency (LF) cetaceans i.e., marine mammal species such as baleen whales with an estimated functional hearing range between 7 Hz and 36 kHz;
- HF cetaceans i.e., marine mammal species such as dolphins, toothed whales, beaked whales, and bottlenose whales with an estimated functional hearing range between 150 Hz and 160 kHz;
- VHF cetaceans i.e., marine mammal species such as true porpoises, river dolphins and *Cephalorhynchus* spp. with an estimated functional hearing range between 200 Hz and 165 kHz; and
- Phocid seals in Water (PW) i.e., “true seals”, a suborder of carnivorous aquatic mammals that includes grey seal and harbour seal, with an estimated functional hearing range between 40 Hz and 90 kHz (underwater).

These are presented pictorially in Figure 2-1 and Figure 2-2 Note that Figure 2-2 includes otariid pinnipeds for completeness but otherwise this group does not feature in the assessment.

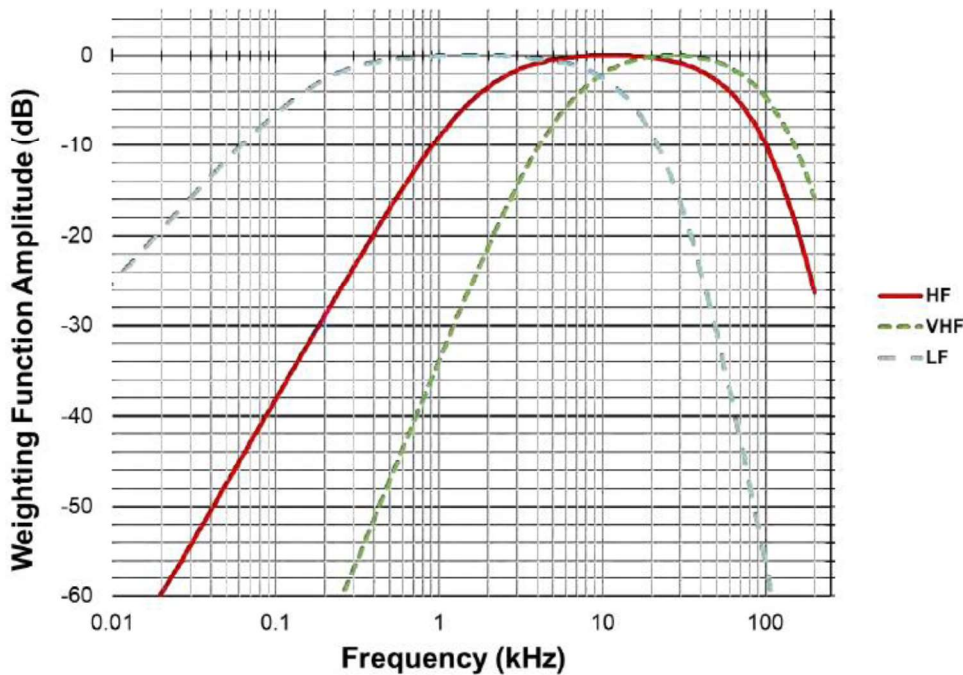


Figure 2-1 Auditory Weighting Functions Cetaceans (NMFS, 2024)

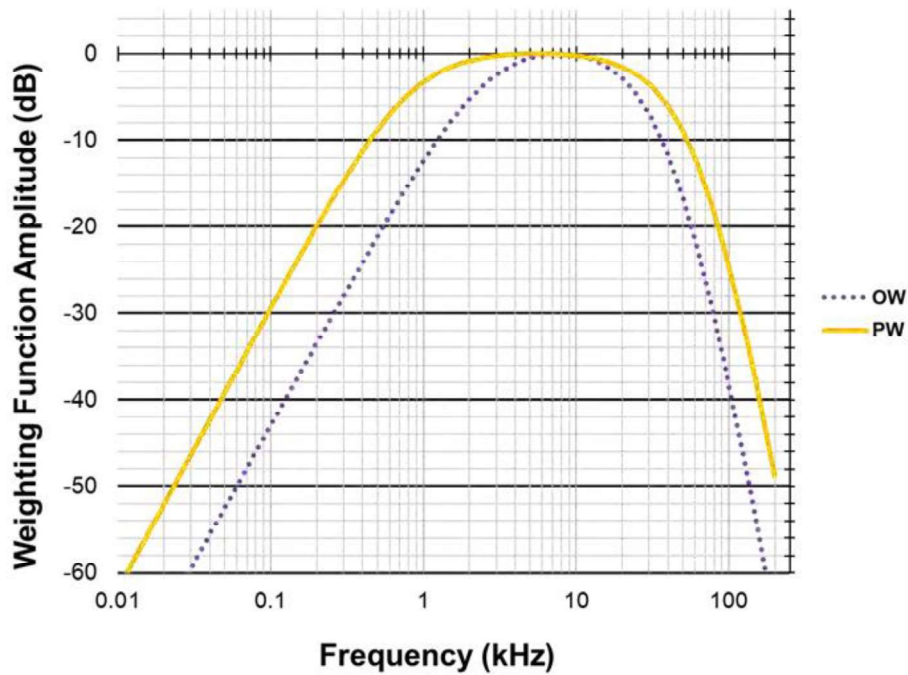


Figure 2-2 Auditory Weighting Functions for seals in water (NMFS, 2024)²

Fish

The most relevant criteria are considered to be those contained in the Sound Exposure Guidelines for Fishes and Sea Turtles (Popper *et al.*, 2014). This presents the outcome of a working group that was established to determine broadly applicable sound exposure guidelines for fishes and sea turtles. In consideration of the diversity of fish and sea turtles, guidelines were developed for broad groups, defined by the way they detect sound. The group also considered different sound sources in terms of their acoustic characteristics, and appropriate metrics defined for measurement of the received levels. The resultant sound exposure guidelines are presented in a set of tables.

Where possible, these tables provide numerical guidelines, reported in appropriate forms (e.g., peak, root mean square (rms), SEL). Where insufficient data exist to recommend guidelines, a subjective approach is adopted in which the relative risk of an effect is placed in order of rank at three distances from the source – near (N), intermediate (I), and far (F). Whilst Popper *et al.* (2014) does not ascribe particular distances to these effects, “near” might be considered to be in the tens of meters from the source, “intermediate” in the hundreds of meters, and “far” in the thousands of meters. The *relative* risk of an effect is then rated as being “high,” “moderate,” and “low” with respect to source distance and animal type.

When an explosion occurs underwater, the water volume affected by the resulting pressure wave is a function of the water depth, source depth and the nature of the substrata. In general, there are two sub regions within the total affected water volume that pose a high risk to fish. In the immediate vicinity of the explosion, the compression forces of the shock wave generated by the explosion predominate, whilst further afield the negative pressure resulting from the overshoot of the gas bubble created by the explosion and the reflection of the shock wave from the water surface can cause cavitation and negative pressures low enough to cause harmful expansion of swim bladders and other barotraumas, including mortality (Popper *et al.*, 2014).

² Whilst Otariids in Water (OW) are included in Figure 2-2 they are not considered as part of this assessment as no otariid (eared seal) species are found in United Kingdom (UK) waters.



A number of studies have been conducted on the impacts of underwater explosions on fish, although these tend to be species and charge weight specific. Popper *et al.*, (2014) proposed guidelines based on a single explosion from dynamite or another relatively small charge. The impact criteria were presented for fish within three simple groups:

- Fish with no swim bladder;
- Fish where a swim bladder is not involved in hearing; and
- Fish where a swim bladder is involved in hearing.

However, for the impact of explosives on mortality and potential mortal injury, the species groups were considered equivalent. The reported peak pressure threshold for mortality and potential mortal injury was in the range of 229-234 dB, providing an upper and lower boundary. It should be noted that this criterion is indicated for a relatively small charge, but is used in this assessment due to the lack of alternative impact criteria for fish.

2.2.2 Impact Criteria

Marine Mammals

The NMFS (2024) underwater acoustic thresholds for the onset of TTS and PTS for cetaceans and phocid seals are presented in Table 2-1. TTS is a recoverable injury but can also be an indication of zones of potential behavioural responses.

Table 2-1 Summary of Weighting Function Parameters for Impulsive Sound Sources (NMFS, 2024)

MARINE MAMMAL GROUP	TYPE OF SOUND	THRESHOLD	
		TTS	PTS
LF cetaceans	Peak Pressure, dB re 1 μ Pa (unweighted)	216	222
	SEL, dB re 1 μ Pa ² s (weighted)	168	183
HF cetaceans	Peak Pressure, dB re 1 μ Pa (unweighted)	224	230
	SEL, dB re 1 μ Pa ² s (weighted)	178	193
VHF cetaceans	Peak Pressure, dB re 1 μ Pa (unweighted)	196	202
	SEL, dB re 1 μ Pa ² s (weighted)	144	159
PW	Peak Pressure, dB re 1 μ Pa (unweighted)	217	223
	SEL, dB re 1 μ Pa ² s (weighted)	168	183



Fish

The Popper *et al.* (2014) guidelines for explosions are reproduced in Table 2-2. These guidelines are based upon a single explosion from dynamite, or another relatively small charge used to dismantle in-water structures.

Table 2-2 Guidelines for potential impact on fish as a result of an explosion (Popper *et al.*, 2014). Relative risk (high, moderate, low) is given for animals at three distances from the source defined in relative terms as near (N), intermediate (I), and far (F).

FISH HEARING GROUP	MORTALITY AND POTENTIAL MORTAL INJURY	IMPAIRMENT			BEHAVIOUR
		RECOVERABLE INJURY	TTS	MASKING	
Fish: no swim bladder (particle motion detection)	229 – 234 dB peak	(N) High (I) Low (F) Low	(N) High (I) Moderate (F) Low	NA	(N) High (I) Moderate (F) Low
Fish where swim bladder is not involved in hearing (particle motion detection)	229 – 234 dB peak	(N) High (I) High (F) Low	(N) High (I) Moderate (F) Low	NA	(N) High (I) High (F) Low
Fish where swim bladder is involved in heading (primarily pressure detection)	229 – 234 dB peak	(N) High (I) High (F) Low	(N) High (I) High (F) Low	NA	(N) High (I) High (F) Low



3 IMPACT RANGES

Table 3-1 shows modelled TNT_{eq} charge weights with estimated SPL_{peak} levels at the source that were used to calculate impact ranges.

Table 3-1 TNT charge in kg and corresponding broadband peak SPL at 1 m.

	TNT _{eq} CHARGE SIZE (kg)												
	0.1	0.15	0.25	2	6	12	20.7	50	70	155	270	290	795
SPL _{peak}	269	270	271	276	278	280	281	283	284	286	287	287	290

Table 3-2 provides the predicted TTS and PTS impact ranges (m) for each of the marine mammal hearing groups following the detonation of various weights of TNT_{eq} charge weights. The results using the unweighted SPL_{peak} sound criteria indicate that for a 0.25 kg charge (equivalent to the donor charge used during LOD) the predicted impact range for the potential onset of PTS is approximately 1.1 km for VHF cetaceans. The predicted range for the onset of TTS for this charge weight is approximately 2 km for VHF cetaceans. Based on the weighted SEL criteria, the predicted PTS ranges for the 0.25 kg charge are approximately 0.02 km and 0.1 km for the onset of PTS and TTS respectively for VHF cetaceans.

Using the unweighted SPL_{peak} criteria, the maximum predicted impact range (for the largest TNT_{eq} charge weight of 795 kg) for the potential onset of PTS is approximately 7.5 km for VHF cetaceans. The predicted maximum range for the onset of TTS is approximately 13.9 km for the VHF cetaceans.

The maximum predicted impact ranges (for the largest TNT_{eq} charge weight of 795 kg) based on the weighted SEL indicate the potential onset of PTS within approximately 2.05 km of the detonation and TTS within approximately 11.5 km; both predicted to occur within LF cetaceans.

It is important to note that the injury criteria are for potential onset of PTS in hearing. The largest of the two injury ranges (SEL or peak pressure) should be used to predict the ranges for each marine mammal group beyond which no injury would occur.

It should also be noted that the duration of the impact will be momentary, due to the nature of the source; i.e., there will be no continued exposure resulting from the LOD of a single UXO. Table 3-3 indicates that there will be the potential for mortal injury to fish up to a distance of 70 m and 484 m, based on the 0.25 kg and the largest TNT_{eq} charge weights respectively for the lowest threshold reported.



Eastern Green Link 2: Marine Scheme Installation Support

UXO Clearance Underwater Sound Assessment

Table 3-2 Predicted TTS and PTS impact ranges (m) on marine mammals for the detonation of various weights of TNT_{eq} charges, based on the weighted SEL and unweighted SPL_{peak} criteria from NMFS (2024). Charge sizes in bold font reflect the max. 0.25 kg charge used in LOD. Numerical values in turquoise identify the largest PTS impact range for each hearing group from a deflagration charge of 0.25 kg.

MARINE MAMMAL GROUP	TNT _{eq} CHARGE WEIGHT (kg)	RANGE (m)			
		SEL		SPL	
		TTS	PTS	TTS	PTS
LF Cetaceans	0.1	1,347	240	212	115
	0.15	1,483	264	234	127
	0.25	1,675	298	264	143
	2	2,754	491	434	235
	6	3,583	638	564	306
	12	4,229	753	666	361
	20.7	4,815	858	759	412
	50	5,943	1,059	936	408
	70	6,442	1,148	1,014	550
	155	7,788	1,387	1,227	666
	270	8,889	1,584	1,401	760
	290	9,044	1,611	1,426	774
795	11,514	2,051	1,813	984	
HF Cetaceans	0.1	29	5	94	51
	0.15	32	6	103	56
	0.25	36	6	117	63
	2	60	11	192	104
	6	78	14	250	135
	12	92	16	295	160
	20.7	104	19	336	182
	50	129	23	414	225
	70	140	25	449	244
	155	169	30	543	295
270	193	34	620	337	
290	196	35	631	342	
795	249	44	802	435	
VHF Cetaceans	0.1	81	14	1,628	883



Eastern Green Link 2: Marine Scheme Installation Support

UXO Clearance Underwater Sound Assessment

MARINE MAMMAL GROUP	TNT _{eq} CHARGE WEIGHT (kg)	RANGE (m)			
		SEL		SPL	
		TTS	PTS	TTS	PTS
VHF Cetaceans	0.15	90	16	1,793	973
	0.25	101	18	2,026	1,099
	2	166	30	3,328	1,806
	6	216	39	4,328	2,349
	12	255	45	5,110	2,773
	20.7	291	52	5,822	3,159
	50	359	64	7,182	3,897
	70	389	69	7,783	4,224
	155	470	84	9,417	5,110
	270	537	96	10,751	5,834
	290	546	97	10,939	5,936
	795	695	124	13,912	7,549
	PW	0.1	1	0	192
0.15		1	0	211	115
0.25		1	0	238	129
2		2	0	392	213
6		2	0	509	276
12		3	1	601	326
20.7		3	1	685	372
50		4	1	845	459
70		4	1	916	497
155		5	1	1,108	601
270		6	1	1,265	687
290		6	1	1,288	699
795		8	1	1,637	889



Table 3-3 Predicted Impact Radius of effect (m) for fish following the detonation of the various TNT weights (kg). based on the Peak Pressure Criteria from Popper et al. (2014)

Threshold Peak Pressure	TNT charge weight (Kg)	Radius of Effect (m)
234 dB (upper boundary)	0.1	34
	0.15	37
	0.25	42
	2	69
	6	90
	12	106
	20.7	121
	50	150
	70	162
	155	196
	270	224
	290	228
	795	291
	229 dB (Lower boundary)	0.1
0.15		62
0.25		70
2		115
6		150
12		177
20.7		202
50		249
70		270
155		326
270		373
290		379
795		484



4 CONCLUSIONS

The impact ranges for the clearance of UXOs containing various weights of TNT have been calculated using a simplified assessment methodology. The assessment uses calculations developed for a methodology proposed by Urick (1983). It is expected that the presented ranges overestimate the actual ranges of impact that would occur in practice, both from physical sound propagation and biological perspective.

The sound levels were converted to impact ranges using the criteria from NMFS (2024) for different marine mammal species groups, and Popper *et al.* (2014) for fish. The NMFS (2024) criteria describe nominally the same effect (i.e., TTS and PTS) based on four marine mammal hearing group specific thresholds, leading to multiple estimates of the ranges of impact which apply to each hearing group respectively. The criteria refer only to the 'onset' of injury risk and should not be considered a definitive value, and therefore does not indicate that all individuals within the predicted region will be impacted.

The predicted effect radii for fish demonstrates a consistent increase in the spatial extent of potential effects as TNT charge weight increases. Even relatively small charges (0.1–0.25 kg) generate peak pressure levels capable of causing mortal injury in fish tens of meters from the detonation point, while larger charges produce impact zones extending hundreds of meters.

Based on the 0.25 kg TNT weight, deflagration proxy, the predicted impact range for the potential onset of PTS is approximately 1.1 km for VHF cetaceans. The predicted range for the onset of TTS for this charge weight is approximately 2 km, also for VHF cetaceans. For fish species, it is predicted that there is a potential for mortal injury to fish up to a distance of 70 m, based on the lowest threshold.

For the largest expected TNT weight (795 kg) auditory injury (PTS) was predicted to occur within approximately 7.5 km, 0.44 km, 2.1 km, and 0.9 km of the UXO clearance location for VHF cetaceans, HF cetaceans, LF cetaceans and phocid seals respectively. For fish species, the maximum predicted impact radius for mortal injury was approximately 484 m based on the largest TNT charge and the lowest threshold.



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