

CONFIDENTIAL

Eastern Green Link 1

Construction Work
EPS Risk Assessment

Prysmian
Document reference 1417900
28 April 2026

OUR VISION

**Creating a world powered
by renewable energy**



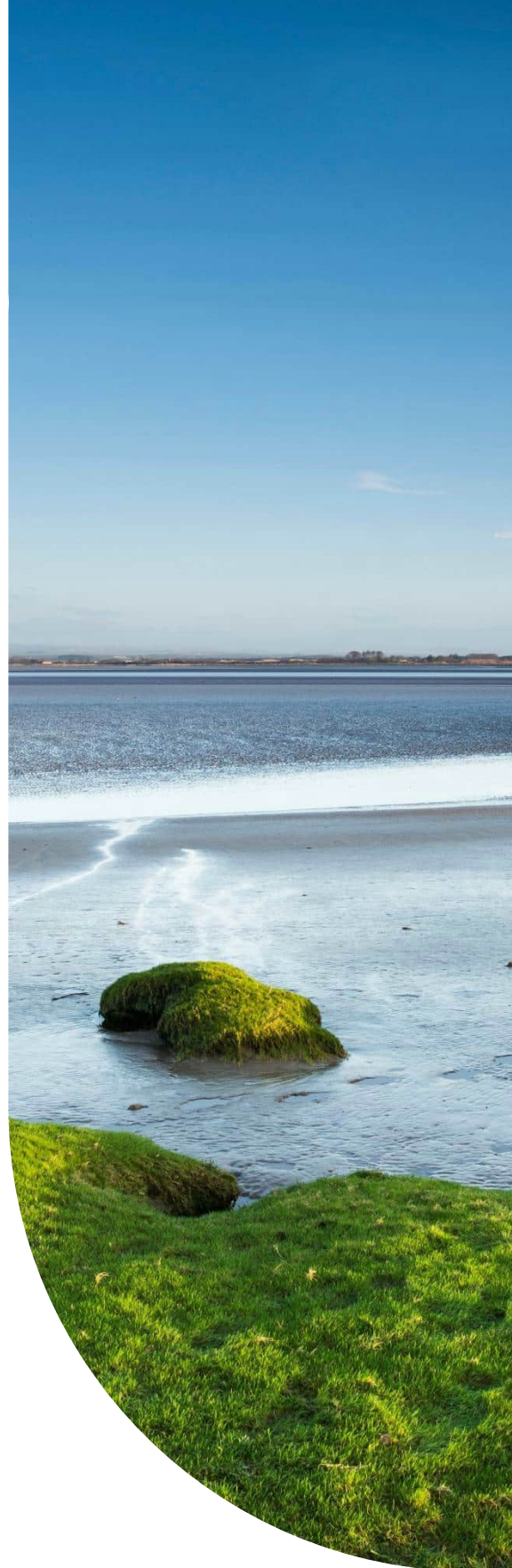
Document revision history



**natural
power**

Contents

1	Introduction.....	7
2	Planned Work.....	9
2.1	Boulder Clearance	9
2.2	Route Preparation Activities	9
2.3	Cable Installation.....	9
2.4	Cable Protection.....	10
2.5	Interim and Final As-built Surveys	10
2.6	Use of USBL Systems	10
2.7	Proposed Vessels	10
2.8	Timing and Duration.....	11
3	Legal Requirement.....	12
3.1	EPS	12
3.2	Seals.....	13
3.3	Basking Sharks	13
3.4	Guidance	14
4	Marine EPS and other Megafauna in the Region of the Marine Scheme	16
4.1	Cetaceans	16
4.2	Seals.....	18
4.3	Other Marine Megafauna	19
5	Description of Potential Impacts and Risk Assessment	21
5.1	Overview of the Potential Effects of Anthropogenic Noise on Marine Mammals	21
5.2	Increased Anthropogenic Noise from Construction Activities and Vessels.....	22
5.3	Increased Anthropogenic Noise from Geophysical Survey and Positioning Equipment.....	24
5.4	Collision Risk	25
6	Mitigation Measures	26
6.1	Transit Watches	26
7	Conclusions	27
7.1	Potential to Injure or Disturb Marine EPS.....	27
7.2	Potential for LSE on Designated Sites and Protected Areas.....	28
8	References.....	29





Tables

Table 2.1 Vessels expected to be used for construction activities	10
Table 4.1 Density and abundance estimates for cetacean species in the vicinity of the Marine Scheme	16
Table 5.1 Marine mammal hearing ranges.....	21
Table 5.2 Auditory injury thresholds for impulsive and non-impulsive noise	22
Table 5.3 Characteristics of underwater sound sources from different cable installation activities and vessels	23
Table 5.4 Indicative geophysical survey and positioning equipment specifications	24
Table 5.5 Maximum number of individuals estimated to have the potential to be disturbed by USBL systems using the 3 km EDR (28.27 km ² area).....	25

Figures

Figure 1.1 Eastern Green Link 1 (EGL1) Marine Scheme	8
Figure 4.1 EGL1 Relevant Marine Mammal Protected Areas	20



Acronyms and Abbreviations

Acronym	Meaning
CES	Coastal East Scotland
CGNS	Celtic and Greater North Seas
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLB	Cable Lay Barge
CLV	Cable Lay Vessel
EDR	Effective Deterrence Range
EGL1	Eastern Green Link 1
EPS	European Protected Species
FCS	Favourable Conservation Status
FPV	Fall Pipe Vessel
GB	Great Britain
GNS	Greater North Sea
GW	Giga Watt
HF	High Frequency
HVDC	High Voltage Direct Current
IAMMWG	International Agency Marine Mammal Working Group
JNCC	Joint Nature Conservation Committee
LF	Low Frequency
LSE	Likely Significant Effect
MBES	Multibeam Echo Sounder
MCT	Marine Conservation Team
MCZ	Marine Conservation Zone
MD-LOT	Marine Directorate Licensing Operations Team
MFE	Mass Flow Excavation



Acronym	Meaning
MMO	Marine Management Organisation
MU	Management Unit
NCMPA	Nature Conservation Marine Protected Area
NGET	National Grid Electricity Transmission
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NS	North Sea
PLGR	Pre-Lay Grapnel Run
PTS	Permanent Threshold Shift
PW	Phocid Pinnipeds in Water
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage (now NatureScot)
SPEN	SP Energy Network
TTS	Temporary Threshold Shift
UK	United Kingdom
USBL	Ultra Short Base Line
VHF	Very High Frequency



1 Introduction

Eastern Green Link 1 (EGL1; hereafter referred to as the 'Marine Scheme') is the one of several developments required to increase the capability of the existing Great Britain (GB) transmission network between Scotland and the North of England (**Figure 1.1**). This increase is required to facilitate growth in flow of renewable generation, helping ensure that the United Kingdom (UK) can meet its target of enabling 40 GW of renewable energy by 2030 and achieving a 'Net Zero economy' by 2050.

The Marine Scheme is being developed by a partnership between SP Energy Networks (SPEN) and National Grid Electricity Transmission (NGET).

The Marine Scheme involves construction of a 2 GW high voltage direct current (HVDC) electrical 'superhighway' operating at 525 kV between the Torness area in East Lothian, Scotland and Hawthorn Pit (north of Seaham) in County Durham, England. The cable will be approximately 196 km long in total; approximately 176 km will be subsea with each land section being about 10 km in length (**Figure 1.1**). Once complete it will be capable of bi-directionally transmitting up to 2 GW – sufficient power for up to 2 million homes.

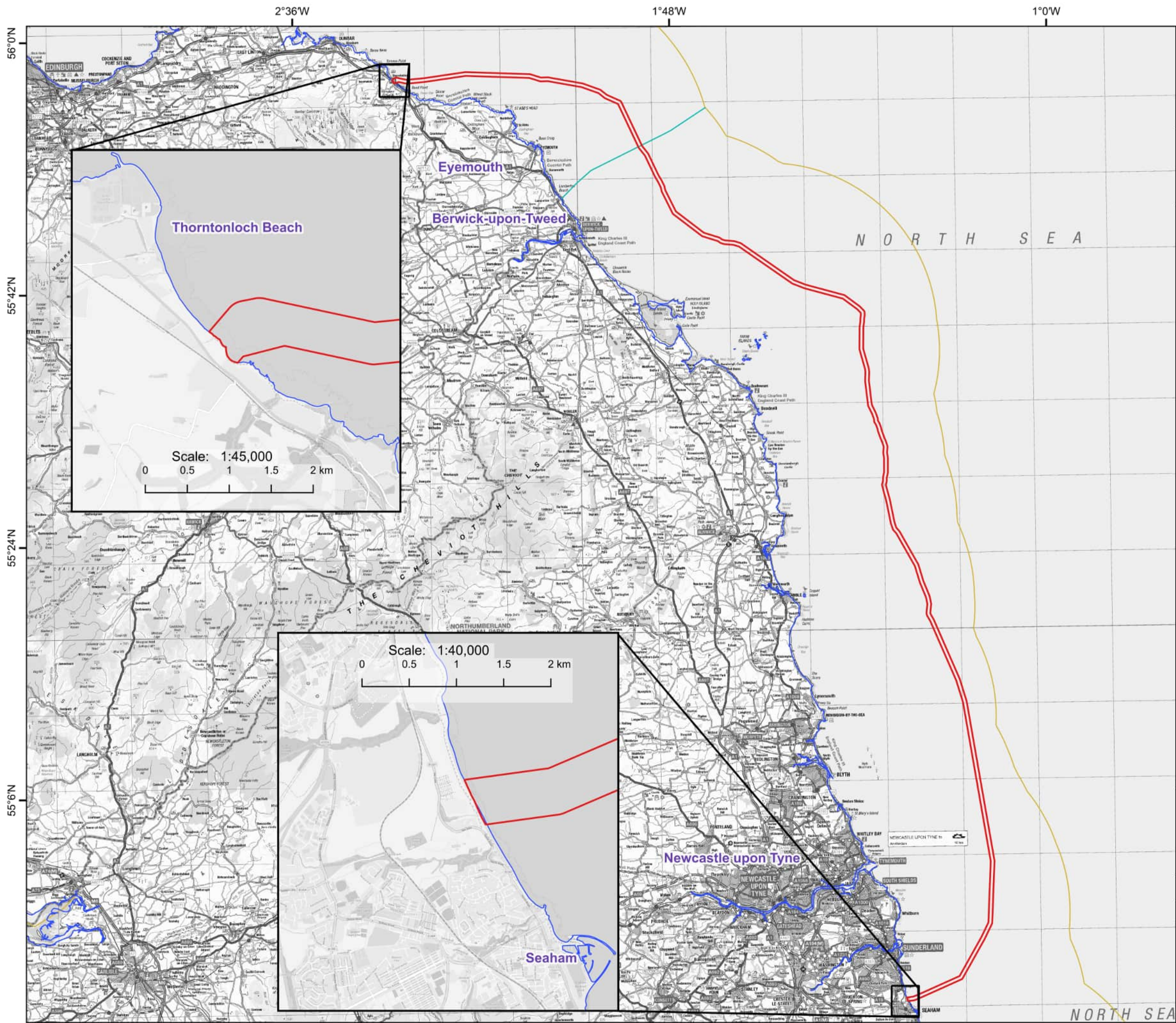
The Marine Scheme has been awarded the following Marine Licences:

- L/2023/00212/2 in English waters by the Marine Management Organisation (MMO); and
- MS-00009880 in Scottish waters by the Marine Directorate – Licensing Operations Team (MD-LOT).

The purpose of this European Protected Species (EPS) Risk Assessment is to:

- Describe the proposed construction work including route preparation and cable installation activities;
- Outline the legislation and guidance applicable to this assessment;
- Describe the marine EPS and other marine megafauna which are likely to occur in the region of the Marine Scheme;
- Assess whether there is any risk to marine EPS and other marine megafauna as a result of the proposed work;
- Outline any proposed mitigation measures; and
- Ascertain whether EPS and basking shark licences are required and can be awarded in Scottish territorial waters¹ and whether a Marine Wildlife Licence is required and can be awarded in English territorial and offshore waters.

¹ Neither the Marine Scheme, nor any potential effects, extend into Scottish offshore waters (>12 nautical miles (NM) from the coast).



Project:
**Eastern Green Link 1
(EGL1), Torness to
Hawthorn Pit**

Title:
**Figure 1.1: Eastern Green Link
1 Marine Scheme**

Key

- EGL1 Marine Scheme
- UK Territorial Sea Limit (12 NM)
- Scotland-England Water Border
- Mean High Water Spring (MHWS)

© Crown Copyright 2025. All rights reserved. Ordnance Survey Licence
AC0000808122.
© OpenStreetMap contributors

Scale @ A3:1:500,000
Coordinate System: WGS 84 UTM Zone 30N

0 7 14 21 28 km

N

Date: 02-04-26	Prepared by: NN	Checked by: CC
Ref: GB211525_M_015_A		

Drawing by:
The Natural Power Consultants Limited
The Green House
Forrest Estate, Dairy
Castle Douglas, DG7 3XS, UK
Tel: +44 (0)1644 430008
Fax: +44 (0)845 299 1236
Email: sayhello@naturalpower.com
www.naturalpower.com

Notes: a) Information on this plan is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the plan itself. b) For the avoidance of doubt and unless otherwise stated: 1. this plan should be used for identification purposes only, unless otherwise stated in accompanying documentation. 2. The Natural Power Consultants Limited accepts no responsibility for the accuracy of data supplied by third parties. 3. The Natural Power Consultants Limited accepts no liability for any use which is made of this plan by a party other than its client. No third party who gains access to this plan shall have any claim against The Natural Power Consultants Limited in respect of its contents.



2 Planned Work

The planned construction work at the Marine Scheme is anticipated to include the following:

- Boulder clearance;
- Route preparation activities;
- Cable installation (in two phases);
- Cable protection; and
- Interim and final as-built surveys.

2.1 Boulder Clearance

Boulder clearance activities will take place in advance of route preparation and cable installation in discrete areas along the cable route. Boulders will be re-positioned by means of a boulder clearance vessel with a boulder plough or boulder grab.

2.2 Route Preparation Activities

Route preparation activities are carried out in order to ensure the subsea cable(s) can be installed safely. These activities may include sea trials and pre-lay grapnel runs (PLGRs). Pre-installation route surveys and unexploded ordnance (UXO) clearance will have already been undertaken prior to construction activities starting (and are not covered in the risk assessment).

2.2.1 Sea trials

In areas of very hard or very soft seabed, submarine cable trenching tools may be trialled within the marine installation corridor, to determine if they are able to achieve the required target trench depth.

2.2.2 Pre-lay Grapnel Run (PLGR)

Pre-lay grapnel runs are executed through the use of a support vessel that tows de-trenching grapnels along the cable route to snatch debris on the surface, or just below the surface, of the seabed.

2.3 Cable Installation

There will be two phases during cable installation: a cable laying (Phase 1) and a cable burial (Phase 2) phase.

2.3.1 Phase 1

In phase 1 of the cable installation, it is proposed that the cable will be laid using a cable lay vessel (CLV) or a cable lay barge (CLB) in shallow waters. These **Reda** will be supported by other vessels such as guard vessels or anchor vessels (see **Section 2.7**).

To install the cable there are two potential methods that can be used:

- Simultaneous cable lay and burial (primary method); or
- Surface cable lay followed by post-lay burial in Phase 2 (see **Section 2.3.2**).

2.3.2 Phase 2

Phase 2 of the cable installation involves the burial of any surface laid cable. This will occur through use of the following equipment:

- Cable burial ploughs;



- Jetting machines; or
- Mechanical trenches.

2.4 Cable Protection

To protect the cables from other assets, potential damages, or where burial passes do not position the cable bundle at the requested depth of lowering, a rock berm will be placed through the use of a fall pipe vessel (FPV). Additionally, a rock berm or mattress will be placed at crossing locations with other assets, where the cable bundle cannot be buried due to the presence of the asset being crossed.

2.5 Interim and Final As-built Surveys

Interim and as-built surveys will be performed using both sound-emitting (e.g. multibeam echo sounder (MBES)) and non-sound emitting (e.g. pipe and cable tracker) equipment. These surveys are carried out during and post-cable lay to identify any risks posed by the laid subsea cable to other marine users.

2.6 Use of USBL Systems

It is assumed that ultra-short baseline (USBL) systems will be used during the planned route preparation and cable installation activities and associated surveys along the length of the Marine Scheme, as indicated within **Figure 1.1**.

The use of USBL systems, whilst acknowledged generally within the Marine Licences and the Environmental Appraisal Report that accompanied the Marine Licence applications, has not previously been assessed for construction and is therefore included here.

USBL equipment specifications are presented in **Table 5.4**.

2.7 Proposed Vessels

Details of the vessel types proposed for use are provided below (**Table 2.1**).

Table 2.1 Vessels expected to be used for construction activities

Vessel	Use
Cable laying vessel (CLV)	Carry and handle long lengths of power cables and can be used to assist the cable tensioner to accurately position the cable on the seabed.
Cable lay barge (CLB)	Used for cable lay operations in shallow water.
Jack-up barge	Provides a stable and elevated work platform.
Back-hoe dredger	Supports pre-installation trenching.
Fall pipe vessel (FPV)	Used for placing rock berms.
Guard vessel	Used to maintain surveillance around the CLV and CLB, as well as guarding free ends of the cable left on the seabed during reloading.



Vessel	Use
Specialised support vessels	These vessels help with surveys, trenching, or boulder clearance.

2.8 Timing and Duration

The construction work at the Marine Scheme is preliminarily planned to begin in Q3 2026 and will be undertaken over a duration of around one year subject to any unforeseen delays. The planned construction work will start with boulder clearance in Q3 2026 with route preparation and cable installation activities following in Q1 – Q3 of 2027. The construction work will finish with the cable protection work and the as-built survey in Q3-Q4 2027.



3 Legal Requirement

3.1 EPS

All species of cetacean in waters around the UK are considered EPS under Annex IV of the Habitats Directive (Council Directive 92/43/EEC) which covers animal and plant species of community interest in need of strict protection.

The need to consider EPS within English and Scottish Territorial Waters comes from two articles of legislation, these are:

- The Conservation of Habitats and Species Regulations 2017 (as amended in England) which transpose the Habitats Directive into English law. This legislation covers English Territorial Waters; and
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended in Scotland) which transposes the Habitats Directive into Scottish law. This legislation covers Scottish Territorial Waters.

The need to consider EPS within offshore waters (>12 nautical miles (NM) from the coast) comes from:

- The Conservation of Offshore Marine Habitats and Species Regulations 2017 which transpose the Habitats Directive into UK law for all offshore activities. This legislation covers UK waters (including both Scottish and English Waters) beyond the 12 NM limit.

These Regulations (collectively known as the 'Habitats' and 'Offshore' Regulations) provide for the designation of protected European sites (Special Areas of Conservation (SACs)) and the protection of EPS as designated under the Habitats Directive.

The Offshore Regulations state, in Section 45, that it is an offence to:

- Deliberately capture, kill or injure any wild animal of a EPS, as listed under Annex IV of the Habitats Directive;
- Damage or destroy, or cause deterioration of the breeding sites or resting places of a EPS; and
- Deliberately disturb EPS (in particular disturbance which is likely to impair the ability of a significant group of animals of that species to survive, breed, rear or nurture their young, or which might affect significantly their local distribution or abundance).

The interpretation of the Habitats Directive (Council Directive 92/43/EEC) is more conservative in Scottish Territorial Waters than in English waters (Territorial and offshore). The Conservation of Habitats and Species Regulations 1994 (as amended in Scotland) state, under section 39, that it is an offence to:

- Deliberately or **recklessly** capture, kill or injure a wild animal of a EPS, as listed under Annex IV of the Habitats Directive;
- Damage or **recklessly** destroy, or cause deterioration of the breeding sites or resting places of an EPS;
- Deliberately or **recklessly** disturb EPS (in particular disturbance which is likely to impair their ability to survive, breed, reproduce, nurture their young, migrate or hibernate, or which might affect significantly their local distribution or abundance);
- Disturb **any** EPS in a matter that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs; and
- **Deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean) through Regulation 39 (2).**

The additional protection afforded by the Conservation of Habitats and Species Regulations 1994 (as amended in Scotland) has been shown in **bold** in the list above. It is therefore an offence to deliberately or recklessly disturb a single cetacean in Scottish Territorial Waters.



In addition, any means of capturing or killing which is indiscriminate and capable of causing the local disappearance of - or serious disturbance to - any population of EPS is an offence under both Scottish and English Regulations.

In English Waters, further protection is provided to cetaceans from section 9 of the Wildlife and Countryside Act 1981 which states that it is considered an offence to disturb or injure a cetacean. In Scotland, cetaceans are protected under Schedule 5 of this Act (as amended).

Licences may be granted by the Marine Directorate (on behalf of the Scottish Ministers) or the MMO via their specific Marine Conservation Team (MCT) (on behalf of the Secretary of State) which allow otherwise illegal activities to go ahead. In England, if it is considered that a Marine Wildlife Licence will not be required, a Marine Licencing Exemption Notification can be submitted to the MMO (i.e. with the exemption process serving as a mechanism for confirming the lack of requirement).

Three tests must be passed before a license can be granted:

1. The license must relate to one of the purposes referred to in Regulation 44;
2. There must be no satisfactory alternative (Regulation 44, 3a); and
3. The action authorised must not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status (FCS) in their natural range (Regulation 44, 3b).

FCS is defined in the Habitats Regulations as the following:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable element of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

The proposed works are within the 12 NM limit of both English and Scottish Territorial Waters. However, sound from the proposed construction work may extend beyond the 12 NM limit. Therefore, the Habitats Regulations (as employed in England and Scotland respectively) and the Offshore Regulations both apply.

3.2 Seals

Under the Wildlife and Countryside Act 1981, the Conservation of Seals Act 1970, and the Conservation of Habitats and Species Regulations 2017, it is an offence to take, injure or kill a seal out to 12 NM.

Under the Conservation of Offshore Marine Habitats and Species Regulations 2017, beyond 12 NM, it is an offence to capture or kill a seal.

The Marine (Scotland) Act 2010 provides the main legal framework for protecting seals in Scottish Territorial Waters. The Act introduced a licensing system for killing or taking seals, making it an offence to do so without a licence. One hundred and ninety-four seal haul-out sites in Scotland have been designated under the Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 which protects seals from harassment by humans at locations where they come ashore to rest, moult, or breed.

3.3 Basking Sharks

In Scotland and England, it is considered an offence to disturb or injure a basking shark. In Scotland, basking sharks are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). In England, basking shark offences are covered under section 9 of the Wildlife and Countryside Act (1981). Basking sharks are also protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), under Council Regulation (EU) No 605/2013.



3.4 Guidance

Guidance entitled 'The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area' was published in 2010 by the Joint Nature Conservation Committee (JNCC), Natural England and the Countryside Council for Wales (now Natural Resources Wales) (JNCC *et al.*, 2010). This document has been used as a resource when a view is needed as to whether there is potential for an offence of deliberately disturbing or injuring/killing a marine EPS to occur within English Territorial and UK offshore waters, as a result of any activity associated with the proposed works.

The guidance considers certain activities that produce loud noises in areas where an EPS could be present to have the potential to result in an injury or disturbance offence, unless appropriate mitigation measures are implemented. The risk of an offence being committed is dependent on a number of factors, including the following:

- Presence/absence of EPS;
- Noise associated with the activity and resulting impacts on EPS species;
- Frequency of occurrence of EPS;
- Density of EPS; and
- Length of exposure of EPS to noise associated with proposed activities.

The JNCC *et al.* (2010) guidance also considers that the potential for disturbance from some activities can be considered "trivial". Activities which might be considered trivial include those that lead to "sporadic disturbances without any likely negative impact on the species".

For an activity to be considered "non-trivial", the JNCC guidance (JNCC *et al.*, 2010) states that "the disturbance to marine EPS would need to be likely to at least increase the risk of a certain negative impact on the species' FCS".

In Scotland the Marine Directorate and Scottish Natural Heritage (SNH) (now NatureScot) produced guidance for Scottish inshore waters 'The protection of Marine European Protected Species from injury and disturbance' in March 2014 (Marine Scotland and SNH, 2014). This guidance was updated in July 2020 (Marine Scotland and SNH, 2020). The Marine Directorate recognise that the guidance '...reflects a precautionary approach...' to the interpretation of the Habitats Directive with regards to EPS and requires the careful examination of the potential impact of proposed offshore activities, and the resultant noise produced, on individual animals likely to be present at the location.

The guidance states that the two main potential causes of death or injury are physical contact (with a vessel) and anthropogenic noise. Likelihood of disturbance for individuals includes factors such as:

- Spatial and temporal distribution of the animal in relation to the activity;
- Any behaviour learned from prior experience with the activity;
- Similarity of the activity to biologically important signals (particularly important in relation to activities creating sound); and
- The motivation of the animal to remain within the areas (e.g., food availability).

Likelihood of potential impacts should include the following considerations:

- Type of activity;
- Duration and frequency of the activity;
- Extent of the activity;



- Timing and location of the activity; and
- Other known activities in the area at the same time.



4 Marine EPS and other Megafauna in the Region of the Marine Scheme

4.1 Cetaceans

Four cetacean species are considered to occur on a relatively common basis in the vicinity the Marine Scheme: Harbour porpoise (*Phocoena phocoena*), bottlenose dolphin (*Tursiops truncatus*), white-beaked dolphin (*Lagenorhynchus albirostris*) and minke whale (*Balaenoptera acutorostrata*) (Arso Civil *et al.*, 2021; Cheney *et al.*, 2024; Gilles *et al.*, 2023; IAMMWG, 2023).

Occasional visitors to the region include common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), white-sided dolphin (*Lagenorhynchus acutus*), killer whale (*Orcinus orca*) and long-finned pilot whale (*Globicephala melas*). Sightings of humpback whale (*Megaptera novaeangliae*) and fin whale (*Balaenoptera physalus*) have also been recorded².

The Marine Scheme falls within SCANS-IV Blocks NS-C and NS-D (Gilles *et al.*, 2023). Abundances and densities of the species commonly seen in the area are shown in **Table 4.1**. Densities from both Blocks have been illustrated to provide a comprehensive view of cetacean presence in the area. The assessment uses the greatest of the estimates for each species. The abundance estimates for the whole and the UK portion of Inter-Agency Marine Mammal Working Group (IAMMWG) marine mammal management units (MU) for each species are also presented in **Table 4.1** (IAMMWG, 2023).

This quantitative risk assessment considers the cetacean species commonly found in the vicinity of the Marine Scheme. Whilst not considered specifically in this assessment due to their low likelihood of occurrence, any assessment of, or mitigation measures put in place for, the species assessed are considered to be appropriate to / relevant for other less commonly occurring species of cetacean.

Table 4.1 Density and abundance estimates for cetacean species in the vicinity of the Marine Scheme

Species	SCANS Block	SCANS density estimate (individuals km ²)	Management Unit (MU)	Abundance of animals in MU	Abundance of animals in UK portion of MU
Harbour porpoise	NS-C	0.6027	North Sea (NS)	346, 601	159,632
	NS-D	0.5985			
Bottlenose dolphin	NS-C	0.0419	Greater North Sea (GNS) and Coastal East Scotland (CES)	2,248	2,111
	R*	0.0298			
White-beaked dolphin	NS-C	0.0149	Celtic and Greater North Seas (CGNS)	43,951	34,025
	NS-D	0.0799			
Minke whale	NS-C	0.0068	CGNS	20,118	10,288
	NS-D	0.0419			

Source: SCANS-IV densities (Gilles *et al.*, 2023), MU abundance (IAMMWG, 2023), CES MU abundance (Cheney *et al.*, 2024).

*SCANS III Block R density presented for bottlenose dolphin as no density available for SCANS-IV Block NS-D (Hammond *et al.*, 2017).

² <https://www.seawatchfoundation.org.uk/recent sightings/>



4.1.1 Harbour Porpoise

The harbour porpoise is widespread around the UK, including the North Sea, Irish Sea, the seas west of Ireland and Scotland, and northwards to Orkney and Shetland. Since the 1990s it has become much less common around the Northern Isles, but it appears to be returning to the English Channel and southern North Sea, where it was infrequent in the late 1980s. The recent SCANS-IV survey, the latest in a series of large-scale surveys for cetaceans in European Atlantic waters, showed that the harbour porpoise population in the North Sea is stable and there is very little difference in the estimated abundance between 2016 and 2022 (Gilles *et al.*, 2023).

Harbour porpoise density in the vicinity of the Marine Scheme, from SCANS-IV, is provided in **Table 4.1**. The IAMMWG abundance for harbour porpoise from the NS MU is also provided.

The closest designated site (SAC) for harbour porpoises (Southern North Sea SAC) is approximately 111 km southeast from the Marine Scheme at its closest point (**Figure 4.1**). The Effective Deterrence Range (EDR) for USBL use is 3 km (the greatest potential disturbance range from the proposed works; JNCC, 2025). There is no overlap with the Southern North Sea SAC, therefore there is no potential for significant disturbance or Likely Significant Effects (LSE).

4.1.2 Bottlenose Dolphin

Both inshore and offshore bottlenose dolphin ecotypes are recognised in UK waters and are likely to occur in the vicinity of the Marine Scheme. Due to the social structure and behaviour of bottlenose dolphins, which tend to occur in clusters or groups rather than singly, density estimates for large areas are not always representative because an even distribution is assumed. Nonetheless, the density of bottlenose dolphins in the vicinity of the Marine Scheme is provided in **Table 4.1** (Gilles *et al.*, 2023). There is no bottlenose dolphin density presented in SCANS-IV for block NS-D so alternatively the density estimate provided has been obtained from SCANS-III block R (Hammond *et al.*, 2017).

Bottlenose dolphin abundance estimates are provided for the summation of both the GNS (IAMMWG, 2023) and CES (Cheney *et al.*, 2024) MUs for bottlenose dolphin in **Table 4.1**.

The closest designated site for bottlenose dolphins (Moray Firth SAC) is approximately 280 km north-northwest of the Marine Scheme via the shortest at sea route (**Figure 4.1**), however, individuals which utilise this SAC are known to regularly travel along the coasts of east Scotland and northern England meaning there is potential connectivity with the Marine Scheme (Cheney *et al.*, 2024). However, due to the social structure and behaviour of bottlenose dolphins, the likelihood of individuals being present at the same time as the construction vessels is small, therefore there is no potential for significant disturbance or LSE.

4.1.3 White-Beaked Dolphin

White-beaked dolphins are detected predominantly offshore in UK waters and their highest densities have been estimated around the Shetland Islands, northern North Sea and northwest Scotland (Gilles *et al.*, 2023). The density of white-beaked dolphins in the vicinity of the Marine Scheme, from SCANS-IV, is provided in **Table 4.1**. The IAMMWG abundance for white-beaked dolphin from the CGNS MU is also provided.

There are no designated sites (SACs) for white-beaked dolphins (the species is not listed on Annex II of the Habitats Directive).

4.1.4 Minke Whale

Minke whales are the smallest of the baleen whales and are widespread around the UK. There was some evidence that minke whale distribution in the North Sea was shifting south between 1994 and 2005 (Hammond *et al.*, 2013). In sequential surveys the distribution seemed to stay the same until the observed distribution from the recent SCANS-IV survey showed many sightings further south in the North Sea than previously seen. There is no evidence of a change in abundance for minke whales in the North Sea from 1989-2022 (Gilles *et al.*, 2023).



Minke whale density in the vicinity of the Marine Scheme, from SCANS-IV, is provided in **Table 4.1**. The IAMMWG abundance for minke whales from the CGNS MU is also provided.

There are no designated sites (SACs) for minke whales (the species is not listed on Annex II of the Habitats Directive).

The closest protected area for minke whale (Southern Trench Nature Conservation Marine Protected Area (NCMPA)) is approximately 168 km north-northwest of the Marine Scheme at its closest point (**Figure 4.1**). Applying the 3 km EDR for USBL (the greatest potential disturbance range from the proposed works; JNCC, 2025) there is no overlap with the Southern Trench NCMPA. Therefore, there is considered to be no potential to adversely affect the Conservation Objectives of the site.

4.2 Seals

Two seal species occur on a relatively common basis in the North Sea: Grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) (Carter *et al.*, 2022).

The Marine Scheme does not directly overlap with any designated seal haul out sites. However, the Fast Castle seal haul out site (which is a grey seal breeding colony) is in the near vicinity of the cable route, being located approximately 1.5 km southeast of the landfall site in Torness (**Figure 4.1**).

4.2.1 Grey Seals

Grey seals are among the rarest seals in the world; the UK population represents about 40% of the world population and 95% of the European population. Grey seals spend most of the year at sea and may range widely in search of prey. They come ashore in the autumn forming breeding colonies on rocky shores, beaches, and in caves often on small largely uninhabited islands.

The greatest densities of grey seals in relation to the Marine Scheme are found in the Berwickshire and North Northumberland Coast SAC (designated for this species) which is approximately 350 m south of the Marine Scheme at its closest point (**Figure 4.1**). The next closest SAC designated for grey seals is the Isle of May SAC which is 26.4 km northwest from the Marine Scheme at its closest point (**Figure 4.1**). Applying the 3 km EDR for USBL (the greatest potential disturbance range from the proposed works; JNCC, 2025) there is potential for overlap with the Berwickshire and North Northumberland Coast SAC. However, the construction vessels will only be in the vicinity of the SAC for a short period of time, a matter of days at most, so any disturbance to grey seals will be short term and reversible. Also, the area of the SAC potentially impacted (c.24 km²) is small in comparison with the size of the SAC (652 km²). There is therefore adequate suitable alternative foraging habitat available to grey seals nearby so it is not considered that the proposed construction works at the Marine Scheme will have an adverse effect on food availability. The Habitats Regulations Assessment (HRA) Report for the Marine Scheme (AECOM, 2022a) screened out underwater sound disturbance to grey seals from the Berwickshire and North Northumberland Coast SAC for Appropriate Assessment on the basis that there will be no LSE.

4.2.2 Harbour Seals

Harbour seals have a near circumpolar distribution, with at least four subspecies recognised worldwide. Only the eastern Atlantic subspecies occurs in Europe. The UK population represents about 5% of the world population and approximately 50% of the European population. Harbour seals are the characteristic seal of sandflats and estuaries but are also found on rocky shores. As pups swim almost immediately after birth, harbour seals can breed in sheltered tidal areas where sand or mud banks allow access to deep water.

Harbour seals are not common in the vicinity of the Marine Scheme. The closest SAC designated for harbour seal (Firth of Tay and Eden Estuary SAC) is approximately 54 km northwest from the Marine Scheme at its closest point. Applying the 3 km EDR for USBL (the greatest potential disturbance range from the proposed



works; JNCC, 2025) there is no overlap with the Firth of Tay and Eden Estuary SAC, therefore there is no potential for significant disturbance or LSE.

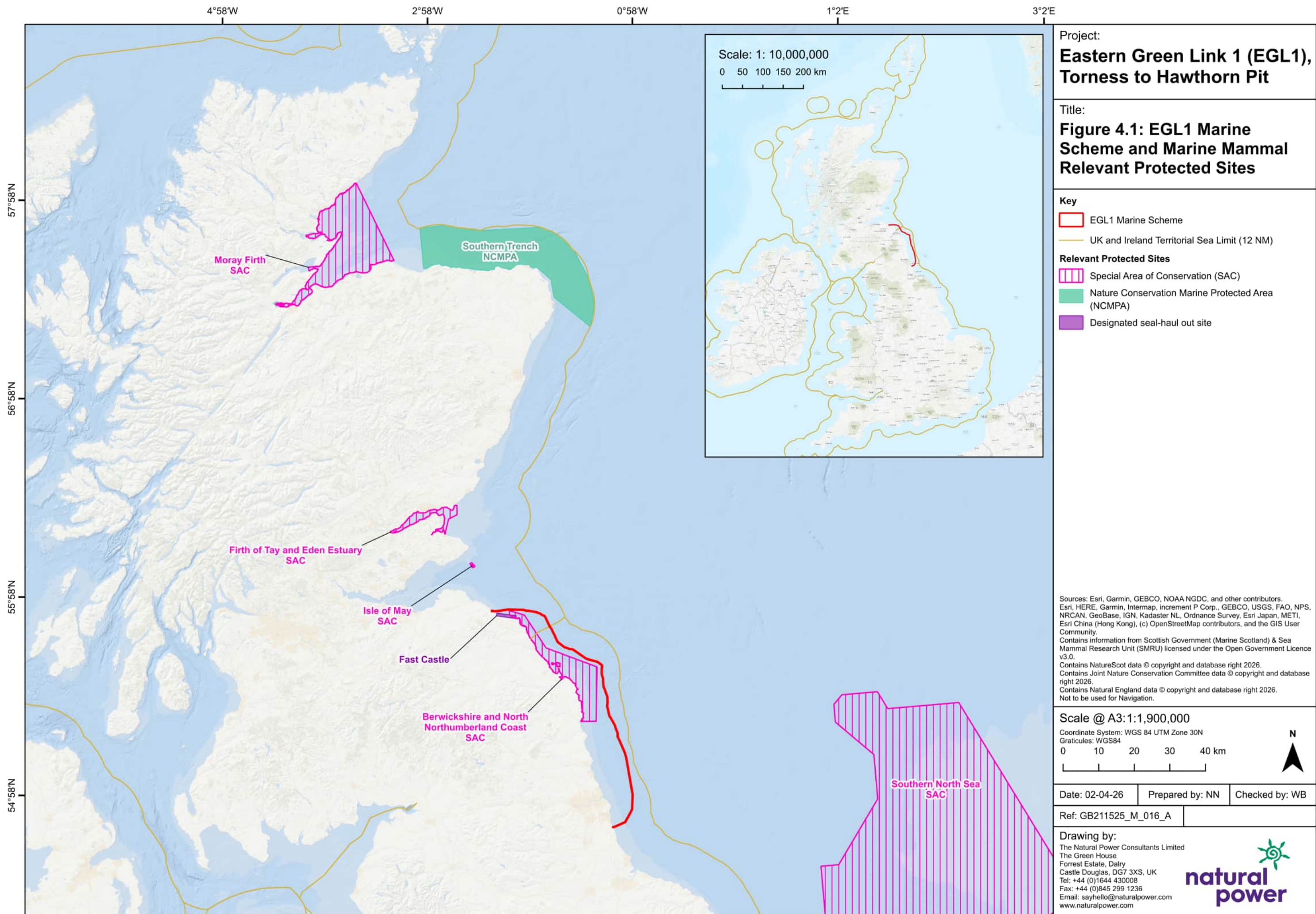
4.3 Other Marine Megafauna

4.3.1 Basking Shark

There have been relatively few sightings of basking sharks (*Cetorhinus maximus*) in the North Sea (Drewery, 2012; Wilson *et al.*, 2020) which indicates that they are uncommon in the vicinity of the Marine Scheme. Due to their habit of feeding at slow speed very close to the surface, basking sharks are potentially at risk from collision with boat traffic (Wilson *et al.*, 2020). In contrast, although there is little information on sound detection in basking sharks, there is no direct evidence of sound causing basking shark mortality or stress (Wilson *et al.*, 2020). Due to the lack of potential for harm as a result of increased anthropogenic noise for this species, it has not been deemed necessary to undertake a detailed assessment in relation to underwater noise. However, any and all mitigations proposed for noise-sensitive species will also be applied to basking sharks).

4.3.2 Marine Turtles

Up to five species of marine turtle (which are also EPS) have been recorded in British waters. Leatherback turtles (*Dermochelys coriacea*) are the most commonly recorded turtle species however the species is thought to be at the most extreme northern limit of its natural range in UK waters (BEIS, 2016). Sightings in the North Sea are uncommon with most UK sightings occurring in the Irish Sea (BEIS, 2016). Due to their low likelihood of occurrence, this EPS Risk Assessment does not assess potential effects on turtles. However, any mitigation proposed (**Section 6**) will be applied to all marine megafauna species including turtles.



Notes: a) Information on this plan is directly reproduced from digital and other material from different sources. Minor discrepancies may therefore occur. Where further clarification is considered necessary, this is noted through the use of text boxes on the plan itself. b) For the avoidance of doubt and unless otherwise stated: 1. this plan should be used for identification purposes only, unless otherwise stated in accompanying documentation. 2. The Natural Power Consultants Limited accepts no responsibility for the accuracy of data supplied by third parties. 3. The Natural Power Consultants Limited accepts no liability for any use which is made of this plan by a party other than its client. No third party who gains access to this plan shall have any claim against The Natural Power Consultants Limited in respect of its contents.



5 Description of Potential Impacts and Risk Assessment

During the proposed construction work there is potential for marine EPS, seals and basking sharks to be impacted. The following impacts associated with the proposed work may affect marine EPS and seals:

- Increased anthropogenic noise from construction activities and vessels; and
- Increased anthropogenic noise from geophysical survey and positioning equipment.

The following impact associated with the proposed work may affect marine EPS, seals and basking sharks:

- Collision risk (with the construction vessel(s)).

5.1 Overview of the Potential Effects of Anthropogenic Noise on Marine Mammals

It is widely documented that marine mammals are sensitive to underwater noise with the level of sensitivity depending on the hearing ability of the species (**Table 5.1**).

Potential effects of underwater noise on marine mammals can be summarised as:

- Auditory injury; and
- Behavioural responses.

Table 5.1 Marine mammal hearing ranges

Functional Hearing Group	Example Species	Generalised Hearing Range (kHz)
Low frequency (LF) cetaceans	Minke whale	0.007 – 36
High frequency (HF) cetaceans	Bottlenose dolphin, white-beaked dolphin	0.15 – 160
Very high frequency (VHF) cetaceans	Harbour porpoise	0.2 – 165
Phocid pinnipeds in water (PW)	Grey seal, harbour seal	0.04 – 90

Source: NMFS (2024).

5.1.1 Auditory Injury

In 2024 the US National Marine Fisheries Service (NMFS) published updated guidance identifying the received levels and auditory weighting functions, or criteria, at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute (≤ 24 hours) exposure to underwater anthropogenic sound sources. The thresholds used in this assessment (taken from NMFS, 2024) are detailed in **Table 5.2** (for the onset of auditory injury³). Use of National Marine Fisheries Service (NMFS) (2024) is considered to constitute best practice because it supersedes earlier guidance from NMFS and publications by Brandon Southall and colleagues on this topic.

³ Defined by NMFS (2024) as damage to the inner ear that can result in destruction of tissue. Auditory injury may or may not result in a Permanent Threshold Shift (PTS). PTS (as defined by NMFS, 2024) is a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level. Temporary Threshold Shift (TTS) has not been used to determine auditory injury here because it is a temporary loss in hearing sensitivity from which animals completely recover.



JNCC *et al.* (2010) proposes that a permanent shift in the hearing thresholds of an EPS would constitute an injury offence. If it is likely that an EPS could become exposed to sound at or above the levels provided in **Table 5.2**, then there is a risk that an injury offence could occur.

Table 5.2 Auditory injury thresholds for impulsive and non-impulsive noise

Functional Hearing Group	Impulsive	Non-impulsive	
	Peak Sound Pressure Level (SPL _{peak}) (dB re 1 μ Pa @ 1 m)	Sound Exposure Level (SEL) (dB re 1 μ Pa ² s @ 1 m)	SEL (dB re 1 μ Pa ² s @ 1 m)
LF cetaceans	222	183	197
HF cetaceans	230	193	201
VHF cetaceans	202	159	181
PW	223	183	195

Source: NMFS (2024).

5.1.2 Behavioural Responses

Behavioural responses may arise where an activity is audible (**Table 5.1**) and at a level above ambient noise. However, the most likely response will be temporary, for example, there is evidence that short-term disturbance caused by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises (Thompson *et al.*, 2013).

For geophysical survey and positioning equipment (i.e. USBL systems), updated JNCC guidance for English, Welsh and Northern Irish waters recommends that a 3 km EDR is used for harbour porpoises (JNCC, 2025). No equivalent document is available in Scotland so this EDR has also been applied for these activities in Scottish waters. Using this value the number of individuals that may potentially show a behavioural response to sound from geophysical survey and positioning equipment can be estimated. Without suitable alternative data being available the same deterrence range has been applied to the other species assessed here. This assumption is highly conservative.

No EDRs are available for non-impulsive (continuous) noise generating activities e.g., construction activities such as cable installation. Therefore, the potential for behavioural responses has been assessed using expert judgement and information from previous underwater noise modelling studies of cable installation activities (Barham *et al.*, 2014, Nedwell *et al.*, 2012).

5.2 Increased Anthropogenic Noise from Construction Activities and Vessels

The proposed construction activities at the Marine Scheme (i.e. boulder clearance, PLGR, cable installation and cable protection) and associated construction vessels have the potential to increase levels of anthropogenic noise in the marine environment and therefore have the potential to affect marine mammals.

Underwater sound characteristics for the construction activities and vessels provided in the Scotland England Green Link 1 / Eastern Link 1 – Marine Scheme Environmental Appraisal Report are presented in **Table 5.3**.



Table 5.3 Characteristics of underwater sound sources from different cable installation activities and vessels

Activity	Operating Frequency (kHz)	Sound Pressure Level (dB re 1 µPa @ 1 m)
Rock placement (proxy for boulder clearance and mattress installation*)	n/a	< vessel sound level
Cable installation (e.g. jetting, trenching)	1-15	178
Cable lay vessel	0.005 - 3.2	180 - 197
Medium (50 - 100 m) and small (<50 m) project support vessels	Low to high frequency	160 - 180

Source: AECOM (2022b)

*Characteristics of the underwater sounds from boulder clearance and mattress installation were not provided in the environmental appraisal but are assumed to be of a similar frequency and SPL to rock placement.

5.2.1 Prediction of Potential Impacts

5.2.1.1 Auditory Injury

The sounds produced by the construction activities and vessels will be non-impulsive and unlikely to be greater than background noise. Previous underwater noise modelling for the construction activities associated with cable installation works at an offshore wind farm site (i.e. cable laying, rock placement, trenching; Nedwell *et al.*, 2012) and for cable installation works for the Caithness Moray HVDC cable (Barham *et al.*, 2014) show that auditory injury ranges are very small (<60 m). Considering these ranges and that animals will likely be displaced from the vicinity of the construction vessels by their presence there is no likelihood of auditory injury from the proposed construction activities and vessels at the Marine Scheme.

5.2.1.2 Behavioural Responses

The underwater noise created by the construction activities and vessels will be audible to marine mammals, as it falls within the hearing range of the marine mammals assessed (**Table 5.1**, **Table 5.3**), and therefore may cause behavioural responses in individuals in close proximity to the works. It is anticipated that behavioural impact ranges from construction activities at the Marine Scheme will be small (i.e. one to two hundred metres) and no greater than the disturbance range from underwater noise from the construction vessels. For example, during the decommissioning of an oil and gas platform (which produces comparable non-impulsive noise to the construction activities at the Marine Scheme) vessel presence was found to be the main source of noise (Fernandez-Betelu *et al.*, 2024). This study found that any behavioural avoidance from vessels will likely be temporary and will not result in long-term displacement (i.e. harbour porpoise disturbed by the decommissioning works were found to increase in the period immediately following the departure of the vessel involved in the activity).

Furthermore, for construction activities it is likely that geophysical survey and positioning equipment (i.e. USBL systems) will be required to undertake this work. This equipment will likely produce sounds that will cause greater disturbance than the construction activity and associated vessels. As a result, the 3 km EDR for USBL systems for a static noise source and the number of individuals impacted applies (see **Section 5.3.2.2**, **Table 5.5**).



5.3 Increased Anthropogenic Noise from Geophysical Survey and Positioning Equipment

Use of geophysical survey and positioning equipment during the proposed construction activities at the Marine Scheme will increase levels of anthropogenic noise in the marine environment, as it operates by producing and receiving sound, and therefore has the potential to induce the onset of auditory injury or disturb marine mammals.

Indicative geophysical survey and positioning equipment specifications are provided in **Table 5.4**.

Table 5.4 Indicative geophysical survey and positioning equipment specifications

Equipment Type	Example Equipment Models	Frequency Range (kHz)	Max Source Pressure Level (SPL _{peak}) (dB re 1 µPa @ 1 m)
MBES	R2Sonic	170 - 450	235
USBL	Kongsberg Hi-PAP 502	21 - 31	207*

Source: AECOM (2022b)

*Although the Kongsberg Hi-PAP USBL can be operated at a maximum source level of 207 dB, USBL equipment will not be operated at levels capable of inducing the onset of Auditory Injury (i.e. >202 dB re 1 µPa @ 1 m).

5.3.1 Prediction of Potential Impacts from MBES

The high frequency sounds produced by the MBES fall outside the hearing range of the marine mammals assessed (**Table 5.1**, **Table 5.4**). Therefore, there is no risk of auditory injury or behavioural responses from the use of this equipment.

5.3.2 Prediction of Potential Impacts from USBL systems

5.3.2.1 Auditory Injury

The sounds produced by the USBL systems fall within the hearing range of the marine mammals assessed (**Table 5.1**, **Table 5.4**). If operated at its highest source level (207 dB re 1 µPa @ 1 m) the Kongsberg Hi-PAP 502 USBL has the potential to induce the onset of auditory injury at very close-range (NMFS, 2024; **Table 5.2**). However, it is possible to reduce the sound source for USBL systems, and no matter which model is used, they will not be operated at levels greater than 202 dB re 1 µPa @ 1 m and therefore, there is no risk of auditory injury onset from the use of this equipment, and no mitigation is required.

5.3.2.2 Behavioural Responses

It is possible that the sounds produced by the USBL systems may be detected by marine mammals of all hearing groups and therefore their use may have the potential to cause disturbance. The most likely response will be temporary behavioural avoidance (there is evidence that short-term disturbance caused by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises (Thompson *et al.*, 2013)).

Using the 3 km EDR recommended for USBL systems for harbour porpoise (JNCC, 2025), the number of individuals for each marine mammal species assessed which has the potential to be affected from the use of this equipment has been estimated (**Table 5.5**). The area of potential effect was estimated using the formula: $\text{area} = \pi r^2 = 28.27 \text{ km}^2$ (where $r = 3 \text{ km}$). For all cetaceans, the number of individuals and the percentage of the MU reference population estimated to have the potential to be disturbed was estimated using the density estimates and reference population abundance estimates presented in **Table 4.1**. Where more than one



density estimate has been provided (e.g., for the two different SCANS survey blocks that intersect with the Marine Scheme), the largest density was used.

There is potential for temporary behavioural disturbance as a result of the use of USBL systems during construction works at the Marine Scheme. However, any response is unlikely to significantly affect the local distribution or abundance of any species in English or Scottish waters (the largest percentage of a reference population which has the potential to be affected in a day is 0.056 % for the UK portion of the bottlenose dolphin MU, which is deemed negligible). For bottlenose dolphins this is likely to be a conservative estimate because of their uneven distribution (see **Section 4.1.2**) and because the EDRs were derived for harbour porpoise (which are more sensitive to underwater noise than bottlenose dolphins; this is also a conservatism to consider for white-beaked dolphins and minke whales).

Table 5.5 Maximum number of individuals estimated to have the potential to be disturbed by USBL systems using the 3 km EDR (28.27 km² area)

Species	Number of individuals	% of MU	% of UK portion of MU
Harbour porpoise	17	0.005 %	0.011 %
Bottlenose dolphin	1	0.053 %	0.056 %
White-beaked dolphin	2	0.005 %	0.007 %
Minke whale	1	0.006 %	0.012 %

Density estimates and reference populations for each species are provided in **Section 4**

5.4 Collision Risk

Vessel strikes are a known cause of mortality in marine EPS and basking sharks (Laist *et al.*, 2001). Non-lethal collisions have also been documented (Laist *et al.*, 2001; Van Waerebeek *et al.*, 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections or predation.

Avoidance behaviour by marine mammals (e.g., bottlenose dolphins), is often associated with fast, unpredictable boats such as speedboats and jet-skis (Bristow and Reeves, 2001; Gregory and Rowden, 2001; Buckstaff, 2004), while neutral or positive reactions for other species have been observed with larger, slower moving vessels such as cargo ships (Sini *et al.*, 2005).

The proposed construction work will require a small number of vessels traveling at slow speeds (e.g. the CLV), being stationary (e.g. for boulder clearance or rock placement) or transiting (i.e. between port and the Marine Scheme). There is no risk of collision when the vessels are stationary. The consistent speed and direction of travel employed by transiting vessels and vessels undertaking construction activities will mean that animals can predict the path of vessels and potentially alter their direction of travel, thus reducing the risk of collision. Additionally, the presence of the construction vessels is unlikely to significantly increase the amount of vessel traffic in the area. Therefore, the increase in potential collision risk for marine mammals and basking sharks is considered to be negligible. Nonetheless, during transits, when vessel speed may be greater, transit watches (see **Section 6.1**) will be conducted.



6 Mitigation Measures

6.1 Transit Watches

An observer on the bridge of all construction vessels will keep watch for marine EPS, basking sharks and seals during all transits to and from the work sites. Any sightings will be communicated to the Officer on watch as soon as is practicable who will ensure that marine EPS, basking sharks and seals are avoided where safe to do so. At all times the Officer on watch will minimise high powered manoeuvres or rapid changes of course, where this does not impair safety, to avoid collisions.

The observer may be the Master of the vessel, a member of the bridge crew or another member of the ship's crew as appropriate. Observers and the vessel operator will be briefed on the Scottish Marine Wildlife Watching Code and Basking Shark Code of Conduct during mobilisation.



7 Conclusions

7.1 Potential to Injure or Disturb Marine EPS

7.1.1 Increased Anthropogenic Noise from Construction Activities

The conclusions of the assessment for effects as a result of increased anthropogenic noise from construction activities and vessels at the Marine Scheme are that:

- There is no potential for auditory injury to EPS; and
- The potential for EPS to respond behaviourally is negligible (see **Section 0**).

7.1.2 Increased Anthropogenic Noise from Geophysical Survey and Positioning Equipment

7.1.2.1 MBES

The conclusions of the assessment for effects as a result of increased anthropogenic noise from the use of MBES are that:

- There is no potential for auditory injury to EPS; and
- There is no potential for EPS to respond behaviourally (see **Section 5.3.1**).

7.1.2.2 USBL systems

The conclusions of the assessment for effects as a result of increased anthropogenic noise from the use of USBL systems are that:

- There is no potential for auditory injury to EPS from the use of USBL systems (see **Section 5.3.2.1**);
- There is the potential for EPS to respond behaviourally (see **Section 5.3.2.2**). However, any disturbance is deemed small scale, short-term, sporadic, reversible, and without any likely negative effect on the FCS of the species assessed.

7.1.3 Collision Risk

The risk of collision with vessels involved in the proposed construction work is negligible for the species likely to be present in this area. Nonetheless, watches will be undertaken during transits whilst vessels will be moving more quickly (see **Section 6.1**). Considering that the presence of the construction vessels is unlikely to significantly increase the vessel traffic in the area then it is concluded that EPS, Marine Wildlife and basking shark licences will not be required in any jurisdiction.

7.1.4 Assessment of Potential Offence

Considering these conclusions:

- In Scottish Territorial Waters (i.e. within 12 NM) an EPS licence (to disturb) will be required and can be granted for the use of USBL systems. The number of individuals which may be disturbed is presented in **Table 5.5**.
- In English Territorial Waters, and both Scottish and English offshore waters, an EPS Licence and Marine Wildlife Licence (to disturb) will not be required for the planned construction works at the Marine Scheme. Therefore, for England, a Marine Licencing Exemption Notification can be submitted to the MMO.



7.2 Potential for LSE on Designated Sites and Protected Areas

There is no potential for LSE on marine mammal SACs and no potential to adversely effect, other than insignificantly, the conservation objectives of the Southern Trench NCMPS (see **Section 4**).

Additional sites were assessed in the project HRA Report (AECOM, 2022a) which concluded No Likely Significant Effects and no further stages of the HRA process required, and in the MPA and Marine Conservation Zone (MCZ) assessment (AECOM, 2022c), which concluded no significant risk to any of the identified designated features or Conservation Objectives of the sites as a result of Marine Scheme related activities.



8 References

- AECOM. (2022a) Scotland England Green Link 1 / Eastern Link 1 - Marine Scheme. Environmental Appraisal Report Volume 3. Appendix 8.2 - Habitat Regulations Assessment Report. Available at: <https://marine.gov.scot/?q=data/marine-licence-application-segl-eastern-link-1-hvdc-cable-and-cable-protection-torness-hawthorn>
- AECOM. (2022b) Scotland England Green Link 1 / Eastern Link 1 - Marine Scheme. Environmental Appraisal Report Volume 2. Chapter 10 - Marine Mammals. Available at: <https://marine.gov.scot/?q=data/marine-licence-application-segl-eastern-link-1-hvdc-cable-and-cable-protection-torness-hawthorn>
- AECOM. (2022c) Scotland England Green Link 1 / Eastern Link 1 - Marine Scheme. Environmental Appraisal Report Volume 3. Appendix 8.1 - MPA and MCZ Assessment. Available at: <https://marine.gov.scot/?q=data/marine-licence-application-segl-eastern-link-1-hvdc-cable-and-cable-protection-torness-hawthorn>
- Arso Civil, M., Quick, N. J., Mews, S., Hague, E., Cheney, B., Thompson, P. M., & Hammond, P. S. (2021). Improving understanding of bottlenose dolphin movements along the east coast of Scotland. Final report.: Report number SMRUC-VAT-2020-10 provided to European Offshore Wind Deployment Centre (EOWDC). March 2021 (unpublished).
- Barham, R., East, S. and Mason, T. (2014). Underwater noise assessment for the Caithness to Moray transmission cable installation. Subacoustech Report No. E483R0104.
- BEIS (2016) Guidance. Oil and gas: environmental data. June 2016 [Online]. Available from: <https://www.gov.uk/guidance/oil-and-gas-environmental-data>
- Carter, M.I.D., Boehme, L., Cronin, M.A., Duck, C.D., Grecian, W.J., Hastie, G.D., Jessopp, M., Matthiopoulos, J., McConnell, B.J., Miller, D.L., Morris, C.D., Moss, S.E.W., Thompson, D., Thompson, P.M. & Russell, D.J.F. (2022). Sympatric seals, satellite tracking and protected areas: Habitat-based distribution estimates for conservation and management. *Front. Mar. Sci.* 9. Available online at: <https://doi.org/10.3389/fmars.2022.875869>
- Cheney, B.J., Arso Civil, M., Hammond, P.S. and Thompson, P.M. (2024). Site Condition Monitoring of bottlenose dolphins within the Moray Firth Special Area of Conservation: 2017-2022. NatureScot Commissioned Report No. 1360.
- Drewery, H.M. (2012). Basking shark (*Cetorhinus maximus*) literature review, current research and new research ideas. *Marine Scotland Science Report* 24/12.
- Fernandez-Betelu, O., Graham, I.M., Malcher, F., Webster, E., Cheong, S.H., Wang, L., Iorio-Merlo, V., Robinson, S. and Thompson, P.M. (2024). Characterising underwater noise and changes in harbour porpoise behaviour during the decommissioning of an oil and gas platform. *Marine Pollution Bulletin*, 200, p.116083.
- Gilles, A., Authier, M., Ramirez-Martinez, N.C., Araújo, H., Blanchard, A., Carlström, J., Eira, C., Dorémus, G., Fernández-Maldonado, C., Geelhoed, S.G.V., Kyhn, L., Laran, S., Nachtsheim, D., Panigada, S., Pigeault, R., Sequeira, M., Sveegaard, S., Taylor, N.L., Owen, K., Saavedra, C., Vázquez-Bonales, J.A., Unger, B. and Hammond, P.S. (2023). Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys. Final report published 29 September 2023. 64 pp. Available from: <https://tinyurl.com/3ynt6swa>
- Hammond, PS, Macleod, K, Berggren, P, Borchers, DL, Burt, ML, Cañadas, A, Desportes, G, Donovan, GP, Gilles, A, Gillespie, D, Gordon, J, Hedley, S, Hiby, L, Kuklik, I, Leaper, R, Lehnert, K, Leopold, M, Lovell, P, Øien, N, Paxton, C, Ridoux, V, Rogan, E, Samarra, F, Scheidat, M, Sequeira, M, Siebert, U, Skov, H, Swift, R, Tasker, ML, Teilmann, J, Van Canneyt, O & Vázquez, JA. (2013). Cetacean abundance and distribution in European Atlantic shelf waters to inform conservation and management. *Biological Conservation* 164: 107-122.



Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Boerjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M., Scheidat, M. and Teilmann, J., 2017. Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys. Wageningen Marine Research.

IAMMWG. (2023). Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091.

JNCC, Natural England and Countryside Council for Wales. (2010). The protection of marine European Protected Species from injury and disturbance. Guidance for the marine area in England and Wales and the UK offshore marine area.

JNCC. (2025). Updated Effective Deterrent Ranges (EDRs) for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise Special Areas of Conservation (SACs). (England, Wales & Northern Ireland) JNCC Report 803. JNCC, Peterborough, ISSN 0963-8091.

<https://hub.jncc.gov.uk/assets/5376c9a1-5d88-4291-aab4-028d5b4a1acd>

Marine Scotland and SNH. (2014). The protection of Marine European Protected Species from injury and disturbance. Guidance for Scottish Inshore Waters. March 2014.

Marine Scotland and SNH. (2020). The protection of Marine European Protected Species from injury and disturbance. Guidance for Scottish Inshore Waters (July 2020 Version).

Meißner K, Schabelon H, Bellebaum J, and Sordyl H. (2006). Impacts of submarine cables on the marine environment: a literature review. Federal Agency of Nature Conservation/ Institute of Applied Ecology Ltd.

National Marine Fisheries Service. (2024). Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (version 3.0): Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts' U.S Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-71, 182p.

Nedwell, J., Brooker, A. and Barham, R. (2012). Assessment of underwater noise during the installation of export power cables at the Beatrice Offshore Wind Farm.

Thompson, P.M., Brookes, K.L., Graham, I.M., Barton, T.R., Needham, K., Bradbury, G. and Merchant, N.D. (2013). Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. Proceedings of the Royal Society B 280: 20132001.

Wilson, C.M., Wilding, C.M. and Tyler-Walters, H. (2020). *Cetorhinus maximus* Basking shark. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews.

naturalpower.com
sayhello@naturalpower.com



LOCAL OFFICE
Glasgow, Scotland

Fourth Floor
130 St Vincent Street
Glasgow
G2 5HF
SCOTLAND
UK

Tel: +44 (0) 1786 542 300

REGISTERED OFFICE

The Natural Power Consultants Limited
The Green House
Forrest Estate, Dalry
Castle Douglas, Kirkcudbrightshire
DG7 3XS

Reg No: SC177881
VAT No: GB 243 6926 48

For full details on our ISO and other certifications, please visit our website.

NATURAL POWER CONSULTANTS LIMITED, THE NATURAL POWER CONSULTANTS LIMITED, NATURAL POWER SARL, NATURAL POWER CONSULTANTS (IRELAND) LIMITED, NATURAL POWER LLC, NATURAL POWER S.A, NATURAL POWER SERVICES LIMITED AND NATURAL POWER OPERATIONS LIMITED (collectively referred to as "NATURAL POWER") accept no responsibility or liability for any use which is made of this document other than by the Client for the purpose for which it was originally commissioned and prepared. The Client shall treat all information in the document as confidential. No representation is made regarding the completeness, methodology or current status of any material referred to in this document. All facts and figures are correct at time of print. All rights reserved. VENTOS® is a registered trademark of NATURAL POWER. Melogale™, WindCentre, ControlCentre™, ForeSite™, vuWind™, WindManager™ and Ocean Pod™ are trademarks of NATURAL POWER.

No part of this document or translations of it may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording or any other information storage and retrieval system, without prior permission in writing from Natural Power. All facts and figures correct at time of print. All rights reserved. © Copyright 2026.