National Grid Energy Transmission

National Grid HVDC Offshore Cable: Western Link 2

EPS, Seal and Basking Shark Risk Assessment

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RSK GENERAL NOTES

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Executive Summary

RSK have been instructed by SPEN and NGET to prepare this European Protected Species (EPS), Seal and Basking Shark Risk Assessment to accompany EPS and Wildlife licensing applications for the proposed cable routing assessment works to Natural Resource Wales (NRW), The Department of Environment, Food, and Agriculture (DEFA, Isle of Man), Department of Agriculture, Environment and Rural Affairs (DAERA), Marine Management Organisation (MMO) and the Marine Directorate - Licensing Operations Team (MD - LOT).

The proposed cable routing assessment works will consist of marine geophysical, geotechnical and benthic sampling surveys required to collect baseline data of the potential survey corridors between Scotland and Wales, crossing Northern Irish and Manx waters. The survey corridor is up to approximately 480 km in length. The survey activity will constitute the following aspects:

- Geophysical
    - Multi-beam Echosounder (MBES)
    - Ultra Short BaseLine (USBL) Underwater Positioning
    - Sidescan Sonar (SSS)
    - Sub bottom profiler (SBP)
    - Synthetic Aperture Sonar (SAS)
    - eBOSS (Sub-Bottom Sonar)
    - 40 and 60 cu/in Mini-G Gun, Multi-channel Analysis of Surface Waves (MASW)
- Geotechnical
    - Borehole drilling
    - Cone Penetration Tests (CPT) or T-Bar Tests
    - Vibrocoring
- Benthic Sampling
    - Sediment grab sampling
    - Drop down video

Of the proposed survey activities, MBES, SSS, SBP, SAS, USBL, eBOSS, vibrocoring, CPT/T-Bar testing , sediment grab sampling, and drop-down video surveys will be undertaken in both nearshore and offshore waters across all jurisdictions (Scottish, Welsh, Northern Irish, and Isle of Man sectors). Mini G-Gun systems and borehole drilling, however, will be confined to nearshore areas within Scottish and Welsh waters, within total areas of 20.97 km^2 and 14.55 km^2, respectively.

The objective of this report is to assess the potential impact of the offshore marine survey programme activities on EPS, seals and basking shark along the proposed Western Link 2 cable corridors to determine the need for an EPS licence under Annex IV of the Habitats Directive (Council Directive 92/43/EEC), and Wildlife licence under Section 10 of The Wildlife (Northern Ireland) Order 1985 (as amended) and Section 9 of The Wildlife Act 1990 (Isle of Man), for Northern Ireland and Isle of Man respectively.

There is the potential for the survey activity to cause injury or disturbance to EPS and seals via noise generated by the geophysical equipment, noise generated by the survey vessels, and collision risk with survey vessels. Temporary behavioural avoidance is the most likely response.

Up to 38 harbour porpoises, <2 Risso's dolphin, 21 bottlenose dolphins, 6 common dolphins, <1 beaked whales and 2 minke whales have the potential to be disturbed during survey activities. As such, there is a requirement for EPS and Wildlife licensing.

However, with the implementation of proposed mitigation, it is deemed that these risks will be negligible and impacts will not be sufficient to cause any population-level effects (i.e., it will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status in their natural range), and thus it is considered that an EPS licence (to disturb) and Wildlife licence can be issued.

The risk for impact on basking sharks from vessel collision is considered negligible. However, because the risk for impact on basking shark cannot be completely ruled out, a Basking Shark Licence will be sought for the proposed activities. The risk is further reduced via the mitigation measures, which reduce risks of impact on basking shark in the same manner as marine mammals. Furthermore, with the low density of basking shark in the area and the infrequency of sightings, it is assessed that any impact experienced would be of low magnitude. As such, it is considered that a Basking Shark licence (to disturb) can be issued.

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1 TERMS AND ABBREVIATIONS

Abbreviation	Elaboration
CI	Confidence Interval
dB	decibel
dBht	dBs referenced to hearing threshold
DAERA	Department of Agriculture, Environment and Rural Affairs
DEFA	The Department of Environment, Food, and Agriculture
EPS	European Protected Species
EU	European Union
HND	Holistic Network Design
HF	High-Frequency
HVDC	High Voltage Direct Current
Hz	hertz
ICOL	Inch Cape Offshore Limited
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
kHz	kilohertz
km	kilometre
km^2	squared kilometre
Kts	knots
kV	kilovolt
LF	Low Frequency
m	metre
MBES	Multi-Beam Echo Sounder
MD-LOT	Marine Directorate – Licensing Operations Team
mHz	megahertz
MMO	Marine Mammal Observer
NGET	National Grid Energy Transmission
NMFS	National Marine Fisheries Service
NRW	Natural Resource Wales
PAM	Passive Acoustic Monitoring
PMFs	Priority Marine Features
PTS	Permanent Threshold Shift
rms	root mean square

Abbreviation	Elaboration
ROV	Remotely Operated Vehicle
RSK	RSK Environment Ltd
SAS	Synthetic Aperature Sonar
SBP	Sub Bottom Profiler
SCANS	Small Cetaceans in European Atlantic waters and the North Sea
SPL	Sound Pressure Level
SSS	Side Scan Sonar
TTS	Temporary Threshold Shift
UK	United Kingdom
USBL	Ultra Short BaseLine
UXO	Unexploded Ordnance
WL2	Western Link 2
VHF	Very High Frequency
μPa	micro pascal

2 INTRODUCTION

2.1 Project Overview

The United Kingdom (UK) has policy ambitions to ramp up offshore wind generation as part of the strategy for achieving net zero objectives and decarbonising the power system. Aligned with the UK government's focus on growth, a clean power system can support wider economic objectives through new jobs across the UK in the sector and associated supply chains and enable growth in other sectors, including the growing digital and data economy. The drive for increased offshore wind generation creates the need for a suite of accompanying transmission system reinforcements. The project, henceforth referred to as Western Link 2 (WL2), comprises of a set of two transmission reinforcement projects (AC5 & AC6) to provide High Voltage Direct Current (HVDC) reinforcement on the west coast of Great Britain between Scotland and Wales identified through the Holistic Network Design (HND) to support achievement of net zero objectives. The need for the projects was further identified in the Beyond 2030 document, which identified both projects as being necessary to enable UK grid decarbonisation (ESO, 2024).

The AC5 project is intended to be located wholly within Scottish Waters and is being developed by Scottish Power Energy Networks (SPEN). AC6, which is to be connected to AC5 via a Bussing Station (T-Point) and will connect Scotland and Wales, is a joint development between SPEN and National Grid Electricity Transmission (NGET).

WL2 is part of a first of a kind development in the UK to create a multi-terminal HVDC 525 kV 2 GW solution. WL2 forms part of an innovative three-ended link and so enhance transmission capability between Scotland and Wales. The design also offers a connection for the MachairWind offshore windfarm. As a multi-jurisdictional and largely offshore development, WL2 is dependent on securing a series of consents, in both terrestrial and marine environments.

To date, WL2 has undergone a wide scale feasibility analysis to identify potential cable connection points within Scotland and Wales, progressing from Strategic Options Identification to Option Identification and Selection. In this phase of works for the WL2 project, the objective is to identify, develop and assess a number of potential routing and siting options to determine a marine and terrestrial cable route corridor, landfall location, converter station site and substation site locations. The technical requirements of the electricity system considered based on an on-balance approach, together with economic viability and options which have the potential to cause the least disturbance to environmental and socio-economic receptors.

To inform the development of the WL2 cable routing assessment works, marine geophysical, geotechnical and benthic sampling surveys are required to collect baseline data of the potential survey corridors. The survey activity[1] will constitute the following aspects:

- geophysical:
    - Multi-Beam Echosounder (MBES)
    - Ultra Short BaseLine (USBL) Underwater Positioning
    - Sidescan Sonar (SSS)
    - Sub Bottom Profiler (SBP)

[1] To note, depending on the outcome of these survey works, there may be a requirement to carry out Seismic Refraction surveying at a later date.

    - Synthetic Aperture Sonar (SAS)
    - eBOSS (Sub-Bottom Sonar)
    - 40 and 60 cu/in Mini-G Gun, Multi-channel Analysis of Surface Waves (MASW)
- geotechnical:
    - borehole drilling
    - Cone Penetration Tests (CPT) or T-Bar Tests
    - vibrocoring
- benthic sampling:
    - sediment grab sampling
    - drop down video.

To support these investigations, RSK have been instructed by SPEN and NGET to conduct a European Protected Species (EPS), Seal and Basking Shark Risk Assessment to allow for the consideration of any potentially identified impacts from the cable routing assessment works on relevant protected species.

2.2 Purpose of the Report

The objective of this report is to assess the potential impact of the offshore geophysical, geotechnical and benthic sampling survey programme activities on EPS, seal and basking shark along the proposed WL2 cable corridors to determine the need for an EPS licence under Annex IV of the Habitats Directive (Council Directive 92/43/EEC) , and Wildlife licence under Section 10 of The Wildlife (Northern Ireland) Order 1985 (as amended) and Section 9 of The Wildlife Act 1990 (Isle of Man), for Northern Ireland and Isle of Man respectively.

This report has been prepared to support applications to Natural Resource Wales (NRW), The Department of Environment, Food, and Agriculture (DEFA, Isle of Man), Department of Agriculture, Environment and Rural Affairs (DAERA),Marine Management Organisation (MMO) and the Marine Directorate - Licensing Operations Team (MD - LOT) for EPS Licences, Wildlife Licences and Basking Shark Licences (where appropriate).

3 PROJECT DESCRIPTION

The potential subsea cable routing corridor for WL2 is proposed to follow a broadly north – south alignment from Ayrshire, Scotland to Caernarfon Bay, Wales. Based on current understanding, the AC5 circuit is entirely based within Scottish inshore waters and has an approximately 95.67 km survey corridor from Ayrshire (Barassie or Prestwick) to Girvan, South Ayrshire. Based on current understanding, the AC6 circuit consists of an approximately 386.61 km survey corridor from South Ayrshire, Scotland to Caernarfon Bay, Wales.

Figure 3.1 below presents the marine corridor routes that are currently undergoing assessment at the time of writing. Based on the outcomes of these assessments, a preferred marine route will be identified. In total, the routes that are to be surveyed for this project are approximately 482 km long.

3.1 Geophysical, Geotechnical & Benthic Sampling Survey

The proposed period for the survey is between 1st March and 1st September 2026 with an expected duration of 90 days, including local mobilisation, transit, survey and local demobilisation. Survey activities may happen beyond this proposed period as contingency in the case of unexpected delays, such as weather, preventing survey activity from occurring as planned. Therefore, this assessment is to accompany a licence application spanning 1st March 2026 to 1st March 2027.

The contractor that will be employed for the offshore survey is still to be determined, therefore exact details on the vessel to be used are not available. The survey vessel is expected to have similar specification and characteristics as in Table 3.1 and have been used as proxy vessels for the purpose of this EPS, Seal and Basking Shark Risk Assessment. Mobilisation and demobilisation are expected to occur from UK ports. Ports will be the nominated based on proximity to respective landfall sides for scheduled port calls for any crew changes and unexpected port calls.

Table 3.1: Anticipated offshore survey vessel specification and characteristics

Vessel	Length (m)	Beam (m)	Gross Tonnage	Draught (m)	Survey speed (kts)	Max speed (kts)
Fugro Galaxy	65.2	14	1929	5.2	4–6	13
Fugro Seeker/ Valkyrie	12	4.88	17	1.07	4	18
Scotia	67	16	2457	5.9	DP	14

The pre-lay survey works will consist of geophysical site investigations (MBES, SSS, SBP, SAS, eBOSS system, Mini G-Gun airguns and magnetometers) as well as the use of USBL positioning systems. In addition, geotechnical sampling (e.g. vibrocoring and CPTs) will be undertaken to characterise seabed sediments and underlying ground conditions. Of the proposed survey activities, MBES, SSS, SBP, SAS, USBL, eBOSS, vibrocoring, CPT / T-Bar testing , sediment grab sampling, and drop-down video surveys will be undertaken in both nearshore and offshore waters across all jurisdictions (Scottish, Welsh, Northern Irish, and Isle of Man sectors). Mini G-Gun systems and borehole drilling, however, will be confined to nearshore areas within Scottish and Welsh waters, within total areas 20.97 km^2 and 14.55 km^2, respectively (Figure 3.2 and Figure 3.3).

The survey corridor will be widened from 500 m to 1500m (from the previous licence application) to accommodate the new survey scope. Including all possible corridor options as shown in Figure 3.1, the survey corridor comprises of 213.3 km² within Scottish waters, 129.71 km² within Irish inshore waters, 19.96 km² within Irish offshore waters, 54.52 km² within the Isle of Man jurisdiction, and 251.2 km² within Welsh waters, giving a total maximum potential survey corridor area of approximately 668.7 km².

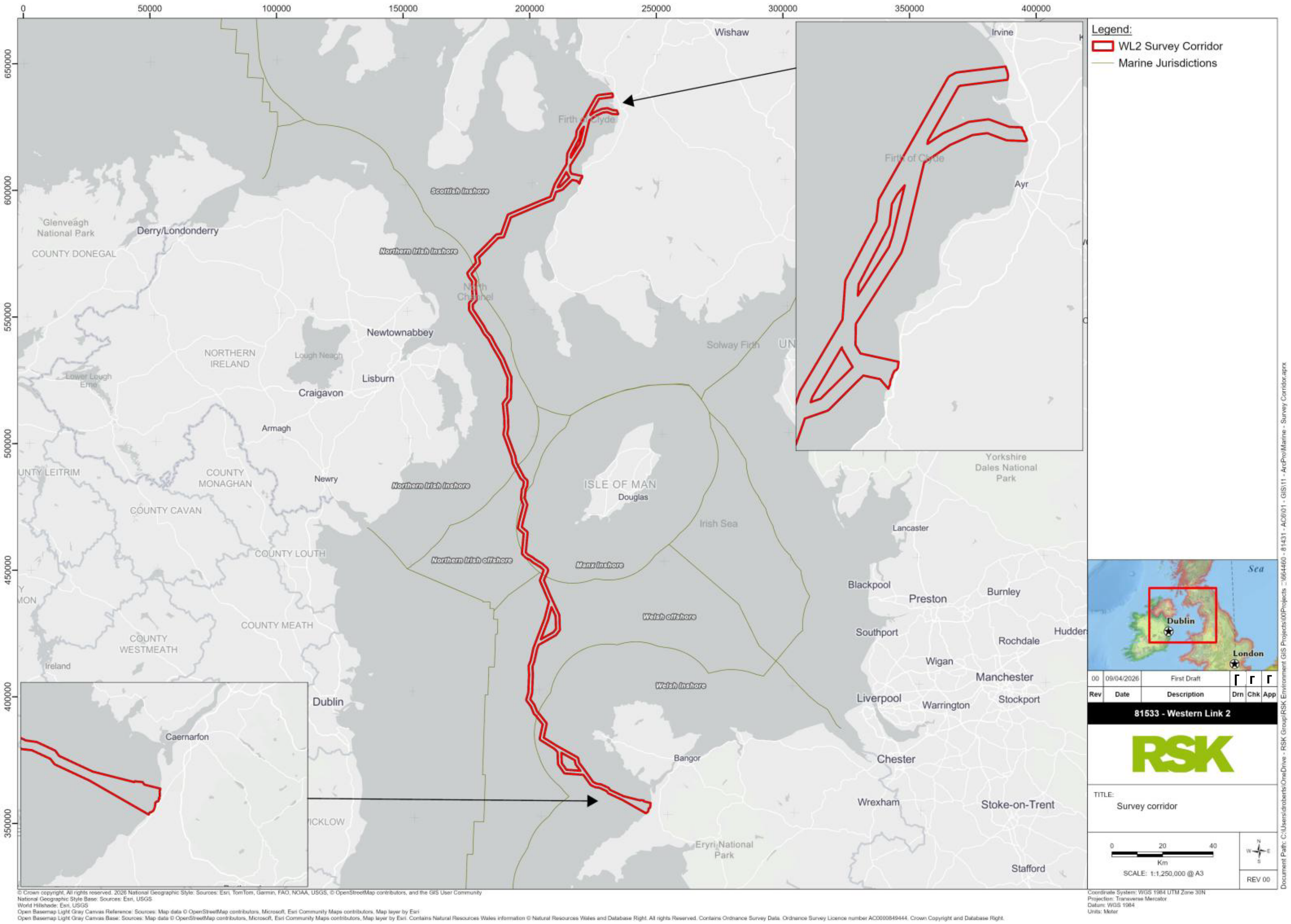

Figure 3.1: Cable routing corridor

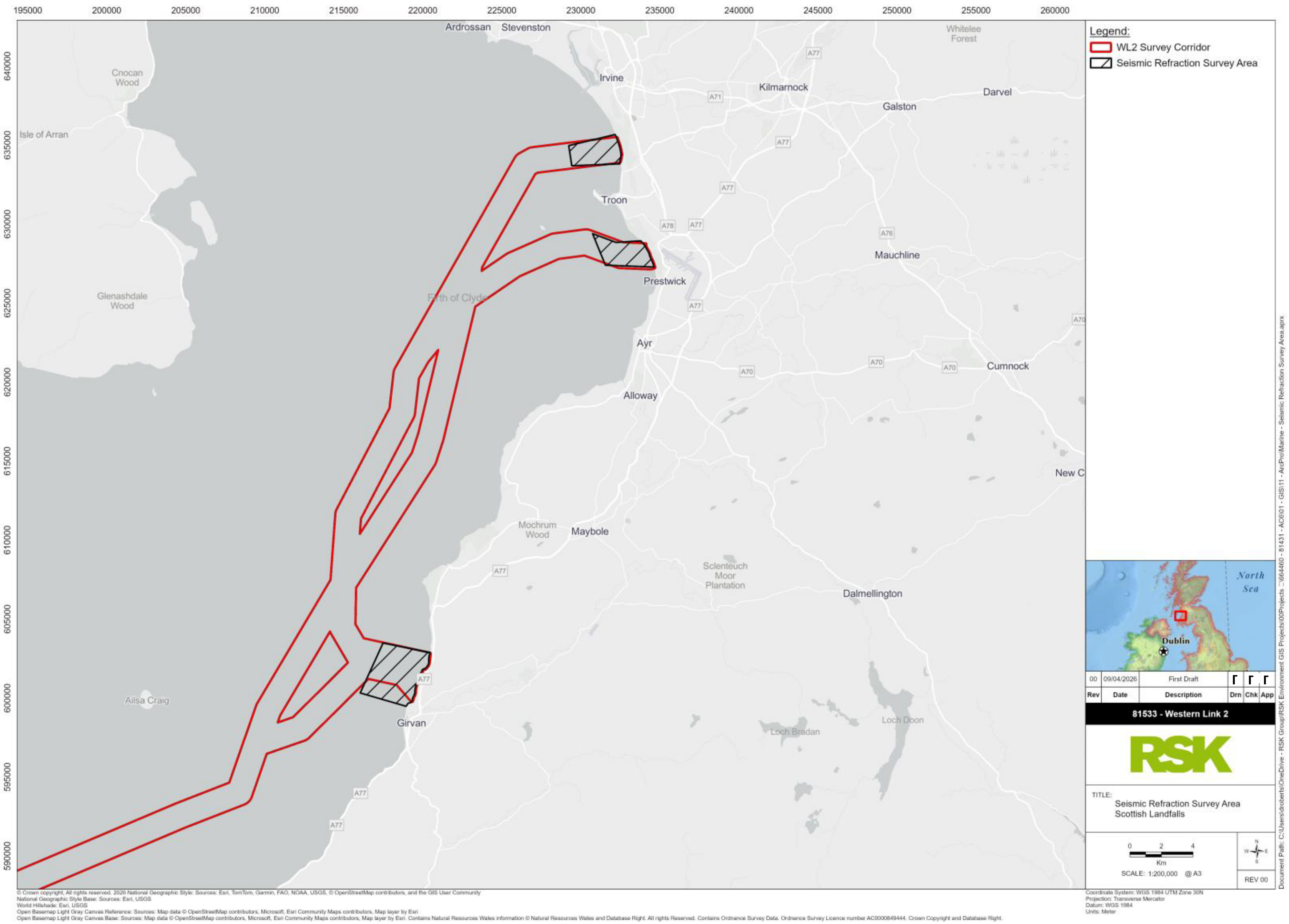

Figure 3.2: Seismic refraction survey area Scotland

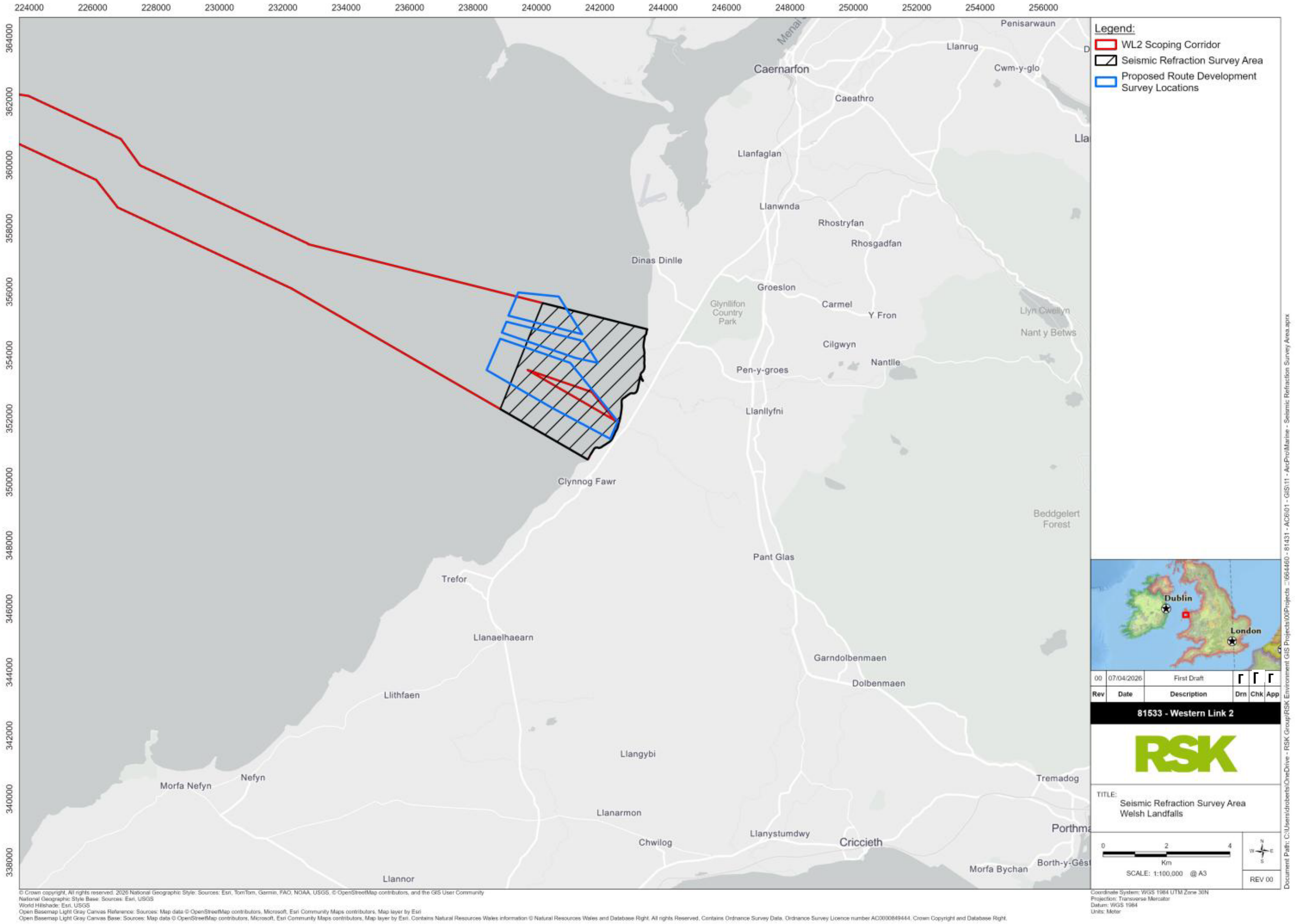

Figure 3.3: Seismic refraction survey area Wales

3.2 Underwater noise sources

The proposed survey activities will employ a combination of geophysical, geotechnical, and benthic sampling techniques to characterise seabed conditions along the cable corridor. Indicative survey equipment systems are presented in Table 3.2, Table 3.3, and Table 3.4. These devices are subject to change depending on the survey vessel proposed. However, the equipment outlined herein would remain representative of the equipment required for the proposed surveys even if specific brand changes occur, for instance frequencies will be adhered to.

The geoelectrical measurements and magnetometers used during pre-lay survey do not generate noise levels significant enough to be potential sources of noise-related disturbance or injury to EPS (JNCC, 2017).

Geotechnical activities such as vibrocore sampling, CPT and borehole drilling are mechanical seabed investigation methods that do not generate significant underwater acoustic emissions. Empirical studies report SPLs for comparable operations in the order of ~130–160 dB re 1 µPa @ 1 m (Erbe & McPherson 2017; Huang Long-Fei et al. 2023), with dominant frequencies typically <100 Hz and energy primarily transmitted through sediment and structure rather than the water column. These levels are well below recognised injury (Permanent Threshold Shift [PTS]) or Temporary Threshold Shift (TTS) onset criteria for cetaceans (Southall et al., 2019) and behavioural disturbance thresholds. On this basis, in line with best practice guidance (see JNCC, 2017), such geotechnical activities are screened out of further underwater acoustic impact assessment in this EPS, Seal and Basking Shark Risk Assessment.

Similarly, the deployment and operation of drop-down video systems and benthic grab sampling equipment are mechanical and transient in nature and are therefore also not regarded as noise-generating activities of significant concern for EPS.

Table 3.2: Parameters of indicative geophysical and geotechnical offshore survey equipment

Survey equipment	Anticipated device(s)	Frequency (kHz)	Estimated noise level SPL (dB re 1 µPa @ 1 m)
Multi-beam Echosounder (MBES)	Kongsberg Simrad EM2040 Dual Rx	200, 300, 400	206
Ultra Short BaseLine (USBL) Underwater Positioning	Kongsberg HiPAP 501	21-31	190-206
Side-scan Sonar (SSS)	Edgetech 4205	300, 600	163
Sub bottom profiler (SBP)	Innomar 100 Medium	2–22	247
Synthetic Aperture Sonar (SAS)	Kraken SAS	335	210 dB re 1µPa/V @ 1m
eBOSS (Towed)	eBOSS System	5–15	153 re 1 µPa/V @ 1 m
Geotechnical Sampling	Vibrocore	<0.01 (100 Hz)	~130–160

Survey equipment	Anticipated device(s)	Frequency (kHz)	Estimated noise level SPL (dB re 1 µPa @ 1 m)
Geotechnical In situ Testing	CPT / T-Bar Frame	<0.01 (100 Hz)	~130–160

Table 3.3: Parameters of indicative geophysical, geotechnical and benthic sampling nearshore survey equipment

Survey equipment	Anticipated device(s)	Frequency (kHz)	Estimated noise level SPL (dB re 1 µPa @ 1 m)
Multi-beam Echosounder (MBES)	Reson T50 MBES	170-420	220
Side-scan Sonar (SSS)	Edgetech 4125	400, 900	163
Sub bottom profiler (SBP)	Innomar SES 2000	85-115	238
	Duraspark UHD 400	0.2–4.25 (200–4250 Hz) output frequency 0.0013–0.00175 (1.3–1.75 Hz) dominant frequency (previously 0.3–1.2)	Peak SPL re1µpa@1m – 221 dB Peak-to-Peak SPL re1µpa@1m – 228 dB (previously 226)
Dynamic MASW (Seismic)	Mini G-Gun – 40 cu/in	0.0048–0.2539 (4.8–25.39 Hz) (previously 0.03–0.6 (30-600 Hz)	SPL (pk-pk) 240 dB re 1µPa SPL (0-pk) 234 dB re 1µPa SPL (rms) 217 dB re 1µPa (previously 213)
Dynamic MASW (Seismic)	Mini G-Gun – 60 cu/in	0.0039-0.02246 (3.9–22.46 Hz) (previously 0.03–0.5 (30–500 Hz)	SPL (pk-pk) 240 dB re 1µPa SPL (0-pk) 234 dB re 1µPa SPL (rms) 218 dB re 1µPa SEL 209 dB re 1µPa^2·s (previously 215)
Geotechnical Sampling	Borehole drilling (jack-up rig)	<0.01 (100 Hz)	~130–160
Geotechnical In situ Testing	Cone Penetration Test (CPT)	<0.01 (100 Hz)	~130–160
Sediment Grab Sampling	Dual Van Veen Grab / Hamon Grab / Day Grab	N/A	N/A

Survey equipment	Anticipated device(s)	Frequency (kHz)	Estimated noise level SPL (dB re 1 μPa @ 1 m)
Drop-down Video	Video system	N/A	N/A

Table 3.4: Parameters of indicative geophysical Remotely Operated Vehicle (ROV) survey equipment

Survey equipment	Anticipated device(s)	Frequency (kHz)	Estimated noise level SPL (dB re 1 μPa @ 1 m)
eBOSS (ROV-mounted)	eBOSS System	5–15	153 re 1 μPa/V @ 1 m

An increase in anthropogenic noise has the potential to affect cetaceans (whales, dolphins and porpoises) (most relevant EPS in the area, Section 5) occurring in the survey area due to the sensitivity of cetacean hearing. As sound travels much further underwater compared to airborne noise, the resulting effects on cetaceans can be at greater distances from the sound source.

It should be noted that the acoustic sources proposed for the survey are a number of orders of magnitude lower in intensity than those used in conventional seismic surveys.

On this basis, only the geophysical survey and positioning systems (e.g., SSS, SBP, SAS, eBOSS, USBL and Mini G-Gun) have been identified as potential sources of underwater noise with the capacity to cause disturbance or injury to EPS. These systems are therefore the only equipment taken forward for detailed consideration and assessment within this report.

3.2.1 Multibeam Echo Sounder (MBES)

MBES is commonly used to create densely sampled digital terrain models that can be used to further define topography with detailed seabed information.

MBES transmits sound energy and analyses the return signal (echo) that has bounced off the seafloor or other objects thereon. This is done by emitting sound waves from directly beneath a vessel's hull (or similar) to produce fan-shaped coverage of the seafloor. The MBES system records the time taken for the acoustic signal to travel from the transmitter (transducer) to the seafloor (or object) and back to the receiver. MBES produces a “swath” of soundings (i.e. depths) to ensure full coverage of an area. The coverage area on the seafloor is dependent on the depth of the water, with coverage typically being two to four times the water depth.

3.2.2 Ultra-Short Baseline (USBL) Positioning Systems and Transponder Beacons

USBL positioning systems and transponder beacons are used to monitor the position of any remotely operated equipment. These will only be used when the towed or remotely operated equipment is in operation. As soon as these are recovered on the deck of the vessel, the vessel’s USBL can be switched off.

The USBL transceiver mounted on the vessel transmits an acoustic pulse that is detected by the transponder mounted on the subsea equipment (e.g. towed SBP or magnetometer). The subsea transponder replies with its own acoustic pulse, which is detected by the shipboard transceiver. The two units work together to communicate the towed devices position relative to the vessel.

3.2.3 Side-Scan Sonar (SSS)

SSS is used to determine the texture, topography and character of the seabed sediments and to detect features such as boulders, outcrops, pipelines, wellheads and other equipment lying on, attached to, or buried immediately beneath the seafloor.

SSS transmits sound energy and analyses the return signal (echo) that has bounced off the seafloor or other objects. SSS typically consists of three basic components: towfish or hull mounted transducer(s), transmission cable, and topside processing unit.

In a side-scan, the transmitted energy is formed into the shape of a fan that sweeps the seafloor from directly under the towfish or vessel hull to either side, typically to a distance of 100 m (depending on factors including water depth and signal strength). The strength of the return echo is continuously recorded, creating a "picture" of the ocean bottom. For example, objects that protrude above the seabed create a dark area (strong return) and shadows from these objects are light areas (little or no return). SSS is typically used in conjunction with MBES to meet full bottom coverage specifications.

3.2.4 Sub-Bottom Profiler (SBP)

SBP systems are used to identify and measure the various marine sediment layers that exist below the sediment / water interface.

These acoustic systems use a technique that is similar to single beam echo sounders and emit an acoustic signal vertically downwards into the water with a receiver monitoring the return signal reflected off the seafloor. Some of the acoustic signal will penetrate the seabed and be reflected when it encounters a boundary between two layers that have different acoustic impedance. Acoustic impedance is related to the density of the material and the rate at which sound travels through the material. When there is a change in acoustic impedance, part of the transmitted sound is reflected. The system uses this reflected energy to record a profile of the marine sediment layers beneath.

3.3 Synthetic Aperture Sonar (SAS)

SAS is an advanced sonar imaging technique used to produce high-resolution acoustic images of the seabed. The system operates by transmitting successive sound pulses as the sonar platform moves along its survey line. These multiple returns are then combined through signal processing to synthesise a much larger effective aperture than the physical size of the sonar array, significantly improving image resolution and clarity.

SAS systems typically operate at high frequencies, commonly in the hundreds of kilohertz range, and employ narrow, acoustic beams similar to conventional side-scan sonar. The resulting data provide detailed representations of seabed morphology and objects on or near the seafloor, making SAS particularly effective for seabed classification, object detection, and fine-scale mapping applications.

3.3.1 eBOSS (Electro-Broadband Ocean Source System)

The eBOSS system is a controlled electro-acoustic source used for high-resolution sub-seabed imaging. It operates by generating low-frequency acoustic pulses through the rapid discharge of electrical energy into the surrounding seawater.

The eBOSS operates within the frequency range of 5–15 kHz, with an estimated source level of 153 dB re 1 μPa/V @ 1 m. It will be deployed as both a towed configuration and an ROV-mounted system, depending on water depth and survey objectives.

3.3.2 Mini G-Gun Systems (40 cu/in and 60 cu/in)

Mini G-Guns are small-volume seismic air-gun systems used for near-surface geophysical profiling, including dynamic MASW operations. The specifications of the two units are provide in Table 3.3.

Both systems are single-chamber airguns operated dynamically near the surface to provide high-resolution seismic data for shallow stratigraphic interpretation

3.4 Biosecurity risk assessment

The introduction or spread of Invasive Non-Native Species (INNS) is a risk for any project, when vessels and equipment have been used in other waterbodies. Species can be transferred between work sites and be “harmful and invasive in locations where they do not naturally occur” and “where material used in the development originates from outside of the site, organisms within the substrate may be introduced into the site.” Best practice, such as Natural England’s evidence standards, advise that the pressure will increase with the spatial/temporal scale and intensity of works

Like many other areas of the UK’s coastline, INNS are already present within the project area. There are numerous ways in which INNS can arrive in UK waters including being carried in ballast water tanks and on the hulls of vessels traveling from one international harbour to another. It is therefore reasonable to assume that some INNS may already be present within the project area.

MARPOL standards will be followed by the appointed contractor to prevent the spread of INNS to the survey works area and other sites after the survey is complete. This will include, where necessary, ensuring that all equipment is properly cleaned prior to being introduced to and leaving the survey work site, adoption of “check, clean, dry” and the identification of high-risk species which will be removed as waste for disposal to prevent spreading.

4 LEGAL REQUIREMENTS

4.1 Marine Mammals

All species of cetacean in waters around the UK are considered EPS under Annex IV of the European (EU) Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) (retained under the European Union (Withdrawal) Act 2018).

The Habitats Directive is transposed into Welsh, Manx, Northern Irish, and Scottish Law via the following regulations:

- Wales and Scotland:
  - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended):
    - Section 38
  - The Conservation of Offshore Marine Habitats and Species Regulations 2017:
    - Section 45
  - The Wildlife and Countryside Act 1981:
    - Section 9
- Isle of Man:
  - The Wildlife Act 1990 (Isle of Man):
    - Section 9
- Northern Ireland:
  - The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009:
    - Section 4
  - The Wildlife (Northern Ireland) Order 1985 (as amended):
    - Section 10.

Under the above listed regulations, it is an offence to:

a) deliberately or recklessly capture, injure, or kill a wild animal of an EPS

b) deliberately or recklessly –

i. harass a wild animal or group of wild animals of an EPS

ii. disturb such an animal while it is occupying a structure or place which it uses for shelter or protection

iii. disturb such an animal while it is rearing or otherwise caring for its young

iv. obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place

v. disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs

vi. disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young

vii. disturb such an animal while it is migrating or hibernating.

It is therefore an offence to disturb, capture, injure or kill deliberately or recklessly disturb a single individual of an EPS (including cetaceans) in Welsh, Manx, Northern Irish, and Scottish offshore and inshore waters.

If it is determined that an activity would cause an offence under the above regulations, a licence may be granted which would allow otherwise illegal activities to go ahead in certain specified circumstances.

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

- The licence must relate to one of the purposes referred to in the regulation.
- There must be no satisfactory alternative.
- The action authorised must not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status in their natural range.

4.2 Seals

Harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) are given full protection in the UK under the Conservation of Seals Act 1970 (England, and Wales), the Marine (Scotland) Act 2010 and The Wildlife (Northern Ireland) Order 1985. Schedule 3 of The Conservation (Natural Habitats, &c.) Regulations 1994 prohibits the killing or taking of seals by certain methods while The Wildlife (Northern Ireland) Order 1985 provides complete protection for both seal species and prohibits the killing of seals except under licence. Under The Wildlife (Northern Ireland) Order 1985, it is also an offence to intentionally or recklessly disturb seals at any haul out site.

Any activities with the potential to disturb seals must obtain a Wildlife Licence in Northern Ireland. As such, an assessment of the potential to disturb seals within Northern Irish waters has been included in this report.

4.3 Basking Shark

While basking shark (*Cetorhinus maximus*) are not listed as Annex II or Annex IV species under the EU Habitats Directive (retained under the European Union (Withdrawal) Act 2018), they are given full protection for all coastal waters up to 12 nm under Schedule 5 of the Wildlife and Countryside Act 1981, Section 9 of the Isle of Man Wildlife Act 1990, and Section 10 of the Wildlife (Northern Ireland) Order 1985. Under these regulations the basking shark is considered a fish, and it is an offence to:

- intentionally or recklessly kill, injure or take fish
- possess or sell fish
- intentionally or recklessly disturb or harass fish.

The Nature Conservation (Scotland) Act 2004 enhances this protection, making it an offence for any activity to deliberately or recklessly capture, kill, injure or disturb any basking shark (or dolphin, whale or porpoise). Additionally, basking shark are considered a mobile Priority Marine Feature in Scottish territorial waters.

As such, activities in Scottish, Northern Irish, and Manx waters with the potential to disturb basking shark must obtain a Basking Shark Licence to undertake works.

4.4 Guidance

In July 2020 the Marine Directorate[2], in conjunction with NatureScot[3], produced an update of the guidance document (entitled 'The protection of Marine European Protected Species from injury and disturbance'), for Scottish inshore waters (Marine Scotland and SNH, 2020). Similar guidance has been produced by Joint Nature Conservation Committee (JNCC) and the Countryside Council for Wales (now Natural Resources Wales) titled '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, 2010).

Both sets of guidance recognise that a very precautionary approach is taken to the interpretation of the EU Habitats Directive with regards to EPS '…This guidance reflects a precautionary approach…' and requires careful examination of the potential impacts 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 any outputs of the activity to biologically important signals (particularly important in relation to activities creating sound)
- the motivation of the animal to remain within the areas (e.g. food availability)
- duration of the activity.

Assessment of 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
- other known activities in the area at the same time.

[2] At the time operating under the name Marine Scotland

[3] At the time operating under the name Scottish Natural Heritage

5 EUROPEAN PROTECTED SPECIES

The Habitats Regulations lists cetaceans, some species of marine turtles, otter (*Lutra lutra*) and sturgeon (*Acipenser sturio/Acipenser oxyrinchus*) as marine EPS. Sturgeon is not expected to be present, and marine turtles are occasional visitors in the survey area as described in Section 5.3. This assessment focuses on cetaceans and, where necessary, otters.

While grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*), which are likely to be present in the survey area, are included on Annex II of the EU Habitats Directive and are Scottish Priority Marine Features (PMFs), they are not EPS. However, both seals and basking shark have been considered within Section 6. Seabirds are also not classified as EPS and have their own protection under other regulations. Therefore, these species are not assessed further in this document.

5.1 Cetaceans

A total of 19 cetaceans are known to occur within the Irish Sea. The survey area overlaps with two Small Cetaceans in European Atlantic waters and the North Sea (SCANS)-IV Blocks: CS-D (overlapping the southern portion of the potential cable route to approximately latitude 55°N) and CS-F (overlapping the northern part of the potential cable route north of latitude 55°N). Within these blocks, abundance and density estimates of six cetaceans have been recorded:

- harbour porpoise (*Phocoena phocoena*)
- bottlenose dolphin (*Tursiops truncatus*)
- Risso's dolphin (*Grampus griseus*)
- common dolphin (*Delphinus delphis*)
- beaked whale (all species combined; Cuvier's beaked whale (*Ziphius cavirostris*), Sowerby's beaked whale (*Mesoplodon bidens*) and unidentified beaked whale)
- minke whale (*Balaenoptera acutorostrata*).

Abundance and density estimates calculated in the SCANS-IV report (Gilles et al., 2023) for species recorded within Block CS-D and CS-F are outlined in Table 5.1.

Table 5.1: Abundance and density estimates to cetacean species within Block CS-D and CS-F

Block	Data	Harbour porpoise	Bottlenose dolphin	Risso's dolphin	Common dolphin	Beaked whale	Minke whale
CS-D	Abundance (CI low– CI high)	9,773 (4,764-18,125)	8,199 (3,595-15,158)	75 (2-259)	949 (32-2.990)	73 (20-267)	477 (85-1,425)
	Density (animals per km^2)	0.28	0.24	0.0022	0.027	0.0021	0.0137

Block	Data	Harbour porpoise	Bottlenose dolphin	Risso's dolphin	Common dolphin	Beaked whale	Minke whale
CS-F	Abundance (CI low– CI high)	3,064 (688-5,906)	647 (13-2,198)	41 (1-153)	829 (14-3,244)	n/a	209 (2-954)
	Density (animals per km^2)	0.20	0.04	0.0027	0.054	n/a	0.0137

Other species may also overlap with survey activities at any given time including (Gilles et al., 2023):

- short-beaked common dolphin (*Delphinus delphis*)
- white-beaked dolphin (*Lagenorhynchus albirostris*).

Species that are considered vagrant include sperm whale (*Physeter macrocephalus*), long-finned pilot whale (*Globicephala melas*), humpback whale (*Megaptera novaeangliae*) and blue whale (*Balaenoptera musculus*). These species are more common in offshore waters but may transit further nearshore during different periods of the year. They are respectively most observed between July and December; November and January; May and September (Reid et al., 2003); and during the summer.

5.2 Otters

Otters are known to occur across the coastal areas around West Scotland and have been recorded in survey sightings around Ailsa Craig (Petty, 2007). Otters have also been recorded in northern Welsh coastal areas. During the most recent (2017) Natural Resource Wales (NRW) survey, evidence of otters was observed at 62% of sites surveyed within the Glaslyn hydrometric area, which is inclusive of the potential Welsh landfall area (Natural Resources Wales, 2021). For otters, the main routes to impact are considered to be collision risk/entanglement and disturbance due to the physical presence of the survey vessels.

5.3 Marine Turtles

Five marine turtle species are documented as occasional visitors to Scottish and Irish waters (Howe, 2018a). Species include the leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempii*), green turtle (*Chelonia mydas*) and Hawksbill turtle (*Eretmochelys imbricata).* The leatherback turtle is the most common species, adapted for the colder Scottish seas (Scottish Government, 2011). As they are only occasional visitors, marine turtles are not assessed further within this document.

5.4 Favourable Conservation Status

Favourable Conservation Status of a species is defined in Article 1(i) of the Habitats Directive as when:

- 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.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long-term basis.

Table 5.2 summarises the conservation status of cetaceans and otters around the UK. Conservation status from the 2019 assessment is unknown for most species due to a change in the method used to assign conservation status. There has been no genuine change in conservation status of any of the five most commonly occurring EPS in the survey area (JNCC, 2019).

Table 5.2: Favourable Conservation Status of the EPS considered to occur regularly in the survey area

Species	Conservation Status 2013 Assessment	Conservation Status 2019 Assessment	Population estimates used in 2019 Assessment[4]
Harbour porpoise (*Phocoena phocoena*)	Favourable	Unknown	197,579 (95% CI 163,294–239,063)
Bottlenose dolphin (*Tursiops truncatus*)	Favourable	Unknown	10,610 (95% CI 6,302–17,865)
Risso's dolphin (*Grampus griseus*)	Unknown	Unknown	7,864 (95% CI 2,613–23,664)
Common dolphin (*Delphinus delphis*)	Favourable	Unknown	60,988 (95% CI 31,735–117,203)
Minke whale (*Balaenoptera acutorostrata*)	Favourable	Unknown	12,340 (95% CI 6,912–22,032)
Otter (*Lutra lutra*)	Favourable	Favourable	21,441 (minimum)[5]

5.5 Protected Sites

The works may pass within or adjacent to several protected sites. The details of these sites, including whether the works may overlap or occur adjacent, and the designation of any relevant EPS receptors are given in Table 5.3.

[4] population estimates are for the Marine Atlantic region

[5] population estimates based on a minimum estimate by number of map 1x1 km grid cells

Source: (JNCC, 2019; JNCC, 2013)

Table 5.3: Protected sites the works may pass within or adjacent to designated for relevant EPS receptors[6]

Protected site	Relevance to proposed works	Relevant designated species
Scotland		
Clyde Sill MPA	Overlapping	N/A
South Arran MPA	Adjacent	N/A
Western Gailes SSSI	Adjacent	N/A
Troon Golf Links and Foreshore	Adjacent	N/A
Girvan to Ballantrae Coast Section and Ballantrae Shingle Beach	Adjacent	N/A
Ailsa Craig SPA	Adjacent	N/A
Northern Ireland		
North Channel MPA	Overlapping	Harbour porpoise
Queenie Corner MPA	Overlapping	N/A
Wales		
North Anglesey Marine / Gogledd Môn Forol SAC	Overlapping	Harbour porpoise
Anglesey Terns / Morwenoliaid Ynys Môn SPA	Overlapping	N/A
Dinas Dinlle SSSI	Adjacent	N/A

[6] To note, there are no overlaps anticipated to occur with any protected sites within Manx waters.

6 OTHER SPECIES

6.1 Basking Shark

The basking shark, the largest fish species in UK waters, is listed as Endangered on the International Union for Conservation of Nature (IUCN) Red List. Their presence in UK waters is seasonal, with presence around the Scottish south-west coast recorded in summer and autumn (Paxton, 2014). In the winter months, individuals move into waters of the continental shelf and shelf edge (Sims et al., 2008).

The estimated densities of basking shark per jurisdiction are presented in Table 6.1. Areas of high relative density of basking shark extend along the western coastline of the Isle of Man and the Celtic Sea, with densities >0.10 individuals per square kilometre (Pikesley, 2020). This makes the area a recognised hot spot for the species. Basking shark in Manx water are typically observed between May and August, with June and July being the peak months for sightings (Howe, 2018b). Although up to approximately 37 km of the cable route corridor may occur within Manx waters, the route does not overlap the high density area along the coastline. As such, it is considered appropriate to assume a density of 0.1 basking shark per square kilometre within the Manx portion of the cable route corridor.

Table 6.1: Estimated basking shark density and cable route length by jurisdiction

Jurisdiction	Basking shark density (n km^{-2}) [7]
Scotland	0.00–0.10
Northern Ireland	0.00–0.01
Isle of Man	>0.10
Wales	0.00–0.01

6.2 Seals

An aerial survey of the coast of Northern Ireland in 2018 estimated a population of 1012 harbour seals and 505 grey seals (Morris & Duck, 2018). While harbour seal numbers had remained relatively unchanged since 2002, grey seals have had a significant population increase over the same period.

Within the potential cable route, the maximum estimated at-sea population per 25 km is 0.01 to 0.025% for both species (Carter et al., 2022). Although up to approximately 100 km of the cable route may occur within Northern Irish waters, 13 km and 87 km for offshore and inshore waters respectively, the route does not overlap the higher density areas along the coastline. As such, it is considered appropriate to assume a density of one harbour seal and 0.5 grey seal per square kilometre within the Northern Irish portion of the cable route corridor.

[7] Density estimate for Scotland from NMPi (2025). Density estimates for Northern Ireland, IoM and Wales from Pikesley, 2020.

7 EPS, SEAL AND BASKING SHARK RISK ASSESSMENT

The main impact pathways for EPS, seals and basking shark are considered to be the following:

- anthropogenic noise resulting from:
  - geophysical survey systems
  - increased noise from vessels
- collision risk/entanglement from vessels and equipment.

7.1 Anthropogenic Noise

Due to the high sensitivity of certain species to noise impacts, additional background information is presented on sound propagation, and marine mammal and basking shark hearing sensitivities and thresholds.

7.1.1 Sound Propagation

In general, sound sources that have high Sound Pressure Levels (SPL) and low frequency (i.e. large airgun array seismic sources) travel the greatest distance underwater. The spread of low frequency sound in the sea is efficient, with little loss due to attenuation (i.e. due to absorption and scattering). Conversely, high frequency sources (such as those emitted from geophysical survey equipment, such as MBES and SSS) tend to have greater attenuation over distance. The process is non-linear with the rate of absorption varying roughly as the square of the frequency. The overall degree of attenuation is also dependent on the water pressure, temperature and salinity.

Spherical spreading describes the decrease in level when a sound wave propagates away from a source uniformly in all directions. Overall, the intensity of sound waves decay exponentially and although low-level signals travel for long distances, higher amplitude waves lose much of their energy very close to the sound source (Gisiner, 1998). Sound also propagates further in deeper water.

7.1.2 Otter Hearing Sensitivity and Threshold

Due to a lack of studies on the underwater hearing of Eurasian otter (*Lutra lutra*), sea otters (*Enhydra lutris*) are typically references as a proxy. Sea otters are not considered sensitive to underwater noise as the species are primarily adapted to hearing airborne sounds and are not specialized for detecting signals in background noise (Ghoul & Reichmuth, 2016), therefore underwater anthropogenic noise impacts are not considered further for otters.

7.1.3 Basking Shark Hearing Sensitivity and Threshold

Unlike cetaceans, basking sharks do not rely on acoustic signals for communication or foraging (Booth et al., 2013). Little is known about their hearing capabilities. In general, shark species are considered to have poor hearing sensitivity compared to teleost fish species with a narrow range of hearing frequencies (20 Hz – 1.5 kHz), with peak sensitivity around 200-600 Hz (Hart and Collin, 2015; Chapuis et al., 2019).

The acoustic sources proposed for the survey predominantly operate above or below the peak sensitivity auditory range of basking sharks, with only the small-volume Mini G-Gun systems producing sound energy within the lower-frequency band (3.9–25.39 Hz) and the Duraspark 400 (0.2–4.25 kHz [output], 0.0013-0.00175 kHz [dominant]; impulsive) , which will be confined to use within the nearshore survey waters of Scotland and Wales. As such, basking shark will be taken forward for consideration in the assessment.

7.1.4 Seal Hearing Sensitivity and Threshold

Harbour seals have an underwater hearing sensitivity in the range of 0.5 to 80 kHz, with a peak sensitivity between 0.5 and 40 kHz (Kastelein et al., 2009; Kastelein et al., 2018). Unfortunately, there has not been equivalent underwater hearing range tests in grey seal. However, in-air research suggests they are most sensitive to frequencies in the range of 4 to 11.2 kHz in water with the potential to detect frequencies as high as 150 kHz (Ridgway and Hoyce, 1975; Ruser et al., 2014).

Given that the hearing range of both species overlaps with the possible frequencies of the SBP, eBOSS, and USBL, there is potential for impact on seals from these survey methods.

7.1.5 Cetacean Hearing Sensitivities and Thresholds

An animal's ability to detect sounds produced by anthropogenic activities depends on the amount of natural ambient or background sound. Wind, precipitation, vessel traffic, and biological sources all contribute to ambient sound.

Cetaceans have been recorded within the survey area all year round, and are sensitive to underwater noise, with the sensitivity of cetaceans to noise being dependent on the specific hearing abilities of the species.

It is possible that some of the cetacean species listed in Table 5.1 will be present during the survey programme:

- harbour porpoise
- bottlenose dolphin
- Risso's dolphin
- common dolphin
- beaked whale
- minke whale.

Going forwards in this assessment, these six species will be used as proxy species for the cetacean community likely to be present.

The species present in the survey area have differing auditory ranges and hence are not equally sensitive to the same noise sources. Table 7.1 presents the estimated auditory bandwidths for the functional hearing group relevant to the six species likely to be present in the vicinity of the proposed survey activities.

Table 7.1: Hearing sensitivity information for the six main EPS likely to present in the vicinity of the survey area

Functional hearing	Relevant species	Generalised hearing range*	Species specific information
Low-frequency (LF) Cetaceans (Baleen whales)	Minke whale	7 Hz to 35 kHz	No species-specific studies
High-frequency (HF) cetaceans	Risso's dolphin	150 Hz to 160 kHz	BEH: 1.6 to 100 kHz AEP: <4 to 142 kHz
	Bottlenose dolphin		EH: 0.4 to 146 kHz AEP: <5 to 169 kHz
	Beaked whale		No species-specific studies
	Common dolphin		No species-specific studies
Very High-frequency (VHF) cetaceans	Harbour porpoise	250 Hz to 180 kHz	BEH: 0.3 to 160 kHz AEP: <10 to 160 kHz

* Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad.

BEH – behavioural studies

AEP – auditory evoked potential studies

Sources: adapted from NMFS (2018) and Southall et al (2019).

There are various potential effects of exposure to sound from anthropogenic activities such as geophysical surveys that can be characterised as physiological or behavioural. The main potential effects can be summarised as:

- auditory injury
- behavioural response, such as disturbance effects.

7.1.6 Auditory Injury

A brief exposure to extremely high sound levels or more prolonged exposure to lower levels of continuous sound can cause injury to the auditory system of cetaceans (Richardson et al.,1995). This auditory injury may be in the form of PTS and/or TTS.

A 130 dB_{ht} (dBs to hearing threshold) (species) level was suggested as suitable criteria for predicting the onset of traumatic hearing loss in cetaceans, which is similar to that used for human exposure in air (Nedwell et al., 2012).

Indicative thresholds for SPLs that have the potential to cause auditory injury (PTS and TTS) in cetaceans were provided by Southall et al., (2019), which correspond with the United States (US) National Marine Fisheries Service (NMFS) indicative thresholds (NMFS, 2018). These thresholds are based on unweighted, instantaneous peaks (SPLs).

Sources of sound were divided into impulsive[8] and non-impulsive:

- impulsive: produce sounds that are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay
- non-impulsive: produce sounds that can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent) and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive sounds do (NMFS, 2018).

SPL thresholds for impulsive sources are presented in Table 7.2. For non-impulsive or continuous noise, the SPL onset threshold for PTS remains 230 dB re 1 µPa Peak (Southall et al., 2019).

Table 7.2: Unweighted SPL onset thresholds for PTS and TTS for impulsive sources

Functional Hearing Group	PTS	TTS
LF cetaceans	219	213
HF cetaceans	230	224
VHF cetaceans	202	196
Phocid seals (in water)	218	212

Source: adapted from (Ghoul & Reichmuth, 2016) and (NMFS, 2018)

It should be stressed that no cetacean mortality or damage to tissue has been documented for exposure to geophysical surveys, and that the exposure level for injury is a theoretical value extrapolated from experimental data. Also, it is recognised that many variables affect the nature and extent of responses to a particular stimulus. Such variables may include the recent experience of cetaceans with the sound stimulus, and their current activity (e.g., feeding vs. migrating).

7.1.7 Behavioural Response

The estimated hearing sensitivities of species present in the survey area are shown in Table 7.1. For very high-frequency (VHF) cetaceans, such as harbour porpoise, the frequency of best hearing is thought to be 105 kHz, while for high-frequency (HF) cetaceans (dolphin species including Risso's dolphin, bottlenose and common dolphins), the frequency of best hearing is 55 kHz (Southall et al., 2019). While there are no species-specific studies for minke whales (low frequency, LF), indirect evidence suggests they are most sensitive to frequencies between 20 Hz and 19 kHz (Erbe, 2002; Tubelli et al., 2012).

The dB_{ht} (species) metric (Nedwell et al., 2012) has been developed as a means of quantifying the potential for a behavioural effect on a species in the underwater environment. As sound is perceived differently by different species, the species' name must be appended e.g. dB_{ht} (harbour porpoise). Table 7.3 summarises the dB_{ht} assessment criteria for a behavioural response.

[8] The term "impulsive" relates specifically to noise-induced hearing loss and specifies the physical characteristics of an impulsive sound source, which likely gives them a higher potential to cause auditory TTS/PTS. This definition captures how these sound types may be more likely to affect auditory physiology and is not meant to reflect categorizations associated with behavioural disturbance (NMFS, 2018).

Table 7.3: Assessment criteria to estimate the potential behavioural responses by cetaceans to underwater noise

Level in dBht (species)	Reaction
0	None
0 to 50	Mild reaction in minority of individuals, probably not sustained
50 to 90	Stronger reaction by majority of individuals, but habituation may limit effect
90 and above	Strong avoidance reaction by virtually all individuals
Above 110	Tolerance limit of sound; unbearably loud

7.2 Anthropogenic Noise from Geophysical Survey Systems

As mentioned in Sections 2.1 and 2.2, acoustic survey and positioning equipment will be used. The geophysical survey systems and positioning equipment onboard the vessel will increase levels of anthropogenic noise in the marine environment because they operate by producing and receiving sound.

As sound travels much further underwater compared to airborne noise, the resulting effects on cetaceans can be at distance from the sound source, depending on the species-specific hearing sensitivities.

7.2.1 Impact on EPS, Seals and Basking Shark

A study from Thompson *et al*. (2013) observed harbour porpoise avoidance of (seismic) survey vessels in the Moray Firth out to 10 km, with animals detected again at the affected sites within a few hours. This 10 km disturbance radius is considered highly conservative as:

- It was observed as a consequence of oil and gas seismic surveys, using equipment that produces significantly higher source levels (more than 250 dB re 1 μPa @ 1 m) and also different operating frequencies (in the range of Hz rather than hundreds of kHz) than the equipment to be used in this survey.
- The waters of the Moray Firth are deep and sound travels further in deeper water, although certain frequencies, particularly mid/high frequencies, can propagate in shallow waters depending on sea surface and seabed; however, these frequencies are likely to be outside the hearing range of many of the species present (see discussion below).

As a consequence, the impact radius has been decreased to 5 km, and an impact area of 78.5 km^2 was used in Table 7.4 (simple calculation of πr^2), and this disturbance radius was also used for the consideration of potential impacts on dolphin species and minke whales, due to the lack of comparative studies. This is considered a conservative proxy, as evidence from Thompson et al.'s research (2013) suggests that short-term disturbance does not lead to long-term displacement of harbour porpoises. Estimates are given for SCANS blocks CS-D and CS-F as the cable route goes through both blocks, which have different reported densities for the relevant species.

Table 7.4: Estimated number of individuals of the six cetacean species potentially disturbed during the operation of geophysical survey and positioning equipment

Species	No. of individuals within the area of potential impact	% of Block CS-D population which has the potential to be affected	% of Block CS-F population which has the potential to be affected	% of Marine Atlantic region population which has the potential to be affected
Harbour porpoise	22 (CS-D) 16 (CS-F)	<0.01	<0.01	<0.01
Bottlenose dolphin	18 (CS-D) 3 (CS-F)	<0.01	<0.01	<0.01
Risso's dolphin	<1 (CS-D) <1 (CS-F)	<0.01	<0.01	<0.01
Common dolphin	2 (CS-D) 4 (CS-F)	<0.01	<0.01	<0.01
Beaked whale	<1 (CS-D)	<0.01	N/A	<0.01
Minke whale	1 (CS-D) 1 (CA-F)	<0.01	<0.01	<0.01

Note: SCANS-IV abundance and density estimates used in calculations from (Gilles et al., 2023); Marine Atlantic region population estimates used in Favourable Conservation Status from (JNCC, 2019).

The estimates of individuals in Table 7.4 are based on the SCANS-VI Block CS-D and CS-F density estimates. However, based on behavioural evidence (i.e. harbour porpoise and minke whales are solitary, while Risso's dolphins are generally seen in small groups, and will be transient along the survey route), it is unlikely that that many individuals would be present in the impact area at the same time. Therefore, these numbers of individuals potentially disturbed by the geophysical survey and positioning equipment are considered highly conservative.

7.2.1.1 Auditory Injury

The survey programme will utilise equipment or variations thereof as outlined in Table 3.2, Table 3.3, and Table 3.4, including MBES, USBL, SSS, SBP, SAS, eBOSS, and Mini G-Gun systems. These systems vary in acoustic characteristics, with differing frequencies, source levels, and propagation patterns relevant to potential auditory impacts on marine fauna.

High-frequency systems, such as the SSS (300–900 kHz), SAS (335 kHz) and MBES *Reson T50* (170–420 kHz; 220 dB re 1 µPa @ 1 m) in nearshore areas and *Kongsberg EM2040 Dual Rx* (200–400 kHz; 206 dB re 1 µPa @ 1 m) in the offshore, operate predominately above the functional hearing ranges of most cetacean species and seals expected to occur in the survey area (see Table 7.1).

The lower frequency boundary of the MBES *Reson T50* (170 kHz) lies marginally within the upper hearing range of very-high-frequency (VHF) cetaceans such as harbour porpoise (sensitive up to ~180 kHz), with a potential overlap with PTS and TTS based on the systems moderate source levels (220 220 dB re 1 µPa @ 1 m). However, this frequency overlap occurs at the extreme limit of auditory sensitivity where porpoise hearing rapidly declines. Given the narrow beam geometry, rapid attenuation, and short pulse duration of MBES systems, received sound levels decline steeply with distance from the transducer. Although the nearshore Reson T50 system (220 dB re 1 µPa @ 1 m) could theoretically exceed the PTS and TTS onset levels for very-high-frequency (VHF) cetaceans (202 and 196 dB re 1 µPa Peak, respectively) within approximately one metre of the source, the probability of such exposure is extremely low due to the highly directional, downward-focused beam and brief emission period (<1 ms). Accordingly, the risk of PTS is limited, due to the unlikeliness that these species remain stationary for a prolonged duration.

The USBL (Kongsberg HiPAP 501) operates at 21–31 kHz with reported source levels between 190 and 206 dB re 1 µPa @ 1 m. These frequencies overlap the hearing ranges of low- and high-frequency cetaceans (e.g., minke whale, Risso's dolphin, bottlenose dolphin) and the sensitive mid-frequency band for seals. However, the system emits short, intermittent signals primarily for positioning of towed equipment, and overall acoustic exposure is minimal. Even assuming the maximum source level, predicted received levels fall well below the TTS thresholds (≥212–224 dB re 1 µPa Peak; Southall et al., 2019). Accordingly, the potential for auditory injury to marine mammals or seals from USBL operation is limited.

SBPs such as the Innomar 100 (2–22 kHz; non-impulsive) and Duraspark UHD 400 (0.2–4.25 kHz [output], 0.0013–0.00175 kHz [dominant]; impulsive) operate within the hearing ranges of low-frequency (minke whale), high-frequency cetaceans (e.g. Risso's, bottlenose, and common dolphins) and seals (e.g. harbour and grey seals). These systems generate downward-directed sound energy with estimated source levels between those indicated in Table 3.2 and Table 3.3. The Innomar systems produce narrow-beam, short-duration signals typical of parametric profilers, while the Duraspark operates as a low-energy sparker-type impulsive source. Based on Southall et al. (2019)(Table 6.2), the potential onset thresholds for PTS are approximately 219 dB re 1 µPa Peak for low-frequency cetaceans, 230 dB re 1 µPa Peak for high-frequency cetaceans, and 218 dB re 1 µPa Peak for seals, while TTS may occur at 213 dB re 1 µPa Peak, 224 dB re 1 µPa Peak, and 212 dB re 1 µPa Peak, respectively. Therefore, auditory injury could only occur if an animal remained within a few metres of the transducer for a sustained period. The potential impact is further reduced given the downward orientation of the acoustic beams, rapid spherical spreading loss (20logR), and short pulse lengths.

The eBOSS system operates between 5–15 kHz with an estimated source level of ~153 dB re 1 µPa/V @ 1 m. It is a low-energy, electro-acoustic system producing brief, non-impulsive signals within the mid-frequency range. This output level is well below recognised thresholds for both PTS and TTS across all cetacean and seal functional hearing groups and therefore presents no realistic risk of auditory injury.

Mini G-Gun systems (40 cu in and 60 cu in) are small-volume impulsive airguns operating between 4.8–25.39 Hz and 3.9–22.46 Hz respectively, with measured peak source levels as indicated in Table 3.3. These single-chamber devices generate high instantaneous peak pressures at very close range, but their chamber volume, shallow deployment depth and intermittent firing regime result in comparatively low cumulative acoustic energy (SEL) relative to conventional multi-gun seismic arrays. Although Mini G-Gun peak levels marginally exceed the TTS and PTS onset peak threshold for low-frequency cetaceans at 1 m (213 dB re 1 µPa Peak and 219 dB re 1 µPa Peak respectively), any risk would therefore be constrained to only a few metres from the source. Considering the short pulse duration, downward energy orientation, rapid propagation loss (spherical spreading plus seabed absorption as the activity is conducted in the nearshore), and expected avoidance behaviour of marine mammals, the probability of TTS or PTS occurring under field conditions is limited.

Basking sharks detect underwater particle motion predominantly at low frequencies (likely <1.5 kHz). Only the Mini G-Guns and Duraspark UHD 400 produce energy in this band; however, despite their high peak SPLs at source, the limited chamber volume and low total SEL mean that elevated particle motion sufficient to be perceived at biologically consequential levels would be restricted to the immediate vicinity of the gun (a few metres). For injuries to be potential, the individual would need be at very close range of the sound source for a prolonged duration. However, given the natural avoidance behaviour, prolonged exposure and injury are unlikely to happen.

To experience auditory injury, a cetacean, seal or basking shark would need to remain within a few metres of an operating sound source for a sustained duration, which is highly unlikely under normal operational and behavioural conditions. All geophysical systems proposed are downward- or laterally directed and exhibit rapid acoustic attenuation with distance. Based on source levels, frequencies, and species-specific hearing sensitivities, none of the proposed survey systems are predicted to exceed recognised PTS or TTS onset thresholds at realistic exposure ranges. Accordingly, the overall risk of auditory injury to EPS, seal and basking shark is limited.

7.2.1.2 Behavioural Response

As described above, high-frequency, non-impulsive systems (e.g. SSS, SAS and MBES) are unlikely to cause more than temporary or minor behavioural responses, given their operating frequencies are largely above the auditory range of most cetaceans and seals. Only harbour porpoise, with sensitivity extending up to approximately 180 kHz, may detect the lowest frequencies of the nearshore MBES; however, any response would be expected to be brief and localised given the narrow, downward-directed beams and rapid attenuation of sound in the water column.

Mid-to low-frequency equipment, including the USBL (21–31 kHz), SBPs (0.0013–115 kHz), eBOSS (5–15 kHz) and Mini G-Guns (3.9–25.39 Hz), may elicit, short-term, localised behavioural effects, such as avoidance or altered swimming behaviour, particularly when animals are within tens to several hundred metres of the source. Based on the 90 dBht strong avoidance criterion (Nedwell et al., 2008), strong avoidance reactions may occur within a limited radius around the vessel, depending on source level and propagation conditions.

However, the short pulse durations, low duty cycles (i.e. short periods of sound emission separated by long intervals), and transient operational use of the sources, combined with the mobility and avoidance capacity of cetaceans, mean that sustained behavioural disturbance or displacement is unlikely.

7.2.2 Conclusions

Anthropogenic noise increase due to geophysical pre-lay survey activities has the potential to cause auditory injury only at very close proximity to the operating sources. These potential threshold shifts are expected to be negligible after mitigation are applied (see Section 8).

The potential for auditory injury is confined to individuals within a few metres of the sound source and is unlikely to affect more than a very small proportion of the EPS populations potentially present within the survey area.

Following relevant guidance (see Section 4.4) and regulations cited in Section 4.1, there is the potential for short-term disturbance of cetaceans and seals arising from the operation of geophysical systems used for the proposed survey programme. Therefore, an EPS Licence (to disturb) and Wildlife Licence will be required.

As noted above, temporary behavioural avoidance is the most likely response. Based on density estimates for the wider region, up to 38 harbour porpoises, <2 Risso's dolphin, 21 bottlenose dolphins, 6 common dolphins, <1 beaked whales and 2 minke whales have the potential to be disturbed during survey activities across both block CS-D and CS-F. This disturbance will not be sufficient to cause any population-level effects (i.e., it will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status in their natural range), and thus it is considered that an EPS licence (to disturb) and Wildlife Licence can be issued (Please see Section 8 for additional information).

7.3 Increased Noise from Vessels

The survey programme will add additional vessels into the offshore marine environment along the cable route. Therefore, it will potentially increase levels of anthropogenic noise and thus has the potential to affect cetaceans. Increased vessel noise has the potential to cause behavioural responses in cetaceans, as well as auditory injury such as PTS or TTS, and may mask naturally occurring sounds.

Noise varies from vessel to vessel but is a continuous noise source; different vessels will generate different frequency characteristics and sound levels depending upon factors such as the propulsion system they are using, as described in Table 7.5.

Table 7.5: Noise specifications of vessels

Size	Length	Type	Estimated noise level SPL (dB re 1 µPa @ 1 m)	Frequencies	Comments
Large	>100 m	Container / cargo ships, super-tankers, cruise liners	180–190	Few hundred Hz	Exact sound output depends on type, size and operational mode
Medium	50 – 100 m	Crew-boats, larger fishing / trawler, research vessels, tugboats	165–180	Mimics large vessels	Tend to have slower revving engines and power trains, with majority of sound energy below 1 kHz
Small	<50 m	jet skis, speed boats, light	160–180	20 Hz - >10 kHz	Greater portion of

Size	Length	Type	Estimated noise level SPL (dB re 1 μPa @ 1 m)	Frequencies	Comments
		commercial runabouts, motor yachts, fishing vessels, small trawlers			sound produced is mainly above 1 kHz mostly from propeller cavitation

7.3.1 Impact on EPS

Table 3.1 presents the potential vessels considered for the proposed activities. As all three vessels are either small or medium sized, the use of a medium sized vessel is considered an appropriate worst-case scenario.

7.3.1.1 Auditory Injury

Auditory injury may occur from noise from medium vessels if animals of any hearing group are less than 1 m from the sound source. However, it is unlikely that PTS will occur further away from vessels as the estimated SPL is lower than the SPL onset threshold for continuous noise of 230 dB re 1 μPa (Southall, 2019).

7.3.1.2 Behavioural Response

Predicted 90 dB_{ht} (species) impact ranges for medium vessels (ICOL, 2013) are presented below (Table 7.6).

Noise from vessels is unlikely to cause disturbance to individual animals, except when in very close proximity to a vessel. Given that the largest potential impact range predicted for a strong avoidance reaction is 11 m (for VHF cetaceans, harbour porpoise), coupled with existing vessel movements within the area, it is considered that sound from vessel activity associated with the survey activities will not significantly add to the background noise levels from vessels already present.

To put the predicted displacement impact ranges caused by vessels into context, the number of individuals likely to be disturbed is estimated for the 90 dB_{ht} (species) impact range. Using the density estimates from SCANS-VI Block CS-D and CS-F (Gilles et al., 2023) (Table 5.1), and the predicted impact range as radii in the simple calculation of area πr^2, less than one individual of any species is likely to be disturbed by noise from large vessel noise at the 90 dBht (Table 7.6).

Table 7.6: Estimated number of individuals of the six cetacean species potentially disturbed by vessel noise from medium vessels (50–100 m)

Species	90 dBht (species) impact range (m)	Area of potential impact (km^2)	Number of individuals within the area of potential impact
Harbour porpoise	11	<0.001	<1
Bottlenose dolphin	4	<0.001	<1
Risso's dolphin	4	<0.001	<1
Common dolphin	4	<0.001	<1
Beaked whale	Unknown	<0.001	-
Minke whale	2	<0.001	<1

Source: 90 dB_{ht} (species) impact range adapted from (Nedwell et al., 2012 and Barham et al., 2014)

7.3.2 Conclusions

Vessel noise is not expected to cause auditory injury in any species of cetacean nor is it anticipated to elicit a behavioural response over and above that caused by the usual vessel activity within the area. Therefore, the potential for the onset of auditory injury to be induced or a long-term, negative behavioural response is negligible.

Following relevant guidance (Section 4.4), it is considered that there is no potential for an offence to be committed as defined in applicable regulations described in Section 4.1 .

7.4 Collision Risk

The physical presence of survey vessels has the potential to pose a collision risk to EPS, seals and basking shark. Any cables associated with the offshore survey equipment may also pose an entanglement risk for cetaceans, seals and basking shark.

Individuals are vulnerable to collisions with larger vessels. Vessel strikes are a known cause of injury and/or mortality in cetaceans (Schoeman et al., 2020), with collisions potentially occurring with vessels of all sizes. Large slow-moving whales are more at risk of vessel strike as smaller cetaceans are generally more mobile allowing them to avoid vessels either in their path or moving towards them. However, there may be a bias in reporting of collisions with larger whales as many vessels may be unaware to have struck with smaller species (Schoeman et al., 2020). Vessels travelling at speeds of 14 knots (kts) or more are also more likely to cause incidents. Injuries can result in fractures, bruises, gashes or severed fins, and the most serious accidents can lead to the death of the animal, although not always immediately (Sea Watch Foundation, 2009).

7.4.1 Impact on EPS, Seals and Basking Shark

Cetacean avoidance behaviour is often correlated with fast and unpredictable vessels, such as speedboats and jet-skis (Bristow & Reeves, 2001; Gregory & Rowden, 2001; Leung Ng & Leung, 2003; Buckstaff,2004), while neutral or positive reactions have been observed with larger, slower moving vessels such as cargo ships (Leung Ng & Leung, 2003; Sini et al., 2005). Harbour porpoise, in particular, generally respond negatively to high-speed planning-hulled vessels (Oakley et al., 2017). Seals are not generally considered particularly vulnerable to vessel collision, especially with large and slow-moving vessels.

The number of survey vessels to be used for the survey programme is still to be decided. The vessels will transit to and from the survey route along predefined corridors. Furthermore, during the surveys themselves, the vessels will follow a predefined survey corridor and will be travelling at a working speed of less than 4 knots approximately with a transit speed of 10 knots approximately.

The predefined transit corridors to site and predefined linear routes for the surveys and cable-lay makes it easy for animals to predict and avoid project vessel movement, and thus greatly reduces the risk of collision. Likewise, collision risk for seals with vessels is considered extremely low, especially with large and slow-moving vessels, given the small and agile nature of seals.

The mobility of cetaceans, seals and otters, the slow speed of the project vessels while operational and the predefined survey routes will also reduce the risk of entanglement. As such, cetaceans, seals and otters are not considered further in regard to collision risk. For the offshore area, the availability of useable habitat for cetacean species negates any barrier effects caused by towed survey equipment, also reducing the risk of entanglement.

To consider the risk of collision, the estimated maximum number of basking shark encountered within the cable route corridor by jurisdiction is presented in Table 7.7. Basking sharks are thought to have little to no awareness of approaching vessels (Speedie et al., 2009), which makes them unlikely to be disturbed by vessels but also makes them susceptible to collision due to lack of evasive behaviour (Pirotta et al., 2015). Given the temporary nature of the works and the low likelihood of encountering basking shark during project activities, the risk of collision is considered to be extremely low. The slow speed of the vessels and use of predefined corridors is considered to further reduce risk to basking shark.

Table 7.7: Estimated basking shark encounter rate by jurisdiction

Jurisdiction	Basking shark density (n km^{-2}) [9]	Maximum cable route area (km^2) (including nearshore landfall surveys)	Estimated maximum individuals encountered within the cable route corridor
Scotland	0.00 – 0.10	213.3	21.33
Northern Ireland	0.00 – 0.01	149.67	1.4967
Isle of Man	>0.10	54.52	5.452
Wales	0.00 – 0.01	251.2	25.12

[9] Density estimate for Scotland from NMPi (2025). Density estimates for Northern Ireland, IoM and Wales from Pikesley, 2020.

7.4.2 Conclusions

Following Scottish guidance outlined in Section 4.4, there is negligible potential for injury or disturbance to EPS, as defined in the relevant Habitats Regulations (see Section 4.1) from collision with vessels or entanglement with cables associated with the proposed work.

No offence will be committed under these regulations and therefore an EPS and Wildlife Licences will not be required for this potential impact (collision with vessels).

7.5 Indirect Impacts

There is potential that some of the survey activities may result in noise impacts on fish and shellfish prey resources (Table 7.8). However, significance of these potential effects is deemed to be negligible. Therefore, no offence will be committed, no mitigation is considered to be necessary, and an EPS or Wildlife licence will not be required for these potential impacts (indirect effects).

Table 7.8: Assessment of potential indirect effects of the survey programme

Cause of potential indirect effect	Prediction	Significance
Changes in fish and shellfish prey resources	Impacts to fish species due to physical presence of the survey vessel(s), electromagnetic field effects or anthropogenic noise are considered to not be significant; therefore, any potential indirect effects on the cetaceans and otters that target these species are also expected to not be significant.	Negligible

7.6 Cumulative Impacts

The transient and linear nature of the pre-lay survey along with project planning will ensure that any potential in-combination impacts from the surveys on EPS are minimised, and as such in-combination effects are not considered significant.

Other projects in proximity to the geophysical surveys have been identified as part of an in depth marine constraint analysis carried out during Phase 1 of the WL2 project works:

- North Channel Wind 1 (conceptual phase)
- North Channel Wind 2 (conceptual phase)
- Morlais (West Anglesey Demonstration Zone) (in operation)
- Holyhead Deep 0.5 MW Site (in operation).

This list only includes projects that may have active investigative, construction or maintenance works occurring concurrently; established projects (pipelines, other cables etc.) will have no cumulative impacts with these surveys as there will be not concurrent works. Due to the localised and temporary nature of the survey activities, and their limited impacts, there are unlikely to be cumulative impacts with other projects. There may be potential for a cumulative impact due to increased underwater anthropogenic noise if the survey activity, such as USBL or SBP use, corresponds with other noisy activities in the area. However, given the transient nature of the survey activities, it is unlikely that this would result in significant cumulative impacts.

8 ASSESSMENT OF POTENTIAL OFFENCE

Following the relevant guidance as detailed in Section 4.4, it can be concluded that, with mitigation, potential impacts from the proposed survey campaign works are unlikely to result in the harassment, disturbing, injuring or killing of an EPS as defined under the following regulations:

- Wales and Scotland:
  - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended):
    - Section 38 and Section 39
  - The Conservation of Offshore Marine Habitats and Species Regulations 2017:
    - Section 45
  - The Wildlife and Countryside Act 1981:
    - Section 9
- Isle of Man:
  - The Wildlife Act 1990 (Isle of Man):
    - Section 9
- Northern Ireland:
  - The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009:
    - Section 4
  - The Wildlife (Northern Ireland) Order 1985 (as amended):
    - Section 10.

In relation to the above regulations, the percentage of the reference population[10] of each cetacean species which has the potential to be disturbed by the geophysical survey equipment is considered to be negligible (less than 1% of each of the six most common cetacean species in the survey area) and therefore not detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status.

Disturbance is likely to be localised and short-term, and with mitigation is considered to be negligible. This disturbance is considered unlikely to have an impact on the Favourable Conservation Status of any cetacean EPS. Disturbance will not be sufficient to cause any population level effects, and thus it is considered that an EPS licence (to disturb) can be issued under the above regulations.

As stated in Section 4, three tests must be passed before an EPS licence can be granted.

8.1 Test 1: The licence must relate to one of the purposes referred to in the Regulations

An EPS Licence may be granted under the following sections of the below regulations:

- Wales and Scotland:
  - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended):
    - Section 44

[10] In this instance the Marine Atlantic region populations used to calculate Favourable Conservation Status is considered the reference population.

- The Conservation of Offshore Marine Habitats and Species Regulations 2017:
  - Section 55
- The Wildlife and Countryside Act 1981:
  - Section 16

- Isle of Man:
  - The Wildlife Act 1990 (Isle of Man):
    - Section 16
- Northern Ireland:
  - The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2009:
    - Section 44
  - The Wildlife (Northern Ireland) Order 1985 (as amended):
    - Section 18.

Each of these regulations provides a list of purposes where an EPS licence can be granted. These are as follows:

- Scientific or educational purposes.
- Ringing or marking, or examining any ring or mark on, wild animals.
- Conserving wild animals or wild plants or introducing them to particular areas.
- Protecting any zoological or botanical collection.
- Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.
- Preventing the spread of disease.
- Preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber or any other form of property or to fisheries.

The proposed WL2 HVDC installation meets the requirements of these regulations by providing a direct economic and environmental benefit on a national scale, through the development of a transmission network in and between Scotland and Wales in order to provide increased capacity to accommodate increased generation from renewable energy in Scotland. As detailed in Section 2.1, WL2 represent an opportunity to progress net zero objectives within the UK. The transmission of renewable energy contributes to achieving the targets sets in the Environment (Wales) Act 2016, The Isle of Man Climate Change Act 2021, the Climate Change Act (Northern Ireland) 2022 Act, and Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. These Acts sets targets to reduce emissions of all greenhouse gases to net-zero by 2050 at the latest, with a series of interim targets identified within each Act for each country.

The projects would also further several key national development and planning frameworks, such as the development of '*Strategic Renewable Electricity Generation and Transmission Infrastructure*' in Scotland's National Planning Framework 4 and to '*integrate development with the provision of additional electricity grid network infrastructure*' in the Planning Policy Wales. The project aims to provide a transmission connection that will facilitate the connection of renewable generation through a marine cable linking Scotland and Wales.

This EPS licence application is for the implementation of a geophysical survey programme for the WL2 HVDC cables. The EPS licence application is founded on Imperative Reasons of Overriding Public Interest (IROPI) identified above to support the EPS licence application process.

It is therefore considered that there is significant overriding public interest for the development of the WL2 HVDC cables, and thus the granting of an EPS licence for the proposed geophysical survey campaign that will help to enable the project's development.

8.2 Test 2: There must be no satisfactory alternative

To fulfil the regulation requirements alternatives test, alternatives to the proposed geophysical survey campaign methods have been considered. The alternatives identified and assessed are the use of lower impact survey equipment than that listed in Section 3, and a "do nothing" scenario consisting of not conducting the proposed activities at all. These alternatives are further considered below.

8.2.1 Alternative Option 1 – Use of Lower Impact Survey Equipment

As explained in Section 5.5, the most significant risk to EPS (cetaceans) from the survey campaign is the potential impacts of anthropogenic noise produced by the survey equipment. The equipment with the greatest potential to generate underwater sound within the hearing range of cetaceans are the low-frequency SBP, USBL, eBOSS system, and the Mini G-Gun sources. The use of the SBP and Mini G-Guns is essential to obtain accurate information on seabed and sub-seabed conditions, allowing characterisation of sediments, stratigraphy, and potential obstructions along the proposed cable corridor. Similarly, the eBOSS system provides high-resolution near-surface data required to confirm seabed integrity and to support geotechnical planning. These data provide greater confidence that there will be no anomalies encountered on the seabed during cable installation, which could otherwise result in technical failure, increased costs, or environmental impacts at later project stages. Similarly, the USBL is needed to accurately position and control the survey equipment underwater. Not tracking the equipment would have potentially severe consequences including loss of equipment, having both economic and environmental impacts, and potential health and safety effects on other sea users.

Options for the use of alternative, higher-frequency or lower-energy systems have been explored; however, these alternatives do not provide the necessary penetration or data quality to achieve the survey objectives. The specification of the proposed devices (Table 3.2, Table 3.3, and Table 3.4) therefore represents the lowest-impact configuration capable of meeting the technical and safety requirements of the project.

Impacts on cetaceans are minimised as far as reasonably practicable through the selection of the least-powerful systems available that can still deliver the required resolution and depth of data. The proposed equipment allows identification of seabed features and potential obstructions (including Unexploded Ordnance (UXOs)) and assessment of sediment conditions to ensure that export cables can be safely installed and operated. While there is a range of subsea positioning equipment (i.e., USBL/transponders) and geophysical survey systems (i.e., SBP, SAS, eBOSS, and Mini G-Guns) available on the market, our assessment has concluded that they would all utilise the same range of frequencies described in Table 3.2, Table 3.3, and Table 3.4, as this is currently the best available technology and industry standard. It is therefore concluded that the use of lower impact survey equipment is not a viable alternative option.

8.2.2 Alternative Option 2 – Do Nothing

As it is not viable to use alternative lower impact equipment to conduct the proposed surveys, the only remaining alternative would be to not undertake the survey campaigns (i.e., "do nothing"). The surveys are required to inform cable routing and siting works and thus a "do nothing" alternative presents significant risks to the project including unknown seabed conditions, unknown locations of potential UXOs and other obstructions, unknown habitat locations and unknown geotechnical conditions resulting in an unsafe construction programme. The lack of this information would result in any works in the area to lay the cable being dangerous, unjustifiable, and thus non-viable. Therefore, it can be reasonably concluded that if the proposed survey campaign was not to go ahead then WL2 would not be able to be developed. As identified in Section 2.1, the project will aid in the development of a transmission network across the UK to provide greater capacity to transmit increased generation from renewable energy in Scotland.

It can therefore be reasonably concluded that there are no satisfactory alternatives to the proposed survey campaigns and associated use of positioning and survey equipment due to the need to accurately position and control the underwater equipment and characterise obstructions on the seabed, as well as the layers of sediment or rock below the seabed. These surveys are essential to the construction of the WL2, thus support the Welsh, Scottish, and UK Governments in reaching their renewable energy targets. Therefore the 'no satisfactory alternative test' is considered to have been met.

As discussed in Section 2.1, there is a need for a transmission cable between Wales and Scotland. Therefore, a "do nothing" alternative to the survey activities is not considered a viable option.

8.3 Test 3: The action authorised must not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status in their natural range

The percentage of the reference population of each cetacean species which has the potential to be disturbed by use of the survey equipment or installation activities are considered to be negligible (less than 1% of the harbour, porpoise; Risso's, bottlenose and common dolphins; and minke whale occurring in the survey area). There are no significant impacts on otters. Therefore, the geophysical survey campaign is not considered to be detrimental to the maintenance of the population of the species concerned at Favourable Conservation Status.

8.4 Basking Shark Licence

As discussed within Section 7.4, the risk for impact on basking sharks from vessel collision is considered negligible. The risk is further reduced via the mitigation measures as described in Section 9 below, which reduce risks of impact on basking shark in the same manner as marine mammals. Furthermore, with the low density of basking shark in the area and the infrequency of sightings, it is assessed that any impact experienced would be of low magnitude. However, because the risk for impact on basking shark cannot be completed ruled out, a Basking Shark licence will be sought for the proposed activities.

8.5 Wildlife Licence (Seals)

As described within Section 6.2, harbour seal and grey seal could be present within the cable route corridor. As shown in Table 7.2, these species have similar thresholds for injury from underwater noise to cetacean EPS. However, due to the low density of seals expected within the cable route corridor and natural fleeing behaviour of the animals, injury is considered extremely unlikely. There is the potential for temporary disturbance of seals at sea due to underwater noise, although this is minimised by the mitigation described in Section 9 below. Given the low density of seals expected within the cable route corridor, it is assessed that any impact experienced would be of low magnitude. Particularly in the offshore area beyond 12 nm, it is not anticipated that seals will be encountered and therefore none as expected to be disturbed outside of nearshore waters.

9 MARINE MAMMAL & BASKING SHARK MITIGATION PLAN

Operation of geophysical survey systems and positioning equipment during the survey activities have the potential to cause auditory injury to EPS (cetaceans) and seals at very close range. Therefore, mitigation in the form of pre-work searches will be undertaken prior to the use of geophysical survey systems, use of positioning equipment, or installation activities. Where possible, soft-start procedures will also be implemented, with sound emitting equipment “ramped up” to operating frequencies.

These mitigation measures for cetacean EPS (JNCC, 2017) are also deemed to be appropriate for seals and basking shark, as well as marine turtles and otter.

9.1 Pre-work Searches

It is acknowledged that adherence to the measures outlined in the JNCC guidelines (JNCC, 2017) constitutes best practice and minimises the risk of disturbing marine mammals. Principles of this guidance will be applied in order to ensure that auditory injury is not induced in any cetaceans present within the injury zone, from the equipment.

Given the low level of risk to marine mammals from the positioning equipment (low likelihood of encounter and low risk of PTS due to power source level of equipment), there is a limited range for auditory injury and/or disturbance from the equipment in use. However, the recommended mitigation zone is 500 m for impulsive/high-energy sources, or as otherwise defined during source-specific assessment, due to the operating frequencies and source levels of some of the equipment being within the hearing range of cetaceans. Pre-watch searches will be carried out for a period of at least 30 minutes prior to activation of any sound-emitting system. If a marine mammal is observed during the pre-watch period within the mitigation zone, initiation of the sound source (or soft start) will be delayed until no animals have been sighted in the mitigation zone for a minimum of 20 minutes. Watches will be conducted via visual methods when conditions allow (i.e., suitable daylight, sea state and visibility). During times when conditions do not allow for reliable visual searches, primarily during the hours of darkness, the pre-watches searches will be conducted using Passive Acoustic Monitoring (PAM). Visual and acoustic watches will be conducted by suitably certified and experienced Marine Mammal Observer (MMO)/PAM personnel. This will allow for coverage for 24-hour operations as needed.

Due to the nature of the positioning equipment and anticipated operational mode, once any subsea equipment (e.g. towed device) is deployed, the USBL positioning system and transponder beacons will be activated and remain operational for the duration of the survey. It follows that USBL positioning system and associated subsea survey equipment, once deployed, will normally be functioning until the subsea equipment is removed from the water.

It is assumed that as the USBL positioning system and transponder beacons are effectively in continual operational mode while the subsea equipment is in the water, this initial and constant signal would act as an acoustic deterrent thereby preventing susceptible cetaceans from entering the localised area in which they may be predisposed to PTS onset (auditory injury). When the USBL positioning system and transponder beacons are working alongside other geophysical equipment emitting sound, it is therefore proposed that additional pre-work mammal watches would only be required if there was a significant break in the operation with deactivation of the

USBL positioning system, and as per the revised JNCC guidance (JNCC, 2017). The guidance states that if there is an unplanned break in the USBL positioning system 'activation' of longer than 10 minutes, then a 30-minute pre-watch before starting up again is necessary. If the break is planned, then the observer would watch during the 'deactivation' period, and if there are no cetaceans seen then the USBL positioning system and transponder beacons can be started again even if the break is longer than 10 minutes. The same procedures will apply to construction activities for the same reasons that the noise-generating activity being ongoing will act as a deterrent, preventing animals entering the distance at which injury could be experienced.

However, pre-work watches should be carried out prior to the activation of all geophysical systems, particular MBES, SSS, SAS and SBPs. Additional pre-work mammal watches would be required where there is a significant break in the operation with deactivation of the sound source, as per the revised JNCC guidance (JNCC, 2017) stated above.

However, pre-work watches will still be carried out prior to the activation of all geophysical systems, particularly, MBES, SSS, SAS, SBP, eBOSS and Mini G-Gun systems. Additional pre-work mammal watches would also be required where there is a significant break in the operation with deactivation of the sound source, as per the revised JNCC guidance (JNCC, 2017) stated above.

9.2 Soft Start

As per the revised JNCC guidance (JNCC, 2017), where practical, the power of acoustic sources (i.e. MBES, SSS, SAS, SBPs) should be ramped up in a uniform manner. This controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period (e.g., output peak sound pressure level of 170 dB->180 dB->190 dB->200 dB->200+ dB over 20 minutes).

However, the JNCC guidance (JNCC, 2017) does acknowledge that in cases where the equipment does not allow a ramp up (i.e., purely on/off systems such as certain sub-bottom profilers or Mini G-Guns), the device shall be operated via a sequential activation method over a minimum duration of 20 minutes prior to full power (e.g. on-off-on cycles at low volume).

Soft start should commence only after the mitigation zone (500 m) around the vessel has been confirmed clear of EPS and basking shark during the pre-work searches.

9.3 Transit Watches

A nominated competent observer on the bridge of the survey vessel will keep watch for marine mammals during transit between port and the survey corridor. Any sightings will be communicated to the Vessel Master as soon as is practicable and the following actions, as per the Scottish Marine Wildlife Watching Code (NatureScot, 2017)[11], implemented:

- The Vessel Master will ensure that marine mammals are avoided to a safe distance (100 m or more) in all possible circumstances.
- The Vessel Master will minimise high powered manoeuvres where this does not impair safety.

[11] This guidance will be used as best industry practice for Wales, Isle of Man, and Northern Ireland in addition to Scotland

9.4 Reporting

A log of all MMO (suitably briefed crew member or dedicated MMO) effort and geophysical survey systems and positioning equipment operations will be kept (using the JNCC Marine Mammal Recording Forms[12]).

Following completion of the survey programme, a report will be submitted to NRW, DEFA DAERAand MD-LOT, which will include the following:

- Completed Marine Mammal Recording Forms.
- Dates, locations and details of activities.
- Details of all MMO operator effort including information about any marine mammals detected.
- Details of any technical problems encountered, and actions taken.

The Marine Noise Registry close-out report will also be completed.

[12] Available with the JNCC 2017 guidelines (JNCC, 2017).

10 CONCLUSIONS

This assessment of the potential for impacts on cetacean EPS and basking shark from geophysical survey activities (increased anthropogenic noise from use of the survey systems, increased vessel noise, collision with vessels and indirect effects) from a worst-case scenario concluded that, post-mitigation:

- The potential for auditory injury is considered to be **negligible**.
- The potential for disturbance is considered to be **negligible** within the context of the wider populations of EPS.

Following Scottish guidance entitled 'The protection of Marine European Protected Species from injury and disturbance: Guidance for Scottish Inshore Waters (July 2020 Version)' and the English and Welsh guidance entitled 'The protection of marine European Protected Species from injury and disturbance'[13], **there is potential for disturbance** to marine EPS (cetaceans), as defined in Section 8 from increased anthropogenic noise during the survey programme.

Therefore, an EPS licence will be required for this potential impact (increased anthropogenic noise).

It is considered that a licence can be granted because the three tests relating to the requirements of the Regulations that must be passed before a licence can be granted (detailed in Section 4) have been satisfied (see Section 8).

In addition, a Basking Shark licence as well as a Wildlife Licence for seals in Northern Ireland will be sought for the potential impacts of increased anthropogenic noise and vessel collision due to an inability to completely rule out the potential for these impacts.

[13] The Scottish and English/Welsh guidance have been used to cover all study areas in the absence of Manx or Northern Irish specific guidance

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