POWERING UP OFFSHORE SOUTH COAST

Risk Assessment for Annex IV Species

IE001220-RPS-RP-XX-RP-EN-0004
A1 C02
29 January 2025

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
S2 P01	Internal draft	RS	AE	GMcE	02/10/2024
S3 P01	Draft for client review	RS	AE	GMcE	04/10/2024
S3 P02	Client and Legal comments received	RS	AE	GMcE	04/10/2024
S3 P03	Client and Legal comments addressed	RS	AE	GMcE	05/11/2024
A1 C01	Final	RS	AE	GMcE	05/11/2024
A1 C02	Updates due to new HWM area	RS	AE	GMcE	29/01/2025

Approval for issue

GMcE	29 January 2025

Prepared by:

RPS

Prepared for:

EirGrid

Dublin | Cork | Galway | Sligo | Kilkenny
rpsgroup.com

RPS Group Limited, registered in Ireland No. 91911
RPS Consulting Engineers Limited, registered in Ireland No. 161581
RPS Engineering Services Limited, registered in Ireland No. 99795
The Registered office of each of the above companies is West Pier Business Campus, Dun Laoghaire, Co. Dublin, A96 N6T7

Contents

Tables

Figures

1 Introduction

1.1 Overview

The Irish Government is taking major steps to make Ireland carbon neutral by 2050. These steps include a commitment to increase the proportion of electricity generated from renewable sources to 80% by 2030. The Climate Action Plan 2024 (DECC, 2024) places offshore wind power at the centre of this commitment, with a key target being the grid connection of at least 5 Gigawatts (GW) of offshore wind by 2030.

EirGrid develops, manages, and operates Ireland's electricity grid and are responsible for the safe, secure and reliable supply of Ireland's electricity. EirGrid was established to act as the independent Transmission System Operator (TSO), in line with the requirements of the EU Electricity Directive (EU) 2019/944 (EU Electricity Directive). EirGrid became operational as the TSO on 1 July 2006 and is a public limited company, registered under the Companies Acts. The Irish Government has also designated EirGrid as the TSO and Transmission Asset Owner (TAO)/ Offshore Asset Owner (OAO) for Ireland's offshore electricity grid.

In March 2023, the Department of the Environment, Climate and Communications (DECC) published the "Accelerating Ireland's Offshore Energy Programme; Policy Statement on the Framework for Phase Two Offshore Wind" (the "Framework"). This policy identified EirGrid as the developer of new offshore grid transmission infrastructure to connect new offshore wind farms on the south coast.

On the basis of the policy, EirGrid has initiated the Powering Up Offshore South Coast (PUOSC) project. This will be the first state led offshore renewable electricity connection in Ireland. The project was included in the European Network of Transmission System Operators for Electricity (ENTSO-E) Ten Year Network Development Plan (TYNDP) in 2024. While the project is at an early stage of development, it is expected to include the development of offshore substation(s) off the southern coast of Ireland, new onshore and offshore transmission cables and new onshore compensation compound as required to accommodate the connection on the existing onshore transmission system. The development area will be established based on the South Coast Designated Maritime Area Plan (SC-DMAP)which was published by the Government of Ireland on 25th October 2024. This infrastructure will facilitate up to 900 MW of power generated by offshore wind farms in Irish waters into our national electricity grid.

The DECC's Framework outlined a four-phase process for developing offshore wind energy infrastructure. In the short-term, the framework is based on a developer-led approach, taking advantage of projects that have been in development for several years. In the medium to long-term it transitions to a plan-led approach in which EirGrid plays a key role.

EirGrid are undertaking the engineering, planning and environmental services necessary to provide the grid infrastructure to support the development of offshore wind.

PHASE 2

As part of the government-led approach to the delivery of offshore wind, known as Phase 2, approximately 900 MW of electricity will be supplied from wind farms off Ireland's south coast. It is anticipated that these offshore wind farms will be constructed in Area A – Tonn Nua within the SC-DMAP area (see Figure 1.1).

These wind farms will be provided by private developers. EirGrid will be responsible for delivering the infrastructure that will connect the power from these wind farms off the south coast to the onshore grid. This will be realised through EirGrid's PUOSC project.

Following publication of the SC-DMAP, EirGrid plans to develop offshore electricity substation(s) and associated offshore transmission cables. This new infrastructure will connect the power generated by offshore windfarms to the national electricity grid.

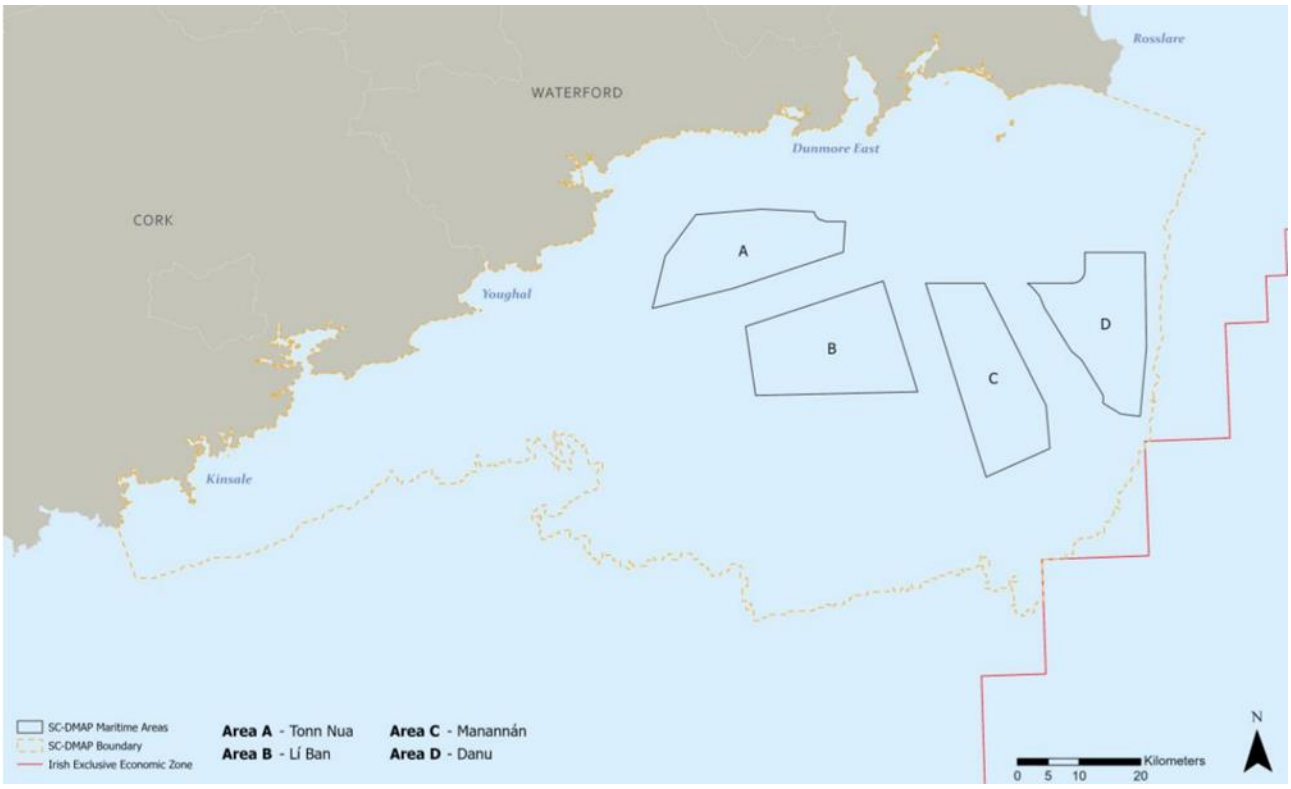

Figure 1.1 SC-DMAP Area

The main components of the PUOSC project are:

- Offshore substation(s) – to be located within Maritime Area A (Tonn Nua) of the SC-DMAP (Figure 1.1).
- A connection between the offshore substation(s) and onshore compensation compounds. This will involve offshore transmission cables; and
- Onshore compensation compounds.

The precise location of the offshore substations have not yet been determined, nor has it been determined how and where they will connect to the national electricity grid onshore. However, due to onshore grid capacity constraints, it is anticipated that one 450 MW offshore to onshore connection will be developed in the Cork area and the other 450 MW offshore to onshore connection will be developed in the Waterford/ Wexford area.

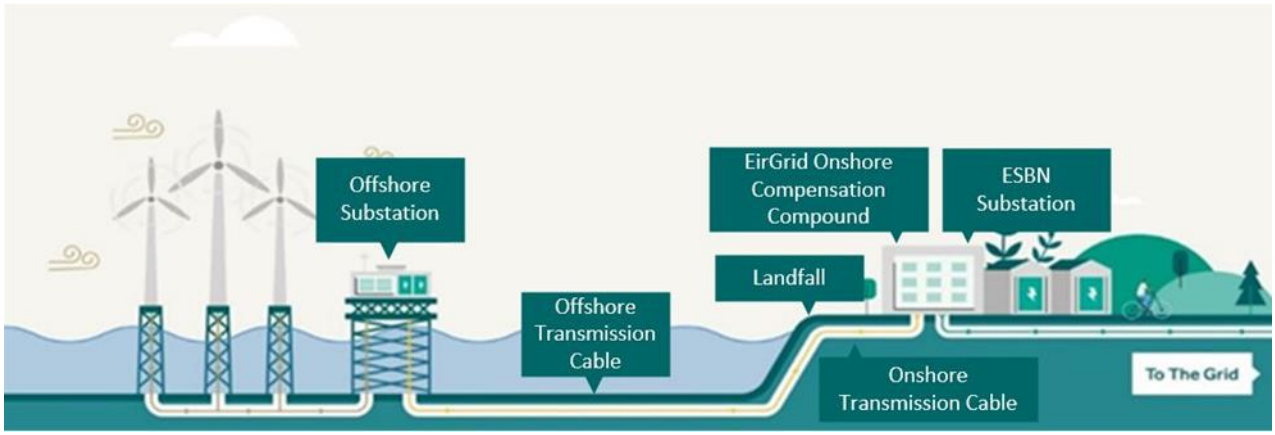

Figure 1.2 Typical Offshore Wind Project Schematic

1.2 Accompanying Reports

The Maritime Usage Licence Application (MULA) consists of the following documents and reports:

- Maritime Usage Licence Application;
- Project Description including drawings;
- Assessment of Impact on the Maritime Usage (AIMU);
- Supporting Information for Screening for Appropriate Assessment (SISAA);
- Risk Assessment for Annex IV Species;
- Subsea Noise Technical Report.

In order to avoid repetition, this report makes reference to these other reports and drawings throughout.

1.3 Purpose of this Report

This report has been prepared by RPS, on behalf of the EirGrid, to provide information on the site investigation works (the SI works) proposed to be undertaken for the PUOSC project in support of the MULA to MARA. This Risk Assessment for Annex IV Species report provides the required level of detail to the MARA for them to complete a risk assessment of the effects of the SI works on Annex IV species occurring within the zone of influence of the SI works.

This report provides a brief description of the SI works, consisting of geophysical, geotechnical, metocean, environmental, archaeological and other investigations and surveys that are proposed to be undertaken, but a more detailed description is provided in the separate 'Project Description' document accompanying this MULA. The Project Description includes details of the methods, equipment and quantities for proposed activities. The results of the SI works will be used to inform engineering design and will also provide baseline data for any subsequent environmental assessments.

1.4 Statement of Authority

The technical competence of the authors is outlined below:

[redacted] is Technical Director in the Environmental Services Business Unit in RPS. He has over 24 years' experience. He holds an honours degree in Civil Engineering (B.E.) from NUI, Galway, a postgraduate diploma in Environmental Sustainability from NUI, Galway, and a Master's in Business Studies from the Irish Management Institute/ UCC. [redacted] is also a Chartered Engineer and Project Management Professional with the Project Management Institute (PMI-PMP). He has managed the delivery of numerous environmental projects including marine and terrestrial projects that have required environmental impact assessment, appropriate assessment, and Annex IV species reports.

[redacted] is a Principal Scientist in the Environmental Services Business Unit in RPS. She has over 13 years' experience in the marine science field and is a Chartered Environmentalist and a Full Member of the Institute of Environmental Sciences. [redacted] holds an honours degree in Environmental Science from Trinity College Dublin and a Master's in Marine Environmental Protection from Bangor University, Wales. [redacted] has delivered the environmental assessments for a wide range of marine and coastal projects, including environmental impact assessment, appropriate assessment and Annex IV species reports.

[redacted] is a Project Scientist in the Environmental Services Business Unit in RPS. She holds a Bachelor's Degree in Marine Science from the University of Galway and Master's Degree in Climate Change and Managing the Marine Environment from Heriot-Watt University Edinburgh. She has three years' experience working in consultancy, assisting on a wide range of projects from offshore renewable energy projects to flood relief schemes, including marine and terrestrial surveys. She is a qualifying CIEEM member.

[redacted] is a Scientist in the Environmental Services Business Unit in RPS. He holds a Bachelor's Degree in Environmental Science from the University of Galway. He has two years' experience working in consultancy, assisting on a wide range of projects from offshore renewable energy projects to flood relief schemes, including terrestrial surveys.

2 Project Description

A detailed Project Description report, including drawings, has been included as a separate report to the MULA to reduce repetition in reports. Please refer to this document for the detail on each of the elements summarised in the text below.

In summary, the PUOSC project SI works Area of Interest (AoI) is located off the south-east coast of Ireland from the High Water Mark out into the Celtic Sea. The AoI has been developed to include:

- Potential areas where offshore substations (OSS) may be constructed,
- Potential offshore transmission cable corridors from the OSS locations towards seven potential landfall zones in coastal areas, and
- The intertidal area below the HWM at seven potential landfall zones where the offshore transmission cables will come to shore and connect to onshore infrastructure.

The total AoI encompass an area of 2,336 km^2. The western extent of the AoI is at Ringroe in County Cork (approx. 10 km south of Crosshaven and 13 km east of Kinsale) and extends eastwards to Cullenstown in County Wexford (approx. 4 km east of Bannow Bay and 6 km south of Wellingtonbridge). The AoI extends into the offshore area to approx. 34 km (18.4 nm) from the coastline at its furthest distance (measured from Bunmahon).

The AoI includes coastal areas from Ringroe, Co. Cork to Ballycrenane Co. Cork, and from west of Bunmahon, Co Waterford to east of Bannow Bay, Co. Wexford. Seven potential landfall locations and zones for surveys and investigations have been identified and are summarised in Table 2.1.

Table 2.1 Potential Landfall Locations to be Investigated

Landfall Zone	Nearest Townlands	County
A	Ballintra West, Ballintra East, Inch, Lahard	Cork
B	Ballybrangan, Ballycroneen West, Ballyrobin South	Cork
C	Garryvoe Lower, Ballybutler, Ballycrenane	Cork
D	Templeyvrick, Ballynasissala, Bunmahon, Ballynagigla, Knockmahon	Waterford
E	Ramstown, Carnivan	Wexford
F	Bannow	Wexford
G	Haggard, Blackhall, Ballymadder	Wexford

The activities proposed to be carried out within the AoI are summarised in Table 2.2.

Table 2.2 Proposed SI works Activities

Survey Type	Survey Elements	Maximum Quantity (where relevant)
Coastal Geophysical Surveys (land-based below the HWM)	Ground Penetrating Radar (GPR) and/or Seismic Refraction.	n/a
	Topographical surveying techniques including UAS, GPS, GNSS devices	n/a
Marine Geophysical Surveys (undertaken from survey vessel(s))	Multi Beam Echosounder (MBES).	n/a
	Sub-bottom profiler (SBP) including Ultra-High Resolution Seismic (UHRS) survey.	n/a
	Side Scan Sonar (SSS).	n/a
	Magnetometer.	n/a
Coastal Geotechnical Surveys (land-based below the HWM)	Trial Pit Investigations.	42
Marine Geotechnical Surveys (undertaken from survey vessel(s) or jack-up barge; JUB)	Grab sampling (this is the same campaign as the surveys included under the Environmental Surveys).	420 (subtidal)
	Vibrocore testing.	276
	Borehole investigations (including downhole Cone Penetration Testing; CPT and sampling).	21 (inshore) 8 (OSS locations)
	Shallow CPT.	276

RISK ASSESSMENT FOR ANNEX IV SPECIES

Survey Type	Survey Elements	Maximum Quantity (where relevant)
	Deep Drive CPT.	16
Metocean and Marine Mammal Acoustic Device Deployment (deployed by vessel and moored to seabed)	Metocean buoy.	2
	Acoustic Doppler Current Profiler (ADCP).	3
	Marine mammal static acoustic monitoring (SAM)	16 locations (4 SAMS x 4 different locations)
Coastal Environmental Surveys (land-based below the HWM)	Ecological walkover surveys (habitats, bat activity and roose assessment, mammals including otter).	n/a
	Ornithological vantage point surveys.	n/a
	Marine mammal vantage point surveys.	n/a
	Intertidal core sampling survey.	Intertidal cores = 126
Marine Environmental Surveys (undertaken from survey vessel(s))	Drop-down video (DDV) and/or Remotely Operated Vehicles (ROV) survey	n/a
	Grab sampling (this is the same campaign as the surveys included under the Marine Geotechnical Surveys Surveys).	Subtidal = As per geotechnical specification.
	Ornithological surveys (boat-based)	n/a
	Marine mammal surveys (boat-based) including passive acoustic monitoring (PAM).	Monthly surveys for minimum two-year period.
	Water Quality Samples, including Conductivity, Temperature and Depth (CTD) Measurements	n/a
Archaeological Surveys	Intertidal Survey.	n/a
	Marine Geophysical Survey (this is the same campaign as the Marine Geophysical Survey above).	n/a
	Sampling	n/a
	Dive Survey.	n/a
	Wade Survey.	n/a
	Monitoring.	n/a
Other Surveys	Noise Surveys.	n/a
	Shipping & Navigation Survey.	n/a
	Unmanned Aircraft Systems (UAS)/ drone surveys.	n/a
	Aerial Surveys (birds and marine mammals).	n/a

3 RISK ASSESSMENT FOR ANNEX IV SPECIES

3.1 Legislative Context

Under Article 12 and 13 of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, as amended (the Habitats Directive). Member States must establish systems of strict protection for animal and plant species which are listed on Annex IV of the Habitats Directive. Article 16 provides for derogations from these legal protections under certain, specific, circumstances. Article 12, 13 and 16 of the Habitats Directive are transposed into Irish law by Regulations 51 - 52 and 54 - 55 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended (the Regulations).

Annex IV species are afforded strict protection throughout their range, both inside and outside of designated protected areas. It is an offence to:

- Deliberately capture or kill any specimen of these species in the wild;
- Deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration;
- Deliberately take or destroy eggs of these species in the wild;
- Damage or destroy a breeding or resting place of such an animal[1];
- Deliberately pick, collect, cut, uproot, or destroy any specimen of [plant] species in the wild; or
- Keep, transport, sell, exchange, offer for sale or offer for exchange any specimen of [animal or plant] species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Directive[2].

The granting of another statutory consent (e.g., planning permission; maritime usage licence) does not remove the obligation to obtain a derogation licence in the event that consented works are not expected to conform with the strict protections afforded to Annex IV species. As such, an application for derogation may have to be made to the Minister for Housing, Local Government & Heritage via the National Parks and Wildlife Service (NPWS) under Regulation 54, in addition to an application for statutory consent. If satisfied that an application meets the criteria for derogation, the Minister may grant a derogation licence, which may be subject to such conditions, restrictions, limitations, and requirements as the Minister considers appropriate, and these will be specified in the licence.

3.2 Methodology

This risk assessment for Annex IV species has been carried out in accordance with the following guidance:

- European Commission (2021) Guidance document on the strict protection of species of community interest under the Habitats Directive. C. (2021) 7301 final. Brussels.
- Mullen, E., Marnell, F. & Nelson, B. (2021) Strict Protection of Animal Species. National Parks and Wildlife Service Guidance Series, No. 2. National Parks and Wildlife Service, Department of Housing. Local Government and Heritage.
- NPWS (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. National Parks and Wildlife Service Guidance Series, No. 2. Department of Housing. Local Government and Heritage.

This risk assessment for Annex IV species follows the methodology structure outlined in NPWS (2021), as follows:

[1] Including any action resulting in damage to, or destruction of, a breeding or resting place of an animal. Breeding or resting places are protected even when the animals are not using them.

[2] National Parks and Wildlife Service (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland.

- Use existing information to determine the probability of the protected species being present in the area affected by the works.
- Ecological survey, if required.
- Examination of impacts and mitigation measures and satisfactory alternatives (if required).

For each of the relevant species discussed in Section 3.4, an assessment was made against each of the strict protections taking into account project details and the available evidence base for each species.

If the examination of impacts concludes that the SI works will not conform with the strict protections afforded to Annex IV species, then an application will be made for a derogation licence under Regulation 54 of the Regulations.

3.3 Relevant Annex IV Species

The SI works will be taking place across the AoI as shown in the drawings contained in Appendix A of the Project Description submitted as part of the MULA.

The Habitats Directive lists species of community interest 'in need of strict protection' within Annex IV. This list was reviewed and all species/species groups with the potential to occur within the area of the proposed SI works were considered further. Of the animal and plant species on Annex IV known to occur in Ireland[3], the following species were identified as having the potential to occur within the AoI of the proposed SI works:

- All bat species;
- Otter;
- All cetacean species; and
- All turtle species.

Other Annex IV species found in Ireland, namely the natterjack toad and the Kerry slug, do not occur in the marine environment and have not been recorded along the coast of the SI works AoI by the National Biodiversity Data Centre (NBDC). Therefore, these Annex IV species are not considered in this assessment.

3.4 Evidence Base

3.4.1 Zone of Influence

The zone of influence of the SI works varies between species. The following zones of influence have been considered in this risk assessment.

- **Bats**: Evidence suggests that bat species follow prey into coastal waters if conditions are favourable (Limpens et al., 2017), however, it is considered highly unlikely they would make use of the proposed AoI for foraging due to its highly exposed nature. The zone of influence is considered to be confined to the above water noise and visual disturbance within the AoI at the seven potential landfall zones.
- **Otters**: Otters are a mobile species and maintain territories. In lowland rivers and fish-rich lakes otters only need to maintain small territories (up to 6 km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Therefore, it is possible that otters may be present at the landfall zones. Otters have been observed to forage out to a maximum of 80m from the coast (NPWS, 2009), therefore a zone of influence for otters is considered to be the landfall zones and extending out to 80 m from the HWM at each of the landfall zones.
- **Cetacean species**: For marine mammals, JNCC (2020) advises that fixed distances should be applied to assess behavioural disturbance, based on empirical evidence. For geophysical surveys, the JNCC's 'effective deterrence range' is 5 km. While the JNCC document focuses on harbour porpoise, this is precautionary for all other hearing groups, as harbour porpoise is considered to be the most sensitive.

[3] European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) | National Parks & Wildlife Service (npws.ie)

Therefore, a zone of influence of the entire AoI plus a 5 km buffer from the AoI boundary has been considered as appropriate for this risk assessment.

- **Turtle species**: Although sightings are rare, turtle species can occur anywhere in the AoI and therefore a zone of influence of the entire AoI has been considered in this risk assessment.

3.4.2 Desk Study

In order to assess the probability of the above species/species groups being present in the zone of influence of the SI works, a desk study was undertaken, in addition to application of professional judgement and knowledge of the geographical area.

The following sources were consulted during the desk study in October 2024:

- Irish Whale and Dolphin Group Sightings Log https://iwdg.ie/browsers/sightings.php/;
- Distribution records for Annex IV species held online by the NBDC www.biodiversityireland.ie;
- NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished Report, National Parks and Wildlife Service. Department of Culture, Heritage and the Gaeltacht, Dublin;
- Giralt Paradell, O., Cañadas, A., Bennison, A., Todd, N., Jessopp, M., Rogan, E. (2024). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2021-2023. Department of the Environment, Climate & Communications and Department of Housing, Local Government & Heritage, Ireland. 260pp;
- BCI (2024). [online] Available at: https://www.batconservationireland.org/.; and
- ORCA (2024). ORCA Ireland Home.

3.4.3 Area of Interest (AoI)

The SI works will be conducted wholly within the AoI covering a total area of 2,336 km^2 as illustrated in Figure 3.1. Further detail is provide in the Project Description report and the drawings in Appendix A of the Project Description submitted as part of the MULA.

Figure 3.1 Overview of AoI, the Proposed Investigation Locations along the Potential Offshore Transmission Cable Corridors and Landfall Zones

3.4.4 Bat Species

All native bat species in Ireland receive the same level of strict protection. The presence or otherwise of bats is typically relevant only to onshore activities; although bats are known to forage and migrate over water and along coastlines, they will not interact with underwater works. Interaction between bats and the proposed SI works, although unlikely, is still possible due to the potential for disturbance caused by the lighting and noise from intertidal and subtidal SI works. According to the NBDC (2024)[4] there are numerous recordings of bat species along the south coast within the 10 km grid squares that cover the coastline and their adjacent waters between Waterford and Cork.

Eight of the nine regularly occurring species in Ireland occur here, with only the lesser horseshoe bat *Rhinolophus hipposideros (*restricted to the western Atlantic seaboard) not occurring[5]. Evidence suggests that bat species follow prey into coastal waters if conditions are favourable (Limpens et al., 2017). However, it is considered highly unlikely they would make use of the proposed AoI for foraging due to its highly exposed nature.

3.4.5 Otter

Otter occurs throughout Ireland, with populations also found along rivers, lakes, riverine (streams up to major river systems), marshland, estuaries and along the coastline (NPWS, 2019) where fish and other prey are abundant, and where the bank-side habitat offers plenty of cover. Otter is an opportunistic predator with a broad and varied diet and have diverse habitat preferences. Otters are a mobile species and maintain territories. In lowland rivers and fish-rich lakes otters only need to maintain small territories (up to 6 km), but along smaller river systems and in upland areas where prey may be less abundant, otter territories can stretch to 20 km (Mullen et al., 2021). Coastal territories tend to be between 3 km to 4 km along the coastline where freshwater is available to clean their fur after exposure to saltwater (Chanin, 2003). In general, otters exploit a narrow strip of habitat, about 10 m wide at the aquatic-terrestrial interface (Mullen et al., 2021), however, otters have been observed to forage out to a maximum of 80 m from the coast (NPWS, 2009).

Records from NBDC (2024)[6] indicated that otters have been sighted in the last 10 years in the intertidal habitats located within and adjacent to the AoI. These records show that otter sightings (live animal sightings, spraints and footprints) have been recorded between 2014 and 2017. Three otter sightings were recorded along the AoI northern boundary at Ballycotton Bay Co. Cork in 2015. Sightings to the east of the AoI were at Bunmahon in 2016, Annestown in 2015, Brownstown in 2014 and a further three sightings in Bannow Bay between 2016 and 2017. Another live sighting in close proximity to the AoI (c. 2 km northwest of the AoI) was recorded at Ballydwane Bay Co. Waterford in 2016. According to NBDC (2024a) live otter sightings have been recorded at Bunmahon and Ballinwillin Beach which overlap potential landfall zones. It is therefore reasonable to conclude that otters are likely to be present at the potential landfall zones. No otter holts or couches were identified at the potential landfall zones by the desk study.

Impacts to otters can occur as a result of permanent loss of breeding or resting sites, habitat loss, disturbance/displacement and injury or mortality.

The main threats to otter include pollution, particularly organic pollution resulting in fish kills; and accidental deaths, e.g., road traffic and fishing gear (NPWS, 2019). The most recent Article 17 conservation assessment for otters in Ireland deemed the species as being in favourable conservation status (NPWS, 2019).

[4] https://maps.biodiversityireland.ie/Map accessed October 2024

[5] Soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus* sensu stricto), Nathusius' pipistrelle (*Pipistrellus nathusii*).whiskered bat (*Myotis mystacinus*), Natterer's bat (Myotis nattereri), Daubenton's bat (*Myotis daubentonii*) brown long-eared bat (*Plecotus auratus*), Leisler's bat (*Nyctalus leisleri*), soprano pipistrelle (*Pipistrellus pygmaeus*), common pipistrelle (*Pipistrellus pipistrellus* sensu stricto) and Nathusius' pipistrelle (*Pipistrellus nathusii*).

[6] https://maps.biodiversityireland.ie/Map/Marine/Species/119290 accessed October 2024

3.4.6 Cetacean Species

Twenty-five species of cetacean have been recorded in the waters around Ireland. The Irish Whale and Dolphin Group (IWDG) holds 674 records of cetacean sightings off the Cork and Waterford coasts and within the Celtic Sea for the period of October 2023 to 2024 (IWDG, 2024). IWDG data show that the waters around the AoI are used by a wide range of cetacean species.

Species recorded were:

- Common dolphin (*Delphinus delphis*);
- Bottlenose dolphin (*Tursiops truncates*);
- Rissos dolphin (*GrampusCgriseus*);
- Harbour porpoise (*Phocoena phocoena*);
- Minke whale (*Balaenoptera acutorostrata*);
- Humpback whale (*Megaptera novaeangliae*); and
- Fin whale (*Balaenoptera physalus*).

No other cetacean species was recorded in the Celtic Sea off the Cork and Waterford coast between October 2023 to October 2024.

Phase II of the Irish ObSERVE programme (2021-2023) was conducted to investigate the occurrence, distribution and abundance of key marine species in Ireland's offshore and coastal regions. These aerial surveys included four offshore areas and coastal waters. The AoI is within the coastal survey stratum 6C while stratum 4 (Celtic Sea) was also considered.

Common dolphin, harbour porpoise and bottlenose dolphin were the most frequently sighted species throughout the Phase II ObSERVE survey programme while minke whale was the most common sighted mysticete species (Paradell et al., 2024).

According to Paradell et al (2024), common dolphins showed a preference for continental shelf waters in both coastal and offshore areas. Common dolphins were frequently recorded in stratum 6C and 4 with groups sizes ranging from one to 100 individuals. Bottlenose dolphins were recorded throughout the survey area primarily in the continental shelf waters of stratum 4 with no sightings recorded in the coastal waters off the south coastal stratum 6C. Risso's dolphin was recorded in stratum 4 and occasionally within stratum 6C with sighting being recorded over the continental shelf and beyond the continental slope (Paradell et al., 2024). Harbour porpoise were primarily recorded in the coastal strata including stratum 6C and in less numbers in stratum 4. Minke whale were observed in all strata including 6C and 4 however the majority of sightings were in waters <200 m. There were no confirmed records of humpback whale during the Phase II surveys although three records of unidentified large whales (>10m) were recorded. These sightings were recorded in the slope waters of the Porcupine Basin off the west coast of Ireland. For fin whales all sightings during the Phase II survey were recorded primarily in Ireland's offshore waters >500 m. One fin whale was recorded in stratum 4 while none were recorded in stratum 6C (Paradell et al., 2024).

Management Unit (MU) boundaries, defined by the IAMMWG (2015, 2022), refer to geographical areas in which the animals of a particular cetacean species are found, to which management of human activities is applied. These geographical areas are delineated based on the best scientific knowledge of the population structure of the species while taking into account jurisdictional boundaries or divisions which are already used for manging human activities (IAMMWG, 2023).

The following sections provide more detail on the most commonly recorded cetacean species within and around the AoI.

3.4.6.1 Common dolphin

Common dolphin is present all year round in Irish waters and are the most frequently observed and stranded species particularly along the south coast (ORCA, 2024a). Densities appear to be highest during autumn and summer off the south and southwest coasts, and higher along southeast coasts in the spring and summer (NBDC, 2024b). According to Paradell et al., (2024), common dolphins showed interannual variability with more sightings during the summer of 2021 than in 2022, mean group sizes were also larger in the summer (7.2) compared to winter (6.7). High densities of common dolphin were found south off Ireland in the Celtic

Sea (stratum 4) and within the coastal waters off the south coast of Ireland (stratum 6C) (Paradell et al., 2024).

Common dolphins face threats such as underwater noise, interactions with fisheries through bycatch, ship strikes, chemical and plastic pollution (ORCA, 2024a). Common dolphins have been assigned to a single MU, the Celtic & Greater North Seas MU (IAMMWG, 2022).

3.4.6.2 Bottlenose dolphin

Bottlenose dolphin is found in both inshore and offshore waters and has been recorded all around the Irish coast. This species can also be found in much deeper waters off the continental shelf (NBDC, 2024c). Three distinct populations have been identified in Irish waters including an offshore group, a coastal transient group and a smaller resident population in the Shannon Estuary, Co. Clare. A semi-resident group of six to ten bottlenose dolphins have also been recorded in Cork Harbour and a group likely to be part of the coastal transient group that utilise Cork harbour as a foraging ground (ORCA, 2024b). According to Paradell et al., (2024), increased encounter rates were noted in the summer of 2022 and summer density distribution maps highlight the importance of the Celtic Sea, while increased bottlenose dolphin abundance during winter was predicted in the northern region of the Celtic Sea (stratum 4).

Bottlenose dolphins are exposed to several threats as they utilise coastal areas. These threats include underwater noise, interactions with fishing gear, habitat destruction and degradation (ORCA, 2024b). Bottlenose dolphins have been assigned to the Offshore Channel and Southwest England and Irish Sea MU (IAMMWG, 2022).

3.4.6.3 Risso's dolphin

Risso's dolphin is typically found further offshore in deeper water over the continental shelf slope in Ireland due to prey preference (NBDC, 2024d, Wall et al., 2013). According to Paradell et al., (2024), group sizes of Risso's dolphin ranged from one to 15 individuals with the majority of sightings recorded in winter. Risso's dolphin were primarily sighted offshore in continental shelf waters.

Risso's dolphin is at risk of plastic pollution caused by ingestion of plastic due to the similarities of it with its prey e.g., squid. They are also threatened by fisheries interactions i.e. entanglement and underwater noise (ORCA, 2024c). Risso's dolphins have been assigned to the Celtic and Greater North Seas MU (IAMMWG, 2022).

3.4.6.4 Harbour porpoise

Harbour porpoise is widespread around the Irish coast (Wall et al., 2013 as cited in NBDC, undated) and the Celtic and Irish Seas. The Celtic and Irish Seas (CIS) is recognised as the MU for harbour porpoise (JNCC, 2022). According to Paradell et al., (2024), mean group sizes of harbour porpoise were notably higher during winter while increased densities were recorded throughout the coastal strata (6C) and stratum 4. A number of harbour porpoise calves were recorded during the Phase II survey however these were mainly within the Irish Sea. Harbour porpoise are also sighted regularly around the coasts of Ireland and throughout the year but are more commonly sighted along the east coast of Ireland (ORCA, 2024d).

Potential threats to harbour porpoise include underwater noise, entanglement in fishing gear, shipping traffic, and coastal development including ORE and other forms of human disturbance (ORCA, 2024d). Abundance of harbour porpoise in the CIS MU is estimated at 62,517 animals (IAMMWG, 2022).

3.4.6.5 Minke whale

Minke whale is the most abundant of all baleen whales in Irish waters and can been seen throughout the year along the entire Irish coastline although most sightings are recorded from the south and west coasts between May and October. They are mostly seen in shallow waters (<200 m) over the Irish Shelf as well as shallow areas such as the Porcupine and Rockall Banks (IWDG, 2015). A seasonal inshore migration occurs off Loop Head Co. Clare during September and October. Important foraging areas for minke whales between April to October have been recorded off the south coast on the outer Dingle Bay as well as from Cape Clear, Co. Cork to Hook Head, Co. Wexford between April to November (IWDG, 2015). According to Paradell et al., (2024), minke whales were commonly recorded in Irish waters in all strata with most sightings in the continental shelf waters with only two sightings occurring in winter. Density distribution maps highlighted that

there may be higher densities of minke whale along the south coast of Ireland particularly in west Cork waters (Paradell et al., 2024). Minke whale have been assigned to the Celtic & Greater North Seas MU (IAMMWG, 2022).

3.4.6.6 Humpback whale

Irish sightings of humpback whale are mainly off the west and south coast of Ireland, with sightings increasing in summer to peak in September, declining after that (NBDC, 2024e, Berrow et al., 2010). Sightings increase in late November as the species are migrating with their prey (herring and sprat) (Berrow et al., 2010). According to Paradell et al., (2024), there were no confirmed sightings of humpback during the survey however three unidentified large whales were noted which could potentially be humpback whales. These recordings were sighted off the Porcupine Basin slope waters. The population is not part of a MU.

3.4.6.7 Fin whale

Fin whale is recorded in Irish waters for most of the year, but records are higher in the summer and autumn, with less recordings during the spring and winter (NBDC, 2024f). Fin whales are typically recorded off the south coast of Ireland in the autumn (wall et al., 2013). According to Paradell et al., (2024), fin whales were recorded across all seasons although the highest number of sightings was recorded in the summer of 2021 and winter 2022. Fin whales can be seen offshore and in Irish coastal waters to the southwest of Ireland (ORCA, 2024e).

Potential threats to fin whale include vessel strikes, entanglement in fishing gear and noise pollution. The population is not part of a MU.

3.4.7 Turtle Species

Four Annex IV species of turtle are known to occur in Ireland: leatherback turtle (*Dermochelys coriacea*), Kemp's Ridley turtle (*Lepidochelys kempii*), loggerhead turtle (*Caretta caretta*) and hawksbill turtle (*Eretmochelys imbricata*). All of the aforementioned species have been recorded along the south coast of Ireland (NBDC, 2024g). Leatherback turtle sightings data show several records along the south coast and within the AoI. The most recent recording was in 2021 where one animal was recorded stranded on Tramore beach in Co. Waterford (NBDC, 2024h). The most recent sighting of Kemp's Ridley turtle was in 2016 where the animal washed up stranded on Tramore beach in Co. Waterford (NBDC, 2024i) and the most recent recording of a hawksbill turtle was in 1983 at Cork Harbour (NBDC, 2024j). Loggerhead turtle was most recently recorded in 2015 where one animal was found stranded at Ballybrannigan beach in Co. Cork and one was stranded at Portally beach in Co. Waterford (NBDC, 2024k). Between 2004 and 2023[7], 224 observations of leatherback turtles were recorded in Irish waters (NBDC, 2024h). Leatherbacks are known to have an 'atypical migration pattern', as while they must return to tropical waters to breed and reach preferred nesting grounds, they are known to spend the summer months in productive temperate waters, like Ireland's, feeding on jellyfish and sea squirts (Doyle, 2007).

It can, therefore, be concluded that sightings of turtles within the AoI are possible but rare, with leatherback and loggerhead turtles being the most common species. The most recent sighting of turtles within the AoI was in 2015 and 2021 where two leatherback turtles were recorded as dead at Tramore Beach.

3.5 Examination of Impacts to Strict Protections

3.5.1 Bat Species

Based on the available evidence, the proposed SI works including access/egress from each potential landfall zone will not result in any direct or indirect impacts on any structure or feature which could be used by roosting bats. Therefore, there is no likelihood of the SI works resulting in any bats being captured or killed and disturbed during periods of breeding, rearing or hibernation. No breeding site or resting place of such animals will be damaged or destroyed during the SI works. Works at the potential landfall zones will be carried out during daylight hours only and will be subject to tidal conditions. Any artificial lighting, if used, will

[7] No data for 2024 was available when accessed October 2024

be localised to either the vessels (or JUB) or at trial pit/test locations within the intertidal zone. Therefore, there is no likelihood of any significant disturbance or displacement of foraging, commuting, or migrating bats.

The proposed SI works conform with the strict protection afforded to bats under Article 12 of the Habitats Directive, and therefore, it is considered that no derogation is required.

3.5.2 Otter

Based on the available evidence gathered in the desk study, it is possible that otters will be present during the coastal element of the proposed SI works. Most of the coastal surveys will involve a small team of surveyors walking along the beach or intertidal zone using non-intrusive hand-held equipment or minimally intrusive equipment such as pole-mounted devices or GPR and magnetometer equipment. For most survey types, no above-water noise, vibration or light will be emitted beyond baseline levels (all potential landfall locations are accessible beaches where human recreational activities regularly occur). Coastal surveys with the potential to emit above-water noise and vibration beyond baseline levels are the excavation of trial pits and geotechnical sampling (boreholes etc.) from a JUB, however, as otter are typically most active at night, it is considered unlikely that otter will be present during coastal surveys which will take place during daylight hours. Any artificial lighting, if used, will be localised to either the vessels (or JUB) or at trial pit/test locations within the intertidal area.

It is considered highly unlikely that intrusive sampling works will interact with otter holts or couches as these are not likely to be in the intertidal zone/on beaches where intrusive sampling will take place.

As otter tend to forage within 80 m of the shoreline (NPWS, 2009), any potential effects are likely to be associated with survey activity at the potential landfall locations, rather than activity further offshore, however, there is, in theory, potential for interaction between foraging otters and underwater noise generated during the marine surveys. For otters foraging in the marine environment, this has the potential to result in injury and/or disturbance. While there are no published underwear noise injury criteria for Eurasian otter, Southall et al. (2019) has provided injury criteria for the 'Other marine carnivores in water (OCW)' hearing group, which includes sea otters. The OCW criteria is extended to Eurasian otter in the current assessment in the absence of more suitable criteria. The underwater noise assessment, presented in the accompanying Subsea Noise Technical Report, undertaken to inform this Annex IV Risk Assessment has concluded the following with respect to injury and/or disturbance to OCW:

- In the absence of mitigation, geophysical sound sources have the potential to cause auditory injury to OCW within 30 m of the sound source (when the boomer SBP is in use) and temporary threshold shift (TTS) within 800 m. When a soft start mitigation is applied, these risk ranges are reduced to <10 m for both auditory injury and TTS. Behavioural disturbance for all hearing groups may range out to 19 km, however, it should be noted that this has not been weighted for hearing groups. It is expected that the physical presence of the vessel will cause otter to avoid the area.
- In the absence of mitigation, geotechnical sound sources have the potential to cause auditory injury to OCW within <10 m of the sound source and TTS within 170 m. When a soft start mitigation is applied, these risk ranges are reduced to <10 m for both auditory injury and TTS. Ranges for behavioural disturbance for all hearing groups are up to 14 km, however, it should be noted that this has not been weighted for hearing groups. It is expected that the physical presence of the vessel and/or JUB will cause otter to avoid the area.
- In the absence of mitigation, ADCPs have the potential to cause auditory injury to OCW within <10 m of the sound source and TTS within <10 m. Ranges for behavioural disturbance for all hearing groups are up to 440 m, however, given the ADCPs main energy is above 300 kHz (outside the hearing range of the receivers) the behavioural disturbance ranges while accounting for the receivers' hearing capabilities have been included. Accounting for the frequency dependent sensitivity of the receivers, the behavioural disturbance range decreases to <10 m for all hearing groups.

The deployment of the ADCPs will not be within 80m of the HWM and therefore it is outside of the zone of influence for otter. It is considered highly unlikely that the limited risk ranges identified for underwater noise effects to otter will result in injury or disturbance given the distance from the HWM of the deployment location and the frequency range of the ADCP. Therefore, the proposed SI works will cause no likelihood of any killing or displacement of breeding, resting or commuting otters due to the proposed SI works.

The proposed SI works conform with the strict protection afforded to otters under Article 12 of the Habitats Directive, and therefore, it is considered that no derogation is required.

3.5.3 Cetacean Species

Potential impacts to cetaceans associated with the SI works are:

- Underwater noise generated during the geophysical and geotechnical surveys resulting in injury and/or disturbance;
- Accidental pollution event; and
- Collision risk with survey vessels, resulting in injury.

3.5.3.1 Underwater Noise

3.5.3.1.1 Assessment

An underwater (subsea) noise assessment was carried out using indicative noise sources for the marine SI works. The assessment and results are presented in the accompanying Subsea Noise Technical Report.

When assessing the potential impact of underwater noise sources on the marine environment a range of variables such as source level, frequency, duration, and directivity were considered. Increasing the distance from the sound source usually results in attenuation with distance. The factors that affect the way noise propagates underwater include: water column depth, pressure, temperature gradients, salinity, as well as water surface and seabed type and thickness. When sound encounters the seabed the amount of noise/sound reflected back depends on the composition of the seabed, i.e., mud or other soft sediment will reflect less than rock. The SI works area and nearby surroundings are characterised by water depths of 0-70 m with a relatively gentle increase in depth with distance from the shore. The sediment properties are varied, from soft, muddy sediment to harder gravelly sediments, with some areas being exposed or near-exposed bedrock of chalk, limestone or sandstone (generally found within 20 km of the coast).

The active acoustic instruments, such as those proposed for this survey, operate by emitting extremely short pulses and are highly directional with narrow beams (Ruppell et al, 2022). While the swathe of the sonars and echosounders will have a maximum range of 6 to 60 m in diameter, many of the sources used for this survey, such as multibeam, side-scan sonar, sub-bottom profilers (SBP), Ultra Short Base-Line positioning system (USBL), chirper/pinger, and sparker operate at high frequency and attenuate quickly as they spread from the source. Coupled with the narrow beam angle and short duty cycles ('on' for microseconds or milliseconds per second) means that surveying sonars have relatively low acoustic impact.

The DAHG "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" 2014 (Department of Arts, Heritage and the Gealtacht, 2014) contains the following statement:

"It is therefore considered that anthropogenic sound sources with the potential to induce Temporary Threshold Shift (TTS) in a receiving marine mammal contain the potential for both (a) disturbance, and (b) injury to the animal."

This states that TTS constitutes an injury and should thus be the main assessment criteria[8]. However, the guidance goes on to specify the use of thresholds from a 2007 publication (Southall et al., 2007) which has since been superseded (Southall, et al., 2019; National Oceanic and Atmospheric Administration, 2024) and no longer represents best available science, nor reflects best practice internationally. Thus, the following excerpt from the guidance is relevant:

"The document will be subject to periodic review to allow its efficacy to be reassessed, to consider new scientific findings and incorporate further developments in best practice."

As there has been no such update to date, but the guidance clearly states its intention to consider new scientific findings, we have applied the latest guidance (National Oceanic and Atmospheric Administration,

[8] Injury being the qualifying limit in the Irish Wildlife Act 1976, section 23, 5c : https://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/print#sec23

2024), reflecting the current best available method for assessing impact from noise on marine mammals. This means that it is auditory injury "AUD INJ" (previously "PTS")[9] that is the criteria for injury, not "TTS".

Auditory injury in cetaceans can be defined as AUD INJ leading to non-reversible auditory injury, or as a TTS in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g., to communicate, navigate, locate prey) for a period of minutes, hours, or days. With increasing distance from the sound source, where it is audible to the animal, the effect is expected to diminish through identifiable stages (i.e., AUD INJ or TTS in hearing, avoidance, masking, reduced vocalisation) to a point where no significant response occurs. Factors such as local propagation and individual hearing ability can influence the actual effect (DAHG, 2014).

A summary of the equipment likely to be used in the SI Works is presented in Table 4.1 of the accompanying Subsea Noise Technical Report.

Should the noise levels from sources provided in the accompanying Subsea Noise Technical Report exceed the thresholds (Table 3.2), there is the potential for underwater noise generated during the geophysical survey to result in injury and/or disturbance to Annex IV marine mammal species in the vicinity of the SI works.

Marine mammal species can be split into functional hearing groupings, according to their frequency-specific hearing sensitivity (Southall *et al*., 2019). Minke, fin and humpback whales are considered low frequency cetaceans (LF), common, bottlenose and Risso's dolphin are considered high frequency cetaceans (HF), harbour porpoise a very high frequency cetacean (VHF) and otters are included as Other Marine Carnivores in Water (OCW). See Table 3.1 below for a list of species contained within each functional hearing group.

Table 3.1 Functional Marine Mammal Hearing Groups for Marine Mammal Species

Southall *et al.* (2019) Hearing Group Name	Species Included in Group
Low-frequency cetaceans (LF)	Baleen whales (minke, fin and humpback whale).
High-frequency cetaceans (HF)	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer, and pilot whales).
Very high-frequency cetaceans (VHF)	Certain toothed whales and porpoises (harbour porpoise).
Other marine carnivores in water (OCW)	Includes sea lions, walrus, otters.
Phocid carnivores in water (PCW)	Earless seals (including harbour and grey seal).

Both the criteria for impulsive and non-impulsive sound are relevant given the nature of the sound sources used during the SI Works. The relevant AUD INJ and TTS criteria proposed by NOAA 2024 are summarised in Table 3.2 which addresses peak pressure levels (L_p) and sound exposure levels (SEL).

[9] Based on NOAA revision of underwater noise guidelines (NOAA, 2018), (Southhall et al., 2019) and (Finneran, 2024). Weighting have been modified to include more low-frequency content (especially for the HF group), along with an increase in the threshold values for HF and VHF, but a decrease for PW and OW groups. The steepness of the weightings at high frequencies has increased so frequencies above region of best hearing are now excluded more effectively. The nomenclature has changed too, while the use of "TTS" remains unchanged to refer to temporary threshold shift, the use of "PTS" (permanent threshold shift) has stopped, with the shorthand "AUD INJ" taking its place (Auditory Injury), to highlight the severity of the effect.

Table 3.2 AUD INJ and TTS onset acoustic thresholds (Southall et al., 2019; Tables 6 and 7)

Hearing Group	Parameter	Impulsive [dB]		Non-impulsive [dB]	
		AUD INJ	TTS	AUD INJ	TTS
Low frequency (LF) cetaceans	L_P, (unweighted)	222	216	-	-
	SEL, (LF weighted)	183	168	197	177
High frequency (HF) cetaceans	L_P, (unweighted)	230	224	-	-
	SEL, (MF weighted)	193	178	201	181
Very high frequency (VHF) cetaceans	L_P, (unweighted)	202	196	-	-
	SEL, (HF weighted)	159	144	181	161
Phocid carnivores in water (PCW)	L_P, (unweighted)	223	217	-	-
	SEL, (PW weighted)	183	168	195	175
Other marine carnivores in water (OCW)	L_P, (unweighted)	230	224	-	-
	SEL, (OW weighted)	185	170	199	179
Sirenians (SI) (NOAA only)	L_P, (unweighted)	225	219	-	-
	SEL, (OW weighted)	186	171	186	180

To assess the impacts of the geophysical survey, each type of sub-bottom profiler (SBP) was modelled as a different scenario. Each scenario assumed that the vessel, SSS, USBL and MBES sources were active, with only the type of SBP changing between the scenarios modelled. The results have been summarised below to present the 'worst-case scenario', and it should be noted that no mitigation (i.e. soft-start measures, or marine mammal observers) has been applied at this stage.

Parametric SBP and chirper/pinger, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur less than 10 m of the sound source, and TTS could occur within 230 m.
- HF group (bottlenose/common dolphin), auditory injury could occur within 20 m of the sound source, and TTS could occur within 200 m.
- VHF group (harbour porpoise), auditory injury could occur within 250 m of the sound source, while TTS could occur within 4,100 m.
- For all marine mammals, behavioural disturbance could occur out to 16 km.

Sparker and boomer, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur less than 40 m of the sound source, and TTS could occur within 1,200 m.
- HF group (bottlenose/common dolphin), auditory injury could occur less than 10 m of the sound source, and TTS could occur within 90 m.
- VHF group (harbour porpoise), auditory injury could occur within 2,200 m of the sound source, while TTS could occur within 4,300 m.
- For all marine mammals, behavioural disturbance could occur out to 19 km.

Geotechnical survey, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury could occur less than 10 m of the sound source, and TTS could occur within 180 m.
- HF group (bottlenose/common dolphin), auditory injury could occur less than 10 m of the sound source, and TTS could occur within 130 m.

- VHF group (harbour porpoise), auditory injury could occur within 180 m of the sound source, while TTS could occur within 3,800 m.
- For all marine mammals, behavioural disturbance could occur out to 14 km.

ADCP, no mitigation:

- LF group (minke, fin and humpback whale), auditory injury and TTS could occur less than 10 m of the sound source.
- HF group (bottlenose/common dolphin), auditory injury and TTS could occur less than 10 m of the sound source.
- VHF group (harbour porpoise), auditory injury could occur within 40 m of the sound source, while TTS could occur within 100 m.
- For all marine mammals, behavioural disturbance could occur out to 440 m, when applying the criterion strictly (unweighted for hearing groups), however, given the ADCPs main energy is above 300 kHz (outside the hearing range of the receivers) the behavioural disturbance ranges while accounting for the receivers' hearing capabilities has also been included. Accounting for the frequency dependent sensitivity of the receivers, the behavioural disturbance range decreases to <10 m for all groups.

This assessment concludes that there is risk of inducing hearing injury (AUD INJ) and TTS following noise from the SI works, but with the implementation of suitable mitigation as outlined below, these can be mitigated effectively to make the risks of auditory injury and TTS low for all hearing groups assessed.

3.5.3.1.2 Mitigation

The mitigation measures proposed will reduce the impact of AUD INJ and TTS on cetaceans from the proposed SI works and will be deemed not significant (reproduced from Section 7.1 in the accompanying Subsea Noise Technical Report):

Geophysical surveys

Given the risk of exceedance of the AUD INJ thresholds significant ranges, mitigation will be applied to limit risks to animals, either by providing enough time for them to vacate the area (soft start) and/or by establishing their likely absence from the zone of injury during the noisy activity (pre-activity search) (as set out below).

Sparker (UHRS) or boomer type SBP: A 30-minute soft start to lower the AUD INJ risk to below 500 m (390 m) for VHF species.

Parametric or chirper/pinger type SBP: A 20-minute soft start (lowers AUD INJ risk to <10 m for all hearing groups).

Geotechnical surveys

The vessel itself will act as a soft start to the noise expected from the geotechnical survey. With modest injury ranges, even with no soft start; 180 m AUD INJ risk for VHF group and below 20 m for the remaining groups, the presence of the vessel 20 minutes prior to vibro-coring start (the noisiest activity) will be sufficient to reduce the risk range for AUD INJ to <10 m.

For the marine geophysical and marine geotechnical SI works a qualified and experienced MMO will be appointed to monitor for marine mammals within the monitored zone i.e. 500 m radial distance of the sound source intended for use. The 500 m pre-start-up survey will be conducted at least 30 minutes before the sound-producing activity i.e. those activities listed in Table 2.2 are due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the monitored zone (500 m) by the MMO. In commencing sound producing activities using the equipment listed above, a "Ramp Up" procedure (i.e. 30 or 20-minute soft-start depending on the activity) must be used. Once the Ramp-Up procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500 m radial distance, of the sound source. If there is a break in sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down, survey line or station change) then all Pre-Start Monitoring and a subsequent Ramp-up Procedure (where appropriate following Pre-Start Monitoring) must be undertaken (DAHG Guidance, 2014). These measures will ensure that impacts on marine mammals will be reduced to the lowest possible risk to ensure there is no significant risk to marine mammals from impulsive noise.

ADCP

The ADCPs main energy will be specified to be equal to or greater than 300 kHz (outside the hearing range of the receivers). Accounting for the frequency dependent sensitivity of the receivers, the behavioural disturbance range decreases to <10 m for all hearing groups.

3.5.3.1.3 Conclusion

Based on the current evidence base, it is considered that no derogation is required as a result of underwater noise impacts, and the proposed SI works conform with the system of strict protection of cetaceans under Article 12 of the Habitats Directive.

3.5.3.2 Risk of collision

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

It is expected that a maximum of eight vessels would be operating at any one time within the AoI (one offshore marine survey vessel, one smaller inshore marine survey vessel and one RIB transporting personnel to and from the JUB). For the geophysical surveys, the vessels will be travelling in a predefined trajectory. It is considered that this will allow animals to predict the movement of the vessels and therefore avoid collisions. The other survey vessels (i.e. benthic survey vessels, geotechnical survey vessel and metocean equipment deployment vessels) will be stationary for extended periods throughout their operations which will reduce the potential for collision with these vessels.

As documented in the accompanying Assessment of Impact on the Maritime Usage (AIMU) Report, the AoI supports reasonably high levels of baseline marine traffic, with cargo vessels, fishing boats and pleasure craft traversing the AoI to access commercial and fishing ports and harbours in the region. It is, therefore, reasonable to assume that marine mammals in the area are exposed to vessel traffic on a regular basis and may exhibit some habituation. In addition, the increase in vessel traffic at any one time is considered to be very low (i.e. up to eight vessels operating within the AoI). On this basis it is predicted that collisions between survey vessels and marine mammals originating from all relevant SACs will be extremely unlikely and there is no likelihood of significant effects occurring.

Therefore, it is considered the proposed SI works do not present a collision risk and therefore conform with the system of strict protection of cetaceans under Article 12 of the Habitats Directive in this regard.

3.5.4 Turtle Species

Data on turtle hearing is limited, however, turtles are adapted to detect sound in water and are known to detect sound at less than 1,000 Hz (Popper et al., 2014). While the majority of the survey equipment to be used operates across higher frequency range (see Table 4-1 in the Subsea Noise Technical Report), injury and disturbance to turtles due to noise impacts is unlikely given the rarity of turtle occurrence. Due to the rarity of turtles within the AoI, the limited scale and duration of the survey activities, it is concluded that there will be no significant disturbance, injury, or death of turtle species as a result of the SI works. There will be no deterioration or destruction of breeding sites or resting places. Therefore, in view of the current evidence base, it is considered that no derogation is required, and the proposed SI works will conform with the system of strict protection of turtles under Article 12 of the Habitats Directive.

4 Summary & Conclusion

The potential for death, injury, disturbance, or damage to or destruction of breeding or resting sites to occur to Annex IV species as a result of the SI works is considered to be low. This risk will be further reduced by the implementation of the mitigation measures outlined in this document and the *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (DAHG, 2014). It is concluded that the SI works will not deliberately capture or kill any Annex IV species listed under Annex IV of the Habitats Directive. The SI works will not disturb Annex IV species during periods of breeding or migration and breeding or resting places of such Annex IV species will not be damaged or destroyed.

Following the assessment of the evidence base and available information on relevant Annex IV species, it is concluded that the SI works comply with the system of strict protections afforded by Article 12 of the Habitats Directive and Regulations 51 and 52 of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. This applies to the following Annex IV species:

- All bat species;
- Otter;
- All cetacean species; and
- All turtle species.

Based on the current available evidence, no derogation licence(s) are considered necessary for the SI works.

5 References

BCI (2024). [online] Available at: https://www.batconservationireland.org/. Accessed October 2024.

Berrow, S. et al. (2010). Irish Cetacean review (2000-2009): a review of all cetacean sighting and stranding records made during the period 2000-2009 by the IWDG through ISCOPE, the Irish Scheme for Cetacean Observation and Public Education. Kilrush: IWDG.

Chanin, P (2003): Ecology of the European Otter, Conserving Natura 2000 Rivers Ecology Series No. 10. English Nature

Department of Arts, Heritage and the Gaeltacht (DAHG) (2014) Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Dublin, Ireland, Department of Arts, Heritage and the Gaeltacht, 58pp.

Doyle, T. K., (2007). Leatherback Sea Turtles (Dermochelys coriacea) in Irish waters. Irish Wildlife Manuals, No. 32. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Giralt Paradell, O., Cañadas, A., Bennison, A., Todd, N., Jessopp, M., Rogan, E. (2024). Aerial surveys of cetaceans and seabirds in Irish waters: Occurrence, distribution and abundance in 2021-2023. Department of the Environment, Climate & Communications and Department of Housing, Local Government & Heritage, Ireland. 260pp

IAMMWG. (2015). Management Units for cetaceans in UK waters (January 2015). JNCC Report No. 547, JNCC Peterborough, ISSN 0963-8091. https://hub.jncc.gov.uk/assets/f07fe770-e9a3-418d-af2c-44002a3f2872

IAMMWG. (2022). Updated abundance estimates for cetacean Management Units in UK waters (Revised 2022). JNCC Report No. 680, JNCC Peterborough, ISSN 0963-8091.

IAMMWG. (2023). Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091. https://hub.jncc.gov.uk/assets/b48b8332-349f-4358-b080-b4506384f4f7

IWDG (2015). Minke Whale Fact sheet Available: https://iwdg.ie/cms_files/wp-content/uploads/2019/04/Minke-whale-profile.pdf

IWDG (2024). Sightings Data. https://www.iwdg.ie/browsers/sightings.php Accessed October 2024

Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M. (2001). Collisions between ships and whales. Marine Mammal Science 17: 35-75.

Limpens, H., Lagerveld, S., Ahlen, I., Anxionnat, D., Aughney, T., Baagoe, H., Bach, L., Bach, P., Boshamer, J., Boughey, K., Le Campion, T.,, Christensen, M., Douma, T., Dubourg-Savage, M-J., Durinck, J., Elmeros, M., Haarsma, A-J., Haddow, J., Hargreaves, D., Hurst, J., Jansen, E., Johansen, T., de Jong, J., Jouan, D., van der Kooji, J., Kyheroinen, E., Mathews, F., Michaelsen, T., Moller, J., Pettersons, G., Roche, N., Rodrigues, L., Russ, J., Smits, Q., Swift, S., Fjederholt, E., Twisk, P., Vandendriesche, B. and Schillemans, M. (2017) Migrating bats at the southern North Sea approach to an estimation of migration populations of bats at the southern North Sea. Technical Report Zoodiervereniging (Dutch Mammal Society).

Mullen, E., Marnell, F. & Nelson, B. (2021) Strict Protection of Animal Species. National Parks and Wildlife Service Guidance, No. 2. National Parks and Wildlife Service, Department of Housing. Local Government and Heritage.

National Biodiversity Data Centre (NBDC) (2024a). European Otter map https://maps.biodiversityireland.ie/Map/Marine/Species/119290 Accessed October 2024

National Biodiversity Data Centre (NBDC) (2024b). Common Dolphin (*Delphinus delphis*); Ireland; Available: https://species.biodiversityireland.ie/134667. Accessed October 2024

National Biodiversity Data Centre (NBDC) (2024c). Bottlenose Dolphin (*Tursiops truncates*) ; Ireland; Available: https://species.biodiversityireland.ie/134666 Accessed October 2024

National Biodiversity Data Centre (NBDC) (2024d). Rissos Dolphin (*Grampus griseus*); Ireland; Available: https://species.biodiversityireland.ie/134743 Accessed October 2024

National Biodiversity Data Centre (NBDC) (2024e). Humpback whale (*Megaptera novaeangliae*); Ireland; Available: https://species.biodiversityireland.ie/134653 Accessed October 2024

National Biodiversity Data Centre (NBDC) (2024f). Fin Whale (*Balaenoptera physalus*); Ireland; Available: https://species.biodiversityireland.ie/134654

National Biodiversity Data Centre (NBDC) (2024g). Biodiversity Maps Maps - Biodiversity Maps (biodiversityireland.ie) Accessed September 2024

National Biodiversity Data Centre (NBDC) (2024h). Leatherback Turtle (*Dermochelys coriacea*); Ireland; Available: https://maps.biodiversityireland.ie/Species/128443

National Biodiversity Data Centre (NBDC) (2024i). Kemp's Ridley (*Lepidochelys kempii*); Ireland; Available:https://maps.biodiversityireland.ie/Dataset/114/Species/128434

National Biodiversity Data Centre (NBDC) (2024j). Hawksbill turtle (*Eretmochelys imbricata*); Ireland; Available: https://maps.biodiversityireland.ie/Species/128441

National Biodiversity Data Centre (NBDC) (2024k). Loggerhead Turtle (*Caretta caretta*); Ireland; Available: https://maps.biodiversityireland.ie/Map/Terrestrial/Species/128443

National Marine Fisheries Service/NOAA. (2018). 2018 Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167 p.

NOAA/Finneran James j. (2024) Marine mammal auditory weighting functions and exposure functions for US Navy Phase 4 acoustic effects analyses [Report]. - [s.l.] : NOAA, 2024.

NPWS (2009) Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report.

NPWS (2021) Guidance on the Strict Protection of Certain Animal and Plant Species under the Habitats Directive in Ireland. National Parks and Wildlife Service Guidance Series, No. 2. Department of Housing. Local Government and Heritage.

ORCA (2024a). Common dolphin https://www.orcaireland.org/common-dolphin Accessed October 2024

ORCA (2024b). Bottlenose dolphin https://www.orcaireland.org/bottlenose-dolphin. Accessed October 2024

ORCA (2024c). Risso's Dolphin https://www.orcaireland.org/rissos-dolphin Accessed October 2024

ORCA (2024d). Harbour Porpoise https://www.orcaireland.org/harbour-porpoise. Accessed October 2024

ORCA (2024e). Fin Whale https://www.orcaireland.org/fin-whale. Accessed October 2024

Popper, Arthur & Hawkins, Anthony & Fay, Richard & Mann, David & Bartol, Soraya & Carlson, Thomas & Coombs, Sheryl & Ellison, William & Gentry, Roger & Halvorsen, Michele & Løkkeborg, Svein & Rogers, Peter & Southall, Brandon & Zeddies, David & Tavolga, William. (2014). Sound Exposure Guidelines. 10.1007/978-3-319-06659-2_7.

Ruppell, C.D., Weber, T.C., Staaterman, E.R., Labak, S.J. & Hart, P.E., (2022). Categorizing Active Marine Acoustic Sources Based on Their Potential to Affect Marine Animals. J. Mar. Sci. Eng. 10, 1278. https://doi.org/10.3390/ jmse10091278

Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L, (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125.

Southall, B. L., Bowles, A. E., Ellison, W. T., Finneran, J. J., Gentry, R. L., Greene., C. R. Jr., Kastak, D., Ketten, D. R., Miller, J. H., Nachtigall, P. E., Richardson, W. J., Thomas, J. A., & Tyack, P. L. (2007). Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4): 411-521.

Van Waerebeek, Koen & Baker, Alan & Félix, Fernando & Gedamke, Jason & Iñiguez, Miguel & Sanino, Gian & Secchi, Eduardo & Sutaria, Dipani & van Helden, Anton & Wang, Yamin. (2007). Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Latin American Journal of Aquatic Mammals. 6. 43-69. 10.5597/lajam00109.

Wall, D. (Marine Institute, 2013). Marine Mammals and Megafauna in Irish Waters - Behaviour, Distribution and Habitat Use- WP1 Monitoring Spatial and Temporal Habitat Use and Abundance of Cetaceans.Marine Research Sub-Programme (NDP 2007-'13), PBA/ME/07/005(02).