

# LIRIC PROJECT – MARINE SURVEY

## Shadow Habitat Regulations Assessment



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## Acronyms

| Term  | Definition                             |
|-------|--|
| CPT   | Cone Penetration Test                  |
| cSAC  | Candidate Special Area of Conservation |
| EU    | European Union                         |
| GB    | Great Britain                          |
| HVDC  | High-Voltage Direct Current            |
| I-SEM | Integrated Single Energy Market        |
| LAT   | Lowest Astronomical Tide               |
| LSE   | Likely Significant Effect              |
| MAG   | Magnetometer                           |
| MBES  | Multibeam echosounder                  |
| PCW   | Phocid Carnivore in Water              |
| pSPA  | Potential Special Area of Conservation |
| PTS   | Permanent Threshold Shift              |
| SAC   | Special Area of Conservation           |
| SCI   | Site of Community Importance           |
| SPA   | Special Protection Area                |
| RPL   | Route Position List                    |
| SSS   | Side Scan Sonar                        |
| SSC   | Suspended Sediment Concentration       |
| SBP   | Sub-Bottom Profiler                    |
| TTS   | Temporary Threshold Shift              |
| USBL  | Ultra Short Baseline                   |
| UXO   | Unexploded Ordnance                    |
| VHF   | Very High Frequency                    |
| ZoI   | Zone of Influence                      |

## Units

| Unit            | Definition        |
|-----------------|-------------------|
| %               | Percent           |
| dB              | Decibels          |
| Hz              | Hertz             |
| kHz             | Kilohertz         |
| km              | Kilometres        |
| km <sup>2</sup> | Square Kilometres |
| kV              | Kilovolts         |
| m               | Metres            |
| m <sup>2</sup>  | Square metres     |
| MW              | Megawatts         |

## Glossary

| Term                                   | Definition  |
|--|---|
| Annex I Habitat                        | A natural habitat type of community interest, defined in Annex I of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive), whose conservation requires the designation of Special Areas of Conservation (SAC).   |
| Annex II Species                       | Animal or plant species of community interest, defined in Annex II of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive), whose conservation requires the designation of Special Areas of Conservation (SPA).   |
| European site                          | A Special Area of Conservation (SAC), possible SAC (pSAC), or candidate SAC, (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a site of community importance (SCI).  |
| Likely Significant Effect (LSE)        | Any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the European site was designated but excluding trivial or inconsequential effects. In the context of European sites, a likely effect is one that cannot be ruled out on the basis of objective information. A 'significant' effect is a test of whether a plan or project could undermine the European site's conservation objectives.  |
| Permanent Threshold Shift (PTS)        | A permanent threshold shift is a permanent shift in the auditory threshold. It may occur suddenly or develop gradually over time. A permanent threshold shift results in permanent hearing loss.  |
| Special Area of Conservation (SAC)     | Special Areas of Conservation are areas designated under the European Union (EU) Habitat's Directive to help conserve certain plant and animal species listed in the Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). |
| Suspended Sediment Concentration (SSC) | Suspended sediment concentration, is defined as the total value of both mineral and organic material carried in suspension by a volume of water.  |
| Temporary Threshold Shift (TTS)        | A temporary threshold shift is a temporary shift in the auditory threshold. It may occur suddenly after exposure to a high level of noise, a situation in which most people experience reduced hearing. A temporary threshold shift may result in temporary hearing loss.   |

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## 1. INTRODUCTION

### 1.1. Project Overview

- 1.1 TI LirIC Limited (the Applicant), a wholly owned subsidiary in the Transmission Investment Group, is developing a proposed 700 megawatt (MW) High Voltage Direct Current (HVDC) electricity interconnector project to connect the Irish Integrated Single Electricity Market (I-SEM) to the Great Britain (GB) wholesale electricity market through a link between Northern Ireland (NI) and Scotland (the LirIC Project, herein referred to as the Development), which is scheduled to be fully operational around the end of this decade.
- 1.2 The Development comprises of two HVDC converter stations, one located in Scotland and the other in NI that will be connected via two 320 kilovolt (kV) HVDC cables running underground and subsea. The total Offshore Cable Corridor length for the Development is approximately 142 kilometres (km).
- 1.3 The Applicant is looking to conduct landfall and marine surveys, including the following:
  - Marine Geophysical Survey/Benthic Survey;
  - Marine Geotechnical Survey;
  - Marine Unexploded Ordnance (UXO) Investigation Survey;
  - Landfall Geophysical Survey; and
  - Landfall Geotechnical Survey.
- 1.4 The surveys aim to provide comprehensive data to the Applicant to inform future cable design and routing and identify potential constraints within the Offshore Cable Corridor. The surveys will collect baseline data to understand the ground conditions along the Offshore Cable Corridor, input to the design and installation process and inform the design of any future surveys such as further pre-construction construction surveys to support activities such as boulder clearance.
- 1.5 The Offshore Cable Corridor covers a 0.5km wide and approximately 142km long area, predominantly within the North Channel and Firth of Clyde. The maximum expected duration of survey operations is estimated to be up to 69 days in total (subject to weather and vessel availability constraints).

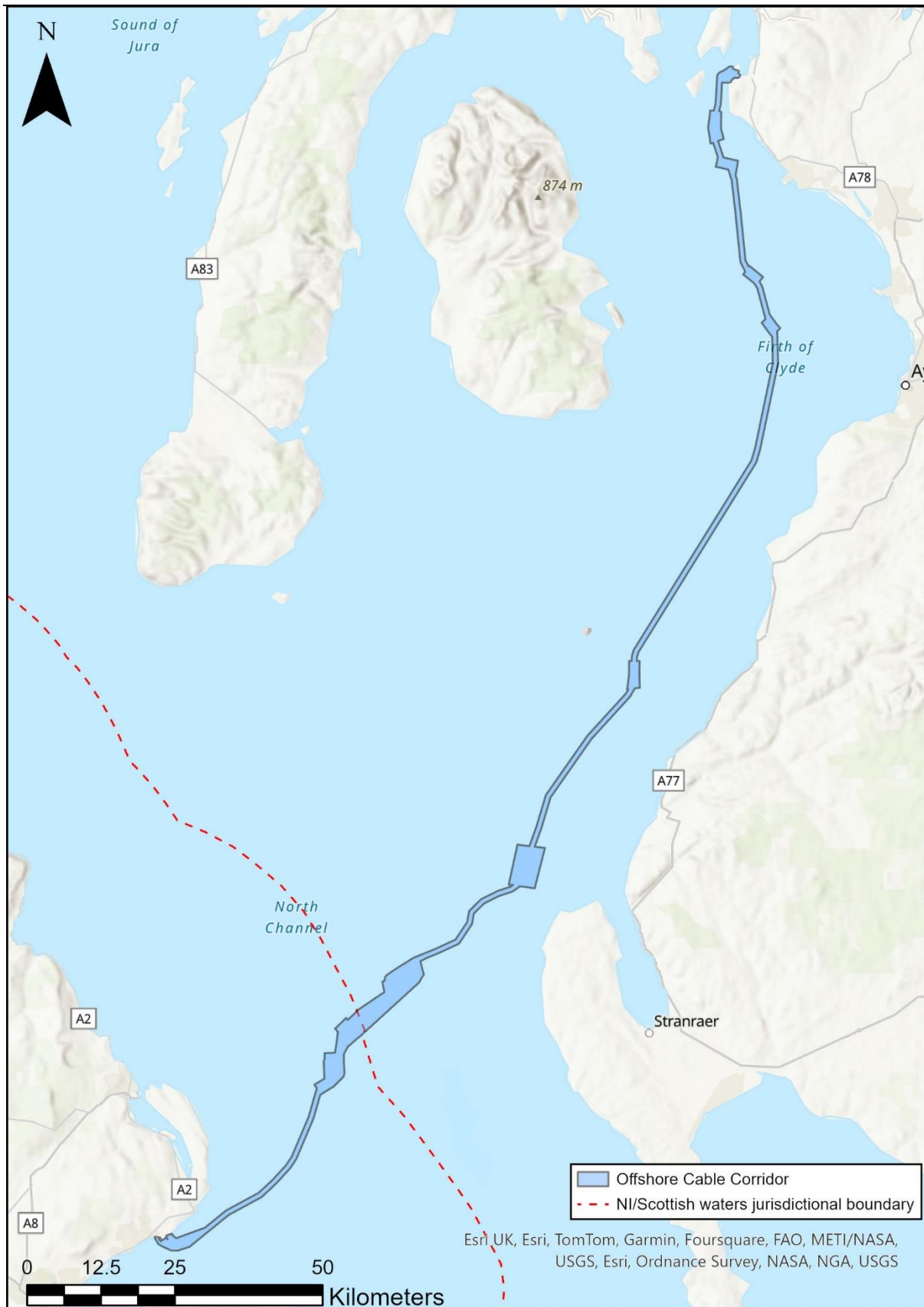


Figure 1-1: Location of the Development



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### 1.1.2. Survey Equipment

- 1.6 The Offshore Cable Corridor will be surveyed using a range of geophysical and geotechnical survey equipment, which is summarised in Table 1-1.
- 1.7 The proposed surveys will probably be undertaken by two survey vessels. While the exact number and specification of the survey vessels and equipment specifications are not yet confirmed; the likely equipment specifications and associated vessels are outlined in Table 1-1.
- 1.8 Further detail on sound sources can be found in Section 1.1.3. The exact equipment to be used will be confirmed prior to the surveys, based on decisions by the survey contractor. Additionally, two Acoustic Doppler Current Profilers (ADCP) may be deployed on the seabed for approximately a month and removed upon completion however ADCPs are not known to elicit any behaviour responses from marine mammals and therefore are not carried forward for consideration in the assessments.

**Table 1-1: Survey Types, Specifications, Equipment and Durations for the Proposed Survey Works**

| Survey Type                                     | Associated Vessels   | Survey Specifications  | Survey Equipment  | Estimated Duration |
|---|--|--|---|--------------------|
| Geophysical                                     | Survey vessel specifications to be confirmed by the survey contractor.<br>Likely to be two vessels one for offshore and one for inshore. | <ul style="list-style-type: none"> <li>500 metre (m) wide corridor centred on the Route Position List (RPL) in water depths greater than 10m below Lowest Astronomical Tide (LAT).</li> <li>250m-wide corridor centred on the RPL between 10m below LAT and 1m above LAT.</li> <li>Additional survey lines at existing infrastructure crossings.</li> <li>Additional survey lines to extend the survey corridor, if required.</li> </ul> | <ul style="list-style-type: none"> <li>Multibeam echosounder (MBES)</li> <li>Side Scan Sonar (SSS)</li> <li>Sub-Bottom Profiler (SBP)</li> <li>Magnetometer (MAG)</li> <li>Subsea positioning (USBL)</li> </ul> | 27-34 days         |
| Geotechnical                                    | Survey vessel specifications to be confirmed by the survey contractor.<br>Likely to be two vessels one for offshore and one for inshore. | <ul style="list-style-type: none"> <li>Approximately 20-30 Cone Penetration Test (CPTs) and Vibrocores to 3m below seafloor.</li> </ul>  | <ul style="list-style-type: none"> <li>Geotechnical, Vibro-coring, drilling, cone penetration testing</li> <li>Trenching</li> </ul>   | 6-12 days          |
| Benthic Grab Samples and Drop-Down Video Stills | Survey vessel specifications to be confirmed by the survey contractor.<br>Likely to be two vessels one for offshore and one for inshore. | <ul style="list-style-type: none"> <li>Approximately 40x benthic grab samples and co-located drop-down video stills.</li> </ul>  | <ul style="list-style-type: none"> <li>0.1m<sup>2</sup> day grab or similar</li> <li>Suitable high-quality</li> </ul>   | 6-8 days           |
| UXO Investigation Survey                        | Survey vessel specifications to be confirmed by the survey contractor.<br>Likely to be two vessels one for offshore and one for inshore. | <ul style="list-style-type: none"> <li>30m wide corridor over a refined RPL.</li> <li>Acquisition up to 2m below LAT.</li> <li>Additional survey lines to extend the survey corridor, if required.</li> </ul>  | <ul style="list-style-type: none"> <li>MBES</li> <li>SSS</li> <li>SBP</li> <li>MAG</li> <li>USBL</li> </ul>   | 15 days            |

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### 1.1.3. Sound Sources

- 1.9 Details of the potential sound sources to be used in the survey are presented below in Table 1-2, including information on the sound produced by each piece of sound-producing survey equipment. It should be noted that these equipment specifications are only indicative but represent the sound levels from various equipment, as exact equipment specification have not yet been decided.
- 1.10 The sound sources included in the assessment have been classified according to the following sound types.
- Impulsive sounds which are typically transient, brief (less than one second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (American National Standards Institute (ANSI 1986; NIOSH 1998; ANSI 2005). This category includes sound sources such as air guns used in seismic surveys, impact piling and underwater explosions.
  - Non-impulsive (continuous) sounds which 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 (ANSI 1995; NIOSH 1998). This category includes sound sources such as continuous vibro-piling, running machinery, some sonar and vessels.

**Table 1-2: Summary of Sound Sources and Activities Included in the Subsea Noise Assessment**

| Equipment  | Source level [SPL]<br>(as used in model)                 | Primary<br>decade bands<br>(-20 dB width) | Source model<br>details  | Impulsive/non-<br>impulsive |
|--|--|---|--|-----------------------------|
| Survey vessel (based on “quiet” vessel)  | 186 decibel (dB) SPL                                     | 10-1,600 Hertz (Hz)                       | Maximal allowable to qualify as “quiet” or “research” with large vessel classification companies.  | Non-impulsive               |
| Side scan sonar (Edgetech FS4200 or equivalent)                                    | 203dB SPL  | 100,000Hz<br>900,000Hz                    | Based on all frequency & modes available to the FS4200, covering 100 to 900 kilohertz (kHz).   | Impulsive                   |
| Multibeam echosounder (Reson Seabat T51R & Kongsberg EM 2040-4 MKII or equivalent) | 205-213dB SPL<br>(ping rate dependent, spherical level)  | 200,000 – 800,000Hz                       | Model based on frequency modulated tone bursts, but representative for constant frequency tone bursts, von Hann window, ping rate determined by local depth.   | Impulsive                   |
| Parametric sub-bottom profiler (Innomar Medium)                                    | Primary:<br>208-210dB SPL<br>Secondary:<br>148-154dB SPL | 4,000 – 15,000Hz &<br>85,000 – 115,000Hz  | Manufacturer Model based on frequency modulated tone bursts, but representative for constant frequency tone bursts, von Hann window, ping rate determined by local depth. Source level used for modelling adjusted for beam pattern and local sediment properties. | Impulsive                   |
| Boomer type sub-bottom profiler  | 169-177dB SPL  | 125 – 16,000Hz                            | Model based on similar sources. Ping rate determined by local depth. Source level used for modelling adjusted for beam pattern and local sediment properties.  | Impulsive                   |
| Sparker type sub-bottom profiler   | 182-190dB SPL  | 400 – 6300Hz                              | Model based on similar sources. Ping rate determined by local depth. Source level used for modelling adjusted for beam pattern and local sediment properties.  | Impulsive                   |
| Ultra Short Baseline (USBL) positioning system                                     | 180dB SPL  | 19,000 – 34,000Hz                         | Manufacturer.<br>3 x 8 ms pulses per second.   | Impulsive                   |
| Geotechnical, Vibro-coring, drilling, cone penetration testing                     | 195 dB SPL   | 10 – 4,000 Hz                             | Based on review of available data.   | Non-impulsive               |
| Trenching  | 172dB SPL  | 10 – 4,000Hz                              | Based on back-calculated recordings from trenching in gravel.  | Non-impulsive               |

## 2. IDENTIFICATION AND SCREENING OF EUROPEAN SITES AND FEATURES

2.1 Figure 2-1 outlines the stages of the HRA process, beginning with Stage 1 screening of European sites with spatial overlap of the Offshore Cable Corridor and/or Zone of Influence for qualifying features. Stage 2 considers the potential for LSE on qualifying features of European sites, with a Stage 3 Appropriate Assessment carried out where potential for LSE is identified.

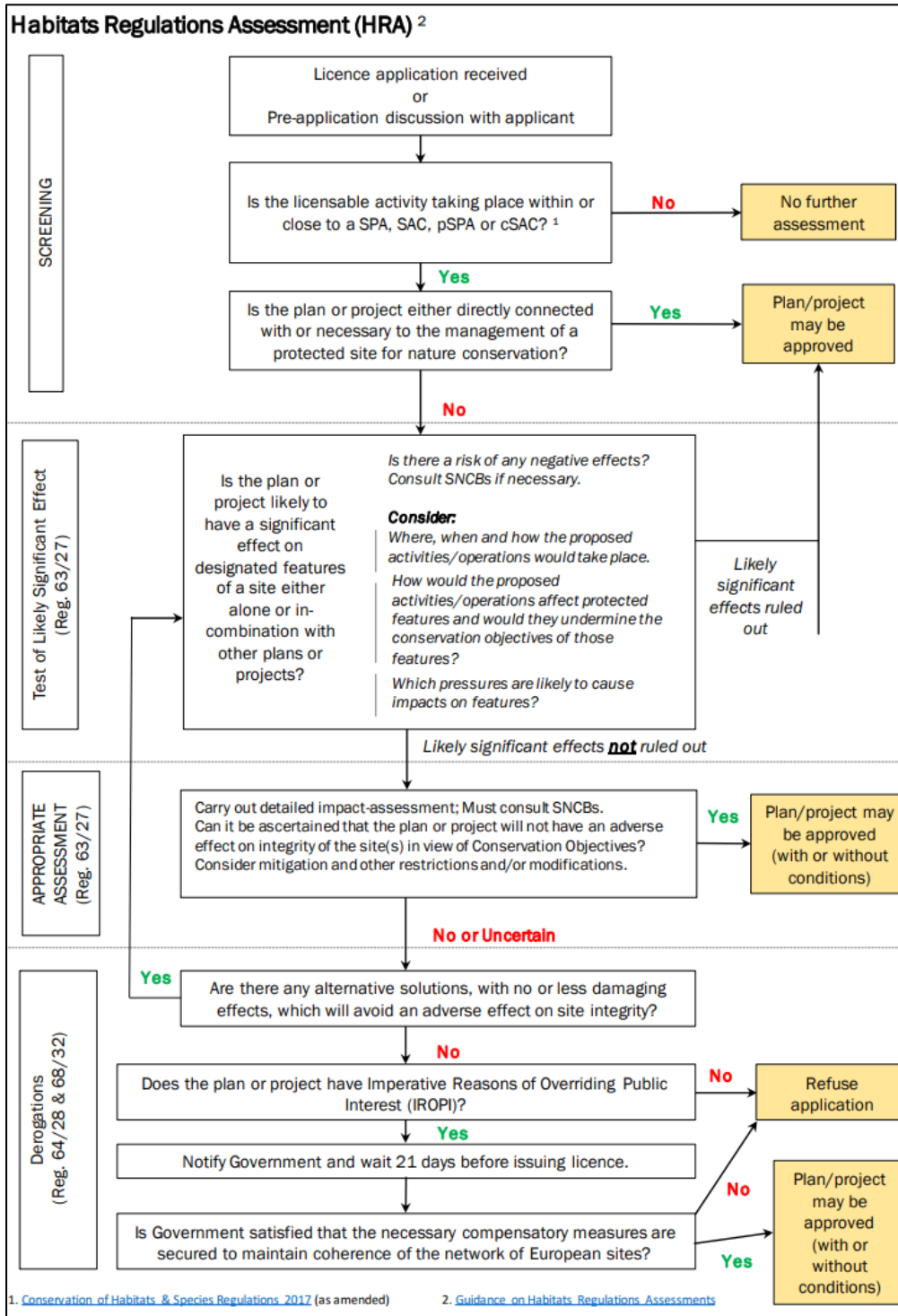


Figure 2-1: Summary of the stages of the HRA process for marine protection areas (Natural England, 2021)

## 2.2. Screening European Sites - Annex I Habitats

- 2.2 The Offshore Cable Corridor (shown in Figure 1-1) does not overlap with any European sites with Annex I habitat features, therefore only indirect effects resulting from the geotechnical surveys have been considered further.
- 2.3 A screening distance of 15km has been used to identify European sites with Annex I habitat features which could be impacted by the geotechnical surveys. This distance represents the maximum Zone of Influence (Zol) for indirect effects associated with the geotechnical surveys (e.g. increases in suspended sediments).
- 2.4 Based on the information provided above, there is one European Site with Annex I habitat features located within the potential Zol. The Maidens SAC is located 11.5km from the Offshore Cable Corridor and is therefore considered for potential LSE below in Section 3.1.

## 2.3. Screening of European Sites – Annex II Diadromous Fish

- 2.5 The Offshore Cable Corridor (shown in Figure 1-1) does not overlap with any European sites with Annex II diadromous fish features, therefore only indirect effects resulting from the geophysical and geotechnical surveys have been considered further.
- 2.6 A screening distance of 15km has been used to identify European sites with Annex II diadromous features which could be impacted by the geotechnical surveys. This distance represents the maximum Zol for indirect effects associated with the geotechnical surveys (e.g. increases in suspended sediments).
- 2.7 The Zol for effects resulting from subsea noise associated with the geotechnical and geophysical survey is informed by the impact ranges identified in the Subsea Noise Report (RPS 2023). For fish Permanent Threshold Shift (PTS) ranges associated with the geophysical surveys extend to a maximum of 40m from the noise source whilst behaviour responses may extend 460m from the noise source. For geotechnical surveys, the maximum range at which PTS could occur is <10m and behavioural responses could occur out to a maximum of 500m.
- 2.8 There are no European sites with Annex II diadromous fish features located within the Zol identified for effects resulting from the geotechnical and geophysical surveys above, therefore Annex II diadromous fish are not considered further.

## 2.4. Screening of European Sites – Annex II Marine Mammals

- 2.9 An overview of the European sites relevant to the Development is provided in Table 2-1. There are a number of SACs with qualifying features that have the potential to be impacted by the geophysical and geotechnical survey activities. For the purposes of this assessment, only SACs with relevant Annex II marine mammal qualifying features have been considered.
- 2.10 The SACs identified as requiring further consideration in this HRA due to their proximity to the Development and their qualifying interest features are provided in Table 2-1 below. SACs located within 100km of the Development were considered based on the potential connectivity with the Development and the relevant foraging ranges of Annex II marine mammal qualifying features.

**Table 2-1: SACs with Annex II marine mammal qualifying features with potential connectivity to the geophysical and geotechnical surveys**

| Site Name                          | Relevant Qualifying Interest Feature | Distance from Proposed Development (km) |
|------------------------------------|--------------------------------------|---|
| North Channel SAC                  | Harbour porpoise                     | 0                                       |
| The Maidens SAC                    | Grey seal                            | 11.5                                    |
| Strangford Lough SAC               | Harbour seal                         | 50.3                                    |
| Murlough SAC                       | Harbour seal                         | 67.4                                    |
| Inner Hebrides and the Minches SAC | Harbour porpoise                     | 95.1                                    |
| Skerries and Causeway SAC          | Harbour porpoise                     | 75.8                                    |

## 2.5. Screening of European Sites – Ornithological Features

- 2.11 The Offshore Cable Corridor (shown in Figure 1-1) overlaps with a proposed Special Protection Area (pSPA) with several other Special Protection Areas (SPAs) considered within a 50km ZoI. Seabirds can forage over a larger area than 50km but due to the small scale of the proposed surveys and the short period over which the surveys would occur only the closest sites would be impacted to the greatest extent and are given further consideration.
- 2.12 A screening distance of 50km has been used to identify SPAs which could be directly or indirectly impacted by the marine surveys. Marine surveys present potential to impact birds through temporary disturbance or displacement due to visual presence of vessels. SPAs within screening distance from the Offshore Cable Corridor with marine or intertidal birds designated as qualifying features are identified in Table 2-2. No terrestrial SPAs were included even if they were present within 50km due to no potential impact. Distance from SPA to the Offshore Cable Corridor was measured as the shortest distance from the Offshore Cable Corridor to SPA boundary.
- 2.13 The East Coast (Northern Ireland) Marine proposed SPA (pSPA) overlaps with the Offshore Cable Corridor and is considered for LSE. Nine other SPAs with marine or intertidal birds as qualifying features were found within 50km of the Offshore Cable Corridor. These sites are summarised in Table 2-2 and shown in Figure 2-2.
- 2.14 Twelve bird species protected under Schedule 1 of the Wildlife (Northern Ireland) Order 1985 are identified in SPA citations for the five SPAs identified in Northern Ireland: Arctic tern *Sterna paradisaea*, black-tailed godwit *Limosa limosa*, curlew *Numenius arquata*, dunlin *Calidris alpina*, goldeneye *Bucephala clangula*, golden plover *Pluvialis apicaria*, greenshank *Tringa nebularia*, Mediterranean gull *Larus melanocephalus*, redshank *Tringa totanus*, Sandwich tern *Thalasseus sandvicensis*, red-throated diver *Gavia stellata* and roseate tern *Sterna dougallii*.

**Table 2-2: SPAs within 50km of the Offshore Cable Corridor with seabirds or wading birds as qualifying features**

| Country          | SPA Name                                   | Distance to Offshore Cable Corridor (km) | Designated species (breeding)   | Designated species (non-breeding)  |
|------------------|--|--|---|--|
| Northern Ireland | East Coast (Northern Island) Marine (pSPA) | 0  | Arctic tern<br>Common tern<br>Manx shearwater<br>Sandwich tern  | Eider<br>Great-crested grebe<br>Red-throated diver   |
|                  | Belfast Lough Open Water                   | 0.93                                     | None  | Great-crested grebe  |
|                  | Belfast Lough                              | 1.56                                     | Arctic tern<br>Common tern  | Bar-tailed godwit<br>Black-tailed godwit<br>Great-crested grebe<br>Redshank  |
|                  | Larne Lough                                | 7.91                                     | Common tern<br>Mediterranean gull<br>Roseate tern<br>Sandwich tern  | None   |
|                  | Outer Ards                                 | 8.01                                     | Arctic tern   | Golden plover<br>Ringed plover<br>Turnstone  |
|                  | Copeland Islands                           | 15.49                                    | Arctic tern<br>Manx shearwater  | None   |
|                  | Strangford Lough                           | 26.21                                    | Arctic tern<br>Common tern<br>Sandwich tern   | Bar-tailed godwit<br>Black-tailed godwit<br>Curlew<br>Dunlin<br>Eider<br>Greenshank<br>Grey plover<br>Goldeneye<br>Knot<br>Oystercatcher<br>Red-breasted merganser<br>Redshank<br>Ringed plover<br>Turnstone |
| Scotland         | Inner Clyde Estuary                        | 46.24                                    | None  | Redshank   |
|                  | Ailsa Craig                                | 1.87                                     | Northern gannet<br>Common guillemot<br>Herring gull<br>Black-legged kittiwake<br>Lesser black-backed gull | None   |



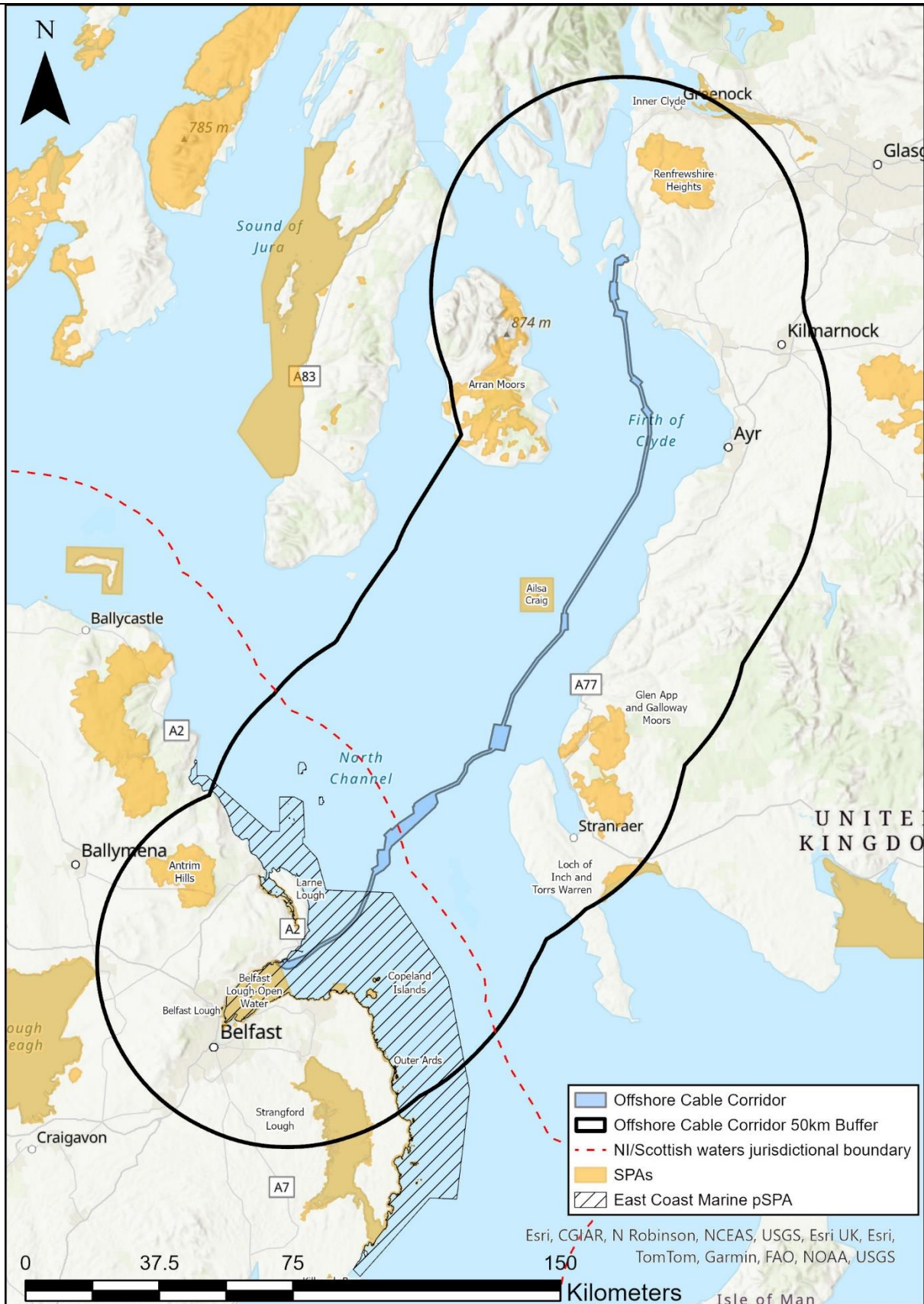


Figure 2-2: SPAs within 50km of the Offshore Cable Corridor

### 3. DETERMINATION OF LIKELY SIGNIFICANT EFFECT

#### 3.1. Assessment of LSE for Annex I Habitats

- 3.1 When considering impacts resulting from the surveys on Annex I habitat qualifying features of nearby SACs, due to the nature of the survey only impacts associated with the geotechnical survey are considered further. Due to the short term, temporary and highly directional nature of effects from the geotechnical surveys, for all European Sites which do not overlap with the Offshore Cable Corridor, the risk of LSE occurring is very low. However, increases in Suspended Sediments (SSC) is considered further below in line with a precautionary approach.
- 3.2 This Section details the potential impact of increased SSCs during geotechnical surveys on Annex I habitat features (Table 3-1).

**Table 3-1: Pathways for LSE: Potential Impacts on Annex I Habitat Features**

| European Site   | Relevant Qualifying Feature                         | Potential Impact | Justification for screening decision   | Potential for an LSE to occur<br>Yes (✓)<br>No (✗) |
|-----------------|---|------------------|--|--|
| The Maidens SAC | Sandbanks slightly covered by seawater all the time | Increases SSC    | in Vibro-coring, drilling, cone penetration testing and trenching undertaken during geotechnical surveys may result in the suspension and subsequent deposition of drill cuttings on the seabed, which has the potential to result in indirect impacts on Annex I habitat features (i.e. increases in SSC and resulting smothering). However, indirect effects on Annex I habitats arising from these activities will be short term, of limited extent and highly reversible. The activities will occur in limited, discrete locations within the Offshore Cable Corridor, and considering the distance to The Maidens SAC (11.5km) any increases in SSCs will be very low and inconsequential in the context of the natural variability in the region on reaching the SAC. In addition, the Offshore Cable Corridor is located within a highly dynamic environment and therefore it is further assumed that increases in SSC would return to background levels within minutes to a small number of hours following geotechnical activities. | ✗  |
|                 | Reefs   |                  | Based on the information provided above, there is no potential for a LSE on sandbanks covered by seawater all the time and reef features of The Maidens SAC.   | ✗  |

#### 3.1.2. LSE In-Combination

- 3.3 The LSE test requires consideration of the Development alone and in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but there is potential for a LSE in-combination with other plans and projects (e.g. where contributions are made by external projects as well as the Development).
- 3.4 For Annex I habitats, no potential for LSE was identified for the Development alone, as there is either no pathway to effect, or the Development would result in only negligible or inconsequential effects that

would not contribute (even collectively) in a material way to in-combination effects and therefore, no additional in-combination issues are identified.

### 3.1.3. Summary of Determination of LSE For Annex I Habitat Features

3.5 Table 3-1 presents the determination of the assessment of LSE as a result of the geotechnical surveys for the Annex I habitat features of The Maidens SAC. The assessment considers the potential impact of increased SSCs during geotechnical surveys and concludes there is **no potential** for LSE to occur at The Maidens SAC.

## 3.2. Assessment of LSE for Annex II Marine Mammals

### 3.2.1. Pathways for LSE

3.6 This Section details the potential impact of injury and disturbance from underwater noise generated during geophysical and geotechnical surveys on Annex II marine mammals (Table 3-2). This is the only relevant potential impact to marine mammal species from the proposed geophysical and geotechnical surveys and therefore the only potential impact considered further.

**Table 3-2: Pathways for LSE: Potential Impacts on Annex II Marine Mammals**

| European Site     | Relevant Qualifying Feature | Potential Impact  | Justification for Screening Decision   | Potential for an LSE to Occur<br>Yes (✓)<br>No (✗) |
|-------------------|-----------------------------|---|--|--|
| North Channel SAC | Harbour porpoise            | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys. | <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent.</p> <p>The North Channel SAC is located along the eastern coast of Northern Ireland and has been identified as an important winter area for harbour porpoise. It is estimated that it supports around 1.2 percent (%) of the UK Celtic and Irish Seas Management Unit (MU) population (JNCC, 2023).</p> <p>As the proposed geophysical and geotechnical surveys may overlap with the winter period for which the site is designated, there is considered to be potential for a LSE on the harbour porpoise feature of the North Channel SAC.</p> | ✓  |
| The Maidens SAC   | Grey seal                   | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys  | <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent and any disturbance impacts will be transient in nature. At its closest point the Maidens SAC is located 11.5km from the Offshore Cable Corridor, however the survey vessel will be moving away from the SAC as the</p>   | ✗  |

| European Site                      | Relevant Qualifying Feature | Potential Impact   | Justification for Screening Decision  | Potential for an LSE to Occur<br>Yes (✓)<br>No (✗) |
|------------------------------------|-----------------------------|--|---|--|
|                                    |                             |  | survey progresses thereby decreasing the potential for disturbance impacts to occur.  |  |
|                                    |                             |  | On the basis of the information provided above, there is no potential for a LSE on the grey seal feature of The Maidens SAC.  |  |
| Strangford Lough SAC               | Harbour seal                | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys | There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent and any disturbance impacts will be transient in nature. The Strangford Lough SAC is located 50.3km from the Offshore Cable Corridor. Considering this distance and the fact that the survey vessel will be moving away from the SAC as the survey progresses the potential for significant disturbance impacts to the harbour seal feature from this SAC is low. | ✗  |
|                                    |                             |  | On the basis of the information provided above, there is no potential for a LSE on the harbour seal feature of Strangford Lough SAC.  |  |
| Murlough SAC                       | Harbour seal                | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys | There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent and any disturbance impacts will be transient in nature. The Murlough SAC is located 67.4km from the Offshore Cable Corridor. Considering this distance and the fact that the survey vessel will be moving away from the SAC as the survey progresses the potential for significant disturbance impacts to the harbour seal feature from this SAC is low.         | ✗  |
|                                    |                             |  | On the basis of the information provided above, there is no potential for a LSE on the harbour seal feature of Murlough SAC.  |  |
| Inner Hebrides and the Minches SAC | Harbour porpoise            | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys | There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent and any disturbance impacts will be transient in nature. The Inner Hebrides and the Minches SAC is located 95.1km from the Offshore Cable Corridor. Considering this distance and the fact that the survey vessel will  | ✗  |

| European Site             | Relevant Qualifying Feature | Potential Impact  | Justification for Screening Decision   | Potential for an LSE to Occur<br>Yes (✓)<br>No (✗) |
|---------------------------|-----------------------------|---|--|--|
|                           |                             |   | <p>be moving away from the SAC as the survey progresses the potential for significant disturbance impacts to the harbour porpoise feature from this SAC is low.</p> <p>On the basis of the information provided above, there is no potential for a LSE on the harbour porpoise feature of Inner Hebrides and the Minches SAC.</p>  |  |
| Skerries and Causeway SAC | Harbour porpoise            | Injury and disturbance from underwater noise generated during geophysical and geotechnical surveys. | <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury and/or disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent and any disturbance impacts will be transient in nature. The Skerries and Causeway SAC is located 67.4km from the Offshore Cable Corridor. Considering this distance and the fact that the survey vessel will be moving away from the SAC as the survey progresses the potential for significant disturbance impacts to the harbour porpoise feature from this SAC is low.</p> <p>On the basis of the information provided above, there is no potential for a LSE on the harbour porpoise feature of Skerries and Causeway SAC.</p> | ✗  |

### 3.2.2. LSE In-Combination

3.7 For Annex II marine mammals, no potential for LSE was identified for the Development alone (other than for North Channel SAC, which is assessed in Section 4 below), as there is either no pathway to effect, or the Development would result in only negligible or inconsequential effects that would not contribute (even collectively) in a material way to in-combination effect and therefore, no additional in-combination issues are identified.

### 3.2.3. Summary of Determination of LSE For Annex II Marine Mammals

3.8 Table 3-2 presents the determination of the assessment of LSE as a result of the geophysical and geotechnical surveys for the Annex II marine mammal features of the North Channel SAC, The Maidens SAC, Strangford Lough SAC, Murlough SAC, Inner Hebrides and the Minches SAC and Skerries and Causeway SAC. The assessment considers the potential impact of injury and disturbance from underwater noise generated during geophysical and geotechnical surveys and concludes there is a potential for LSE to occur at the North Channel SAC only, and this SAC is therefore assessed further in Section 4.

## 3.3. Assessment of LSE for Ornithological Features

### 3.3.1. Pathways for LSE

3.9 This Section details the potential impact of disturbance and displacement from presence of vessels during geophysical surveys on qualifying ornithological features designated at SPAs within screening distance of the Offshore Cable Corridor (Table 3-3 and Table 3-4). The exact timing of the surveys is yet to be confirmed, therefore both species designated as qualifying features during the breeding

season and species designated as qualifying features during the non-breeding/wintering season were considered for LSE.

- 3.10 During the breeding season, the foraging ranges of each qualifying species from each identified SPA shown in Table 3-3 overlap with the Offshore Cable Corridor, therefore presenting a potential for disturbance and displacement in foraging areas.

**Table 3-3: Pathways for LSE: Potential Impacts on SPA ornithological features (breeding season)**

| European Site                             | Relevant Qualifying Feature | Vulnerability to Disturbance And Displacement | Potential Impact  | Justification For Screening Decision  | Potential For An LSE To Occur<br>Yes (✓)<br>No (✗) |
|---|-----------------------------|---|---|---|--|
| Belfast Lough SPA                         | Arctic tern                 | Low   | Disturbance and displacement from presence of vessels.  | Foraging ranges for all species at each identified SPA overlap with the Offshore Cable Corridor.  | ✗  |
|   | Common tern                 | Low   |   |   | ✗  |
| East Coast (Northern Ireland) Marine pSPA | Arctic tern                 | Low   | Potential for disturbance and displacement in foraging areas during the breeding season, however the impacts are expected to be short term, temporary and limited in extent with no species highly sensitive to vessel movements. | Each of the species foraging range is vast compared to the area over which the species could be impacted. Roseate tern has the smallest foraging range of the relevant qualifying features at 23.2km which means a bird can forage over ~1690 square kilometres (km <sup>2</sup> ). The disturbance or displacement around the vessel as the surveys are undertaken will be minute compared to the area available for foraging. | ✗  |
|   | Common tern                 | Low   |   |   | ✗  |
| Larne Lough SPA                           | Mediterranean gull          | Low   | Moderate  | As no species is considered very highly vulnerable to disturbance and displacement there is no potential for significant impacts from these temporary surveys.  | ✗  |
|   | Sandwich tern               | Moderate                                      |   |   | ✗  |
| Copeland Islands SPA                      | Common tern                 | Low   | Moderate  | As no species is considered very highly vulnerable to disturbance and displacement there is no potential for significant impacts from these temporary surveys.  | ✗  |
|   | Mediterranean gull          | Low   |   |   | ✗  |
|   | Roseate tern                | High  |   |   | ✗  |
| Outer Ards SPA                            | Sandwich tern               | Moderate                                      | Moderate  | As no species is considered very highly vulnerable to disturbance and displacement there is no potential for significant impacts from these temporary surveys.  | ✗  |
|   | Common tern                 | Low   |   |   | ✗  |
| Strangford Lough SPA                      | Arctic tern                 | Low   | Moderate  | As no species is considered very highly vulnerable to disturbance and displacement there is no potential for significant impacts from these temporary surveys.  | ✗  |
|   | Common tern                 | Low   |   |   | ✗  |
| Ailsa SPA                                 | Sandwich tern               | Moderate                                      | Moderate  | As no species is considered very highly vulnerable to disturbance and displacement there is no potential for significant impacts from these temporary surveys.  | ✗  |
|   | Black-legged kittiwake      | Low   |   |   | ✗  |
|   | Common guillemot            | Moderate                                      |   |   | ✗  |
|   | Herring gull                | Low   |   |   | ✗  |
|   | Lesser black-backed gull    | Low   |   |   | ✗  |
|   | Northern gannet             | Low   | Low   | ✗   |  |

- 3.11 For the non-breeding/wintering season, the East Coast (Northern Ireland) Marine pSPA, Belfast Lough Open Water SPA and Belfast Lough SPA (and their non-breeding/wintering qualifying ornithological features) have been screened into the assessment for potential LSE due to their proximity to the Offshore Cable Corridor and the medium-to-high sensitivity of qualifying species to disturbance and displacement by vessels. Disturbance by vessels in the non-breeding season presents potential for increased energetic costs to avoid the source of disturbance while simultaneously causing a loss of energy intake and replenishment through disrupted foraging and roosting (Goodship & Furness 2022).

**Table 3-4: Pathways for LSE: Potential Impacts on SPA ornithological features (non-breeding/wintering season)**

| European Site                             | Relevant Qualifying Feature | Vulnerability to Disturbance and Displacement | Potential Impact                                      | Justification For Screening Decision   | Potential For LSE To Occur<br>Yes (✓)<br>No (✗) |
|---|-----------------------------|---|---|--|---|
| East Coast (Northern Ireland) Marine pSPA | Eider                       | Medium/High                                   | Disturbance and displacement from presence of vessels | Potential for disturbance and displacement within and adjacent to foraging and roosting areas during the non-breeding/wintering season.  | ✓   |
|   | Red-throated diver          | High  |   |  | ✓   |
|   | Great crested grebe         | Medium  |   |  | ✓   |
| Belfast Lough Open Water SPA              | Great crested grebe         | Medium  |   | Impacts are expected to be short term, temporary and limited in extent however species have medium-to-high sensitivity to vessel movements.  | ✓   |
| Belfast Lough SPA                         | Redshank                    | Medium  |   | SPAs are located 0km and 1.56km from the Offshore Cable Corridor, overlapping with disturbance distance and/or connectivity with SPAs, therefore cannot conclude no LSE on qualifying species.   | ✓   |
|   | Great crested grebe         | Medium  |   |  | ✓   |
| Outer Ards SPA                            | Golden plover               | Medium  |   | Potential for disturbance and displacement of foraging and roosting areas during the non-breeding season however the impacts are expected to be short term, temporary and limited in extent.   | ✗   |
|   | Ringed plover               | High  |   |  | ✗   |
|   | Turnstone                   | Low   |   |  | ✗   |
| Strangford Lough SPA                      | Bar-tailed godwit           | Medium  |   | SPAs are located 8.01 to 46.2km from the Offshore Cable Corridor therefore no overlap with disturbance distances of any species.<br><br>No species is considered very highly vulnerable to disturbance and displacement therefore no potential for significant impacts from these temporary surveys. | ✗   |
|   | Black-tailed godwit         | Medium  |   |  | ✗   |
|   | Curlew                      | High  |   |  | ✗   |
|   | Dunlin                      | Medium  |   |  | ✗   |
|   | Eider                       | Medium/High                                   |   |  | ✗   |
|   | Greenshank                  | Medium/High                                   |   |  | ✗   |
|   | Grey plover                 | Medium  |   |  | ✗   |
|   | Goldeneye                   | High  |   |  | ✗   |
|   | Knot                        | Medium  |   |  | ✗   |
|   | Oystercatcher               | Medium  |   |  | ✗   |
|   | Red-breasted merganser      | High  |   |  | ✗   |
|   | Redshank                    | Medium  |   |  | ✗   |
|   | Ringed plover               | High  |   |  | ✗   |
| Turnstone                                 | Low                         |   | ✗   |  |   |
| Inner Clyde Estuary SPA                   | Redshank                    | Medium  |   |  | ✗   |

### 3.3.2. LSE In-Combination

3.12 For ornithological features, no potential for LSE was identified for the Development alone during the breeding season, as there is either no pathway to effect, or the Development would result in only negligible or inconsequential effects that would not contribute (even collectively) in a material way to in-combination effects and therefore, no additional in-combination issues are identified.

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3.13 During the non-breeding/wintering season, potential for LSE was identified for the Development alone. Therefore additional information on any site/feature which is included within the alone assessment will be taken account of during the in-combination assessment as part of the appropriate assessment (Section 4).

### 3.3.3. Summary of determination of LSE for ornithological features

3.14 Table 3-3 and Table 3-4 present the determination of the assessment of LSE as a result of the Development for ornithology features of nine SPAs. The assessment considers the potential impact of disturbance and displacement from presence of vessels and concludes that there is potential for LSE on non-breeding/wintering ornithological features at three SPAs: East Coast (Northern Ireland) Marine pSPA, Belfast Lough pSPA and Belfast Lough SPA. The SPAs and their qualifying features with potential for LSE are taken forward to Appropriate Assessment to determine potential for Adverse Effect on Integrity (AEOI) of the SPAs.



## 4. APPROPRIATE ASSESSMENT

### 4.1. Appropriate Assessment for Ornithological Features

#### 4.1.1. East Coast Marine pSPA

- 4.1 The East Coast Marine pSPA protects marine foraging and roosting areas for red-throated diver, eider and great crested grebe. Due to the direct overlap between the Offshore Cable Corridor and the protected site an LSE could not be ruled out at the screening stage.
- 4.2 The East Coast Marine pSPA supports a non-breeding population of 121 red-throated *diver Gavia stellata* (5-year mean to 2014/15), representing 6% of the all-Ireland wintering population (DAERA 2016). Red-throated diver have high sensitivity to boat disturbance, with boat traffic increasing flight frequency at a mean flight initiation distance (FID) of 1.2km (Goodship & Furness 2022). Red-throated diver are known to travel large escape distances from vessel disturbance, with mean distances of 400 to 750m and maximum distances of 1km to 1.7km (MMO 2023), resulting in high energetic costs arising from long flights to escape disturbance.
- 4.3 The East Coast Marine pSPA supports marine foraging and roosting areas for a non-breeding population of 3,126 eider *Somateria mollissima*, representing >90% of the all-Ireland population (5-year mean to 2014/15). Eider have medium to high sensitivity to boat disturbance, with a mean FID in response to boat traffic of 177m, with potential for displacement up to 1km from vessels (Goodship & Furness 2022). However, it has been reported that most eider flocks displaced by boat traffic return to pre-disturbance behaviour within 10 minutes of disturbance (Denhard *et al.* 2020), with 91.8% of flocks reported returning to pre-disturbance activities within 16.5 minutes (MMO 2018).
- 4.4 The East Coast Marine pSPA has also supports 737 wintering great crested grebe *Podiceps cristatus*, representing 13.4% of the all-Ireland population (5-year mean to 2012/13) (DAERA 2016). Great crested grebe have medium sensitivity to human disturbance (Goodship & Furness, 2019), with mean FID in response to non-motorised watercraft of 90 to 340m, and likely slightly greater FID in response to motorised vessels (Goodship & Furness 2022). Wintering great crested grebe move from inland freshwater breeding sites to coastal inshore waters for foraging and roosting throughout the non-breeding season. The East Coast Marine pSPA protects the coastal wintering sites for great crested grebe wintering off the east coast of NI.
- 4.5 Overall, the presence of survey vessels within the East Coast Marine pSPA has the potential to cause disturbance and displacement to non-breeding red-throated diver, eider and great crested grebe due to spatial overlap and sensitivity of qualifying species to disturbance.
- 4.6 In the context of the conservation objectives of the East Coast Marine pSPA “**to maintain each qualifying feature in favourable condition**” (DAERA 2016), it is not expected that disturbance impacts from the Development will prevent the objectives from being met due to the scale of the surveys proposed. The additional vessel traffic during survey works has the potential to cause disturbance to the qualifying features in the non-breeding season, however the short term and temporary nature of the works is unlikely to cause a significant decrease in the populations of qualifying features relative to national trends. It is likely that birds disturbed and displaced by survey vessels will disperse throughout the extensive 967km<sup>2</sup> pSPA (or to the six adjoining SPAs of which the pSPA supports bird populations) and return to pre-disturbance behaviour after the source of disturbance has passed. The conservation objective to maintain favourable condition of the other qualifying features of the pSPA is not expected to be affected as all other species represent breeding populations and there will be no temporal overlap with surveys.
- 4.7 To conclude, the proposed survey works are not considered to result in AEOI on any qualifying feature of the pSPA from the Development alone.
- 4.8 The likelihood of other surveys occurring within the East Coast Marine pSPA at the same time (i.e. for the same limited number of days) are very low therefore the potential for other geophysical or geotechnical surveys to overlap spatially or temporally with the geophysical and geotechnical surveys is considered highly unlikely.

**4.9 Therefore, it can be concluded that there is no risk of an adverse effect on the integrity of the East Coast Marine pSPA from disturbance and displacement during geophysical and geotechnical surveys alone or in-combination.**

#### **4.1.2. Belfast Lough Open Water SPA**

- 4.10 Belfast Lough Open Water SPA does not overlap with the Offshore Cable Corridor as it passes 0.93km from the SPA boundary at the shortest distance. The SPA is defined as the marine area of the sea lough, surrounded by the Belfast Lough SPA intertidal area and overlapping the East Coast (Northern Ireland) Marine pSPA.
- 4.11 Belfast Lough Open Water SPA supports a wintering population of 1,096 great crested grebe (5-year mean to 2011/12) (DAERA 2015). As stated in Section 4.1.1, great crested grebe have medium sensitivity to human disturbance and have a FID of 90 to 340m. Belfast Lough Open Water SPA is a highly active marine area with continuous vessel traffic including ferries, cargo ships and fishing vessels entering the port of Belfast, therefore great crested grebe using the SPA may already be habituated to vessel disturbance to an extent. The presence of survey vessels in the Offshore Cable Corridor running at a minimum of 0.93km from the SPA will not overlap with great crested grebe at the SPA using known FID. However, the Offshore Cable Corridor and disturbance distance of SPA birds is only separated by 587m, therefore there is potential for overlap where vessels may deviate slightly from the Offshore Cable Corridor and where birds move between Belfast Lough and the Irish Sea.
- 4.12 In the context of the conservation objective of Belfast Lough Open Water SPA “**to maintain each feature in favourable condition**” (unfavourable condition indicated by a decline in numbers below the Common Standards Monitoring (CSM) baseline), this objective was being met at the last condition assessment in 2014 (DAERA 2015).
- 4.13 The population of great crested grebe at Belfast Lough Open Water SPA was in a favourable condition at the last condition assessment in 2014 despite the SPA being a busy route for boat traffic. Therefore, it is not expected that the temporary and short-term presence of additional vessels at the mouth of the sea lough during surveys will impact the population of birds to an extent which would cause a significant decrease in number relative to national trends.
- 4.14 To conclude, the proposed survey works are not considered to result in AEOI on any qualifying feature of the pSPA from the Development alone.
- 4.15 The likelihood of other surveys occurring within the Belfast Lough Open Water SPA at the same time (i.e. for the same limited number of days) are very low therefore the potential for other geophysical or geotechnical surveys to overlap spatially or temporally with the geophysical and geotechnical surveys is considered highly unlikely.
- 4.16 Therefore, it can be concluded that there is no risk of an adverse effect on the integrity of Belfast Lough Open Water SPA from disturbance and displacement during geophysical and geotechnical surveys alone or in-combination.**

#### **4.1.3. Belfast Lough SPA**

- 4.17 Belfast Lough SPA adjoins the East Coast Marine pSPA and despite no overlap with the Offshore Cable Corridor, there is potential for connectivity with and disturbance to the qualifying bird populations supported by Belfast Lough SPA. The SPA spans the intertidal areas surrounding Belfast Lough, complementing the East Coast Marine pSPA and Belfast Lough Open Water SPA which cover the marine area of the sea lough.
- 4.18 Belfast Lough Open Water SPA supports a non-breeding/wintering population of 1,096 great crested grebe (5-year mean to 2011/12) (DAERA, 2015). As stated in Section 4.1.1, great crested grebe have medium sensitivity to human disturbance and have a FID of 90 to 340m. As in Section 4.1.2, the disturbance distance is not expected to overlap with the Offshore Cable Corridor, however the separation distance is only 1.22km. There is, therefore, still potential for disturbance to overlap if survey vessels deviate from the Offshore Cable Corridor and where birds move between Belfast Lough SPA and the Irish Sea.
- 4.19 Belfast Lough SPA also supports a non-breeding/wintering population of 1,297 redshank (5-year mean to 2011/12) (DAERA 2015) which forage and roost in its intertidal areas. Redshank show medium

sensitivity to human disturbance, particularly to construction work, known to reduce densities of birds and foraging activity on adjacent intertidal habitats (Goodship & Furness 2022). Redshank show a maximum FID of 260m to non-motorised watercraft and likely greater FID to motorised watercraft (FID not available). Sensitivity to human disturbance is known to be greater for redshank at roosting sites, such as intertidal flats where the FID to pedestrians walking on intertidal flats is at a maximum of 450m (Goodship & Furness 2022). Using available FID values, it can be assumed that the presence of survey vessels along the Offshore Cable Corridor, which runs 1.56km from the SPA at the shortest distance, likely presents little to no risk of disturbance. Belfast Lough is highly active with continuous vessel traffic, therefore redshank using the SPA may already be habituated to vessel disturbance to an extent. Risk of disturbance to wintering redshank at Belfast Lough SPA is low owing to non-overlapping features with the Offshore Cable Corridor, low disturbance distance and habituation to existing vessel traffic. However, it is possible that vessel activity along the Offshore Cable Corridor at the entrance to Belfast Lough may cause disturbance to and impact movement of redshank between the SPA and other nearby coastal intertidal areas, particularly through the mouth of Belfast Lough.

- 4.20 In the context of the conservation objective of Belfast Lough SPA “**to maintain each feature in favourable condition**” (unfavourable condition indicated by a decline in numbers below the Common Standards Monitoring (CSM) baseline), this objective was not being met for all qualifying features at the last condition assessment in 2014 (DAERA 2015).
- 4.21 The population of great crested grebe was assessed as favourable in the 2014 condition assessment as the five-year mean number of birds is greater than the CSM baseline, therefore the conservation objective of the SPA is currently being achieved for this species.
- 4.22 The most recent five-year mean number of redshank at the SPA reported after the 2014 assessment is 1,297 which represents a shortfall of the CSM baseline of 713 individuals. Despite the condition of the redshank qualifying feature being unfavourable, the SPA site population trend at last assessment was ‘stable’ while the UK population trend was ‘stable-fluctuating’, indicating that there is no significant decrease in the SPA population compared to national trends (DAERA 2015).
- 4.23 It is not expected that the temporary and short-term presence of vessels during the survey period of the Offshore Cable Corridor will cause an impact to the population of great crested grebe or redshank at the SPA, particularly as vessels are already frequent in the area. The presence of survey vessels will also not impact the terrestrial habitat factors supporting the qualifying species populations: habitat extent and roost site locations (DAERA 2015). The presence of survey vessels in the non-breeding season will not have a negative impact on the maintenance of a favourable condition of bird species qualifying in the breeding season as there is no temporal overlap.
- 4.24 To conclude, the proposed survey works are not considered to result in AEOI on any qualifying feature of the pSPA for the Development alone.
- 4.25 The likelihood of other surveys occurring within the Belfast Lough SPA at the same time (i.e. for the same limited number of days) are very low therefore the potential for other geophysical or geotechnical surveys to overlap spatially or temporally with the geophysical and geotechnical surveys is considered highly unlikely.
- 4.26 **Therefore, it can be concluded that there is no risk of an adverse effect on the integrity of Belfast Lough SPA from disturbance and displacement during geophysical and geotechnical surveys alone or in-combination.**

## 4.2. Appropriate Assessment for Marine Mammals

- 4.27 To provide suitable information to inform an Appropriate Assessment, an assessment of the potential effects of the geophysical and geotechnical survey on the Conservation Objectives of SACs with Annex II marine mammal features for which an LSE could not be ruled out in Table 3-2 is required. In Section 3.2, the potential for LSE on the North Channel SAC through which circa 9km of the Offshore Cable Corridor runs (shown in Figure 3-1) could not be ruled out.
- 4.28 The impact for which LSE was considered was the potential for elevated levels of underwater noise during the geophysical and geotechnical survey to lead to injury and disturbance to marine mammals. A detailed assessment of this impact is provided in Table 4-1 with respect to the Conservation Objectives of North Channel SAC. Upon conclusion of the assessment against individual Conservation

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Objectives of the North Channel SAC, an overall conclusion is provided with respect to the potential for an adverse effect on the integrity of the site.

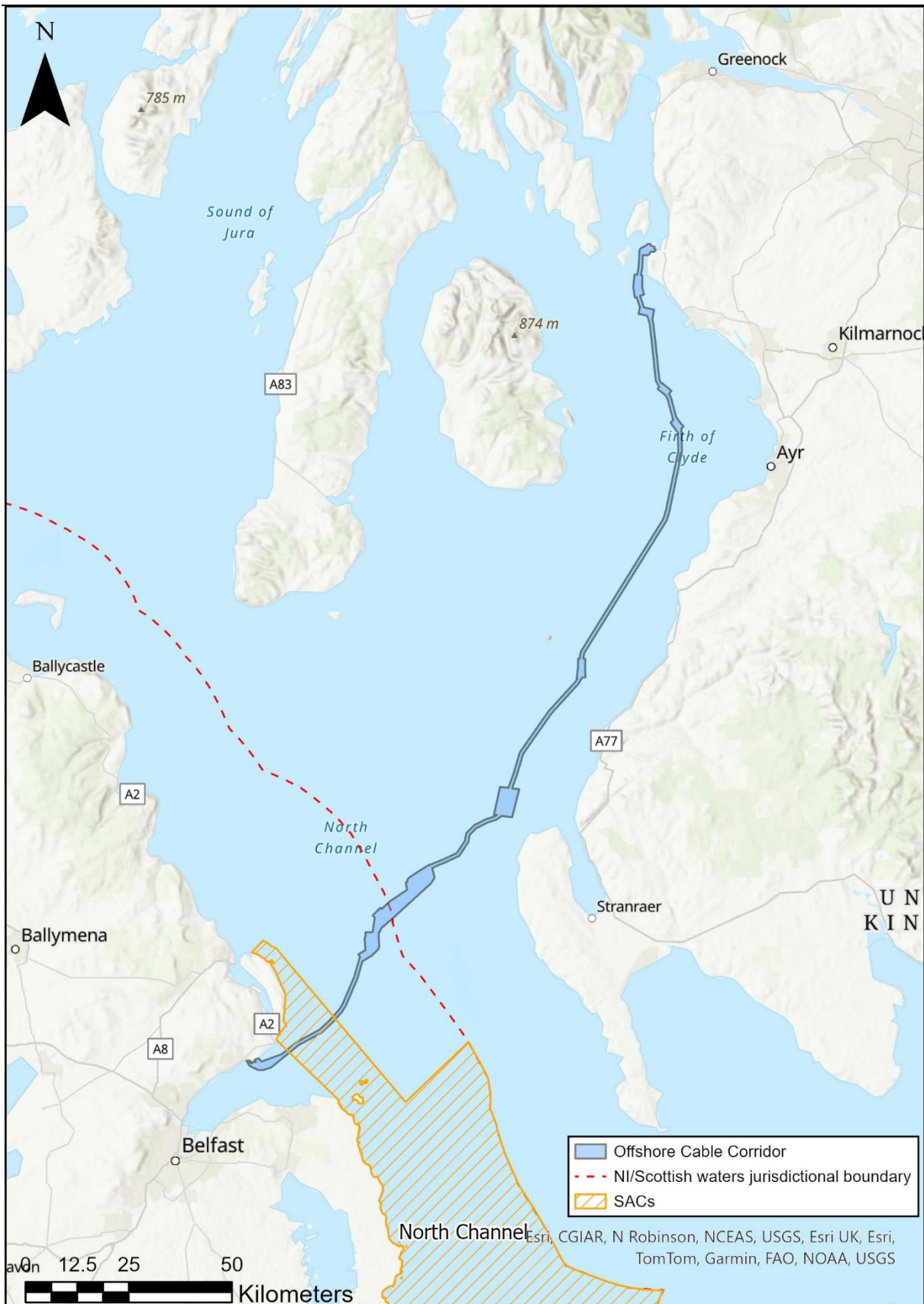


Figure 3-1: Location of the North Channel SAC in relation to the Offshore Cable Corridor

**Table 4-1: Information to inform an appropriate assessment: Harbour Porpoise Qualifying feature associated with North Channel SAC**

| Conservation Objective                                     | Assessment (alone or in combination with other plans and projects)   |
|--|--|
| <p>Harbour porpoise is a viable component of the site.</p> | <p><u>Injury</u></p> <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in injury to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent compared with the wider habitat available.</p> <p>For harbour porpoise features, PTS ranges associated with the geophysical surveys extend to a maximum of 940m from the noise source. PTS is unlikely to occur given that marine mammals are likely to move away from survey vessels prior to surveys commencing (RPS 2023). For geotechnical surveys the maximum range at which PTS could occur is &lt;10m for harbour porpoise features (RPS 2023). Implementation of mitigation (RPS 2023) such as, a 30-minute search by a certified MMO to establish likely absence of marine mammals within a 1000m exclusion zone around the vessel or a 30-minute soft-start, where acoustic output is reduced by at least 10dB and a 30-minute search by a certified MMO to establish likely absence of marine mammals within just 500m will ensure that the risk of inducing PTS is very low. These mitigation measures outlined above are in line with the JNCC (2017) guidance on minimising the risk of injury to marine mammals from geophysical surveys, and if marine mammals were to be present in the area given the slow start procedures in place, it is expected that the animals should have sufficient time to flee from the vessel and effectively vacate the 500m exclusion zone prior to surveys. If in the event PTS were to occur only a very small number of animals would be impacted which would be inconsequential in the context of the wider population.</p> <p>This effect is considered to be negligible in relation to the wider Celtic and Irish Seas MU area and unlikely to affect harbour porpoise as a feature of SACs.</p> <p><u>Disturbance</u></p> <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent compared with the wider habitat available.</p> <p>For harbour porpoise features, TTS may extend 2.9km from the noise source. Behavioural responses associated with geophysical surveys could extent out to a maximum range of 260m from the noise source (RPS 2023). For geotechnical surveys the maximum range at which TTS could occur is 140m. Behavioural responses associated with geotechnical surveys could extent out to a maximum range of 23km from the noise source (RPS 2023). Although behavioural impacts extend to 23km, any disturbance responses would be very short term and highly reversible, with animals returning to the area once surveys have ceased. Noting that the large behavioural response range for marine mammals is based on the 120dB SPL (unweighted) limit. As this source has most energy at lower frequencies, it is unlikely that any group except for the low frequency group can hear the source to this distance, therefore high frequency cetaceans such as harbour porpoise are not expected to elicit a behavioural response to this extent. As mentioned above disturbance over these ranges could lead to avoidance of the ensonified area, causing displacement of harbour porpoise within the disturbance zone. However, Thompson <i>et al.</i> (2013) suggests, harbour porpoises are likely to return to the area quickly following completion of the survey.</p> <p>The EDR approach, as outlined in JNCC (2020), recommends the use of 5km deterrence range for geophysical and geotechnical surveys. The implementation of a 5km EDR for the geophysical and geotechnical surveys could potentially result in a 66.4km<sup>2</sup> overlap with the North Channel SAC. Using this disturbance footprint could result in potential disturbance across an area equating to 4.1% of the total area of the North Channel SAC which, is below the daily 20% guidance threshold from JNCC (2020). In terms of disturbance across the site averaged over the season (winter, 182 days<sup>1</sup>) a daily footprint of 66.4km<sup>2</sup>, over up to 69 days of survey would result in an average of 1.6% of the relevant area of the North</p> |

<sup>1</sup> Winter defined as October to March inclusive

| Conservation Objective  | Assessment (alone or in combination with other plans and projects)  |
|---|---|
|   | <p>Channel SAC being affected over the season<sup>2</sup>. This therefore falls well below the threshold of 10% of the relevant area of the site over the season.</p> <p>Given that the likelihood of PTS is very low, that disturbance impacts associated with these activities will be short term and limited in extent and transient in nature and well within the disturbance thresholds outlined in JNCC (2019), underwater noise generated during geophysical and geotechnical survey will not prevent harbour porpoise from remaining a viable component of the site.</p>  |
| <p><b>There is no significant disturbance of the species.</b></p>   | <p>There is the potential for underwater noise generated during the geophysical and geotechnical surveys, as well as from survey vessels, to result in disturbance to marine mammal species in the vicinity of the Offshore Cable Corridor. However, noise associated with these activities will be short term and limited in extent compared with the wider habitat available.</p> <p>The potential for disturbance impacts to harbour porpoise features of the SAC are outlined above for the 'harbour porpoise is a viable component of the site' conservation objective.</p> <p>Given that disturbance impacts associated with these activities will be short term and limited in extent and transient in nature and well within the disturbance thresholds outlined in JNCC (2019), underwater noise generated during geophysical and geotechnical survey will not result in significant disturbance of the species.</p> |
| <p><b>The condition of supporting habitats and processes, and the availability of prey is maintained.</b></p> | <p>The increase in underwater noise associated with the geophysical and geotechnical survey will not affect the distribution or extent of habitats found within the North Channel SAC as there is no impact pathway which could affect these habitats. Any impacts to fish resulting from the geophysical and geotechnical survey will be limited in spatial scale (with ranges of effect less than 260m from the source) and temporary, with fish expected to return to the area after the completion of the survey. Therefore, underwater noise generated during geophysical and geotechnical survey will not result in the condition of supporting habitats and processes, and the availability of prey is maintained.</p>   |

4.29 As outlined in Table 4-1, with the implementation of mitigation the risk of inducing PTS is very low, and any disturbance impacts associated with these activities will be short term, limited in extent, transient in nature and well within the disturbance thresholds outlined in JNCC (2019). Given the very small length of the Offshore Cable Corridor that overlaps with the North Channel SAC (8.1 km), the survey vessel will only be operating within the North Channel SAC for a very small proportion of the total 69 days of survey. The likelihood of other surveys occurring within the North Channel SAC at the same time (i.e. for the same limited number of days) are very low therefore the potential for other geophysical or geotechnical surveys to overlap spatially or temporally with the geophysical and geotechnical surveys is considered highly unlikely.

**4.30 Therefore, it can be concluded that there is no risk of an adverse effect on the integrity of the North Channel SAC from injury and disturbance from underwater noise generated during geophysical and geotechnical surveys alone or in-combination.**

<sup>2</sup> For example, a daily footprint of 4.1% for 69 days would result in an average of 4.1 x 69/182 days (winter) =1.6%

## 5. SUMMARY

5.1 On the basis of the information provided above in Section 3, there is **no potential** for a LSE to occur to the following European sites and relevant qualifying features for geotechnical or geophysical surveys associated with the Development acting alone or in-combination:

- The Maidens (sandbanks which are slightly covered by seawater, reefs and grey seal);
- Strangford Lough SAC (harbour seal)
- Murlough SAC (harbour seal)
- Inner Hebrides and the Minches SAC (harbour porpoise)
- Skerries and Causeway SAC (harbour porpoise)
- East Coast (Northern Island) Marine (pSPA) (Arctic tern, common tern, Manx shearwater, sandwich tern, eider and red-throated diver);
- Belfast Lough (Arctic tern, common tern, bar-tailed godwit, black-tailed godwit and redshank);
- Ailsa Craig (northern gannet, common guillemot, herring gull, black-legged kittiwake and lesser black-backed gull);
- Larne Lough (common tern, Mediterranean gull, roseate tern and sandwich tern);
- Outer Ards (Arctic tern, golden plover, ringed plover and turnstone);
- Copeland Islands (Arctic tern and Manx shearwater);
- Strangford Lough (Arctic tern, common tern, sandwich tern, bar-tailed godwit, black-tailed godwit, curlew, dunlin, eider, greenshank, grey plover, goldeneye, knot, oystercatcher, red-breasted merganser, redshank, ringed plover and turnstone); and
- Inner Clyde Estuary (redshank).

5.2 On the basis of the information provided in Section 3, there is **is potential** for a LSE to occur to the following European sites and relevant qualifying features:

- North Channel SAC (harbour porpoise);
- East Coast (Northern Ireland) Marine pSPA (red-throated diver, eider, great crested grebe);
- Belfast Lough Open Water SPA (great crested grebe); and
- Belfast Lough SPA (great crested grebe, redshank).

5.3 On the basis of the information provided in the Appropriate Assessment in Section 4, there is **no potential** for AEOL to occur at the following European sites and relevant qualifying features:

- North Channel SAC (harbour porpoise);
- East Coast (Northern Ireland) Marine pSPA (red-throated diver, eider, great crested grebe);
- Belfast Lough Open Water SPA (great crested grebe); and
- Belfast Lough SPA (great crested grebe, redshank).



## 6. REFERENCES

- American National Standards Institute (1986) S12.7-1986 Method for Measurement of Impulsive Noise.
- American National Standards Institute (1995) S3.20-1995 Bioacoustical Terminology.
- American National Standards Institute (2005) S1.13-2005 Measurement of Sound Pressure Levels in Air.
- Dehnhard, N., Skei, J., Christensen-Dalsgaard, S., May, R., Halley, D., Ringsby, T.H. and Lorentsen, S-H. (2020). Boat disturbance effects on moulting common eiders *Somateria mollissima*. Marine Biology, 167(12). <https://doi.org/10.1007/s00227-019-3624-z>
- Department of Agriculture, Environment and Rural Affairs (DAERA). (2015) Belfast Lough Open Water Special Protection Area (SPA) Conservation Objectives 2015. Available online at: <https://www.daera-ni.gov.uk/sites/default/files/publications/doe/belfast-lough-open-water-spa-conservation-objectives-2015.pdf>
- Department of Agriculture, Environment and Rural Affairs (DAERA). (2015) Belfast Lough Special Protection Area (SPA) Conservation Objectives 2015. Available online at: <https://www.daera-ni.gov.uk/sites/default/files/publications/doe/belfast-lough-spa-conservation-objectives-2015.pdf>
- Department of Agriculture, Environment and Rural Affairs (DAERA). (2016) East Coast (Northern Ireland) Marine special protection area citation. East Coast (Northern Ireland) Marine Special Protection Area Consultation. Available online at: [https://www.daera-ni.gov.uk/sites/default/files/consultations/doe/east-coast-%28northern-ireland%29-marine-special-protection-area-citation\\_0.pdf](https://www.daera-ni.gov.uk/sites/default/files/consultations/doe/east-coast-%28northern-ireland%29-marine-special-protection-area-citation_0.pdf)
- Goodship, N. M. and Furness, R. W. (2019) Seaweed hand-harvesting: literature review of disturbance distances and vulnerabilities of marine and coastal birds. Scottish Natural Heritage Research Report No. 1096.
- Goodship, N. M. and Furness, R. W. (MacArthur Green). (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.
- JNCC (2017) JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys. Available at: <https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/jncc-guidelines-seismicsurvey-aug2017-web.pdf> Accessed January 2024.
- JNCC (2019). Harbour Porpoise (*Phocoena phocoena*) Special Area of Conservation: North Channel Conservation Objectives and Advice on Operations (England, Wales & Northern Ireland).
- JNCC (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs (England, Wales & Northern Ireland). JNCC Report No. 654, JNCC, Peterborough, ISSN 0963- 8091.
- JNCC (2023) North Channel MPA. Available at: <https://jncc.gov.uk/our-work/north-channel-mpa/> Accessed January 2024.
- Marine Management Organisation (MMO). (2018). Displacement and habituation of seabirds in response to marine activities. A report produced for the Marine Management Organisation. MMO Project No: 1139. Available online at: [https://assets.publishing.service.gov.uk/media/5b1fae7b40f0b634b469faac/Displacement\\_and\\_habitation\\_of\\_seabirds\\_in\\_response\\_to\\_marine\\_activities.pdf](https://assets.publishing.service.gov.uk/media/5b1fae7b40f0b634b469faac/Displacement_and_habitation_of_seabirds_in_response_to_marine_activities.pdf)
- Marine Management Organisation (MMO). (2023). Stage 4 Fishing Gear MPA Impacts Evidence: Marine Birds. Available online at [https://assets.publishing.service.gov.uk/media/656f23bf0f12ef07a53e0250/Stage\\_4\\_Fishing\\_Gear\\_MPA\\_Impacts\\_Evidence\\_-\\_Marine\\_Birds.pdf](https://assets.publishing.service.gov.uk/media/656f23bf0f12ef07a53e0250/Stage_4_Fishing_Gear_MPA_Impacts_Evidence_-_Marine_Birds.pdf)
- Natural England (2021). Habitats Regulation Assessment (HRA). Available online at: [https://designatedsites.naturalengland.org.uk/pdfs/HRA\\_Process&Component\\_Flowcharts.pdf](https://designatedsites.naturalengland.org.uk/pdfs/HRA_Process&Component_Flowcharts.pdf)
- NIOSH, (1998). Criteria for a recommended standard: occupational noise exposure. DHHS (NIOSH) Publication Number 98-126. Available online at: <https://www.cdc.gov/niosh/docs/98-126/> Accessed January 2024.
- RPS (2023). LirIC Marine Geophysical & Geotechnical Survey; Subsea Noise Technical Report

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Southall, B. L., Finneran, J. J., Reichmuth, C., Nachtigall, P. E., Ketten, D. R., Bowles, A. E., Ellison, W.T., Nowacek, D.P and Tyack, P. L. (2019). Marine mammal noise exposure criteria: updated scientific recommendations for residual hearing effects. *Aquatic Mammals*, 45(2).

Thompson, P. M., Brookes, K. L., Graham, I. M., Barton, T. R., Needham, K., Bradbury, G. and Merchant, N. D. (2013). *Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises*. *Proceedings of the Royal Society B: Biological Sciences*, 280 (1771), pp.20132001.