

BRITISH TELECOMMUNICATIONS PLC

Scottish Isles R100

Technical Appendix C: Protected Sites Assessment Report - Orkney



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GLOSSARY

AA

Appropriate Assessment

BT

British Telecommunications Plc

BTO

British Trust for Ornithology

FEAST

Feature Activity Sensitivity Tool

GIS

Geographical Information System

Global Marine

Global Marine Systems Ltd

HRA

Habitats Regulations Appraisal

INIS

Invasive Non-indigenous Species

Intertek

Intertek Energy & Water Consultancy Services

JNCC

Joint Nature Conservation Committee

KM

Kilometre

LSE

Likely Significant Effect

M

Metre

MarLIN

The Marine Life Information Network

MARPOL

The International Convention for the Prevention of Pollution from Ships

MCAA

Marine and Coastal Access Act

MEA

Marine Environmental Appraisal

MHWS

Mean High Water Springs

MS-LOT

Marine Scotland Licensing Operations Team

MU

Management Unit

NCMPA

Nature Conservation Marine Protected Area

PSA

Protected Sites Assessment

pSPA

Proposed Special Protection Area

ROV

Remotely Operated Vehicle

SAC

Special Area of Conservation

SNCB

Statutory Nature Conservation Body

SPA

Special Protection Area

SSSI

Site of Special Scientific Interest

USBL

Ultra Short Baseline

1. INTRODUCTION

This Protected Sites Assessment report has been prepared for British Telecommunication plc (BT) for the Scottish Isles R100 Project. It supports the Marine Licence applications to Marine Scotland Licensing Operations Team (MS-LOT) for installation of seven submarine telecommunication cables in the Orkney geographical area. Separate Protected Sites Assessment reports have been prepared for the Shetlands and Inner Hebrides geographical areas.

Global Marine Systems Ltd (hereafter referred to as Global Marine) has been sub-contracted by BT to install the cables. Intertek Energy and Water Consultancy Services (Intertek) has been appointed by Global Marine to provide permitting services for the installation project and has prepared this Protected Sites Assessment Report.

1.1 Project Background

BT is proposing to install and operate 16 submarine fibre optic cables to extend superfast broadband (30Mbps+) coverage in three geographical regions: Orkney, Shetlands, and the Inner Hebrides. These new cables will form part of the Scottish Government's 'Reaching 100%' (R100) programme, contracted to BT.

BT propose to install seven fibre optic cables in the Orkney region (See Figure 1-1, Drawing P2308-LOC-001_OR-C).

This Protected Sites Assessment Report covers the marine components of seven cable corridors in the Orkney geographical area. Each cable listed below will have a separate marine licence application supported by the MEA and supporting documents. Each cable marine licence application will be for an application corridor, hereafter referred to as the cable corridor. The cable corridor covers a width of 500m within which the cable route will be installed. A corridor is applied for so that there is scope for refining the cable route following the identification of any environmental and engineering constraints identified as part of the consenting and route engineering process. The PSA has assumed that the cable route could be positioned anywhere within the cable corridor.

The cable corridors extend from mean-high water springs (MHWS) of the first landfall to MHWS at the second landfall. The Cable Corridors are as follows:

- Cable Corridor 2.5 – Eday to Westray
- Cable Corridor 2.6 – Eday to Sanday
- Cable Corridor 2.7 – Sanday to Stronsay
- Cable Corridor 2.9 – Orkney Mainland – Rousay
- Cable Corridor 2.10 – Orkney Mainland – Shapinsay
- Cable Corridor 2.11 – Hoy – Flotta
- Cable Corridor 2.12 – Flotta – South Ronaldsay

This is defined as the Project for Orkney geographical area and comprises:

- The installation of seven separate marine fibre-optic telecommunication cables; and
- All associated works required to install the seven cables.

An additional cable corridor, Cable Corridor 2.3 – Shetland to Sanday, crosses between the Shetland and Orkney geographical areas. As the cable corridor lies predominantly in the Shetland region it has been assessed as part of the Shetland Protected Sites Assessment report (Ref: P2308_R5428_Rev0).

As such, any assessment findings regarding this cable corridor in Orkney waters can be found in the Shetland PSA report.

**SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT**

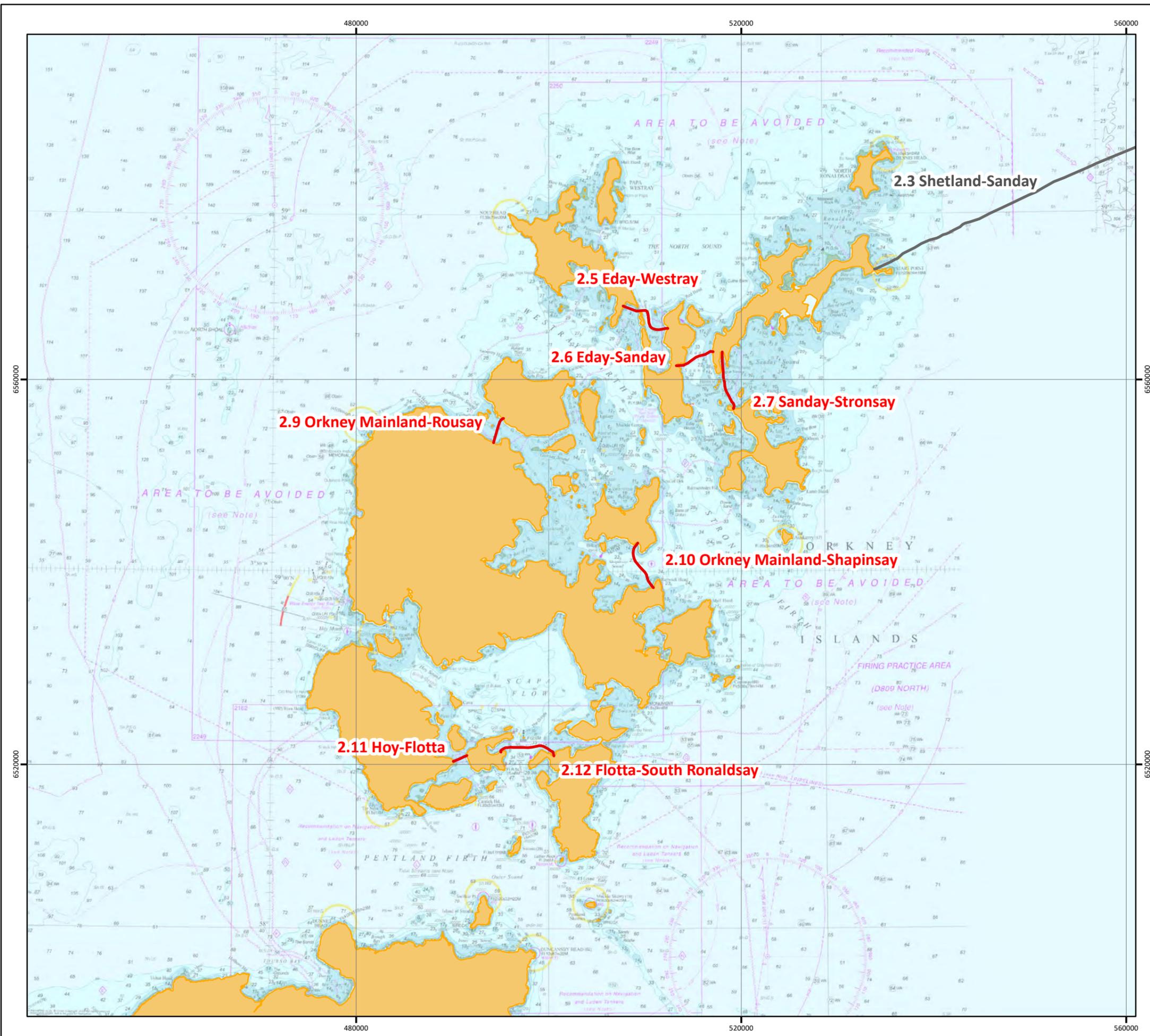
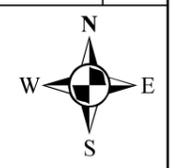
**LOCATION OVERVIEW
Cable Route Centre Lines - Orkney**

Drawing No: P2308-LOC-001_OR

C

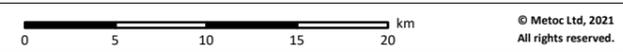
Legend

- Cable Route Centreline
- Not Assessed



NOTE: Not to be used for Navigation

Date	23 August 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ONS; MarineFind; ESRI;
File Reference	J:\P2308\Mxd\01_LOC\ P2308-LOC-001_OR.mxd
Created By	Chris Dawe
Reviewed By	Abigale Nelson
Approved By	Paula Daghish



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1.2 Purpose and Scope of Report

When making a marine licensing decision, MS-LOT is required to consider the impacts of the proposed Project alone and in-combination with other relevant plans or projects on designated sites. To inform this decision-making process the Applicant is required to provide assessments in accordance with specific legislation and guidance.

This report has been prepared to present the findings of a protected sites assessment to include the following components:

- Identification of Relevant Protected Sites (Section 2)
- Habitats Regulations Appraisal (HRA) Stage 1 Screening (Section 3)
- Nature Conservation Marine Protected Area (NCMPA) Assessment
- Sites of Special Scientific Interest (SSSI) Assessment (Section 4)
- HRA Stage 2 Information to Inform Appropriate Assessment (Section 5)

The assessments determine whether the Project, either alone or in-combination with other plans or projects, is likely to have a significant effect on any European sites, hinder the conservation objectives of any NCMPA and/or effect the integrity of any SSSIs. The assessment approach and methodology are provided in Annex 1.

The protected sites included in this report are:

- **European sites** - A collective term for Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites, including any sites which have not been formerly designated such as proposed Special Protection Areas (pSPA).
- **NCMPAs**
- **SSSIs**

This report has been prepared in accordance with the following guidance:

- Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2018).
- The Planning Inspectorate Advice note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2017).
- Habitats Regulations Appraisal of Plans – Guidance for Plan-Making Bodies (Tyldesley, 2015).
- The European Commission Guidance - Article 6 of the Habitats Directive – “Rulings of the European Court of Justice. Final Draft”, September 2014 (EC, 2014).
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (EC, 2007).
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC, 2002).

The assessment approach and methodology are provided in Annex 1.

1.3 Consultation

Table 1-1 summarises the relevant consultation undertaken to date for R100, received prior to and during preparation of the Protected Sites Assessment, which is considered in this report.

Table 1-1 Consultation responses

Stakeholder	Comment
NatureScot	<p>Introductory meeting to the project (22/3/2021). Confirmation from NatureScot that they would recommend submission of an initial screening prior to undertaking any applicable Stage 2 AA and prior to submitting the applications. This is to ensure sites selected are agreed and the appropriate level of data has been used to inform assessments.</p>
NatureScot	<p>17/06/2021 Meeting to discuss methods for Protected Sites Assessments (PSAs) including the selection of relevant protected sites for inclusion in the PSAs; mitigation and designated seal haul out sites.</p> <p>NatureScot thought the approach to selecting relevant sites could be over precautionary and recommended the following:</p> <p>Relevant Protected Sites Selection</p> <ul style="list-style-type: none"> ▪ Cetaceans use Management Unit (MU). ▪ Grey seal 100km search distance. ▪ Harbour seals 50km search distance. ▪ Birds – focus to be on nearby breeding colony SPAs and marine SPAs the cable corridors are either close by to or go through. Sites within 10km is sufficient without searching further afield. ▪ SSSIs at landfalls can use terrestrial guidance, no need to include sites to 10km. <p>Mitigation (timing restrictions, avoidance of peak periods)</p> <ul style="list-style-type: none"> ▪ Consider operational timings where possible – some species will only be sensitive at certain times. ▪ If going through or close to colony or marine SPAs then timing of works important. Appropriate mitigation would be to conduct works prior to the breeding season, because when birds are travelling back and forth with prey items for their chicks they are most sensitive. ▪ Advised for Orkney and Shetland if cable installation corridor within a SAC for harbour seal avoid breeding and moulting periods. <p>Seal Haul-out Sites</p> <ul style="list-style-type: none"> ▪ NatureScot advised Seal haul outs can be included in the MEA. <p>Other Discussion Points</p> <ul style="list-style-type: none"> ▪ The Fair Isle Demonstration and Research MPA (DRMPA) can go in the MEA. The MEA should consider the objectives for the site and assess whether the planned cable installation works will overlap with any planned research and management programs.
NatureScot	<p>13/07/2021 Meeting – follow up on discussion points from the previous meeting. Intertek presented a revised list of relevant protected sites which was sent separately to NatureScot for review. NS confirmed their agreement with this list by email on 04/08/2021.</p> <p>Screening tables were sent to NatureScot to review on 11/08/2021</p> <p>NS advised that once assessments have been undertaken and the key seasonal sensitivities are understood they are willing to support the Applicant in agreeing appropriate seasonal restrictions (where necessary) that are cognisant of the requirements of the installation programme.</p>
NatureScot	<p>14/09/2021 Meeting – to present key findings of the protected sites assessments and the benthic surveys conducted for four of the cable corridors. Key points discussed:</p> <ul style="list-style-type: none"> ▪ NS advised they had reviewed the PSA screening tables and thought the assessments seemed reasonable. ▪ Protected sites assessments for the Orkney geographical area identified potential requirement for mitigation/seasonal restrictions for seal, common eider (moulting) and red-throated diver (breeding). ▪ NS advised the 900m distance for disturbance to seals hauled out on land Intertek has applied could be over precautionary and 500m could be used. ▪ The cable corridor of Cable Corridor 2.9 which is 0.87km from Eynhallow SSSI (designated for seals) is therefore outside the 500m disturbance distance for seals hauled out on land, however there is a designated seal haul out site which overlaps

Stakeholder	Comment
	<p>the cable corridor for a short distance. NS advised cable installation works at the landing point during the seal pupping season (June and July) should be avoided.</p> <ul style="list-style-type: none"> ▪ NS advised that any disturbance to eider (moulting) and red-throated diver (breeding) wouldn't be significant as the vessels will be so slow moving and the works very short-term. ▪ NS advised that nesting birds are most vulnerable at the beginning of the breeding season when they are first settling in their nests. Therefore, installation works close to any nest sites should be programmed for later in the breeding season if the entire breeding season cannot be avoided.
NatureScot	<p>22/09/2021 Meeting – follow up on discussion points from previous meeting NS provided the following advice:</p> <ul style="list-style-type: none"> ▪ The 500m buffer for visual disturbance of seals onshore, can definitely be applied instead of 900m. This 500m buffer for seals is based on common sense, it is not in legislation but is NatureScot's advisory guidance. ▪ Where the works may be within the 500m disturbance distance, they should avoid seal pupping period in June/July. ▪ It might be useful to include in the method statement the use of screens/barriers around onshore works to prevent visual disturbance. ▪ For the landing point on Rousay (cable corridor 2.9) NS think the seals will mostly be further to the West of the landing site and possibly out of sight of any works judging from the topography of the coastline. However, this would depend on the length of the works, type of machinery used and number of people working at the site – if heavy machinery is needed or length of works is beyond a few days or seals are present close to the site and within view of the works, then barriers maybe a good mitigation to avoid visual disturbance. ▪ Common eider (moulting) should not be significantly affected if vessels go slowly so they have time to move away. As they can't fly during the moulting period, they would need more time to move away. ▪ Red-throated diver (breeding) should not be significantly affected unless the works are close to nest sites. ▪ The Scottish marine wildlife watching code provides guidance on appropriate speeds for vessel movements.

1.4 Project Assumptions and Footprints

1.4.1 Assumptions

To determine the likely significant effect (LSE) of a project activity on Interest Features of protected sites, key information and assumptions from the project description have been used. These are summarised in Table 1-2 for ease of reference. The Project will typically involve one main installation lay vessel and one ancillary support vessel. Installation will take up to 20 days per cable corridor, except for Cable Corridor 2.9 which may take longer (up to 30 days) due to shallow water depths and more time required for diver and ROV pre-installation survey. This broadly reflects all activities associated with the cable route, vessel activity will be for a shorter duration within this period (approximately 6 days). These durations include contingency and may be less in practice. A full Project Description is included in the R100 Marine Environmental Appraisal (MEA), Chapter 2 (Document Reference: P2308-R5391_Rev0 MEA Chapter 2).

Table 1-2 Project assumptions and footprints

Project Activity	Description / Assumption	Footprint
Vessel positioning	The cable lay will be performed by an installation vessel with a dynamic positioning system. Anchors are unlikely to be used due to current speeds, however where divers are deployed, anchors from support vessels may be a requirement for safety reasons. The anchor will be within the cable corridor.	Within Cable corridor
Cable Installation (burial)	Cable trench will be up to 0.5m wide.	0.5m wide
	Excavation tools have the following seabed footprints: Plough 2.6m wide (plough share 0.5m and plough skids 1.05m each side) Jetting ROV 1m wide (2 x 0.5m wide tracks)	Worst case scenario 2.6m wide
	Coarse sediments deposition – probable fate is to settle back in the very near field (~100m) (Gooding et al 2012)	Within 100m
	Fine grained sediment deposition may travel farther afield (within 1-2km of the Cable Corridor) (Gooding et al 2012)	Within 2km
	Impulsive sound (USBL positioning system for ROV)	1.1km radii
External cable protection	Crossings – There are no engineered crossings within the Orkney geographical region.	N/A
Stabilisation	Where the cable is surface laid and metocean conditions are such that stabilisation of the cable is required, rock bags may be placed on the surface laid cable every 50m, as required.	

1.4.2 Overview of installation methods and footprints per Cable Corridor

This section provides a summary of key information regarding installation techniques (burial, surface laid or a combination of the two) and temporary and permanent footprints for each proposed Cable Corridor.

To determine the temporary and permanent impacts to the seabed from cable installation activities and external cable protection for each cable corridor, information has been taken from the project description and summarised in Table 1-3. Where applicable, estimated overall footprint areas have been used to assess what percentage of a protected site will be affected.

Table 1-3 Summary of installation methods and footprints per licence application

Cable Corridor	PLGR / RC Note 1	Installation method Note 2					Contingency measures (worst case deposits)			
		Approximate footprint of installation (width of tool x length of installation)					Boulder relocation Note 7	No. Rock Bags Note 8 3m diameter = 7m ² per rock bag (8T bag)	No. Concrete Mattress Note 9 6m x 3m = 18m ² per mattress	Bentonite Cement (m ³) Note 10 (0.3m x 0.5m) x length of rock
Surface lay Note 3	Plough Note 4 2.6m wide x length of cable corridor (worst case)	Trenching 2m deep x width of excavator bucket (assumed to be 2m)	Rock cutting Note 5 (50m Length x 0.5 burial x 0.3 width)	ROV Note 6						
Cable 2.5 – Eday to Westray	✓	✓	0.017km ²	✓	✓	✓	25 bags 175m ²	3 mattresses 54m ²	<7.5m ³	
Cable 2.6 – Eday to Sanday	✓	✓	0.01km ²	✓	✓	✓	25 bags 175m ²	3 mattresses 54m ²	<7.5m ³	
Cable 2.7 – Sanday to Stronsay	✓	✓	0.017km ²	✓		✓	40 bags 280m ²	3 mattresses 54m ²		
Cable 2.9 – Orkney mainland to Rousay	✓	✓	0km ²	✓		✓	52 bags 364m ²	3 mattresses 54m ²		
Cable 2.10 – Orkney mainland to Shapinsay	✓	✓	0.014km ²	✓		✓	18 bags 126m ²	3 mattresses 54m ²		
Cable 2.11 – Hoy to Flotta	✓	✓	0.004km ²	✓		✓	10 bags 70m ²	3 mattresses 54m ²		
Cable 2.12 – Flotta to South Ronaldsay	✓	✓	0.017km ²	✓		✓	10 bags 70m ²	3 mattresses 54m ²		

Definitions of installation activities are given in the project description (Document Reference: P2308-R5391_Rev0 MEA_Chapter 2)

1.5 Data Sources

The following data sources, listed in Table 1-4, have been used to inform the Protected Sites Assessment.

Table 1-4 Data Sources

Receptor	Sources
Birds	<ul style="list-style-type: none"> ▪ Joint Nature Conservation Committee (JNCC) website (https://jncc.gov.uk) ▪ NatureScot website (https://www.nature.scot) ▪ The Royal Society for the Protection of Birds (RSPB) website (https://www.rspb.org.uk) ▪ Scottish Wildlife Trust website (https://scottishwildlifetrust.org.uk/) ▪ Wetland Bird Survey (WeBS) Core Count Data (BTO, 2021) ▪ BTO report 724: Desk-based revision of seabird foraging ranges used for HRA screening (Woodward <i>et al.</i>, 2019) ▪ JNCC Interim Displacement Advice Note (Joint SNCB, 2017) ▪ JNCC Report No. 567 An assessment of numbers of wintering divers, seaduck and grebes in inshore marine areas of Scotland (Lawson <i>et al.</i>, 2015) ▪ JNCC Report No. 541 Identification of important marine areas in the UK for red-throated divers (<i>Gavia stellata</i>) during the breeding season (Black <i>et al.</i>, 2015) ▪ Population Trends of Breeding Seabird Colonies in Scottish SPAs (The Scottish Government, 2012)
Mammals and Marine Mammals	<ul style="list-style-type: none"> ▪ Otter survey reports (Aquatera, 2021) ▪ Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III (Hammond <i>et al.</i> 2017) ▪ Atlas of Cetacean distribution in north-west European waters (Reid <i>et al.</i>, 2003) ▪ Sea Watch Foundation sightings data (Sea Watch Foundation, 2020) ▪ Marine Scotland NMPI tool (Marine Scotland 2020) ▪ Updated seal usage maps: The Estimated at-sea Distribution of Grey and Harbour Seals (Russel <i>et al.</i> 2017) ▪ Seal haul out sites (Marine Scotland, 2020 and DAERA, 2020)
In-Combination Effects	<ul style="list-style-type: none"> ▪ Marine Scotland Marine Licence Application Public Register (Marine Scotland 2020a) ▪ Marine Scotland (2020b) National Marine Plan interactive (NMPI) (Marine Scotland, 2020b) ▪ Department of Agriculture, Environment and Rural Affairs Marine Licensing Public Register (DAERA, 2020a) ▪ DAERA Northern Ireland Marine Mapviewer (DAERA, 2020b) ▪ Sea Fish Industry Authority (SEAFISH) Kingfisher Information Service

2. IDENTIFICATION OF RELEVANT PROTECTED SITES

2.1 Identification of Relevant Protected Sites

The potential for a protected site to be significantly affected depends on whether receptors which are designating features of a protected site:

- a. Can come into contact with the Project; and
- b. Are sensitive to the installation activities to the extent that the activity is likely to have an adverse effect on the conservation objectives for the features (for European sites or NCMPAs) or effect the integrity of a SSSI.

The HRA and NCMPA Assessment processes require that all European sites and NCMPAs in and around the proposed Project should be identified. In the absence of a stipulated search area, identification of relevant European sites has been achieved by applying the following steps:

1. Identify which receptors could be sensitive to the installation activities (Section 2.1.1);
2. Identify the potential pressures the proposed installation activities could have on these receptors and what the zone of influence for these receptors is, i.e. the spatial extent over which effects could extend (Section 2.1.2, Table 2-1);
3. Using the zones of influence as a guide, define a search area within which protected sites are identified to determine if the relevant receptor is a designated feature of the site (Section 2.1.2, Table 2-1);
4. Screen protected sites within the defined search areas to assess whether a pathway for effect (pressure-receptor pathway) exists between the interest features of the protected sites and the pressures exerted by the Project.

Under the Nature Conservation (Scotland) Act 2004, the local planning authority, all landowners and occupiers, and the Secretary of State must be provided with notification of any activities or works within or adjacent to a SSSI. Therefore, any SSSI within or adjacent to a proposed cable corridor has been identified as a relevant protected site for assessment in the SSSI assessment (Section 4).

Where a European site has been identified as a relevant protected site and it is also designated as a SSSI, the site has been assessed in the HRA only and has not been repeated in the SSSI assessment.

2.1.1 Identification of sensitive receptors

The receptors which could potentially be affected by the Project and could be the designating interest features of protected sites are:

- Intertidal and benthic habitats;
- Fish (including basking shark);
- Birds;
- Marine mammals (cetaceans and pinnipeds); and
- Otter

A geographical information system (GIS) was used to map the boundaries of protected sites in relation to the Project. Since the geographical scope of the Project is within the marine environment (below MHWS), protected sites with either a marine component or marine features (features which occur

within or utilise the marine environment) have been included in the assessments. In addition to this, protected sites at the landfalls which may be defined as terrestrial and whose features may interact with the Project activities have been included in the assessments (see Figure 2-1).

2.1.2 Defining a search area (identification of potential pressures and zone of influence)

The JNCC pressure list 2021, which is based on the OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) pressure list and descriptions (OSPAR Commission 2011) has been used to describe the potential pressures expected from the proposed installation activities. Listed in Table 2-1, these potential pressures may be direct or indirect, temporary, or permanent, beneficial, or harmful to the protected site, or a combination of these.

Table 2-2 identifies the pressures that have been scoped out of the protected sites assessment and the reason for the exclusion. These pressures will not be discussed further.

The zone of influence – the predicted spatial extent over which effects may extend – has also been defined. The zone of influence has been used to establish a search area within which protected sites are screened for a relevant qualifying interest feature. Since mobile species from protected sites further afield may travel into the zone of influence, the zone of influence cannot be used alone as a distance to screen in relevant protected sites. Therefore, search areas (distances from the Project) for each receptor group have been applied taking into consideration other information such as marine mammal management units, bird foraging distances and expert judgement. Justification for the spatial extent of the search area is provided in Table 2-1.

**SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT**
PROTECTED SITES
Relevant Protected Sites
Orkney

Drawing No: P2308-PROT-005_OR

A

Legend

 Cable Route Application Corridor

Environmental Designation

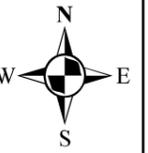
 SAC

 SPA

 pSPA

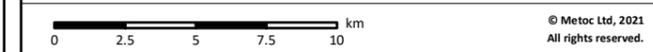
 Ramsar

 SSSI



NOTE: Not to be used for Navigation

Date	22 September 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; OSOD; SNH
File Reference	J:\P2308\Mxd\02_PROT\ P2308-PROT-005_OR.mxd
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Table 2-1 Potential pressures, zones of influence and protected site search area

Receptor	Potential Pressure	Project Activity	Zone of influence	Search Area and Justification
Habitats	Siltation rate changes, including smothering (depth of vertical sediment overburden)	Cable burial	Coarse grained sediment 100m (Gooding et al 2012)	Application area Effects on the habitat because of the installation activities may occur along the entire cable corridor of each cable.
	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Seabed preparation Cable burial	Within footprint of installation tools Installation Plough (skids + share) 2.6m wide (disturbance) Plough share width 0.5m x 1m deep (penetration)	
		Anchor placement	Within direct footprint of anchors - Immediate area of anchor placement within the application area	
	Abrasion/disturbance of the substrate on the surface of the seabed	Anchor placement Surface laid cable	Area where anchor chains drag on the seabed Footprint of surface laid cable	
	Change to another seabed type	Placement of rock bags for stabilisation of surface laid cable	Within footprint of rock bags (a rock bag may be placed every 50m along a section of surface laid cable)	
Fish	Collision below water with static or moving objects not naturally found in the marine environment (e.g. boats, machinery, and structures)	Presence of installation vessel	Specifically relating to basking shark, which are known to spend significant time at the surface and are more vulnerable to collision. Within path of the cable installation vessel	Application corridor
Birds	Visual and above water noise disturbance	Presence of installation vessel Cable burial	Radial distances from application corridor <ul style="list-style-type: none"> ▪ 10km Red-throated diver (pers coms Alex Robbins, Nature Scot, 13/07/2021) ▪ 4 km divers and sea ducks (JNCC 2017) ▪ 2 km all other seabird species (JNCC 2017) 	10km It is recognised that some seabirds from other SPAs will forage and loaf in the zone of influence. However, disturbance will be limited in extent and duration and there is sufficient space in the surrounding environment for birds to temporarily relocate. Therefore, only sites within 10km of the Project have been screened for qualifying bird features.

Receptor		Potential Pressure	Project Activity	Zone of influence	Search Area and Justification
		Changes to supporting habitat and prey availability	Cable burial	Installation Plough (skids + share) 2.6m wide (disturbance)	Application area Effects on the habitat because of the installation activities may occur along the entire cable corridor of each cable.
Cetacean and pinniped		Changes to underwater noise (impulsive sound)	Impulsive sound from use of an Ultra Short Baseline (USBL) positioning system for positioning the ROV during post cable lay inspection	Disturbance distance 1.1km radius (worst-case disturbance radius from USBL)	Management Unit In recognition of the highly mobile nature of cetaceans the relevant species management unit will define the search area.
Cetacean		Changes to supporting habitat and prey availability	Cable burial	Installation Plough (skids + share) 2.6m wide (disturbance)	Management Unit Effects on habitat as a result of the installation activities may occur along the entire cable corridor of each cable.
Pinniped	Grey seal	Visual (and above water noise) disturbance	Presence of installation vessel	500 m radius (pers comms – NatureScot 2021)	100 km: While the zone of influence for visual (and above water noise) disturbance of seals has been found to be 500m, grey seals have been found to forage up to 100km from their haul-out sites (Cunningham <i>et al.</i> , 2009; SMRU, 2017).
	Harbour seal				
	All	Changes in supporting habitat and prey availability	Cable burial	Installation Plough (skids + share) 2.6 m wide (disturbance)	Application area Effects on the habitat as a result of the installation activities may occur along the entire cable corridor of each cable.

Table 2-2 Pressures scoped out and reason for exclusion

Pressure scoped out	Receptor	Reason for Exclusion
Accidental hydrocarbon and PAH contamination	All receptors	<p>Unplanned events (accidental oil or chemical spills) have been scoped out of the protected sites assessment for the following reasons: The likelihood of a large oil spill occurring from a Project vessel is extremely low and the risk is no greater than that for any other vessel in the region.</p> <p>It is illegal under the Regulation 26 of Annex I of MARPOL for vessels to pollute the marine environment. To ensure compliance with statute all vessels must have control measures and an approved shipboard oil pollution emergency plans SOPEP in place. Legal compliance ensures that there are no significant effects on a protected site.</p>
Siltation rate changes including smothering (depth of vertical sediment overburden)	Habitat	Far field effects have not been considered as deposition thicknesses are minimal and not sufficient to cause smothering past 100m (Goodall et al., 2012).
Water flow (tidal current) changes including sediment transport considerations.	Habitat	The footprint of any placed cable protection will be limited to that required to ensure cable stability on the seabed. The cable protection can cause localised scour in sedimentary environments; however, it will be limited in extent. No change to water flow (tidal current) is expected.
Introduction or spread of invasive non-indigenous species (INIS)	Habitat	The introduction of INIS (e.g. through discharge of ballast water from Project vessels) will be managed under the International Convention for the Control and Management of Ship's Ballast Water and Sediments. It is illegal under the IMO Ballast Water Management Convention for vessels to pollute the marine environment. To ensure compliance with statute all vessels must have control measures and an approved Shipboard Oil Pollution Emergency Plan in place. Legal compliance ensures that there are no significant effects on a protected site.
Visual (and above water noise) disturbance	Fish	During cable installation, the presence of the installation vessels and equipment (and associated noise) could result in the visual (and above water noise) disturbance of fish within the vicinity of operations, with some displacement of fish within the water column. However, the disturbance from installation operations will be temporary, localised, and given existing background levels of noise and shipping in Scottish waters, fish are likely to be habituated to such disturbance. Therefore, no significant effects will occur.
Siltation rate changes including smothering (depth of vertical sediment overburden)	Fish	There are three pathways for species to be smothered as a result of Project activities: by displaced sediments during trenching; by the re-deposition of suspended sediment; and by external cable protection material being placed on the seabed (which is being considered as a contingency). The effect from displaced sediment will be very localised, only affecting species in the immediate vicinity of cable installation. Suspended sediment settlement levels will be minimal with any material deposited quickly re-suspended and distributed by natural hydrodynamic processes. Therefore, no significant effect will occur.
Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures)	Marine mammals	Due to the limited spatial and temporal extent and slow speed (the majority of cable installation operations will be 1knot (2km/hour) or less; approximately 1 knot (2km/hour) for surface lay and 0.3 knots (0.6km/hour) for plough installation, with potential for a small amount of time up to 6 knots (11km/hour) for vessel movement within the cable corridor when not laying the cable) of installation vessels, marine mammals within the application corridor, within the Project Area, this pressure has been scoped out of the Protected Sites Assessment.

Pressure scoped out	Receptor	Reason for Exclusion
Underwater noise changes (continuous and impulsive sound)	Fish	<p>Data sources available (Popper et al. 2014 and OSPAR Commission 2012) consider that the potential for likely significant effects to fish from cable installation activities is low. Many species of fish lack the specialisations for receiving sound, therefore no effects to these groups of fish are anticipated.</p> <p>Potential effects are limited to fish with hearing specialties. To sustain an injury fish would need to be within close proximity of the vessel for 24 hours, which is extremely unlikely based on the migratory and predatory nature of these specialised species. Therefore, the effect of underwater noise changes to fish will not have a significant effect.</p>
Underwater noise changes (continuous sound)	Marine mammals	<p>Shipping and fishing activity are common across the Project area. Vessels transit the area routinely, generating relatively high levels of noise. As a result, marine mammal populations in the Project area are habituated to continuous noise of the type generated during cable installation activity.</p> <p>Cable installation does not constitute a change from baseline vessel densities in the area. Therefore, the effect of underwater noise changes from cable installation will not have a significant effect.</p>

2.2 Relevant Protected Sites

The initial examination of protected sites and the Project activities identified 15 relevant protected sites where a possible pressure-receptor pathway exists within the Orkney geographical region. Of these, 13 were European Sites and two were SSSIs.

European sites to be considered in the HRA Screening include:

- Faray and Holm of Faray SAC
- Sanday SAC
- Calf of Eday SPA and SSSI
- Copinsay SPA
- East Sanday Coast SPA, Ramsar and SSSI
- Hoy SPA and SSSI
- Orkney Mainland Moors SPA
- Pentland Firth Islands SPA and SSSI
- Rousay SPA and SSSI
- Switha SPA and SSSI
- West Westray SPA and SSSI
- North Orkney pSPA
- Scapa Flow pSPA

Protected sites to be considered in the SSSI Assessment include:

- Doomy and Whitemaw Hill SSSI
- Eynhallow SSSI

2.2.1 Sites and pressures excluded from further assessment

Two NCMPAs were identified within the search distance, Papa Westray NCMPA and Wyre and Rousay Sounds NCMPA. However, no potential interaction between the features of these sites and installation activities were identified. Therefore, these sites will not be considered further and a NCMPA assessment has not been included in this Protected Sites Assessment.

3. HRA STAGE 1 SCREENING

3.1 Screening Approach

3.1.1 Approach to Screening for Appropriate Assessment (AA)

One or more of the Orkney region proposed Cable Corridors is located within or adjacent to a European site, therefore there exists the potential for the Project to have a significant effect on a European site. As such the proposed Project must be screened to determine if Appropriate Assessment (AA) is required.

Screening for AA has been undertaken by applying the following steps:

1. Compile information on the qualifying interest features and conservation objectives of the identified relevant European sites.
2. Consider the Project activities and the changes that they may cause that may be relevant to the European sites.
3. Identify if any elements of the Project are likely to have a significant effect on any of the qualifying interest features, alone or in-combination with other projects and plans, directly or indirectly.
4. Provide a screening statement with conclusions. If significant effects are likely or uncertain, proceed to AA.

Although the process is laid out as sequential steps, in practice steps 2 and 3 have been undertaken concurrently.

All current case law relevant to the Habitats Directive has been applied. The European Court of Justice ruling CJEU C-323/17 (People Over Wind and Peter Sweetman vs Coillte Teoranta) has clarified that mitigation measures should not be applied during Screening for AA.

No mitigation has been considered during the screening process.

All European sites have been mapped in GIS, with distances to cable corridors measured from the edge of the cable corridor to the edge of the European site at the closest point assessed in this report. Only marine European sites, and European sites containing marine features have been included.

Screening conclusions have been determined based on the following criteria for 'screened in' and 'screened out':

- Screened in: A pathway between the Project and the interest feature can be identified that is likely to result in an effect, or a pathway between the activities and the interest features can be identified but it is uncertain whether or not a significant effect is likely.
- Screened out: Either a pathway between the project and the qualifying interest features cannot be identified or a pathway exists but there is no physical overlap of the pressure and the interest feature, or because any potential effects would be insignificant, being so restricted or remote from the site that they would not undermine the conservation objectives for the conservation site.

Screened out sites have not been assessed further; all screened in sites have been taken forward for further assessment in the Stage 2 Information to Inform AA (Section 5).

3.1.2 Approach to Screening the Project in-combination with other plans or projects

The Conservation (Natural Habitats, &c.) Regulations 1994 (CHSR) (as amended) requires that any plans or projects likely to have a significant effect either individually or in combination with other plans or projects, shall be subject to AA of its implications for the site in view of the site's conservation objectives.

Only plans or projects that would increase the likelihood of significant effects on a European site should be considered. Where the proposed Project could result in a likely significant effect it will automatically be taken forward to Stage 2 (AA) and therefore there is no need to assess during the screening stage if in-combination effects are possible.

Where the proposed Project has no likely significant effects, in-combination effects assessment is not required since the proposed Project is not contributing to an effect. It is only where the proposed Project could result in a minor effect on a European site that in-combination effects with other plans or projects should be assessed to determine whether together with other plans or projects the Project could result in a significant effect.

3.2 Screening Relevant European Sites for AA

Table 3-1 presents the results of the screening of the identified relevant European sites for AA. The distances have been measured from the closest point on the European site to the cable corridor for each proposed cable corridor. The cable corridor covers a width of 500m within which the cable route will be installed. A corridor is applied for so that there is scope for refining the cable route following the identification of any environmental and engineering constraints identified as part of the consenting and route engineering process.

Table 3-1 Screening relevant European sites for AA

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision	
Faray and Holm of Faray SAC and SSSI (UK0017096)	Annex II species that are a primary reason for selection of this site: <ul style="list-style-type: none"> Grey seal (<i>Halichoerus grypus</i>) 	Cable 2.5	0.0	Visual (and above water noise) disturbance	Screened in for further assessment as seals can be disturbed at haul-out sites at a distance of 500m or less (pers comms – NatureScot 2021). Potential for LSE, AA is required.	SCREENED IN	
		Cable 2.6	2.6			Seals typically can be disturbed at haul-out sites at a distance of 500m or less (pers comms – NatureScot 2021). As such, installation activities for these Cable Corridors will not lead to visual and above water noise disturbance of grey seal. No LSE, AA is not required.	SCREENED OUT
		Cable 2.7	6.8				
		Cable 2.9	15.4				
		Cable 2.10	19.0				
		Cable 2.12	41.2				
		Cable 2.11	44.5				
		Cable 2.5	0.0	Underwater noise changes	Screened in for further assessment as underwater noise generated by installation activities could lead to disturbance of grey seals in the vicinity of such noise. Potential for LSE, AA is required.	SCREENED IN	
		Cable 2.6	2.6				
		Cable 2.7	6.8				
		Cable 2.9	15.4				
		Cable 2.10	19.0				
		Cable 2.12	41.2				
		Cable 2.11	44.5				
Cable 2.5	0.0	Changes in supporting habitat and prey availability	Cable installation activities will disturb an area of approximately 0.007km ² , which is 0.09% of the SAC's marine area. Temporary disturbance to such a small area of the protected site will not result in any significant adverse effects to supporting habitat and prey availability. No LSE, AA is not required.	SCREENED OUT			
Cable 2.6	2.6				No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required		
Cable 2.7	6.8						

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
		Cable 2.9	15.4			
		Cable 2.10	19.0			
		Cable 2.12	41.2			
		Cable 2.11	44.5			
Sanday SAC (UK0030069)	Annex I habitats that are a primary reason for selection of this site: <ul style="list-style-type: none"> Bedrock reef habitat Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: <ul style="list-style-type: none"> Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide 	Cable 2.7	3.6	Change to another seabed type Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substrate below the surface of the seabed Siltation rate changes (including smothering)	No pressure/receptor pathway exists due to the distance of these cable corridors from the SAC. No LSE, AA is not required.	SCREENED OUT
		Cable 2.6	4.8			
		Cable 2.5	9.4			
		Cable 2.10	23.8			
		Cable 2.9	27.5			
		Cable 2.12	46.8			
		Cable 2.11	51.7			
	Annex II species that are a primary reason for selection of this site: <ul style="list-style-type: none"> Harbour seal (<i>Phoca vitulina</i>) 	Cable 2.7	3.6	Visual (and above water noise) disturbance	Seals typically can be disturbed at haul-out sites at a distance of 500m or less (pers comms – NatureScot 2021). As such, installation activities for these cable corridors will not lead to visual and above water noise disturbance of harbour seal. No LSE, AA is not required.	SCREENED OUT
		Cable 2.6	4.8			
		Cable 2.5	9.4			
		Cable 2.10	23.8			
		Cable 2.9	27.5			
		Cable 2.12	46.8			
		Cable 2.11	51.7			
			Underwater noise changes	Screened in for further assessment as underwater noise generated by installation activities could lead to disturbance of harbour seal in the vicinity of such noise. Potential for LSE, AA is required.	SCREENED IN	
Cable 2.7	3.6					
Cable 2.6	4.8					
		Cable 2.5	9.4			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision		
		Cable 2.10	23.8		While harbour seal can range far from their haul-out sites for feeding purposes, harbour seals typically forage 11-21km from their haul-out site (DECC, 2016). As such, the potential for individuals from this site to be found in significant numbers in the vicinity of installation activities is low. No LSE, AA is not required.	SCREENED OUT		
		Cable 2.9	27.5					
		Cable 2.12	46.8					
		Cable 2.11	51.7					
		Cable 2.7	3.6	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT		
		Cable 2.6	4.8					
		Cable 2.5	9.4					
		Cable 2.10	23.8					
		Cable 2.9	27.5					
		Cable 2.12	46.8					
		Cable 2.11	51.7					
		Calf of Eday SPA and SSSI (UK9002431)	Article 4.2 Seabird Assemblage (Breeding) ▪ Cormorant (<i>Phalacrocoax carbo</i>).	Cable 2.6	0.4	Visual (and above water noise) disturbance	Screened in for further assessment as cormorant are considered to be sensitive to visual and above water noise disturbance (Joint SNCB, 2017) and these cable corridors are within the species mean max foraging range (25.6km) (Woodward <i>et al.</i> , 2019). In addition, disturbance to individuals nesting within the site could occur from installation activities. Potential for LSE, AA is required.	SCREENED IN
				Cable 2.7	1.0			
Cable 2.5	1.3							
Cable 2.9	20.2							
Cable 2.10	21.2							
Cable 2.11	44.1							
Cable 2.12	48.1		Screened out as these cable corridors are located outside of cormorants mean max foraging range (25.6km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	SCREENED OUT				
Article 4.2 Seabird Assemblage (Breeding) ▪ Guillemot (<i>Uria aalge</i>)	Cable 2.6		0.4	Visual (and above water noise) disturbance	Screened in for further assessment as guillemot are considered to be sensitive to visual and above water noise disturbance and all the cable corridors are within the mean max foraging range (73.2km) of all the Orkney	SCREENED IN		
	Cable 2.7		1.0					
	Cable 2.5		1.3					

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
		Cable 2.9	20.2		cable corridors (Joint SNCB, 2017; Woodward et al. 2019). In addition, disturbance to individuals nesting within the site could occur from installation activities. Potential for LSE, AA is required.	
		Cable 2.10	21.2			
		Cable 2.11	44.1			
		Cable 2.12	48.1			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Fulmar (<i>Fulmaris glacialis</i>) Great black-backed gull (<i>Larus marinus</i>) Kittiwake (<i>Rissa tridactyla</i>) 	Cable 2.6	0.4	Visual (and above water noise) disturbance	Fulmar, great black-backed gull and kittiwake are considered to have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017). As such, the species will not be significantly disturbed by installation activities associated with these cable corridors. No LSE, AA is not required.	SCREENED OUT
		Cable 2.7	1.03			
		Cable 2.5	1.3			
		Cable 2.9	20.2			
		Cable 2.10	21.2			
		Cable 2.11	44.1			
		Cable 2.12	48.1			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Cormorant Guillemot Fulmar Great black-backed gull Kittiwake 	Cable 2.6	0.4	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.7	1.03			
Cable 2.5		1.3				
Cable 2.9		20.2				
Cable 2.10		21.2				
Cable 2.11		44.1				
Cable 2.12		48.1				
Copinsay SPA (UK9002151)	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot 	Cable 2.10	8.0	Visual (and above water noise) disturbance	Screened in for further assessment as guillemot are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and all the cable corridors are within the species mean max foraging range (73.2km) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.12	15.0			
		Cable 2.11	23.7			
		Cable 2.7	25.4			
		Cable 2.9	29.6			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
		Cable 2.6	29.8			
		Cable 2.5	33.7			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Fulmar Great black-backed gull Kittiwake 	Cable 2.10	8.0	Visual (and above water noise) disturbance	Fulmar, great black-backed gull and kittiwake are considered to have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017). As such, these species will not be significantly disturbed by installation activities within the cable corridors. No LSE, AA is not required.	SCREENED OUT
		Cable 2.12	15.0			
		Cable 2.11	23.7			
		Cable 2.7	25.4			
		Cable 2.9	29.6			
		Cable 2.6	29.8			
		Cable 2.5	33.7			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot Fulmar Great black-backed gull Kittiwake 	Cable 2.10	8.0	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.12	15.0			
		Cable 2.11	23.7			
		Cable 2.7	25.4			
		Cable 2.9	29.6			
Cable 2.6		29.8				
Cable 2.5		33.7				
East Sanday Coast SPA, Ramsar and SSSI(UK9002331)	Article 4.1 Annex I (Wintering) <ul style="list-style-type: none"> Bar-tailed godwit (<i>Limosa lapponica</i>) Article 4.2 Migratory Species (Wintering) <ul style="list-style-type: none"> Purple sandpiper (<i>Calidris maritima</i>) Turnstone (<i>Arenaria interpres</i>) 	Cable 2.6	9.4	Visual (and above water noise) disturbance	The qualifying interest features for the East Sanday Coast SPA, Ramsar and SSSI are intertidal wading bird species. As all the cable corridors are more than 9km from this protected site, there will be no or minimal interaction between the species within the protected area, and the installation activities. No LSE, AA is not required.	SCREENED OUT
		Cable 2.7	9.6			
		Cable 2.5	10.6			
		Cable 2.10	25.8			
		Cable 2.9	29.3			
		Cable 2.12	48.8			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	Article 4.1 Annex I (Wintering) <ul style="list-style-type: none"> Bar-tailed godwit (<i>Limosa lapponica</i>) Article 4.2 Migratory Species (Wintering) <ul style="list-style-type: none"> Purple sandpiper (<i>Calidris maritima</i>) Turnstone (<i>Arenaria interpres</i>) 	Cable 2.11	53.7			
		Cable 2.6	9.4	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.7	9.6			
		Cable 2.5	10.6			
		Cable 2.10	25.8			
		Cable 2.9	29.3			
		Cable 2.12	48.8			
		Cable 2.11	53.7			
Hoy SPA and SSSI (UK9002141)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver (<i>Gavia stellata</i>) 	Cable 2.11	4.2	Visual (and above water noise) disturbance	Screened in for further assessment as red-throated diver are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and the cable corridor is within the species mean max foraging range (9km) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.12	8.4			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot Puffin (<i>Fratercula arctica</i>) 	Cable 2.10	23.8	Visual (and above water noise) disturbance	Screened out as these cable corridors are outside of red-throated divers mean max foraging range (9km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	SCREENED OUT
		Cable 2.9	24.0			
		Cable 2.6	41.2			
		Cable 2.7	42.0			
		Cable 2.5	42.5			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot Puffin (<i>Fratercula arctica</i>) 	Cable 2.11	4.2	Visual (and above water noise) disturbance	Screened in for further assessment as guillemot and puffin are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and the cable corridor is within the species mean max foraging range (73.2 and 137.1km, respectively) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.12	8.4			
		Cable 2.10	23.8			
		Cable 2.9	24.0			
		Cable 2.6	41.2			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
		Cable 2.7	42.0			
		Cable 2.5	42.5			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Peregrine (<i>Falco peregrinus</i>) Article 4.2 Migratory Species (Breeding) <ul style="list-style-type: none"> Great skua (<i>Stercorarius skua</i>) Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Fulmar Great black-backed gull Arctic skua (<i>Stercorarius parasiticus</i>) Kittiwake 	Cable 2.11	4.2	Visual (and above water noise) disturbance	Peregrine, Arctic skua, fulmar, great black-backed gull, great skua and kittiwake are considered to have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017). As such, the species will not be significantly disturbed by installation activities associated with these cable corridors. No LSE, AA is not required.	SCREENED OUT
		Cable 2.12	8.4			
		Cable 2.10	23.8			
		Cable 2.9	24.0			
		Cable 2.6	41.2			
		Cable 2.7	42.0			
		Cable 2.5	42.5			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver Peregrine Article 4.2 Migratory Species (Breeding) <ul style="list-style-type: none"> Great skua Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot Puffin Fulmar Great black-backed gull Arctic skua Kittiwake 	Cable 2.11	4.2	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.12	8.4			
		Cable 2.10	23.8			
		Cable 2.9	24.0			
		Cable 2.6	41.2			
		Cable 2.7	42.0			
		Cable 2.5	42.5			
Orkney Mainland Moors SPA (UK9002311)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver 	Cable 2.9	2.4	Visual (and above water noise) disturbance	Screened in for further assessment as red-throated diver are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and this cable corridor is within the species mean max foraging range (9km) (Woodward <i>et al.</i> , 2019).	SCREENED IN

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
					Potential for LSE, AA is required.	SCREENED OUT
		Cable 2.10	11.4	Visual (and above water noise) disturbance	Screened out as these cable corridors are outside of red-throated divers mean max foraging range (9km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	
		Cable 2.11	12.0			
		Cable 2.12	12.4			
		Cable 2.5	21.5			
		Cable 2.6	22.0			
		Cable 2.7	25.4			
	Article 4.1 Annex I (Wintering) <ul style="list-style-type: none"> ▪ Hen harrier (<i>Circus cyaneus</i>) Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> ▪ Short-eared owl (<i>Asio flammeus</i>) 	Cable 2.9	2.4			Visual (and above water noise) disturbance
		Cable 2.10	11.4			
		Cable 2.11	12.0			
		Cable 2.12	12.4			
		Cable 2.5	21.5			
		Cable 2.6	22.0			
		Cable 2.7	25.4			
	Article 4.1 Annex I (Wintering) <ul style="list-style-type: none"> ▪ Hen harrier (<i>Circus cyaneus</i>) Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> ▪ Red-throated diver ▪ Short-eared owl (<i>Asio flammeus</i>) 	Cable 2.9	2.4	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.10	11.4			
		Cable 2.11	12.0			
		Cable 2.12	12.4			
		Cable 2.5	21.5			
		Cable 2.6	22.0			
		Cable 2.7	25.4			
Pentland Firth Islands SPA and SSSI (UK9001131)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> ▪ Arctic tern (<i>Sterna paradisaea</i>) 	Cable 2.12	8.8	Visual (and above water noise) disturbance	Screened in for further assessment as Arctic tern are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors	SCREENED IN
Cable 2.11	9.8					

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
					are within the species mean max foraging range (25.7km) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED OUT
		Cable 2.10	29.0	Visual (and above water noise) disturbance	Screened out as these cable corridors are outside of Arctic tern mean max foraging range (25.7km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	
		Cable 2.9	40.8			
		Cable 2.7	49.7			
		Cable 2.6	51.5			
		Cable 2.5	54.3			
		Cable 2.12	8.8	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.11	9.8			
		Cable 2.10	29.0			
		Cable 2.9	40.8			
		Cable 2.7	49.7			
		Cable 2.6	51.5			
		Cable 2.5	54.3			
		Rousay SPA and SSSI (UK9002371)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Guillemot Kittiwake 	Cable 2.9	0.0	Visual (and above water noise) disturbance
Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern 	Cable 2.5		6.1	Visual (and above water noise) disturbance	Screened in for further assessment as Arctic tern are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within the species mean max foraging range (25.7km) (Woodward <i>et al.</i> , 2019).	
	Cable 2.6	9.3				
	Cable 2.7	13.7				
	Cable 2.10	16.5				

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
					Potential for LSE, AA is required.	
		Cable 2.12	33.6		Screened out as these cable corridors are outside of Arctic tern mean max foraging range (25.7km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	SCREENED OUT
		Cable 2.11	34.2			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Guillemot 	Cable 2.5	6.1	Visual (and above water noise) disturbance	Screened in for further assessment as guillemot are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and all the cable corridors are within the species mean max foraging range (73.2km) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.6	9.3			
		Cable 2.7	13.7			
		Cable 2.10	16.5			
		Cable 2.12	33.6			
		Cable 2.11	34.2			
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Kittiwake 	Cable 2.5	6.1	Visual (and above water noise) disturbance	Arctic skua, fulmar and kittiwake are considered to have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017; NatureScot, 2017). As such, the species will not be significantly disturbed by installation activities associated with these cable corridors. No LSE, AA is not required.	SCREENED OUT
		Cable 2.6	9.3			
		Cable 2.7	13.7			
		Cable 2.10	16.5			
		Cable 2.12	33.6			
		Cable 2.11	34.2			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Guillemot Kittiwake 	Cable 2.9	0.0	Changes in supporting habitat and prey availability	Cable installation activities will disturb an area of approximately 0.002km ² , which is 0.005% of the total SPA's marine area. Temporary disturbance to such a small area of the protected site will not result in any significant adverse effects to supporting habitat and prey availability. No LSE, AA is not required.	SCREENED OUT
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern 	Cable 2.5	6.1		No potential pressure/receptor pathway exists as these cable corridors are not located within the SPA.	SCREENED OUT
		Cable 2.6	9.3			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Guillemot 	Cable 2.7	13.7		No LSE, AA is not required.	
		Cable 2.10	16.5			
		Cable 2.12	33.6			
		Cable 2.11	34.2			
Switha SPA and SSSI (UK9002891)	Article 4.1 Annex I (Wintering) <ul style="list-style-type: none"> Greenland barnacle goose (<i>Branta leucopsis</i>) 	Cable 2.12	3.0	Visual (and above water noise) disturbance	No potential pressure/receptor pathway exists for Greenland barnacle goose. Screened out as the Greenland barnacle geese of this SPA predominately spend their time either feeding on South Walls Island or roosting on Switha Island. Although they could utilise the waters in between, none of the cable corridors are located within this area. Therefore, they will not be present in the immediate vicinity of installation activities. No LSE, AA is not required.	SCREENED OUT
		Cable 2.11	3.6			
		Cable 2.10	25.5			
		Cable 2.9	35.0			
		Cable 2.7	45.9			
		Cable 2.6	47.0			
		Cable 2.5	49.5			
		Cable 2.12	3.0	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.11	3.6			
		Cable 2.10	25.5			
		Cable 2.9	35.0			
		Cable 2.7	45.9			
		Cable 2.6	47.0			
		Cable 2.5	49.5			
West Westray SPA and SSSI (UK9002101)	Article 4.2 Migratory Species <ul style="list-style-type: none"> Guillemot Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Razorbill (<i>Alca torda</i>) 	Cable 2.5	7.3	Visual (and above water noise) disturbance	Screened in for further assessment as guillemot and razorbill are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within the species' mean max foraging range (73.2 and 88.7km, respectively) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.9	13.0			
		Cable 2.6	15.0			
		Cable 2.7	18.4			
		Cable 2.10	27.1			
		Cable 2.12	46.3			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
		Cable 2.11	48.0			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern 	Cable 2.5	7.3	Visual (and above water noise) disturbance	Screened in for further assessment as Arctic tern are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within the species mean max foraging range (25.7km) (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.9	13.0			
		Cable 2.6	15.0			
		Cable 2.7	18.4			
		Cable 2.10	27.1			
		Cable 2.12	46.3	Visual (and above water noise) disturbance		
	Cable 2.11	48.0				
	Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Kittiwake 	Cable 2.5	7.3	Visual (and above water noise) disturbance	Arctic skua, fulmar and kittiwake are considered to have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017; NatureScot, 2017). As such, the species will not be significantly disturbed by installation activities associated with these cable corridors. No LSE, AA is not required.	SCREENED OUT
		Cable 2.9	13.0			
		Cable 2.6	15.0			
		Cable 2.7	18.4			
		Cable 2.10	27.1			
		Cable 2.12	46.3			
		Cable 2.11	48.0			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Arctic tern Article 4.2 Migratory Species <ul style="list-style-type: none"> Guillemot Article 4.2 Seabird Assemblage (Breeding) <ul style="list-style-type: none"> Arctic skua Fulmar Kittiwake 	Cable 2.5	7.3	Changes in supporting habitat and prey availability	No potential pressure/receptor pathway exists as the cable corridors are not located within the SPA. No LSE, AA is not required	SCREENED OUT
		Cable 2.9	13.0			
		Cable 2.6	15.0			
		Cable 2.7	18.4			
		Cable 2.10	27.1			
		Cable 2.12	46.3			

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	<ul style="list-style-type: none"> Razorbill 	Cable 2.11	48.0			
North Orkney Proposed SPA (pSPA) (UK9020314)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Common eider (<i>Somateria mollissima</i>) European shag (<i>Phalacrocorax aristotelis</i>) 	Cable 2.9	0.0	Visual (and above water noise) disturbance	Screened in for further assessment as red-throated diver, common eider and European shag, are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within these species' mean max foraging range (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.10	0.0			
		Cable 2.6	6.4			
		Cable 2.5	6.8			
		Cable 2.7	9.5			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> European shag (<i>Phalacrocorax aristotelis</i>) 	Cable 2.12	14.0	Visual (and above water noise) disturbance	Screened out as these cable corridors are outside of these species mean max foraging ranges (9 - 13.2 km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.	SCREENED OUT
		Cable 2.11	19.0			
	Article 4.1 Annex I (Non-Breeding) <ul style="list-style-type: none"> Great northern diver (<i>Gavia immer</i>) Slavonian grebe (<i>Podiceps auratus</i>) Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Long-tailed duck (<i>Clangula hyemalis</i>) Red-breasted merganser (<i>Mergus serrator</i>) Velvet scoter (<i>Melanitta fusca</i>) 	Cable 2.9	0.0	Visual (and above water noise) disturbance	Screened in for further assessment as there is no available data on foraging ranges for great northern diver, Slavonian grebe, long-tailed duck, red-breasted merganser and velvet scoter these species they have been screened in as a precautionary measure for all Orkney cable corridors (JNCC, 2017). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.10	0.0			
		Cable 2.6	6.4			
		Cable 2.5	6.8			
		Cable 2.7	9.5			
		Cable 2.12	14.0			
		Cable 2.11	19.0			
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver Article 4.1 Annex I (Non-Breeding) <ul style="list-style-type: none"> Great northern diver (<i>Gavia immer</i>) Slavonian grebe (<i>Podiceps auratus</i>) Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Common eider (<i>Somateria mollissima</i>) European shag (<i>Phalacrocorax aristotelis</i>) 	Cable 2.9	0.0	Changes in supporting habitat and prey availability	Cable installation activities within cable corridors 2.9 and 2.10 will disturb an area of approximately 0.008km ² , which is 0.03% of the pSPA. Temporary disturbance to such a small area of the protected site will not result in any significant adverse effects to supporting habitat and prey availability. No LSE, AA is not required.	SCREENED OUT
		Cable 2.10	0.0			
Cable 2.6		6.4	No potential pressure/receptor pathway exists as these cable corridors are not located within the SPA.		SCREENED OUT	
Cable 2.5		6.8				

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Long-tailed duck (<i>Clangula hyemalis</i>) Red-breasted merganser (<i>Mergus serrator</i>) Velvet scoter (<i>Melanitta fusca</i>) 	Cable 2.7	9.5		No LSE, AA is not required.	
		Cable 2.12	14.0			
		Cable 2.11	19.0			
Scapa Flow pSPA (UK9020321)	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver 	Cable 2.11	0.0	Visual (and above water noise) disturbance	Screened in for further assessment as red-throated diver, black-throated diver, great northern diver, Slavonian grebe common eider, long-tailed duck, red-breasted merganser, common goldeneye and European shag are considered to be sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within the species mean max foraging range (Woodward <i>et al.</i> , 2019). Potential for LSE, AA is required.	SCREENED IN
		Cable 2.12	0.0			
	Article 4.1 Annex I (Non-Breeding) <ul style="list-style-type: none"> Great northern diver Black-throated diver (<i>Gavia arctica</i>) Slavonian grebe 	Cable 2.10	7.8			
	Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Common eider European shag Long-tailed duck Red-breasted merganser Common goldeneye (<i>Bucephala clangula</i>) 					
	Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver 	Cable 2.9	17.6	Visual (and above water noise) disturbance		
Article 4.1 Annex I (Breeding) <ul style="list-style-type: none"> Red-throated diver 	Cable 2.7	25.9	Visual (and above water noise) disturbance	Screened out as this cable corridor is outside of these species mean max foraging ranges (9 -21.5km) (Woodward <i>et al.</i> , 2019). No LSE, AA is not required.		
	Cable 2.6	28.2				
	Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> Common eider European shag 	Cable 2.5				30.9
Article 4.1 Annex I (Non-Breeding) <ul style="list-style-type: none"> Great northern diver Black-throated diver (<i>Gavia arctica</i>) Slavonian grebe 	Cable 2.9	17.6	Visual (and above water noise) disturbance	Screened in for further assessment as black-throated diver, great northern diver, Slavonian grebe common eider, long-tailed duck, red-breasted merganser, and common goldeneye are sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable	SCREENED IN	

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	<p>Article 4.2 Migratory Species (Non-Breeding)</p> <ul style="list-style-type: none"> Common eider <p>Article 4.2 Migratory Species (Non-Breeding)</p> <ul style="list-style-type: none"> Long-tailed duck Red-breasted merganser Common goldeneye (<i>Bucephala clangula</i>) 				<p>corridors are within the species mean max foraging range (Woodward <i>et al.</i>, 2019).</p> <p>Potential for LSE, AA is required.</p>	SCREENED IN
	<p>Article 4.1 Annex I (Non-Breeding)</p> <ul style="list-style-type: none"> Great northern diver Black-throated diver (<i>Gavia arctica</i>) Slavonian grebe <p>Article 4.2 Migratory Species (Non-Breeding)</p> <ul style="list-style-type: none"> Long-tailed duck Red-breasted merganser Common goldeneye (<i>Bucephala clangula</i>) 	<p>Cable 2.7</p> <p>Cable 2.6</p> <p>Cable 2.5</p>	<p>25.9</p> <p>28.2</p> <p>30.9</p>	<p>Visual (and above water noise) disturbance</p>	<p>Screened in for further assessment as black-throated diver, great northern diver, Slavonian grebe, long-tailed duck, red-breasted merganser, and common goldeneye are sensitive to visual and above water noise disturbance (JNCC, 2017) and these cable corridors are within the species mean max foraging range (Woodward <i>et al.</i>, 2019).</p> <p>Potential for LSE, AA is required.</p>	
	<p>Article 4.1 Annex I (Breeding)</p> <ul style="list-style-type: none"> Red-throated diver <p>Article 4.1 Annex I (Non-Breeding)</p> <ul style="list-style-type: none"> Great northern diver Black-throated diver (<i>Gavia arctica</i>) Slavonian grebe <p>Article 4.2 Migratory Species (Non-Breeding)</p> <ul style="list-style-type: none"> Common eider European shag <p>Article 4.2 Migratory Species (Non-Breeding)</p> <ul style="list-style-type: none"> Long-tailed duck Red-breasted merganser Common goldeneye (<i>Bucephala clangula</i>) 	<p>Cable 2.11</p> <p>Cable 2.12</p>	<p>0.0</p> <p>0.0</p>	<p>Changes in supporting habitat and prey availability</p>	<p>Cable installation activities within cable corridors 2.11 and 2.12 will disturb an area of approximately 0.01km², which is 0.005% of the pSPA. Temporary disturbance to such a small area of the protected site will not result in any significant adverse effects to supporting habitat and prey availability.</p> <p>No LSE, AA is not required.</p>	SCREENED OUT
	<p>Article 4.1 Annex I (Breeding)</p> <ul style="list-style-type: none"> Red-throated diver 	<p>Cable 2.10</p> <p>Cable 2.9</p>	<p>7.8</p> <p>17.6</p>		<p>No potential pressure/receptor pathway exists as these cable corridors are not located within the site.</p>	SCREENED OUT

Site Name & Code	Primary and qualifying features	Cable Corridor	Distance (km)*	Potential pressure	Potential pressure-receptor pathway for LSE	Screening decision
	Article 4.1 Annex I (Non-Breeding) <ul style="list-style-type: none"> ▪ Great northern diver ▪ Black-throated diver (<i>Gavia arctica</i>) ▪ Slavonian grebe Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> ▪ Common eider ▪ European shag Article 4.2 Migratory Species (Non-Breeding) <ul style="list-style-type: none"> ▪ Long-tailed duck ▪ Red-breasted merganser ▪ Common goldeneye (<i>Bucephala clangula</i>) 	Cable 2.7	25.9		No LSE, AA is not required.	
		Cable 2.6	28.2			
		Cable 2.5	30.9			

*Distance is the closest point from the protected site to the edge of the cable corridor

3.3 Screening Statement and Conclusions

To determine whether the Project is likely to have a significant effect on any European sites, either individually or in-combination with other plans or projects, HRA Screening was carried out.

The HRA screening initially identified 13 relevant European sites where a possible pressure-receptor pathway existed between the sites and the Project activities. These 13 sites were subject to screening which involved further analysis taking into consideration the qualifying interest features. Screening identified 11 European sites where it could not be ruled out that the Project activities will result in a LSE.

A review of the Project activities identified two pressures that could be exerted on qualifying features of the 11 European sites. These were:

- Visual (and above water noise) disturbance
- Underwater noise changes

Screening concluded that Appropriate Assessment is required for:

- Faray and Holm of Faray SAC (UK0017096)
- Sanday SAC (UK0030069)
- Calf of Eday SPA (UK9002431)
- Copinsay SPA (UK9002151)
- Hoy SPA (UK9002141)
- Orkney Mainland Moors SPA (UK9002311)
- Pentland Firth Islands SPA (UK9001131)
- Rousay SPA (UK9002371)
- West Westray SPA (UK9002101)
- North Orkney pSPA (UK9020314)
- Scapa Flow pSPA (UK9020321)

A summary of the screening conclusion for each site is detailed in Table 3-2 below.

Table 3-2 Summary of Screening Conclusions

Key – Screening Conclusion	Screened In – Potential for LSE, AA is required	Screened Out – No potential for LSE. AA is not required		
Site Name and Code	Applicable Qualifying Feature/s	Potential Pressure/s	Cable Corridor/s	Screening Conclusion
Faray and Holm of Faray SAC and SSSI (UK0017096)	Grey seal	Visual (and above water noise) disturbance	2.5	AA required
			2.6, 2.7, 2.9, 2.10, 2.11 and 2.12	No AA
		Underwater noise changes	All Cable Corridors	AA required
		Changes in supporting habitat and prey availability	All Cable Corridors	No AA

Site Name and Code	Applicable Qualifying Feature/s	Potential Pressure/s	Cable Corridor/s	Screening Conclusion
Sanday SAC (UK0030069)	Bedrock reef habitat Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide	Change to another seabed type Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substrate below the surface of the seabed Siltation rate changes (including smothering)	2.5, 2.6, 2.7, 2.9, 2.10, 2.11 and 2.12	No AA
	Harbour seal	Visual (and above water noise) disturbance	All Cable Corridors	No AA
		Underwater noise changes	2.5, 2.6 and 2.7	AA required
		Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Calf of Eday SPA and SSSI (UK9002431)	Breeding cormorant	Visual (and above water noise) disturbance	2.5, 2.6, 2.7, 2.9 and 2.10	AA required
			2.11 and 2.12	No AA
	Breeding guillemot		All Cable Corridors	AA required
	Breeding fulmar, great black-backed gull, and kittiwake		All Cable Corridors	No AA
	Breeding cormorant, guillemot, fulmar, great black-backed gull and kittiwake	Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Copinsay SPA (UK9002151)	Breeding guillemot	Visual (and above water noise) disturbance	All Cable Corridors	AA required
	Breeding fulmar, great black-backed gull, and kittiwake		All Cable Corridors	No AA
	Breeding guillemot, fulmar, great black-backed gull, and kittiwake	Changes in supporting habitat and prey availability	All Cable Corridors	No AA
East Sanday Coast SPA, SSSI and Ramsar (UK9002331)	Non-breeding bar-tailed godwit, purple sandpiper, and turnstone	Visual (and above water noise) disturbance	All Cable Corridors	No AA
		Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Hoy SPA and SSSI (UK9002141)	Breeding red-throated diver	Visual (and above water noise) disturbance	2.11 and 2.12	AA required
			2.5, 2.6, 2.7, 2.9 and 2.10.	No AA
	Breeding guillemot and puffin		All Cable Corridors	AA required

Site Name and Code	Applicable Qualifying Feature/s	Potential Pressure/s	Cable Corridor/s	Screening Conclusion
	Breeding peregrine, Arctic skua, fulmar, great black-backed gull, great skua, kittiwake		All Cable Corridors	No AA
	Breeding red-throated diver, guillemot, puffin, peregrine, Arctic skua, fulmar, great black-backed gull, great skua, kittiwake	Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Orkney Mainland Moors SPA (UK9002311)	Breeding red-throated diver	Visual (and above water noise) disturbance	2.9	AA required
			2.5, 2.6, 2.7, 2.10, 2.11 and 2.12	No AA
	Non-breeding hen-harrier and breeding short-eared owl		All Cable Corridors	No AA
	Breeding red-throated diver Non-breeding hen-harrier and breeding short-eared owl	Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Pentland Firth Islands SPA (UK9001131)	Breeding Arctic tern	Visual (and above water noise) disturbance	2.11 and 2.12	AA required
			2.5, 2.6, 2.7, 2.9 and 2.10	No AA
		Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Rousay SPA (UK9002371)	Breeding Arctic tern	Visual (and above water noise) disturbance	2.5, 2.6, 2.7, 2.9, 2.10	AA required
			2.11, 2.12	No AA
	Breeding guillemot		All Cable Corridors	AA required
	Breeding Arctic skua, fulmar and kittiwake		All Cable Corridors	No AA
Switha SPA and SSSI (UK9002891)	Non-breeding Greenland barnacle goose	Visual (and above water noise) disturbance	All Cable Corridors	No AA
			Changes in supporting habitat and prey availability	All Cable Corridors
West Westray SPA (UK9002101)	Breeding guillemot and razorbill	Visual (and above water noise) disturbance	All Cable Corridors	AA required
	Breeding Arctic tern		2.5, 2.6, 2.7, 2.9 and 2.10	AA required
			2.11 and 2.12	No AA
	Breeding Arctic skua, fulmar and kittiwake	All Cable Corridors	No AA	
	Breeding guillemot and razorbill, Arctic tern, Arctic skua, fulmar and kittiwake	Changes in supporting habitat and prey availability	All Cable Corridors	No AA

Site Name and Code	Applicable Qualifying Feature/s	Potential Pressure/s	Cable Corridor/s	Screening Conclusion
North Orkney pSPA (UK9020314)	Breeding red-throated diver Non-breeding common eider, European shag, great northern diver, long-tailed duck, red-breasted merganser, Slavonian grebe, and velvet scoter	Visual (and above water noise) disturbance	2.5, 2.6, 2.7, 2.9, and 2.10	AA required
	Breeding red-throated diver, European shag	Visual (and above water noise) disturbance	2.11 and, 2.12	No AA
	Non-breeding common eider, great northern diver, long-tailed duck, red-breasted merganser, Slavonian grebe, and velvet scoter			AA required
	Breeding red-throated diver Non-breeding common eider, European shag, great northern diver, long-tailed duck, red-breasted merganser, Slavonian grebe, and velvet scoter	Changes in supporting habitat and prey availability	All Cable Corridors	No AA
Scapa Flow pSPA (UK9020321)	Breeding red-throated diver. Wintering black-throated diver, great northern diver, and Slavonian grebe. Non-breeding common eider, long-tailed duck, red-breasted merganser, common goldeneye, and European shag.	Visual (and above water noise) disturbance	2.10, 2.11 and 2.12	AA required
	Wintering black-throated diver, great northern diver, and Slavonian grebe. Non-breeding common eider, long-tailed duck, red-breasted merganser, common goldeneye		2.9	AA required
	Breeding red-throated diver. Non-breeding European shag			No AA
	Wintering black-throated diver, great northern diver, and Slavonian grebe. Non-breeding long-tailed duck, red-breasted merganser, common goldeneye		2.5, 2.6, 2.7	AA required
	Breeding red-throated diver. Non-breeding European shag and Common eider			No AA
	Breeding red-throated diver. Wintering black-throated diver, great northern diver, and Slavonian grebe. Non-breeding common eider, long-tailed duck, red-breasted merganser, common goldeneye, and European shag.	Changes in supporting habitat and prey availability	All Cable Corridors	No AA

4. SSSI ASSESSMENT

4.1 Introduction

SSSIs represent the best of Scotland's natural heritage. They are identified for their flora, fauna, geological or physiographical features or a combination of these. Chapter 1, Section 3 of the Nature Conservation (Scotland) Act 2004 provides for the notification and confirmation of SSSIs, by the country conservation body in Scotland (NatureScot). The local planning authority, all landowners and occupiers, and the Secretary of State must be notified of any activities or works within or adjacent to a SSSI. This Act also contains measures for the protection and management of SSSIs, with attention to the integrity of the site and conservation objectives.

The notified bodies have a specified time-period within which representations and objections may be made. The country conservation body must consider these responses and may withdraw or confirm the notification. The assessment of potential effects to SSSIs in this report will inform the notification process as part of the Marine licence application submission to MS-LOT.

Table 4-1 below presents the results of the screening of the identified relevant SSSIs for further assessment. The distances have been measured from the closest point on the site to the cable corridor for each proposed cable corridor.

It should be noted that the Calf of Eday, East Sanday Coast, Faray and Holm of Faray, Hoy, Pentland Firth Islands, Rousay and West Westray SSSIs are co-located within other European sites. As such these SSSIs have been assessed under their applicable European site in Section 3 of this report.

Table 4-1 Screening relevant SSSIs for assessment

Site Name	Notifying features	Cable Corridor	Distance (km)	Potential pressure	Potential pressure-receptor pathway for adverse effect on site integrity	Screening decision
Doomy and Whitemaw Hill SSSI	Breeding Birds Whimbrel (<i>Numenius phaeopus</i>)	Cable 2.6	0.1	Visual (and above water noise) disturbance	Screened in for further assessment as whimbrel from this SSSI may be near the installation activities at the landfill. Potential for adverse effect on site integrity, further assessment required.	SCREENED IN
	Breeding Birds Arctic skua	Cable 2.6	0.1	Visual (and above water noise) disturbance	Arctic skua have a low sensitivity to visual and above water noise disturbance from vessel movements (JNCC, 2017; NatureScot, 2017). As such, the species will not be significantly disturbed by installation activities associated with these cable corridors. Potential for adverse effect on site integrity, further assessment required.	SCREENED OUT
Eynhallow SSSI	Harbour seal (<i>Phoca vitulina</i>)	Cable 2.9	0.9	Visual (and above water noise) disturbance	Seals typically can be disturbed at haul-out sites at a distance of 500m or less (pers comms – NatureScot 2021). As such, installation activities for this cable corridor will not lead to visual and above water noise disturbance of harbour seal. No LSE, AA is not required.	SCREENED OUT
				Underwater noise changes	Underwater noise generated by installation activities could lead to disturbance of seals within 1.1km of the cable corridor. Potential for adverse effect on site integrity, further assessment required.	SCREENED IN

Table 4-1 above concluded that there is the potential for adverse effects on site integrity on the following SSSIs and that further assessment is required:

- Doomy and Whitemaw Hill SSSI
- Eynhallow SSSI

4.2 Doomy and Whitemaw SSSI

4.2.1 Features screened through for assessment

- Whimbrel (Breeding)

4.2.2 Assessment

Doomy and Whitemaw Hill SSSI (first notified in 1983) was designated for supporting at least 1% of the British nationally significant breeding population of Whimbrel (NatureScot, 2010). The latest condition assessment (2016) classed the whimbrel population as "unfavourable no change" (Nature Scot, 2021). Whimbrel are a summer resident of Scotland, and on average, seven pairs have been counted in this SSSI. As Cable Corridor 2.6 is 0.1km from the SSSI, there is potential for disturbance to individuals within the SSSI.

Impact to the breeding whimbrel from the Doomy and Whitemaw SSSI could arise from the cable installation activities on the shore at the landfall and potentially nearshore activities may cause visual and above water noise disturbance to birds. Disturbance is predicted to be limited to that initiated by the movement of vessels or by noise due to works carried out at the landfall e.g. flushing, typically into flight. The level of noise associated with cable installation activities is low with the presence of vessels the main cause of disturbance. A single disturbance event does not have an immediate effect on the survival or productivity of an individual bird. Repeated disturbance or disturbance over an extended period can affect the survival and productivity of a bird. Cable installation of telecommunication cables is a single discrete event.

Whimbrel are an intertidal wading bird species, and the cable corridor is 0.1km from the terrestrial area of the SSSI, so installation activities will not impact individuals foraging within the SSSI.

Installation vessels will be slow moving (approximately 2km/hr) which is slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, the cable installation activities will be a continuous, transient but temporary occurrence (approximately 6 days).

The eastern edge of the SSSI, closest to the cable corridor and landfall, is occupied by an airport with grassland and tarmac. Additionally, there is the B9063 road which is between the installation activities and the SSSI. Therefore, whimbrel are likely to have habituation to some human disturbance from the airport and roads. As whimbrel nest in moorlands they are unlikely to be nesting within 300m of the landfall due to the airport. Installation activities are therefore unlikely to cause disturbance to whimbrel nesting in the SSSI.

Due to the distance from whimbrel nesting and foraging areas within the site, disturbance to whimbrel is unlikely. There is no potential for adverse effect on whimbrel, and the site integrity for whimbrel will be maintained.

4.2.3 Project specific mitigation

None specified.

4.2.4 Conclusion

It is unlikely that any visual (and above water noise) disturbance will occur to Whimbrel foraging or nesting within the site. Additionally, any disturbance caused to Whimbrel will be temporary and localised. Therefore, installation activities for Cable Corridor 2.6 will not hinder the management objectives for the site.

4.3 Eynhallow SSSI

4.3.1 Features screened through for assessment

- Harbour (common) seal

4.3.2 Assessment

Cable Corridor 2.9 is 0.87km south east of Eynhallow SSSI, which is designated for the resident harbour seal population. Eynhallow SSSI site encompasses the small island of Eynhallow along with a small area of the sea surrounding the island. It is one of the two most important breeding and haul out sites for harbour seal in Orkney, supporting on average more than 10% of Orkney's total harbour seal population (NatureScot, 2016a). When last assessed in August 2013, the population within the site was assessed as Unfavourable Declining.

Underwater noise from positioning equipment (USBL) during installation activities has the potential to disturb seals up to 1.1km from the installation activities, based on a highly precautionary assessment. Calculations presented in the Orkney Geographical Area European Protected Species (EPS) Assessment (Appendix D, Document Ref: P2308_R5284_Rev1) concluded auditory injury will not occur in seal from the use of the USBL.

Cable Corridor 2.9 lies within 0.87km of the SSSI, therefore there is the potential for temporary disturbance to seal swimming at the SSSI. The section of the cable corridor within 1.1km (zone of influence for underwater noise disturbance) of the SSSI boundary is approximately 1.2km in length of the 3km cable corridor. The underwater positioning equipment (USBL) would be used during plough operations only. Should ploughing be undertaken along this cable corridor, the USBL would only be operating within 1.1km of the SSSI for approximately 2 hours (based on an installation speed of 0.6km/hour for up to 1.2km). The installation activity is a one-off occurrence and will not be repeated. Therefore, as harbour seal in the waters adjacent to the Eynhallow SSSI will only be subject to a one off temporary (up to 2 hours) and localised disturbance, there will be no significant disturbance.

The assessment has concluded there is no potential for significant adverse effects on harbour seal, and the site integrity for harbour seal will be maintained. However, as best practice the programme of installation activities for cable corridor 2.9 will aim to avoid installation during the harbour seal pupping season in June and July if possible.

4.3.3 Project specific mitigation

None specified.

4.3.4 Conclusion

Given the one off, short term and transient nature of the installation works, it is unlikely that significant effects to harbour seal within the Eynhallow SSSI will occur. If disturbance occurs, it will be temporary and localised and the Project will not hinder the achievement of the management objectives for the SSSI.

5. HRA STAGE 2 - INFORMATION TO INFORM APPROPRIATE ASSESSMENT

5.1 Introduction

The HRA Stage 1 Screening documented in Section 3, concluded that there is the potential for LSEs on the following 11 European sites and that AA is required:

- Faray and Holm of Faray SAC (UK0017096)
- Sanday SAC (UK0030069)
- Calf of Eday SPA (UK9002431)
- Copinsay SPA (UK9002151)
- Hoy SPA (UK9002141)
- Orkney Mainland Moors SPA (UK9002311)
- Pentland Firth Islands SPA (UK9001131)
- Rousay SPA (UK9002371)
- West Westray SPA (UK9002101)
- North Orkney pSPA (UK9020314)
- Scapa Flow pSPA (UK9020321)

To inform the AA the Applicant must provide data and information on the project and on the European site. An analysis of potential effects on the site must be completed and presented as 'Information to Inform Appropriate Assessment'. This is a more detailed ecological assessment of the proposed activities, taking into consideration the conservation objectives for the European site and its overall integrity. It looks to answer two key questions:

- What are the likely effects of the proposed activity?
- How quickly could the qualifying feature recover from the effect, if at all?

The duty to undertake AA, having considered the 'Information to Inform AA', and to ensure that the stringent evaluation and decision-making procedure is applied correctly, lies with the competent authority, which for the Project is MS-LOT. The AA will be a focused and detailed impact assessment of the implications of the Project, alone and in combination with other plans and projects, on the integrity of a European site in view of its conservation objectives.

If the assessment concludes that the plan or project will adversely affect the integrity of a European site, then the process must proceed to Stage 3, or the Project should be abandoned.

Any mitigation measures necessary to avoid, reduce or offset negative effects should be proposed at this stage (Stage 2).

5.2 Objectives and Structure of this Information to Inform AA

Screening identified 11 European sites where it could not be ruled out that the Project activities will result in LSE and therefore required Stage 2 AA. This section provides information for the competent authority to undertake the AA.

The 11 European sites were screened in for the following pressure – receptor pathways

- 1 SAC - Visual (and above water noise) disturbance – seals
- 2 SACs - Underwater noise changes - seals
- 9 SPAs - Visual (and above water noise) disturbance - birds

Section 5.3 provides details on each of the three pressure-receptor pathways and includes the assessment of in-combination effects.

Some common baseline information needed for each of the European site assessments has been provided first in Section 5.4 and then the assessment of each site has been presented in sections 5.5 – 5.15.

5.3 Pressure-receptor Pathways for European Sites Requiring AA

5.3.1 Visual (and above water noise) disturbance - seals

The HRA screening identified that there is the potential for a LSE on the qualifying features ‘grey seal’ of the Faray and Holm of Faray SAC and ‘harbour seal’ of the Sanday SAC from the pressure ‘Visual (and above water noise) disturbance’.

Seals can be disturbed when hauled out at a distance of up to 500m from the disturbance (pers comms – NatureScot, 2021). Visual disturbance induces a flight response, where seals will flush into the water. There is evidence that seals are less likely to flush during breeding and moulting periods, and will quickly return to land, which is likely attributed to a trade-off between fleeing and nursing during this period (Andersen *et al.*, 2012).

However, chronic flushing as a result of vessel disturbance reduces nursing time, increases energy use and disrupts energy balance, which can compromise growth and survival (Jansen *et al.*, 2010; Harding *et al.*, 2005). Repeated or prolonged disturbance can also influence the distribution of seals, where they may be more likely to utilise undisturbed areas even if they are less favourable for habitat suitability or prey availability (Jansen *et al.*, 2015). Therefore, prolonged or repeated visual and above water noise disturbance within 500m of hauled out seals could result in reduced growth and survival of seals, particularly young pups, which could affect the demographic characteristics of the population. There is also potential for impacts to the distribution of seals within a site.

The Project will typically involve the Main lay vessel and one ancillary support vessel. Given the distance of the cable corridors to the European Sites, screening could not rule out that temporary disturbance of hauled out seal will not occur.

5.3.2 Underwater noise changes - seals

The HRA screening identified that there is the potential for a LSE on the qualifying feature ‘grey seal’ of the Faray and Holm of Faray SAC and ‘harbour seal’ of the Sanday SAC from the pressure ‘Underwater noise changes’ from the USBL device used to position the ROV to conduct touch down monitoring.

Underwater noise changes generated by the USBL may pose a risk to the seal population. Such noise can impact the species in two ways:

- Injury - physiological damage to an individuals’ auditory or other internal organs; and
- Disturbance – either temporary or continuous. While this factor does not result in injury, disruptions to behavioural patterns such as migration, nursing, breeding, foraging, socialising and/or sheltering may occur.

Acute to significant long-term consequences to seal populations can occur, for example by avoidance of important habitats, interference with vocalisations and auditory damage (Southall *et al.*, 2019;

Tyack, 2008). Male seals have been shown to utilise a repertoire of underwater vocalisations during mating season to attract a mate (Ruser *et al.*, 2014, Van Parijs and Kovacs, 2011), and to defend territories (Matthews *et al.*, 2017).

Harbour seals use low frequency rumblings from 250Hz to 1.4kHz (Van Parijs, Janik and Thompson, 2000), whereas grey seal vocalisations typically range between 100Hz and 3kHz (Asselin, Hammill and Barrette, 1993), with both species more sensitive to continuous noise than impulsive noise (Baltic Marine Environment Protection Commission, 2016). Therefore, there is potential for significant noise disturbance during mating to affect seal breeding success, as seals rely on these vocalisations (Baltic Marine Environment Protection Commission, 2016). Similar vocalisations have been recorded in harbour seal outside of breeding seasons, but the behavioural significance of these vocalisations is unknown (Andersson *et al.*, 2015). To determine the potential impact of noise generated by the USBL on seal, the sound levels that will be produced have been compared to the available estimated thresholds for injury and disturbance in seal. JNCC guidance (JNCC, 2020) recommends using the injury criteria proposed by Southall *et al.* (Southall *et al.*, 2019) based on a combination of linear (un-weighted) peak pressure levels and mammal hearing weighted (M-weighted) sound exposure levels (SEL).

If frequencies of the sound produced fall outside the predicted auditory bandwidth for a species, then disturbance is unlikely. Sufficiently high noise sources, however, can still cause damage to an individuals' auditory or other internal organs. Both grey seal and harbour seal are thought to possess a typical hearing range of 50 Hz to 86 kHz (NMFS, 2018). The highly precautionary assessment identifies that there is potential for disturbance to marine mammals (if sensitive) up to 1.1km from the sound source (NMFS, 2018).

Repeated or prolonged disturbance in the vicinity of seal haul out sites and foraging areas may result in reduced opportunities for catching prey items. Prolonged underwater noise disturbance could result in reduced mating and breeding success, which could affect the demographic characteristics of the population.

Noise will be temporarily generated by the USBL during the cable installation. The vessel mounted system to be used throughout cable installation activities is the HiPAP502. This transmits a directional beam, with a source level of SPL 190dB re 1µPa @1m (assumed to be 0-pk) in the frequency range 21-31 kHz, with an effective range of 2000m¹. This is within the audible range of seal. There will be no ongoing effect of noise from the cable once installed. Therefore, during installation there is potential for temporary underwater noise disturbance from the use of the USBL which may cause temporary disturbance to mating and other behavioural activities of seals up to 1.1km from the installation activities.

5.3.3 Visual (and above water noise) disturbance – birds

The HRA screening identified that there is the potential for a LSE on bird qualifying features of nine SPAs from the pressure 'Visual (and above water noise) disturbance'.

The most vulnerable birds to disturbance are those within the zone of influence of the installation operations, as described in Table 2-1 (Section 2). Disturbance is predicted to be limited to that initiated by the movement of vessels or by noise e.g. flushing, typically into flight or by diving. The level of noise associated with cable installation activities is low with the presence of vessels the main cause of disturbance. Birds may take evasive action, but a single disturbance event does not have any immediate effect on the survival or productivity of an individual bird. Repeated disturbance, or disturbance over an extended period, can affect survival and productivity (Valente and Fischer, 2011).

¹ It should be noted, the transmitter characteristics are within the range of echo sounders used on a variety of vessels (including pleasure craft, yachts, fishing vessels and other marine craft). Such echo sounders used by other vessels common across the area operate in the frequency range 12-400kHz, with signal strengths up to 230dB re 1µPa @1m (Risch *et al.* 2017).

The extent to which a seabird responds to disturbance is dependent upon factors including the period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler *et al.*, 2010). Some seabirds are more resilient to disturbance than others. The breeding/summer season is typically defined as 1st April to 30th September.

Prolonged disturbance at the nest site could result in impaired breeding, disruption to incubation, increased nest failures due to predation and nest abandonment (Valente and Fischer, 2011). These factors could affect the demographic characteristics of the population. Repeated or prolonged disturbance within breeding bird foraging zones may result in reduced opportunities for catching prey items, nesting success and chick production.

The Project will typically involve one main installation lay vessel and one ancillary support vessel. Installation will take approximately 20 days per cable corridor, except for Cable Corridor 2.9 which may take longer (approximately 30 days) due to shallow water depths and more time required for diver and ROV pre-installation survey. This broadly reflects all activities associated with the cable route, vessel activity will be for a shorter duration within this period (approximately 6 days). Therefore, during installation there is potential for temporary visual and above water noise disturbance from the presence of the vessels which may interrupt the feeding, breeding or nesting activities of birds from the screened in SPAs.

5.3.4 In-combination effects

5.3.4.1 Method

The Habitats Directive requires that plans or projects are assessed alone and in-combination with other plans or projects to determine whether a likely significant effect to European sites could occur. Only plans or projects that would increase the likelihood of significant effects should be considered.

For there to be a potential cumulative impact between the proposed installation and another project, plan, or licensed activity there must be a common pressure-receptor pathway which overlaps spatially and to a certain degree temporally.

The nature of a linear telecommunications cable project means that many potential pressures result in temporary or short-term and localised effects restricted to an area smaller than the footprint of the Project cable corridors. The search area for other projects has been defined as anything within the 5km zone of influence from the Orkney cable corridors, herein referred to as the assessment search area. Although it is recognised that certain pressures may exceed this spatial extent these have been scoped out of the assessment as they will have a negligible effect.

To identify which projects and plans are likely to interact with the proposed Project cable corridors, it was established whether a common pressure-receptor pathway exists with the Project cable installation and other types of projects and plans identified. Based on professional judgement, projects and plans were grouped into categories and then each category was assessed to determine whether it would have a pathway likely to induce similar pressures as the Project activities. Where project categories had a pressure-receptor pathway, these were considered in further detail to see whether they have:

- A common-pressure receptor pathway with the project;
- Activities, the effects of which overlap spatially with the project; and
- Activities, the effects of which overlap spatially and temporally with the project.

5.3.4.2 Identifying relevant projects

To identify the potential for cumulative impacts of the R100 Project within the Orkney geographical area the following information sources have been reviewed and plotted on to GIS (Figure 5-1, Drawing Reference No: P2308_CUMU-002-OR-A):

- MS-LOT Public register
- National Marine Plan interactive (NMPi)
- SEAFISH Kingfisher Bulletin (Issues 27, 32, 35 dated 2021)
- UKDEAL: Oil and gas industry information;
- Oil and Gas Authority: Oil and gas industry information;
- KIS-ORCA: Marine cables information; and
- The Crown Estate Scotland Website: Offshore wind farm and marine aggregate digital data.

A review of the Marine Scotland Marine Licence Applications Public Register was undertaken in August 2021 to identify projects to be included in the assessment. Projects which had a license expiry date before January 2022 were not included as it is assumed that the licensable activity of these works will have taken place before the expiry date (any application variations with extended dates were included).

A review of the NMPi tool did not identify any other proposed projects or plans that would induce similar pressures and/or that were located within the assessment search area of the Orkney cable corridors (Marine Scotland 2021b).

In addition to the Marine Scotland public registers, GIS analysis of known infrastructure in the area was undertaken, using the data sources above. Of the infrastructure identified only one project (Lashay Sound Tidal Array) has the possibility of in-combination effects as all other infrastructure is already in place with no additional maintenance or repairs scheduled that the applicant is aware of. However, this has been screened out of the assessment as publicly available information suggests there are no current plans to develop the site (ORJIP, 2021; Parliament UK, 2011; Marine and Risk Consultants Ltd, 2021)

Two disposal sites and one oil rig were identified within the 5km assessment search area. Two of the disposal sites were not operational (one closed, one disused). The oil terminal is operational but with no installation/maintenance works being carried out and therefore no similar pressure receptor pathways occurring.

Table 5-1 presents known projects, plans and licences identified from the various sources as being within the assessment search area.

Fishing activity

Dredging for shellfish and demersal trawling are two of the key fishing activities employed within the Orkney geographical area. Dredging, particularly for scallops, involves teeth being raked through the seabed to disturb and collect scallops within the seabed sediments. Both scallop dredging and demersal fishing induce the pressures penetration and/or disturbance to the substratum on the surface of the seabed including abrasion, and abrasion/disturbance of the substratum below the surface of the seabed. As a result, there is the potential for the Orkney geographical area cable installations to have inter-project effects with demersal fishing activity. Despite this, the Orkney cable installation will be a temporary and one-off disturbance. Furthermore, the installation of the Orkney cables would only induce these pressures on a narrow footprint on the seabed, therefore potential cumulative impacts with demersal fishing activities will be highly limited and are therefore not considered further.

Table 5-1 Projects identified from MS-LOT public register and from MS communication

Project Category	Name/Type of project	Description of project	MS LOT Reference Number	Distance from cable corridor (km)							Stage Document submitted	Approximate distance to Protected sites (km)
				Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12		
Cable	BT Openreach Telecoms Subsea Cable - Cables to H&I Active	Maintenance of telecoms cable – however no work currently planned	5077				0				Not on the public register	Rousay SPA (Within) North Orkney pSPA (Within)
Mooring	Orkney Seafood Ltd - Mooring for Marine Farm	Project highlighted by MS documents not on public register	9349				1.3				Not on the public register	Unknown
Fish (including shellfish) farm	Marine Farm - Pegal Bay, Orkney	Application for renewal of existing licence	00008892							4.2	Application	Scapa Flow pSPA (Within)
Fish (including shellfish) farm	Marine Licence - Marine Farm - Eday Sound, Orkney	Application for renewal of existing licence	00009016		3.5	4.3					Licence	Doomy and Whitemaw SSSI (2.6km) Faray and Holm of Faray SAC (5.6km) Calf of Eday SPA (6.8km)
Renewables - Tidal	Marine Licence - Construction, Deployment and Removal of Gravity Based Anchors - Shapinsay Sound Test Site	Continued deployment of three GBAs, and installation and removal of a fourth GBA when required.	00009060					2.6			Licence	North Orkney pSPA (within)
Renewables - Tidal	Marine Licence - Deployment of Test Support Buoy (TSB)- Shapinsay Sound Test Site	Deployment and removal of the TSB and associated moorings	00009061					2.6			Licence	North Orkney pSPA (within)

Project Category	Name/Type of project	Description of project	MS LOT Reference Number	Distance from cable corridor (km)							Stage Document submitted	Approximate distance to Protected sites (km)
				Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12		
Construction, alteration or improvement of any works	Marine Licence - Extended Slipway and Landing Jetty - Scammalin Bay, Island of Faray -	Construction works below MHWS for a new extended slipway and landing jetty associated with the proposed Orkney Community Wind Farm - Faray project	00009361	0	2.7						Application	Faray and Holm of Faray SAC (within) Doomy and Whitemaw SSSI (2.7km) Calf of Eday SAC (4.5km)
Construction, alteration or improvement of any works	Capital Dredging and Sea Disposal - Scammalin Bay	Dredging and at sea disposal works for a new extended slipway and landing jetty associated with the proposed Orkney Community Wind Farm - Faray project.	00009362	0	2.7						Application	Faray and Holm of Faray SAC (within) Doomy and Whitemaw SSSI (2.7km) Calf of Eday SAC (4.5km)
Renewables - Wave	Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 6	No documents available for this on the public register, however most likely application is for ongoing operation	06266		3.7						Licence	Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Wave	Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 7 & 8	No documents available for this on the public register, however most likely application is for ongoing operation	06282		3.7						Licence	Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)

Project Category	Name/Type of project	Description of project	MS LOT Reference Number	Distance from cable corridor (km)							Stage Document submitted	Approximate distance to Protected sites (km)	
				Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12			
Renewables - Wave	Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 4	No documents available for this on the public register, however most likely application is for ongoing operation	06437		3.7							Application	Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Tidal	Marine Licence- Construction, Operation and Deposit of a Tidal Energy Device - Fall Of Warness, Test Berth 5	Installation, operation and decommissioning of tidal energy generator and anchor system.	06818/181025		3.7							Application	Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Fish (including shellfish) farm	New Marine Farm – Scapa Flow	New finfish farm	06823								0	Licence	Scapa Flow pSPA (within) Switha SPA (7.8km)
Chemotherapeutant	Marine Licence - Wellboat Discharge - Lober, Scapa Flow, Orkney	Bath Treatment of Atlantic Salmon for sea lice infestation using approved compounds in a wellboat enclosure at SEPA licensed marine cage fish farm at SMH (Lober), Scapa Flow, Orkney	07034								0	Licence	Scapa Flow pSPA (within) Switha SPA (7.4km)

Project Category	Name/Type of project	Description of project	MS LOT Reference Number	Distance from cable corridor (km)							Stage Document submitted	Approximate distance to Protected sites (km)
				Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12		
Fish (including shellfish) farm	Marine Licence - Marine Farm - Hunda, Orkney	Deposit of a new finfish farm	07080							4	Licence	Scapa Flow pSPA (within)
Pontoon	Marine Licence - Pontoon - Various Locations	This application applies to pontoon berths and their maintenance	07105						2.3		Licence	Kirlwall Longhope
Chemotherapeutant	Marine Licence – Wellboat Discharge – Eday, Orkney	Bath Treatment of Atlantic Salmon for sea lice infestation using approved compounds in a wellboat enclosure at SEPA licensed marine cage fish farm at Eday, Orkney	07137		3.4	3.9					Application	Doomy and Whitemaw SSSI (2.6km) Faray and Holm of Faray SAC (5.6km) Calf of Eday SPA (6.8km)
Fish (including shellfish) farm	Marine Licence Application- Marine Farm- North Bay, Hoy	New oyster farm at North Bay, Hoy, Orkney	07160						4.9		Licence	Scapa Flow pSPA (within) Switha SPA (7.8km)
Mooring	Marine Licence - New Mooring - Deer Sound, Orkney	The application is for a temporary mooring location for a marine energy generator	07168					2.4			Licence	North Orkney pSPA (within)
Fish (including shellfish) farm	Marine Licence - Marine Farm - Carness Bay, The String	Application for renewal of existing site	07176					4.1			Licence	North Orkney pSPA (within)
Renewables - Tidal	Installation of rock anchors, Fall of Warness and Shapinsay Sound	This project is for the installation, testing, removal and decommissioning of	07373/00008851					2.1			Licence	North Orkney pSPA (within)



Project Category	Name/Type of project	Description of project	MS LOT Reference Number	Distance from cable corridor (km)						Stage Document submitted	Approximate distance to Protected sites (km)	
				Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11			Cable 2.12
		up to eight rock anchors.										Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)

5.3.4.3 Relevant projects

Of the projects listed in Table 5-1, there are seven projects which have a common pressure-receptor pathway and require further assessment for potential in-combination effect. The other projects either do not overlap temporally, spatially or do not have a common pressure receptor pathway. Table 5-2 provides a summary of the projects considered further by the assessment.

Table 5-2 Projects identified which require further assessment within search area of the Orkney region

Project Category	Project Name	Distance of Cable Corridor from project (km) or intersect (Int)							Protected sites
		Cable Corridor							
		2.5	2.6	2.7	2.9	2.10	2.11	2.12	
Construction, alteration or improvement of any works	Orkney Islands Council - Faray Slipway Extension and Landing Jetty	Int	2.7						Faray and Holm of Faray SAC (within) Doomy and Whitemaw SSSI (2.7km) Calf of Eday SPA(4.5km)
Construction, alteration or improvement of any works	Orkney Islands Council - Capital Dredging and Sea Disposal - Scammalin Bay	Int	2.7						Faray and Holm of Faray SAC (within) Doomy and Whitemaw SSSI (2.7km) Calf of Eday SPA (4.5km)
Renewables - Wave	Tocado Tidal Energy Ltd - Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 6		3.7						Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Wave	OpenHydro Site Development Ltd - Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 7		3.7						Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Wave	Scotrenewables Tidal Power Ltd - Marine Licence – Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 8		3.7						Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Wave	OpenHydro Group Ltd - Marine Licence		3.7						Doomy and Whitemaw SSSI (0.9km)



Project Category	Project Name	Distance of Cable Corridor from project (km) or intersect (Int)							Protected sites
		Cable Corridor							
		2.5	2.6	2.7	2.9	2.10	2.11	2.12	
	– Construction and operation of tidal energy convertor – EMEC, Fall of Warness, Berth 4								Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)
Renewables - Tidal	Orbital Marine Power (Orkney) plc - Marine Licence- Construction, Operation and Deposit of a Tidal Energy Device - Fall Of Warness, Test Berth 5		3.7						Doomy and Whitemaw SSSI (0.9km) Faray and Holm of Faray SAC (3.7km) Calf of Eday SPA (6.7km)

SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT
CUMULATIVE IMPACT
Other Marine Users and Protected Sites
Orkney

Drawing No: P2308-CUMU-002_OR A

Legend

- █ R100 Application Corridor
- - - 5km Zone of Influence
- Subsurface Infrastructure
- Terminal
- Aquaculture Site**
- Fish, Active
- Fish, Inactive
- Fish, De-Registered
- Shellfish, Active
- Shellfish, Inactive
- Shellfish, De-Registered
- Pipelines**
- Active
- Cables**
- Power
- Power (Disused)
- Telecom
- Seaweed Licence
- Energy Agreement**
- Tidal Farm
- Wave Farm
- Designated Area
- Disposal Sites**
- Closed
- Disused
- Military Practice Area**
- Air Force Department
- Environmental Designation**
- SAC
- SPA
- pSPA
- Ramsar
- SSSI

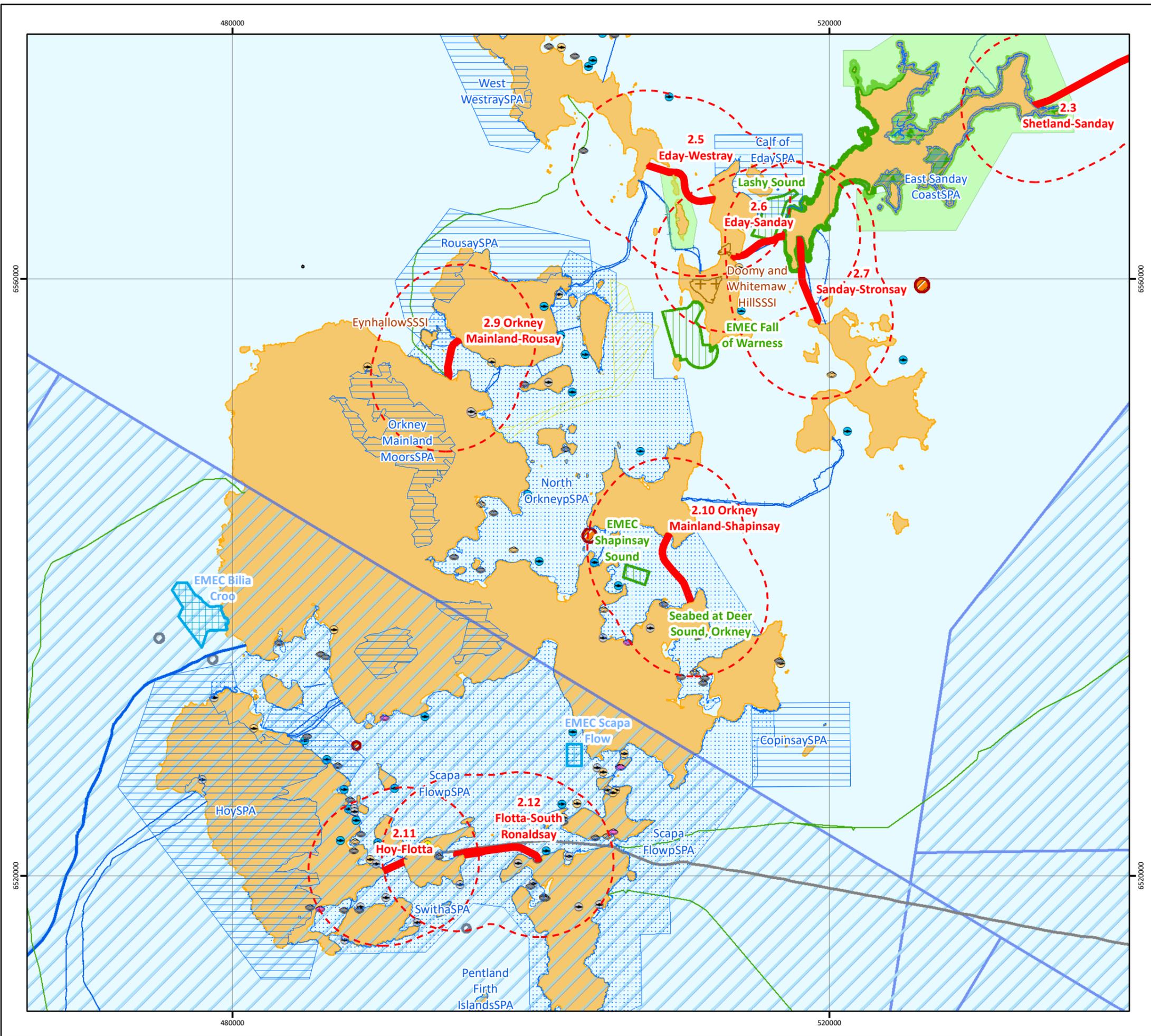


NOTE: Not to be used for Navigation

Date	23 September 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ONS; MS; KISCA; OGA; CES; CEFAS; UKHO; ESRI; SHN
File Reference	J:\P2308\Mxd\14_CUMU\ P2308-CUMU-002_OR.mxd
Created By	Emma Langley
Reviewed By	Chris Carroll
Approved By	Paula Daghish



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5.3.4.4 Assessment of in-combination effects

EMEC - Fall of Warness Tidal Test Site

European Marine Energy Centre (EMEC) Ltd. hold a section 36 consent under the Electricity Act 1989 in the Fall of Warness tidal site covering generation of electricity for the whole site. The site is located west of the island of Eday and partly overlaps with the assessment search area for Cable Corridor 2.6 Eday to Sanday (distance of 3.7km from the cable corridor). There are currently eight cable test berths in an approximately 8km² area occupied by different developers.

The common pressure-receptor pathway with Cable Corridor 2.6 Eday to Sanday is noise effects on marine mammals and seabirds. Faray and Holm of Faray SAC is designated for grey seal and could potentially be affected by an in-combination pressure due to noise output. The noise output of the Orkney cable installation is expected to have a radius of 1.1km. Characterisation of the acoustic levels of turbines at the Fall of Warness site concluded that it is unlikely that the noise generated by operating tidal energy converters would have a significant impact on marine mammals (Harland, 2013).

Doomy and Whitemaw SSSI is designated for Arctic skua and the whimbrel. Arctic Skua are not sensitive to disturbance therefore an in-combination effect for these species will not occur. Whimbrel are an intertidal wading species and will not be in the vicinity of the tidal turbines and therefore will not be effected by activity.

Calf of Eday SPA is designated for seabirds with sensitive species including guillemot and cormorant. Spatially the impacts from Cable Corridor 2.6 Eday to Sanday and the Fall of Warness site will not overlap given the distance between the two areas (3.7km) and therefore will not lead to a cumulative noise impact on designated bird features.

Given the short distance between the two projects there is the possibility that the two zones of influence would act as a barrier preventing animals from entering two areas at once as there will be a temporal overlap between the projects. Mitigation has been put in place within the Fall of Warness tidal site to reduce the effects of disturbance on marine mammals and sea birds, specifically adherence to The Scottish Marine Wildlife Watching Code (SMWWC), capped vessel speed and radius buffers of 50m near breeding seabird cliffs. Neither project will have a significant effect on marine mammals, fish or seabirds. In addition, the R100 Project is limited in duration (approximately 6 days per cable corridor) and therefore there will be no significant cumulative impacts and the integrity of the protected sites will not be affected.

Faray Slipway Extension and Landing Jetty (009361) – Orkney Islands Council / Capital Dredging and Sea Disposal - Scammalin Bay (009362) – Orkney Islands Council

Orkney Island Council have proposed a new extended slipway construction at the current slipway located at Scammalin Bay, south-east coast of the Island of Faray. This will include capital dredging and sea disposal of the dredged material to provide access to the slipway. The works are located within the Faray and Holm of Farray SAC/SSSI and environmental assessment for the project concluded no significant effect on the European Site. Works are (indicatively) scheduled to commence on the 1st of April 2025, with completion expected on the 30th of April 2026.

The project is located approximately 2.7km from Cable Corridor 2.6 Eday to Sanday at the closest approach. A potential LSE has been identified in relation to the pressures visual and underwater noise changes. Information to inform AA has been provided and mitigation has been proposed to reduce the significance of effect.

As the two projects will not overlap spatially or temporally there will be no cumulative impact in relation to underwater noise or visual disturbance.

5.4 Qualifying Interest Feature Summary

The HRA screening identified that 11 European sites require AA and that there was a potential for LSE on a total of 20 bird qualifying species and two seal qualifying species from these sites. A summary of key information on these species including foraging ranges, sensitivity to disturbance and seasonal information (e.g. breeding and moulting) where available has been provided in Table 5-3 below.

Table 5-3 Interest Feature Summary

Receptor	Woodhall <i>et al.</i> , 2019		Joint SNCB, 2017		Suggested seasonal definitions for birds in the Scottish Marine Environment (NatureScot, 2020)												
	Mean-Max Range (km)	Foraging	Disturbance Susceptibility	Habitat Specialisation	Winter			Summer						Winter			
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Auks																	
Atlantic puffin (<i>Fratercula arctica</i>)	137.1		2	3													
Guillemot (<i>Uria aalge</i>)	73.2		3	3													
Razorbill (<i>Alca torda</i>)	88.7		3	3													
Cormorants and Shags																	
Cormorant (<i>Phalacrocorax carbo</i>)	25.6		4	3													
European shag (<i>Phalacrocorax aristotelis</i>)	13.2		3	3													
Divers																	
Black-throated diver (<i>Gavia arctica</i>)	Unknown		5	4													
Great northern diver (<i>Gavia immer</i>)	Unknown		5	3													
Red-throated diver (<i>Gavia stellata</i>)	9.0		5	4													
Sea Ducks and Grebes																	
Common eider (<i>Somateria mollissima</i>)	21.5		3	4													
Common goldeneye (<i>Bucephala clangula</i>)	Unknown		4	4													
Long tailed duck (<i>Clangula hyemalis</i>)	Unknown		3	4													
Red-breasted merganser (<i>Mergus serrator</i>)	Unknown		3	4													
Slavonian grebe (<i>Podiceps auratus</i>)	Unknown		3	4													
Velvet scoter (<i>Melanitta fusca</i>)	Unknown		5	3													
Gulls and Terns																	
Arctic tern (<i>Sterna paradisaea</i>)	25.7		2	3													
Kittiwake (<i>Rissa tridactyla</i>)	156.1		2	2													
Petrels																	
Northern fulmar (<i>Fulmarus glacialis</i>)	542.3		1	1													
Skuas																	
Arctic skua (<i>Stercorarius parasiticus</i>)	62.5		1	2													
Great skua (<i>Stercorarius skua</i>)	443.3		1	2													
Waders																	
Whimbrel (<i>Numenius phaeopus</i>)	Unknown		Unknown	Unknown													
Marine Mammals																	
Grey seal (<i>Halichoerus grypus</i>)	>100 (NatureScot, 2021d)		N/A	N/A													
Harbour seal (<i>Phoca vitulina</i>)	21 (DECC, 2016).		N/A	N/A													
Key	Bird breeding season / Seal pupping season (NatureScot, 2021d) Present Period of flightless moult for common eider Unlikely to be present in significant numbers																

5.5 Faray and Holm of Faray SAC

5.5.1 Screening conclusion

The HRA screening identified that there was a potential LSE on the qualifying feature ‘grey seal’ from the following pressures:

- Visual (and above water noise) disturbance
- Underwater noise changes

5.5.2 Conservation objectives

To avoid deterioration of the habitats of grey seal (the qualifying feature) or significant disturbance to grey seal, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying feature; and

To ensure for grey seal that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.5.3 Assessment against conservation objectives (includes feature assessment)

5.5.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Faray SAC is provided in Table 5-4.

Table 5-4 Summary of LSE for visual (and above water noise) disturbance for the qualifying features of Faray and Holm of Faray SAC

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Grey seal							

Note: Dark blue cells denote where cable corridors are within European site.

The Faray and Holm of Faray SAC encompasses the waters of the islands of Faray and the Holm of Faray, in addition to the terrestrial area of the Holm of Faray. The site is designated for the breeding grey seal colony that is found within the site. The islands support the second-largest grey seal breeding colony in the UK, contributing around 9% of annual UK pup production (JNCC, 2021). Cable corridor 2.5 overlaps with the east and northern extents of the SAC between the islands of Eday and Westray. Installation activities within 500m of the seal haul-out sites have the potential to disturb individuals hauled out within the SAC (pers comm – NatureScot, 2021). The Project will typically involve the Main lay vessel and one ancillary support vessel. It cannot be ruled out that even temporary disturbance during the breeding season will not affect pup production and lead to a change in the population dynamics for the year. Due to the sensitive nature of grey seals when hauled-out, the close proximity of installation activities to the SAC and presence of significant numbers of individuals during the breeding season (typically occurring between October and December, inclusive), significant disturbance to grey seal could occur as a result of installation activities should they overlap with the breeding season. This has the potential to negatively affect their ability to remain a viable component of the site. This has the potential to negatively affect their ‘Favourable Maintained’ status. Therefore,

it is appropriate to implement mitigation measures to ensure that the Project will not hinder the conservation objectives for the site.

LSE cannot be ruled out for Cable Corridor 2.5 for the qualifying feature grey seal during their peak breeding seal from October to December.

No LSE for will occur on the qualifying feature grey seal population within the Faray and Holm of Faray SAC for all other cable corridors.

5.5.3.2 Underwater noise changes

A summary of the qualifying features and cable corridors screened in underwater noise changes in Faray SAC is provided in Table 5-5.

Table 5-5 Summary of LSE for underwater noise changes for the qualifying features of Faray and Holm of Faray SAC

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Grey seal							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE. Dark blue cells denote where cable corridors are within protected site.

Sound generated by USBL devices is used to determine the position of subsea equipment during cable installation. The system operates by emitting a low frequency acoustic pulse between the transponder on the vessel and the transducer on the subsea unit. The vessel mounted system to be used throughout cable installation activities is the HiPAP502. This transmits a directional beam, with a source level of SPL 190dB re 1µPa @1m (assumed to be 0-pk) in the frequency range 21-31 kHz, with an effective range of 2000m. Such frequencies will be audible to nearby grey seal, and thus could potentially disturb animals.

Calculations presented in the Orkney Geographical Region European Protected Species (EPS) Assessment (Document: P2308_R5284_Rev1) concluded auditory injury will not occur in seal from the use of the USBL. Calculations assumed 24 hours continuous exposure to impulsive sound and used the injury criteria as given in NMFS (2018), for a permanent threshold shift or temporary threshold shift in hearing. However, the highly precautionary calculations identified that disturbance may occur within 1.1km of the USBL.

The calculations presented in the Orkney EPS Assessment were highly precautionary. NMFS (2018) acknowledge that criteria for disturbance (termed effective silence in the case of NMFS 2018), are not representative of the effects on animals within their natural environment but are based on a limited number of studies of captive individuals and do not take into account habituation to ambient sound. Within Orkney waters, ambient sound is dominated by shipping noise (Richards *et al* 2007), which is of low frequency in addition to fishing and military operations. These ambient sound sources are likely to reduce the effects of disturbance from the USBL.

The Project will typically involve the Main lay vessel and one ancillary support vessel. Up to approximately 40% of the site may be temporarily subject to underwater noise sufficient to cause disturbance. Cable installation activities will be a continuous, transient but temporary occurrence (approximately 6 days per cable corridor). As the installation activities will move at a maximum speed of 2 knots, the highly precautionary area of disturbance will move with the vessel and the effects will be brief in any one place and localised to the installation activity. Animals will not be subject to lasting or prolonged periods of disturbance. Recent studies have shown that individuals will quickly return to an area that was subjected to even high-intensity noise emissions within a short period of time (Russell *et al.*, 2016). As such, noise and associated temporary disturbance from the cable laying activities themselves will not result in a significant adverse effect on nearby individuals.

As the cable corridor of Cable Corridor 2.5 overlaps directly with the eastern extent of the SAC, there is the potential that the USBL noise could disturb individuals in the vicinity of the haul-out site itself. The remaining cable corridors in the Orkney region are a sufficient distance away from the SAC (minimum 2.6km to the cable corridor of Cable Corridor 2.6) that USBL activities for those cable corridors would not impact seals from Faray and Holm of Faray SAC.

Although activities close to the landfall will be typically restricted to several days, it cannot be ruled out that even temporary disturbance during the breeding season will not affect pup production and lead to a change in the population dynamics for the year. As the population status is 'Favourable Maintained', it is therefore appropriate to implement mitigation measures to ensure that the Project will not hinder the conservation objectives for the site.

LSE cannot be ruled out for Cable Corridor 2.5 for the qualifying feature grey seal during their peak breeding seal in October and December.

No LSE for will occur on the qualifying feature grey seal population within the Faray and Holm of Faray SAC for all other cable corridors.

5.5.4 Project specific mitigation

- M1 - Installation activities should not occur at Cable Corridor 2.5 during the peak grey seal breeding season from October to December (inclusive).

5.5.5 Conclusion

Project specific mitigation has been proposed to avoid installation during the peak harbour seal breeding season. Providing that the mitigation measures are implemented, the Project will not significantly disturb harbour seal within the cable corridor for Cable Corridor 2.5 and an LSE will not occur. The conservation objectives of the Faray and Holm of Faray SAC and SSSI will not be affected and therefore there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects**.

5.6 Sanday SAC

5.6.1 Screening conclusion

The HRA screening identified that there was a potential LSE on the qualifying feature 'harbour seal' from the following pressures:

- Underwater noise changes

5.6.2 Conservation objectives

To avoid deterioration of the habitats of harbour seal (the qualifying feature) or significant disturbance to harbour seal, thus ensuring that the integrity of the site is maintained, and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying feature; and to ensure for harbour seal that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.6.3 Assessment against conservation objectives

5.6.3.1 Underwater noise changes

A summary of the qualifying features and cable corridors screened in for underwater noise changes in Sanday SAC is provided in Table 5-6.

Table 5-6 Summary of LSE for underwater noise changes for the qualifying features of Sanday SAC

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Harbour seal							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

Sanday is situated in the north-east of the Orkney archipelago and supports the largest group of harbour seal at any discrete site in Scotland. The breeding groups, found on intertidal haul-out sites that are unevenly distributed around the Sanday coast, represent over 4% of the UK population. Nearshore kelp beds that surround Sanday are important foraging areas for the seals, and the colony is linked to a very large surrounding population in the Orkney archipelago (JNCC, 2016). Harbour seals spend most time around haul out sites and foraging in offshore areas in the Moray Firth (Thompson *et al.*, 2013). None of the cable corridors are located within the Sanday SAC, with the cable corridor for the closest (Cable Corridor 2.7) being located 3.6km from the SAC.

The only potential source of noise capable of having a significant effect on harbour seal is the use of USBL devices. Seals present in the vicinity of installation activities could be susceptible to disturbance from USBL devices given the overlap in their hearing ranges and frequencies generated by USBL devices. As stated previously however, recent studies have shown that individuals will quickly return to an area that was subjected to even high-intensity noise emissions within a short period of time (Russell *et al.*, 2016). Also, the highly precautionary calculations identified that disturbance may occur within 1.1km of the USBL, so the zone of influence from the installation activities does not overlap with the SAC. None of the cable corridors are located close enough to the SAC to disturb seals at their haul-out sites within the SAC.

Additionally, the cable installation activities will be a continuous, transient but temporary occurrence (approximately 6 days per cable corridor). As the installation activities will move at a maximum speed of 2 knots, the highly precautionary area of disturbance will move with the vessel and the effects will be brief in any one place and localised to the installation activity. Animals will not be subject to lasting or prolonged periods of disturbance. Recent studies have shown that individuals will quickly return to an area that was subjected to even high-intensity noise emissions within a short period of time (Russell *et al.*, 2016). As such, noise and associated temporary disturbance from the cable laying activities themselves will not result in a significant adverse effect on nearby individuals.

No LSE for all cable corridors listed in Table 5-6 will occur on the qualifying features within the Calf of Eday SPA.

5.6.4 Project specific mitigation

None specified.

5.6.5 Conclusion

As there is no overlap in the zone of influence and the SAC there will be no significant disturbance to seals within the site. Additionally, the installation activities will be a transient, temporary occurrence that will not affect harbour seal in the long-term. As such, the harbour seal population will not be significantly disturbed by the Project. The conservation objectives of the Sanday SAC will not be

affected and therefore there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.7 Calf of Eday SPA

5.7.1 Screening conclusion

The HRA screening identified that there was a potential LSE from the pressure 'Visual (and above water noise) disturbance' on the qualifying features:

- Breeding cormorant
- Breeding guillemot

5.7.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species

5.7.3 Assessment against conservation objectives

5.7.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Calf of Eday SPA is provided in Table 5-7.

Table 5-7 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Calf of Eday SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Breeding cormorant							
Breeding guillemot							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

Calf of Eday SPA is a small maritime island to the north of Eday in Orkney. Calf of Eday has a rocky shoreline with cliffs to the north and the west and is dominated by maritime heath and grassland. The seaward extension of the SPA extends approximately 2km into the marine environment to include the seabed, water column and surface. The Calf of Eday SPA qualifies under Article 4.2 of the EC Wild Birds Directive by supporting in excess of 20,000 individual seabirds. It regularly supports 30,000 seabirds including nationally important populations of great cormorant and common guillemot (NatureScot, 2009a).

The closest cable corridor to the SPA is Cable Corridor 2.5, which is located 0.4km south of the site. As the cable corridor is not located within the SPA, there will be no effects from installation activities on the extent of habitats supporting the species, or the structure, function and supporting processes of habitats supporting the species. However, as the cable corridor is within 2km of the site, there is potential for impact to the distribution of the species within the site.

Breeding cormorant and guillemot

The last population estimate of cormorant and guillemot for the Calf of Eday SPA (recorded in 2009) indicated that the SPA supports:

- 223 breeding pairs of cormorant, which was equivalent to 3% of the Great Britain (GB) population at the time; and
- 12,645 individuals of guillemots, which was equivalent to 1% of the GB population at the time (NatureScot, 2009a).

As the cable corridor for Cable Corridor 2.5 is located 0.4km from the SPA, there is potential for disturbance from installation activities to impact the distribution of the species within the site.

Both cormorant and guillemot are present in Orkney year-round. They are most sensitive to disturbance during their breeding seasons, which for cormorant is February to September, and guillemot is April to August. However, nesting birds within the site are on the Calf of Eday island which is approximately 2.8km from the closest cable corridor (Cable Corridor 2.5), therefore nesting birds will not be disturbed by the installation activities.

Based on the species mean max foraging ranges listed in Table 5-3, there is potential for installation activities associated with the cable corridors for Cable Corridors 2.5, 2.6, 2.7, 2.9 and 2.10 for cormorant, and all cable corridors for guillemot, to disturb foraging cormorant and guillemot during the breeding season. Both species have moderate sensitivity to vessel disturbance (Joint SNCB, 2017). Vessel activity through areas where these species are present on the surface may result in temporary displacement from optimal areas for feeding/loafing. However, the area disturbed due to vessel movements along the cable corridor is very small in the context of the distribution of cormorant and guillemot (i.e. limited to the immediate vicinity of where works are being carried out) and installation of telecommunication cables represents a single discrete event.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). It is therefore concluded that any disturbance to individuals foraging within the cable corridor will be temporary and localised.

As the closest cable corridor intersects three ferry corridors, it is likely that cormorant and guillemot have some local habituation to vessel disturbance. Additionally, strong currents through the Sound of Faray and Lashy Sound mean that cormorant and guillemot are unlikely to be foraging along the majority of the cable corridors closest to the protected SPA.

As no nesting cormorant or guillemot will be disturbed and cormorant and guillemot foraging at sea will only be subject to temporary and localised disturbance, there will be no significant disturbance. Therefore, distribution of the species within the site and their population as a viable component of the SPA will be maintained.

No LSE for all cable corridors listed in Table 5-7 will occur on the qualifying features within the Calf of Eday SPA.

5.7.4 Project specific mitigation

None specified.

5.7.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within any of the cable corridors listed above in Table 2-7 will not disturb nesting cormorant or guillemot on the Calf of Eday

SPA. Any temporary disturbance to cormorant and guillemot from the SPA foraging at sea will be minimal and localised.

The distribution of the species within the site and their population as a viable component of the SPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.8 Copinsay SPA

5.8.1 Screening conclusion

The HRA screening identified that was a potential LSE from the pressure 'Visual (and above water noise) disturbance' on the qualifying feature:

- Guillemot

5.8.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.8.3 Assessment against conservation objectives

5.8.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Copinsay SPA is provided in Table 5-8.

Table 5-8 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Copinsay SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Guillemot							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

The Copinsay SPA comprises a group of islands 4km off the east coast of Orkney Mainland. The islands have a cliffed rocky coastline and maritime vegetation that support large colonies of breeding seabirds. The seaward extension of the SPA extends approximately 2km into the marine environment to include the seabed, water column and surface (NatureScot, 2009b). The Copinsay SPA qualifies under 4.2 of the EC Wild Birds Directive by supporting in excess of 20,000 individual seabirds. It regularly supports 70,000 seabirds including nationally important populations of guillemot.

The cable corridor for Cable Corridor 2.7 is closest to the SPA, located 7.97km south of the site. As the cable corridor is not located within the SPA, there will be no effects from installation activities on the distribution of the species within site, the distribution and extent of habitats supporting the species or the structure, function and supporting processes of habitats supporting the species.

Guillemot (Breeding)

The last population estimate of guillemot within Copinsay SPA (recorded in 2009) indicated that the SPA supports a breeding population of 29,450 individuals, which was equivalent to 3% of the GB population (NatureScot, 2009b). Recent bird counts in Copinsay SPA suggest the population is stable, with 18,675 individuals counted in the Seabird 2000 survey compared to 18,461 in 2015 (JNCC, 2019). As the installation activities will occur outside 2km of the SPA itself, there will be no disturbance to individuals nesting or foraging within the SPA, but individuals from the SPA could be found foraging in the vicinity of all cable corridors listed above in Table 5-8.

Many guillemot spend winter at sea, but they are present year round in Orkney in inshore waters, with highest abundances during breeding seasons (April to August) when they return to the land (Scottish Wildlife Trust, 2021c). They are most sensitive to disturbance during breeding months, when disturbance could impact nesting success and chick survival.

Based on guillemots mean max foraging range listed in Table 5-3, there is potential for installation activities associated with all the cable corridors listed in Table 5-8 above to disturb foraging guillemot during the breeding season. Guillemot have moderate sensitivity to vessel disturbance (Joint SNCB, 2017). Vessel activity through areas where these species are present on the surface may result in temporary displacement from optimal areas for feeding/loafing. However, the area disturbed due to vessel movements along the cable corridor is very small in the context of the distribution of guillemot (i.e. limited to the immediate vicinity of where works are being carried out) and installation of telecommunication cables represents a single discrete event.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). As guillemot have only moderate sensitivity to disturbance, and Orkney has moderate vessel activity, it is likely that guillemot have some local habituation to vessel disturbance. Any disturbance to guillemot will be brief and localised.

As no nesting guillemot will be disturbed and guillemot foraging at sea will only be subject to temporary and localised disturbance, there will be no significant disturbance. Therefore, distribution of the species within the site and their population as a viable component of the SPA will be maintained.

No LSE for all cables corridors listed in Table 5-8 will occur on the qualifying features within Copinsay SPA.

5.8.4 Project specific mitigation

None specified.

5.8.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within any of the cable corridors listed above in Table 5-8 will not disturb nesting guillemot within Copinsay SPA. Any temporary disturbance to guillemot from the SPA foraging at sea will be minimal and localised.

The distribution of the species within the site and their population as a viable component of the SPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.9 Hoy SPA

5.9.1 Screening conclusion

The HRA screening identified that the pressure ‘Visual (and above water noise) disturbance’ could have a potential LSE on the qualifying features:

- Red-throated diver
- Guillemot
- Puffin

5.9.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.9.3 Assessment against conservation objectives

5.9.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Hoy SPA is provided in Table 5-9.

Table 5-9 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Hoy SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Red-throated diver							
Guillemot							
Puffin							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

Hoy SPA covers the northern and western two-thirds of Hoy island and extends approximately 2km into the marine environment. The closest cable corridor (Cable Corridor 2.11) to the site, is located on the South-East of the Island, 4.24km from the Hoy SPA. As the cable corridor is not located within the SPA, there will be no effects from installation activities on the distribution of the species within the site, the distribution and extent of habitats supporting the species or the structure, function and supporting processes of habitats supporting the species.

Red-throated diver (Breeding)

The Orkney Isles are considered by RSPB (2021) to be a stronghold for the UK red-throated diver population, behind only the Shetland Isles in population size. While several sites for red-throated diver have been designated across Orkney, due to the small geographical area of Orkney the populations of these sites are thought to be part of the same overall population (O’Brien et al., 2018). The last known

adult population estimate of red-throated diver at Hoy SPA was 111 individuals, which is equivalent to 2.7% of the British population (Dillon *et al.*, 2009). The latest assessed condition by Nature Scot for red-throated diver in 2007 classed the SPA population condition as “favourable maintained”. Within Hoy SPA red-throated diver are known to nest on the numerous small lochans found on the moorland and forage in nearby waters (Orkney Islands Council, 2019). They are also known to use the several scattered lochans within the Orkney Mainland Moors SPA as breeding areas (Orkney Islands Council, 2019). As the installation activities will occur outside 2km of the SPA itself, there will be no disturbance to individuals nesting or foraging within the SPA.

Red-throated diver have a mean-max foraging range of 9km (Woodward *et al.*, 2019). As such, individuals from Hoy SPA could forage within the cable corridors of Cable Corridors 2.11 and 2.12 which are located within the Scapa Flow pSPA. Scapa Flow has been selected to provide protection to important wintering grounds for waterfowl, with the inshore area also selected as an important foraging area for breeding red-throated diver. This foraging area falls within foraging range of a high concentration of nesting territories, including those of the Hoy SPA (NatureScot 2016f). Therefore, red-throated diver from Hoy SPA foraging within the cable corridors of Cable Corridors 2.11 and 2.12 have been assessed under Scapa Flow pSPA (Section 6.12).

No LSE for all cables listed in Table 5-9 will occur on the qualifying feature breeding red-throated diver.

Guillemot and Puffin (Breeding)

The last known population size for guillemot in Hoy SPA was 9,020 in 2007; a decline of 59% since the previous survey in 1999 (JNCC, 2019). The puffin population on the island of Hoy is 3,000 individuals (approximately 75% of the Orkney puffin population) (Hughes *et al.*, 2018) showing that the island is an important stronghold for puffin in Orkney. As the installation activities will occur outside 2km of the SPA itself, there will be no disturbance to individuals nesting or foraging within the SPA.

Many guillemot spend winter at sea, but they are present year-round in Orkney in inshore waters, with highest abundances during breeding seasons (April to August) when they return to the land (Scottish Wildlife Trust, 2021). Puffin spend most of the year out at sea, but return to land to breed from April to August (Scottish Wildlife Trust, 2021e). The Old Red Sandstone cliffs and several stacks and crags on the west coast of the island of Hoy have been noted to provide important breeding sites for both species (Orkney Islands Council, 2019). Breeding puffin tend to aggregate at sea near to colonies in early March before coming ashore.

Based on the species mean max foraging ranges listed in Table 5-3, there is potential for installation activities associated with all cable corridors to disturb foraging guillemot and puffin during the breeding season. However, if breeding puffin and guillemot remain close to their colonies which are on the other side of the island of Hoy to the closest Cable Corridor 2.11 (Hoy to Flotta) then their chance of foraging within this cable corridor, or any of the other cable corridors is reduced.

Guillemot and puffin have moderate and low to moderate sensitivity to vessel disturbance, respectively (Joint SNCB, 2017). Vessel activity through areas where these species are present on the surface may result in temporary displacement from optimal areas for feeding/loafing. The area disturbed due to vessel movements along the cable corridors is very small in the context of the distribution of guillemot and puffin (i.e. limited to the immediate vicinity of where works are being carried out) and installation of telecommunication cables represents a single discrete event.

Installation vessels will be slow moving (approximately 2km/hr) slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). It is therefore concluded that any disturbance will be temporary and localised and will not result in any likely significant effects on guillemot and puffin.

As no nesting guillemot or puffin will be disturbed, and individuals foraging at sea will only be subject to temporary and localised disturbance, there will be no significant disturbance. Therefore, distribution of the species within the site and their population as a viable component of the SPA, will be maintained.

No LSE for all cables corridors in the Orkney region will occur on the qualifying features guillemot and puffin within Hoy SPA.

5.9.4 Project specific mitigation

None specified.

5.9.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within any of the cable corridors listed above in Table 5-9 will not disturb guillemot, puffin, and red-throated diver within Hoy SPA.

The distribution of the species within the site and their population as a viable component of the SPA, will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.10 Orkney Mainland Moors SPA

5.10.1 Screening conclusion

The HRA screening identified that the pressure 'Visual (and above water noise) disturbance' could have a potential LSE on the qualifying feature:

- Red-throated diver

5.10.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species

5.10.3 Assessment against conservation objectives

5.10.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Orkney Mainland Moors SPA is provided in Table 5-10.

Table 5-10 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Orkney Mainland Moors SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Red-throated diver							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

Red-throated diver (Breeding)

Orkney Mainland Moors SPA comprises four areas of moorland on Mainland, Orkney. The predominant habitats include extensive areas of blanket bog, acid grassland, wet and dry heath, acidic raised-mire, and calcareous valley mire (NatureScot, 2008). The last population estimate for the site (recorded in 2009) indicated that the site supports an average of 18 breeding pairs of red-throated diver annually, accounting for 2% of the British population (Dillon et al., 2009). The latest assessed condition by Nature Scot for red-throated diver in 2007 classed the SPA population condition as “favourable maintained”, with the most significant negative pressure on the species identified as invasive species (NatureScot, 2008).

The closest cable corridor to the site is for Cable Corridor 2.9, located 2.43km north of the site. As the cable corridor for Cable Corridor 2.9 is not located within the SPA, there will be no disturbance to individuals nesting or foraging within the SPA. There will be no effects from installation activities on the distribution of the species within site, the distribution and extent of habitats supporting the species or the structure, function and supporting processes of habitats supporting the species.

Red-throated diver from the site may forage within the cable corridor for Cable Corridor 2.9 as it lies within the species mean-max foraging range of 9km (Woodward et al., 2019). This section of the cable corridor is located within the North Orkney pSPA. The marine waters of North Orkney have been selected to provide protection for inshore wintering waterfowl and foraging areas for breeding red-throated diver. The foraging area falls within foraging range of a high concentration of nesting territories, including those of the Orkney Mainland Moors SPA (NatureScot 2016d). Therefore, red-throated diver from Orkney Mainland Moors SPA foraging within cable corridor 2.9 have been assessed under North Orkney pSPA (Section 6.14).

Any disturbance to red-throated diver will be brief and localised. Due to the low utilisation by red-throated diver within the cable corridors of Cable Corridors 2.9 and 2.10 and the temporary and localised nature of installation activities, there will be no significant disturbance of red-throated diver and their population as a viable component of (and distribution within) the site will be maintained.

No LSE for all cables listed in Table 5-10 will occur on the qualifying feature breeding red-throated diver.

5.10.4 Project specific mitigation

None specified.

5.10.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within any of the cable corridors listed above in Table 5-10 will not disturb nesting birds within the Orkney Mainland Moors SPA. Any disturbance of foraging breeding red-throated diver will be temporary and localised.

The distribution of the species within the site and their population as a viable component of the SPA, will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.11 Pentland Firth Islands SPA

5.11.1 Screening conclusion

The HRA screening identified that the pressure ‘Visual (and above water noise) disturbance’ could have a potential LSE on the qualifying features:

- Arctic tern

5.11.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species

5.11.3 Assessment against conservation objectives

5.11.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Pentland Firth Islands SPA is provided in Table 5-11.

Table 5-11 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Pentland Firth Islands SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Arctic tern							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

Pentland Firth Islands SPA consists of the small uninhabited islands of Swona and Muckle Skerry situated in the Pentland Firth between South Ronaldsay and mainland Scotland. The islands are low-lying with cliffs and rocky shorelines. Above the shore the islands support a variety of habitats including maritime heath, rough grassland, marsh, and open freshwater. The closest cable corridors to the site are those for Cable Corridors 2.11 and 2.12, located 9.81km and 8.77km north of the site, respectively. As these cable corridors are not located within the SPA, there will be no effects from installation activities on the distribution of the species within site, the distribution and extent of habitats supporting the species or the structure, function and supporting processes of habitats supporting the species.

Arctic Tern

The last population estimate for the site (recorded in 1995) indicated that the site supports 1000 breeding pairs of Arctic tern annually. Despite declines in Arctic tern numbers across Orkney, further surveys over the past decade have confirmed that The Pentland Firth Islands SPA is still regularly used by large numbers of Arctic tern (NatureScot, 2016c). The Pentland Firth Islands SPA holds the largest population of breeding Arctic tern in Scotland, which have been nesting on the islands since the late 1960’s (NatureScot, 1998). In Scotland, Arctic tern are present during the breeding season (May to August), before migrating to Antarctica for winter (Scottish Wildlife Trust, 2021a).

As the installation activities will occur outside 2km of the SPA itself, there will be no disturbance to individuals nesting or foraging within the SPA.

Arctic tern may forage within the cable corridors for Cable Corridors 2.11 and 2.12 as both are within the mean-max foraging range for the species (25.7km, Woodward et al., 2019). In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), Arctic tern is classed as having a moderate habitat specialisation (score of 3 out of 5) and a low susceptibility to disturbance (score of 2 out of 5). This finding is in line with other studies which indicate that Arctic tern have a low sensitivity to vessel disturbance (NatureScot, 2017).

Two populations of Arctic tern are present at the Pentland Firth Islands SPA, the Muckle Skerry and Swona colonies. The cable corridor for Cable Corridor 2.11 is outside the main distribution (indicated by the maximum curvature) for both colonies, with a density of 0.1 or less individuals per km². Cable Corridor 2.12 is within the maximum curvature; however, densities are estimated to be very low with 0.1 or less individuals per km² across the majority of the cable corridor and a small section up to 0.5 individuals per km² (Figure 5-1, Drawing: P2308-BIRD-006).

Due to the low utilisation of the waters within the cable corridors for Cable Corridors 2.11 and 2.12, by Arctic tern, the low sensitivity of Arctic tern to vessel disturbance and the temporary and localised nature of installation activities there will be no significant disturbance of Arctic tern. Therefore, distribution of the species within the site and their population as a viable component of the site will be maintained.

No LSE for all Cable Corridors 2.11 and 2.12 will occur on the qualifying features within Pentland Firth Islands SPA.

5.11.4 Project specific mitigation

None specified.

5.11.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within the cable corridors of Cable Corridors 2.11 and 2.12 will not disturb nesting Arctic tern in the Pentland Firth Islands SPA. Any temporary disturbance to Arctic tern from the SPA foraging at sea will be brief, minimal and localised.

The distribution of the species within the site and their population as a viable component of the SPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

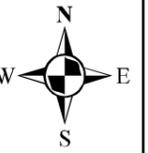
**SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT
BIRD ACTIVITY
Arctic Tern Distribution
in Pentland Firth Islands SPA**

Drawing No: P2308-BIRD-006_OR

A

Legend

Cable Route Application Corridor



Arctic Tern Predictive Bird Distribution (per km²)

0.1 or less

0.1 - 0.5

0.5 - 1

1 - 5

5 or greater

Maximum Curvature

Protected Site

SPA

pSPA

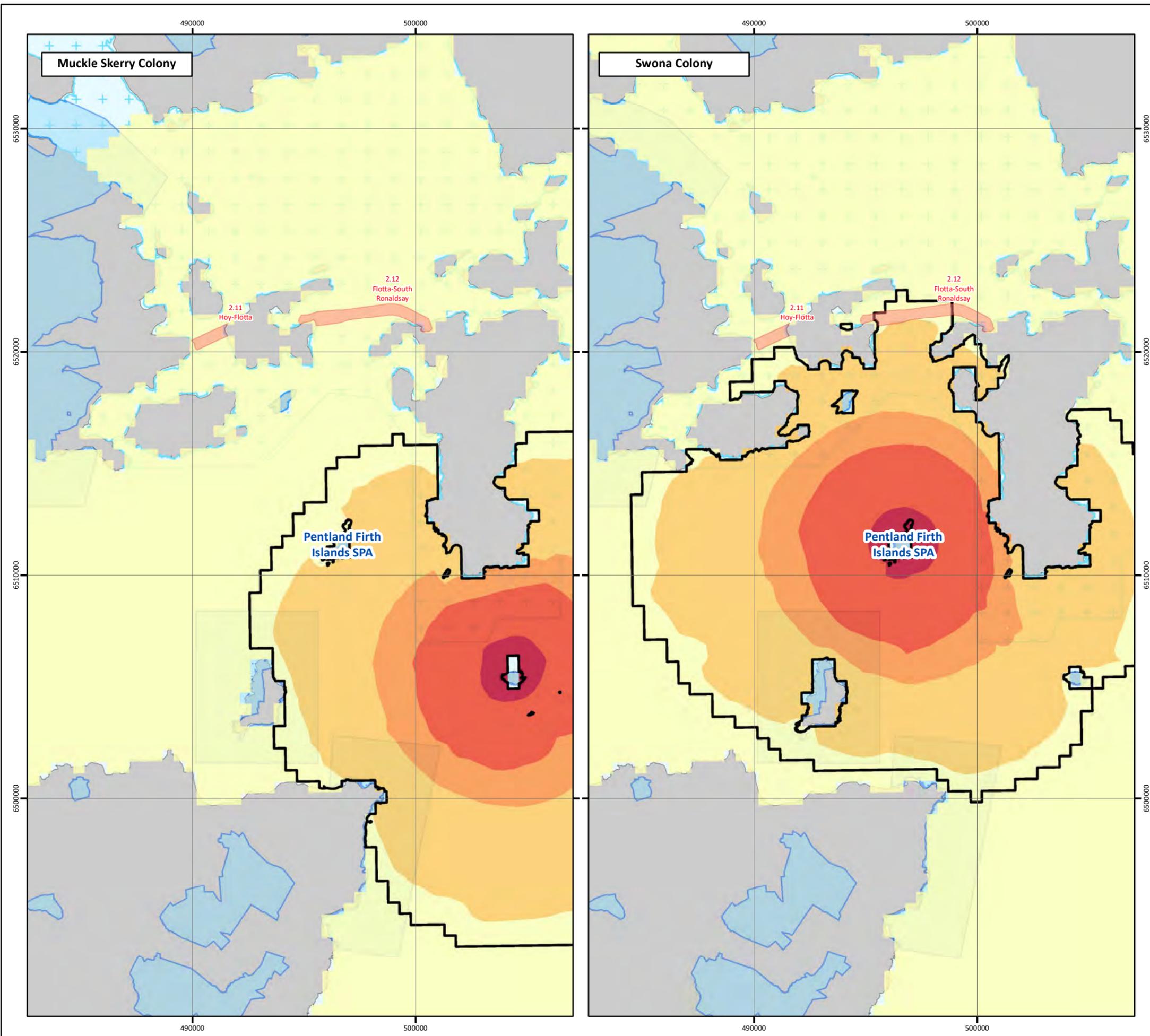


NOTE: Not to be used for Navigation

Date	25 August 2021
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; JNCC; OSOD; SNH
File Reference	J:\P2308\Mxd\11_BIRD\ P2308-BIRD-006_OR.mxd
Created By	Jessica Harvey
Reviewed By	Chris Dawe
Approved By	Jill Hobbs



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5.12 Rousay SPA

5.12.1 Screening conclusion

The HRA screening identified that the pressure ‘Visual (and above water noise) disturbance’ could have a potential LSE on the qualifying features:

- Arctic tern
- Arctic skua
- Fulmar
- Guillemot
- Kittiwake

5.12.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.12.3 Assessment against conservation objectives

5.12.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Rousay SPA is provided in Table 5-12.

Table 5-12 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Rousay SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Arctic tern							
Arctic skua							
Fulmar							
Guillemot							
Kittiwake							

Note: Dark blue cells denote where cable corridors are within European site. Blue cells denote cable corridors where screening has identified a potential for LSE.

Rousay SPA consists of sea cliffs and areas of maritime heath and grassland in the northwest and northeast of the island. The boundary of the SPA extends seaward approximately 2km into the marine environment to include the seabed, water column and surface (NatureScot, 2021c, 2021b).

The cable corridor for Cable Corridor 2.9 is within the SPA for approximately 0.21km², which is equivalent to 0.004% of the SPA, at the southern edge of the SPA at the landfall approach and landfall

site on Rousay. Installation of Cable Corridor 2.9 therefore has potential to disturb nesting breeding birds and breeding birds feeding within the SPA at the cable landfall site on Rousay. The next closest cable corridor is that of Cable Corridor 2.5, which is 6.13km from the site, followed by the cable corridors for Cable Corridors 2.6, 2.7, 2.10, 2.12 and 2.11, which have potential to disturb foraging birds from the site.

Arctic tern and guillemot (Breeding)

Table 5-13 provides the last population estimate (recorded in 2009; NatureScot, 201b) and condition status (guillemot 2016 and Arctic tern 2018) for the two species.

Table 5-13 Population estimates and condition status

	Arctic tern	Guillemot
Population estimate	790 pairs	10,600 individuals
% of the GB population	2%	1%
Condition status	Unfavourable no change	Unfavourable no change
Breeding season	May to August	April to August

As the installation activities for Cable Corridor 2.9 are within the SPA, there is potential for disturbance to individuals nesting and foraging within the SPA. Due to the foraging range of Arctic tern and guillemot there is also potential for disturbance to birds from the site foraging within all other cable corridors.

In Scotland, Arctic tern are present during the breeding season, before migrating to Antarctica for winter (Scottish Wildlife Trust, 2021a). Many guillemot spend winter at sea, but they are present year round in Orkney in inshore waters, with highest abundances during the breeding season when they return to the land (Scottish Wildlife Trust, 2021c). They are most sensitive to disturbance during breeding months, when disturbance could impact nesting success and chick survival.

Breeding guillemot typically nest in dense colonies on wide, open ledges on rocky cliffs (Dunn, 1999), such as those in the northern area of the SPA. The habitat at the landfall site is sloping, and predominantly agricultural land and grassland making it unsuitable for nesting guillemot (NatureScot, 2021a).

Arctic tern nest on sand and shingle beaches along the coast. Whilst there is a small area of beach at the Cable 2.9 landfall which could be appropriate for nesting Arctic tern, no nesting Arctic tern or guillemot have been found nesting at the landfall or in the surrounding area in the JNCC Seabird 2000 census surveys (JNCC, 2004) (Figure 5-2, Drawing: P2308-BIRD-011_OR).

Additionally, the landfall site for Cable Corridor 2.9 is likely to be subject to regular human disturbance from an adjacent active agricultural land and grassland (Scottish Natural Heritage, 2021) and any nesting Arctic tern at the landfall will exhibit habituation to disturbance. Nesting Arctic tern have been shown to habituate to regular human disturbance and return to their nests within tens of seconds following disturbance, having minimal impact on hatching success (Syrová et al., 2020). Installation activities will not cause significant detrimental disturbance at the Cable 2.9 landfall within the SPA. The cable corridor only intersects the SPA for 0.004% of the site, so there will be no significant effect on the distribution of birds within the site.

Based on the foraging ranges of Arctic tern and guillemot, there is potential for installation activities associated with all the cable corridors, to disturb foraging breeding Arctic tern and guillemot. Arctic tern and guillemot both have moderate sensitivity to vessel disturbance (Joint SNCB, 2017). Installation vessels will be slow moving (approximately 2km/hr) which is slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are

effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, Arctic tern show little escape or avoidance behaviour in response to disturbance from vessels (Garthe and Hüppop, 2004).

It is concluded that any temporary disturbance to birds foraging within the cable corridors will be brief, minimal and localised and will not result in any likely significant effects to Arctic tern or guillemot. There will be no significant disturbance of nesting birds, and the populations will be maintained as a viable component of the SPA. No LSE will occur to the Arctic tern or guillemot populations within Rousay SPA.

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

BIRD ACTIVITY Nesting Birds at Rousay SPA

Drawing No: P2308-BIRD-011_OR_

A

Legend

Cable Route Application Corridor

Protected Site

SPA

pSPA

Seabird 2000 Nesting Counts - Arctic Skua

- 0
- 1 - 10
- 11 - 25
- 26 - 75
- More than 75

Seabird 2000 Nesting Counts - Other Species

- 0
- 1 - 50
- 51 - 500
- 501 - 5000
- More than 5000

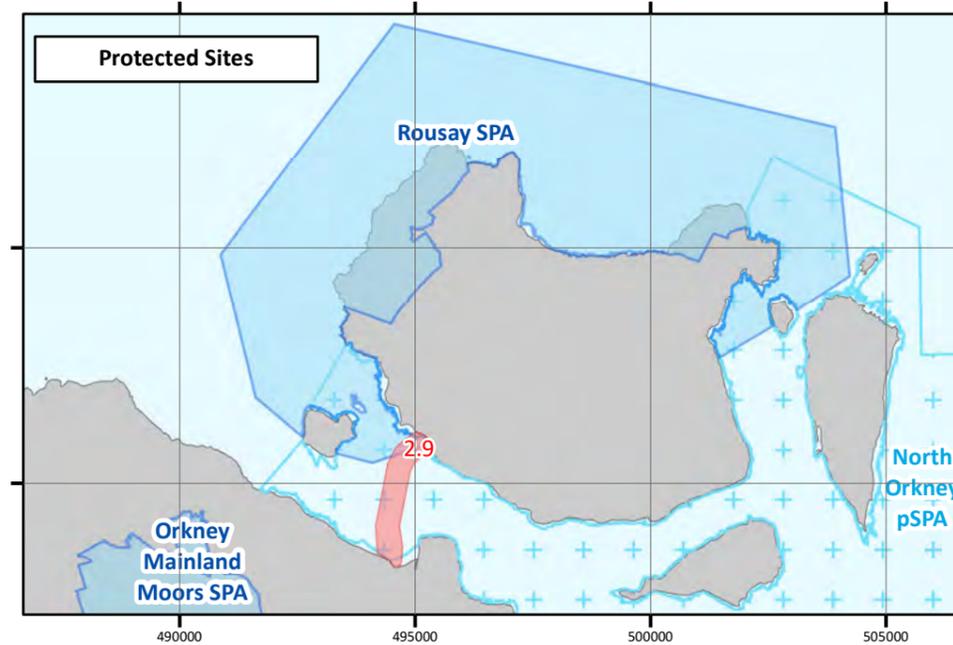
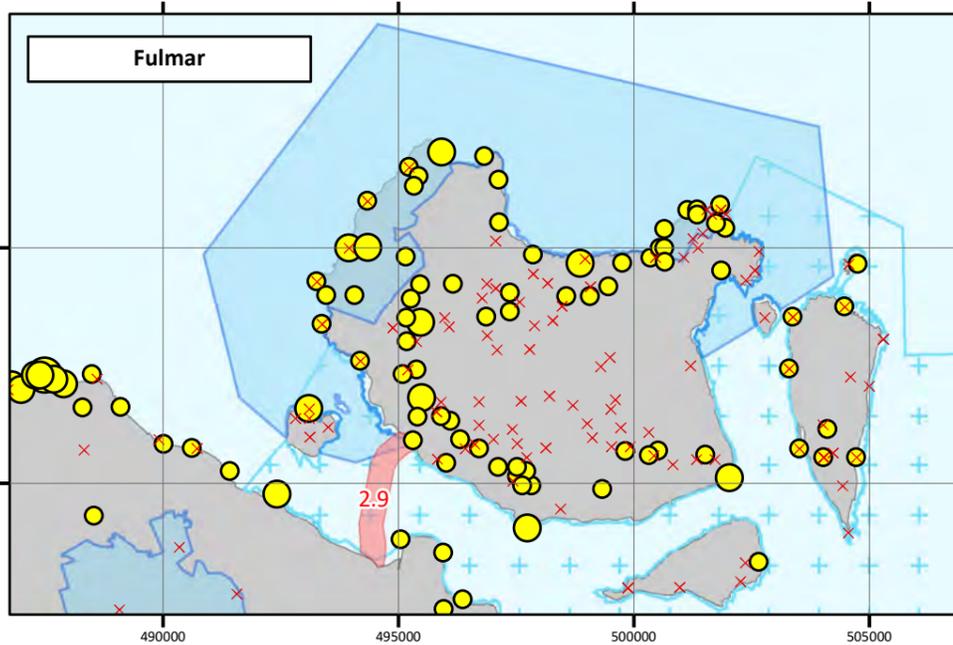
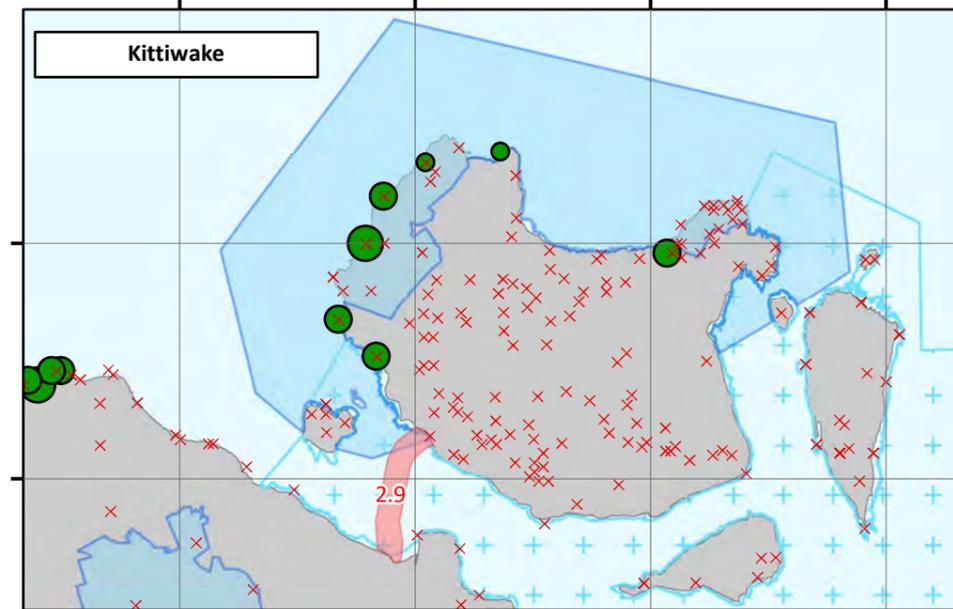
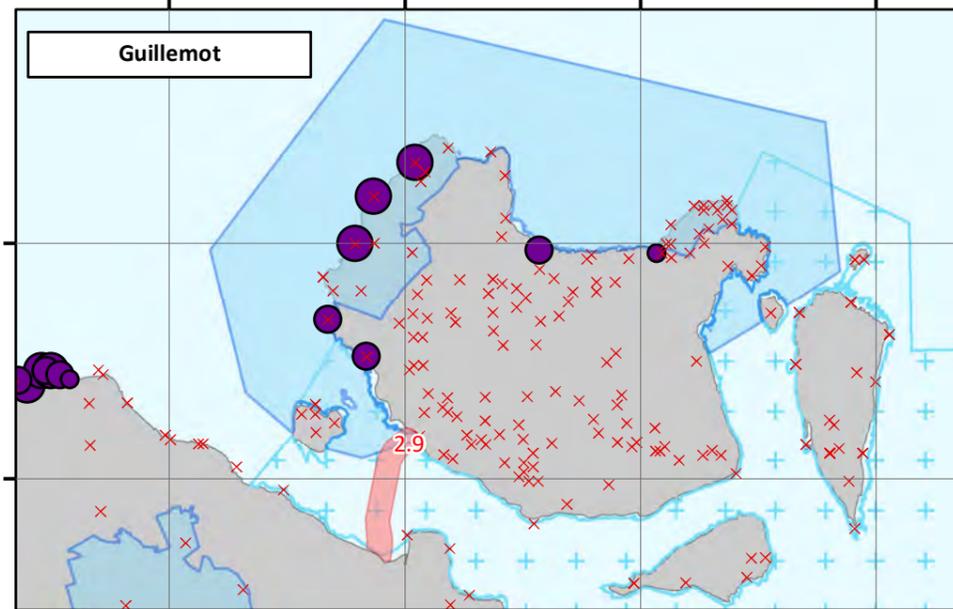
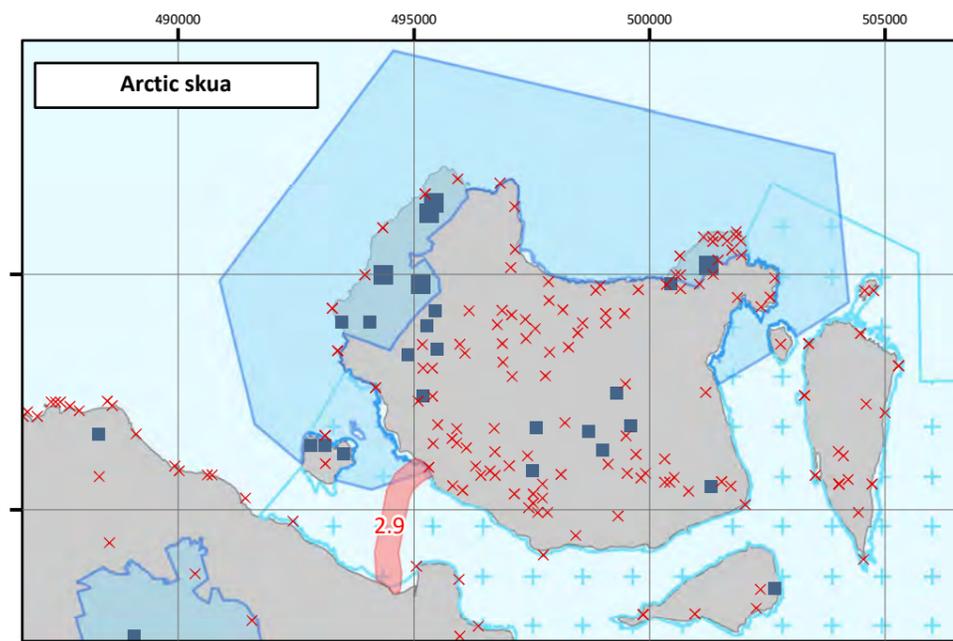
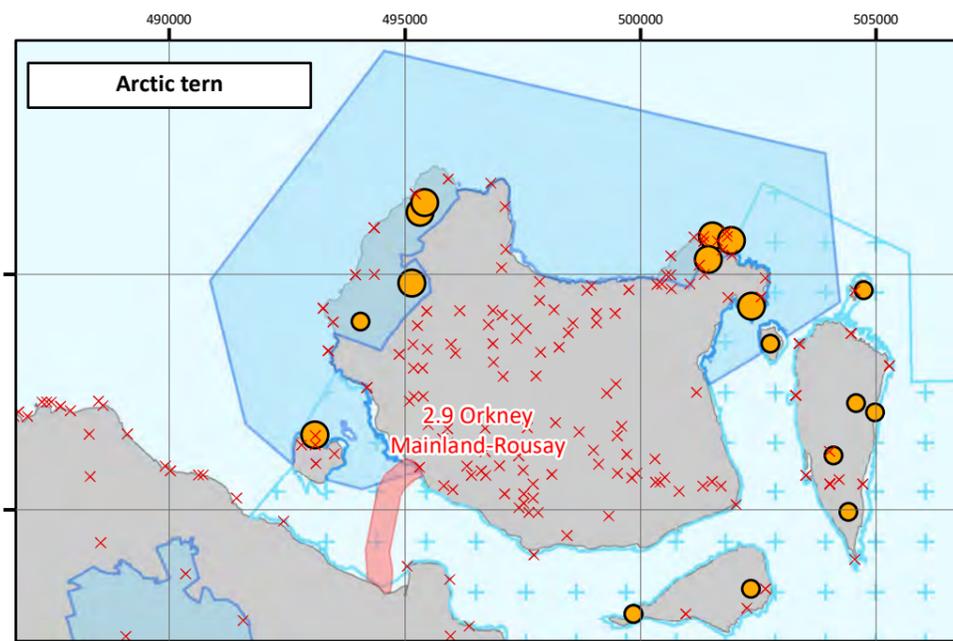


NOTE: Not to be used for Navigation

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Created By	Jessica Harvey
Reviewed By	Chris Dawe
Approved By	Jill Hobbs



0 2.5 5 7.5 10 km © Metoc Ltd, 2021 All rights reserved.



Arctic skua, fulmar and kittiwake (Breeding)

Table 5-14 provides the last population estimate (recorded in 2009; NatureScot, 201b) and condition status for the three species.

Table 5-14 Population estimates and condition status

	Arctic skua	Fulmar	Kittiwake
Population estimate	130 pairs	1,240 pairs	4,900 individuals
% of the GB population	4%	0.2%	1%
Condition status	Unfavourable no change (2015)	Unfavourable no change (2016)	Favourable maintained (2016)
Breeding season	May to August	April to mid-September	April to August

As the installation activities are within the SPA, there is potential for disturbance to individuals nesting and foraging within the SPA at Cable Corridor 2.9.

Arctic skua only use Orkney, including Rousay SPA, during their breeding season, arriving in May until August (RSPB, 2021). Fulmar are present at the site year-round, breeding between April and mid-September. Breeding fulmar reside on cliff ledges during the day, and generally forage at night (Scottish Wildlife Trust, 2021b). Kittiwake typically spend their winter at sea, returning to nesting sites in Scotland to breed between April and August, though individuals have started to re-occupy nest sites as early as February (Scottish Wildlife Trust, 2021d).

Arctic skua have a mean-max foraging range of 2km (Woodward et al., 2019). As such, individuals from the Rousay SPA would only be disturbed by installation activities for Cable Corridor 2.9. Arctic skua typically nest in moorland habitats (Scottish Wildlife Trust, 2021). Grassland and agricultural land are the only habitats within 400m of the landfall site (Scottish Natural Heritage, 2021). Nesting Arctic skua have not been identified at the landfall or in the surrounding area in the JNCC Seabird 2000 census surveys (JNCC, 2004) (Figure 5-2, Drawing: P2308-BIRD-011_OR). Therefore, the installation activities will not disturb nesting Arctic skua, which are likely to select remote moorland habitat in the remote central and northern areas of the island for nesting.

Kittiwake and fulmar typically nest on clifftops and rock ledges, such as those in the northern areas of the SPA. The habitat at the landfall site is sloping, and predominantly agricultural land and grassland making it unfavourable for nesting fulmar and kittiwake (NatureScot, 2021a). No nesting kittiwake have been found at the landfall, or in the surrounding area in the JNCC Seabird 2000 census surveys (JNCC, 2004) (Figure 5-2, Drawing: P2308-BIRD-011_OR). Fulmar have been found nesting in the landfall area in low densities. However, previous studies have shown only up to 20% of fulmar flush due to vessel disturbance, and they have one of the lowest escape distances (70 to 157m) due to their low sensitivity to vessel disturbance. They are, therefore, unlikely to be disturbed by installation vessels (Fliessbach *et al.*, 2019). In conclusion, installation activities will not impact nesting fulmar and kittiwake within the SPA at the Cable Corridor 2.9 landfall.

Arctic skua and fulmar have very low sensitivity to vessel disturbance, and kittiwake have low sensitivity to vessel disturbance (Joint SNBC, 2017). Therefore, these species will not be disturbed by cable installation whilst foraging at sea.

It is concluded that there will be no significant disturbance to nesting Arctic skua, fulmar and kittiwake and their population as a viable component of the SPA will be maintained.

No LSE for all cables will occur on the qualifying features within Rousay SPA.

5.12.4 Project specific mitigation

None specified.

5.12.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within the cable corridor of Cable Corridor 2.9 will not disturb nesting qualifying species in Rousay SPA. Any temporary disturbance to Arctic tern and guillemot from the SPA foraging at sea will be brief, minimal and localised.

The distribution of the species within the site and their population as a viable component of the SPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.13 West Westray SPA

5.13.1 Screening conclusion

The HRA screening identified that the pressure 'Visual (and above water noise) disturbance' could have a potential LSE on the qualifying features:

- Arctic tern
- Guillemot
- Razorbill

5.13.2 Conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site;
- Distribution of the species within site;
- Distribution and extent of habitats supporting the species;
- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

5.13.3 Assessment against conservation objectives

5.13.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in West Westray SPA is provided in Table 5-15.

Table 5-15 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of West Westray SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Arctic tern							
Guillemot							
Razorbill							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE.

West Westray SPA is an 8km stretch of sea cliffs, together with adjacent grassland and heathland, along the west coast of the island of Westray in Orkney. The cliffs support large colonies of breeding

auks and kittiwakes while the grassland and heathland areas support breeding colonies of skuas and terns. The seaward extension extends approximately 2km into the marine environment to include the seabed, water column and surface (NatureScot, 2009c).

The cable corridor for Cable Corridor 2.5 is closest to the SPA, located 7.31km east of the site. As no cable corridors are located within the SPA, there will be no effects from installation activities on the distribution of the species within the site, the distribution and extent of habitats supporting the species or the structure, function and supporting processes of habitats supporting the species.

Arctic tern, guillemot and razorbill (Breeding)

No nesting Arctic tern, guillemot or razorbill will be disturbed by the installation due to the distance of all the cable corridors from the SPA. The potential for LSE therefore arises from the presence of installation vessels within the mean max foraging ranges of the three species. Based on the species mean max foraging ranges listed in Table 5-3, there is potential for installation activities associated with Cable Corridors 2.5, 2.6, 2.7, 2.9 and 2.10 to disturb foraging Arctic tern, and all cable corridors to disturb foraging guillemot and razorbill.

The SPA supports populations of Arctic tern and guillemot of European importance and razorbill of national importance. Table 5-16 provides the last population estimate (recorded in 2009; NatureScot, 2009c) and condition status (2017) for the three species.

Table 5-16 Population estimates and condition status

	Arctic tern	Guillemot	Razorbill
Population estimate (individuals)	1,140	42,150	1,946
% of the GB population	3% (of breeding population)	1%	1%
Condition status	Unfavourable not change	Unfavourable declining	Favourable recovered
Breeding season	May to August	April to August	June to July

Species are most vulnerable to disturbance during the breeding season, when disturbance could impact nesting success and chick survival. Arctic tern and razorbill are only present during their breeding season, whereas guillemot are present year-round in Orkney waters.

Arctic tern have a low to moderate, and guillemot and razorbill have a moderate, sensitivity to vessel disturbance (Joint SNCB, 2017). Vessel activity through areas where these species are present on the surface may result in temporary displacement from optimal areas for feeding/loafing. The area disturbed due to vessel movements along the cable corridor is considered to be very small in the context of the distribution of Arctic tern, guillemot and razorbill (i.e. limited to the immediate vicinity of where works are being carried out).

Installation vessels will be slow moving (approximately 2km/hr) which is slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). It is therefore concluded that any temporary disturbance will be brief, minimal and localised and will not result in any likely significant effects on Arctic tern, guillemot and razorbill. Their population will be maintained as a viable component of the SPA.

No LSE for all cables listed in Table 5--15 will occur on the qualifying features within the West Westray SPA.

5.13.4 Project specific mitigation

None specified.

5.13.5 Conclusion

Visual (and above water noise) disturbance caused by the installation works within the cable corridor listed in Table 5-15 will not disturb nesting qualifying species in West Westray SPA. Any temporary disturbance to Arctic tern, guillemot and razorbill from the SPA foraging at sea will be brief, minimal and localised.

The distribution of the species within the site and their population as a viable component of the SPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.14 North Orkney pSPA

5.14.1 Screening conclusion

The HRA screening identified that the pressure 'Visual (and above water noise) disturbance' could have a potential LSE on the qualifying features:

- Red-throated diver
- Common eider
- European shag
- Great northern diver
- Long-tailed duck
- Red-breasted merganser
- Slavonian grebe
- Velvet scoter

5.14.2 Preliminary conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long-term and it continues to make an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species.

This contribution will be achieved through delivering the following objectives for each of the site's qualifying features:

- Avoid significant mortality, injury, and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term; and
- To maintain the habitats and food resources of the qualifying features in favourable condition.

5.14.3 Assessment against preliminary conservation objectives

5.14.3.1 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in North Orkney pSPA is provided in Table 5-17.

Table 5-17 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of North Orkney pSPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Red-throated diver							
Common eider							
European shag							
Great northern diver							
Long-tailed duck							
Red-breasted merganser							
Slavonian grebe							
Velvet scoter							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE. Dark blue cells denote where cable corridors are within protected site.

North Orkney pSPA comprises an area of 226.95km² in the seas north of the Orkney mainland. The site encompasses Deer Sound, Shapinsay Sound and Wide Firth and includes the seas around the islands of Rousay, Egilsay and Wyre. The sounds around North Orkney pSPA provide numerous sheltered bays and inlets for birds to moult, roost, rest, and feed. Sea depths in the channels between the islands are relatively shallow and rarely greater than 20m. Sediments are primarily mixtures of mud, sand and gravel but become coarser in areas where tidal currents are stronger, such as between the main islands. These habitats support a varied invertebrate fauna including polychaete worms, crustaceans, bivalve molluscs, and pelagic and demersal fish species.

Between September and April, the sheltered sounds, firths, and sandy bays in the North Orkney pSPA provide important refuges for some 5,000 non-breeding and passage birds. Common eider and shag use the site throughout the year and red-breasted mergansers are typically short distance migrants, using coastal areas in winter. Other birds including long-tailed duck, velvet scoter, Slavonian grebe and great-northern diver, migrate thousands of miles from their northern breeding grounds in Northern Europe and western Siberia to this site.

In summer, the site provides feeding grounds for red-throated divers breeding on nearby islands (NatureScot, 2016b). The distribution of birds within the site are displayed below in Figure 5-3 (Drawing: P2308-BIRD-001_OR) and Figure 5-4 (Drawing: P2308-BIRD-002_OR).

The cable corridors for Cable Corridors 2.9 and 2.10 are located entirely within the SPA, with the remaining cable corridors all being located within the foraging ranges of the qualifying species.

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

BIRD ACTIVITY Bird Distribution in North Orkney pSPA Sheet 1 of 2

Drawing No: P2308-BIRD-001_OR

A

Legend

Cable Route Application Corridor

Predictive Bird Distribution (per km²)

- 1 or less
- 1 - 2
- 2 - 5
- 5 - 10
- 10 or greater

Maximum Curvature

Distribution of red breasted merganser

- 0
- 10 or less
- 10 - 25
- 25 or greater

Distribution of velvet scoter

- 0
- 5 or less
- 5 - 25
- 25 or greater

Protected Site

- SPA
- pSPA

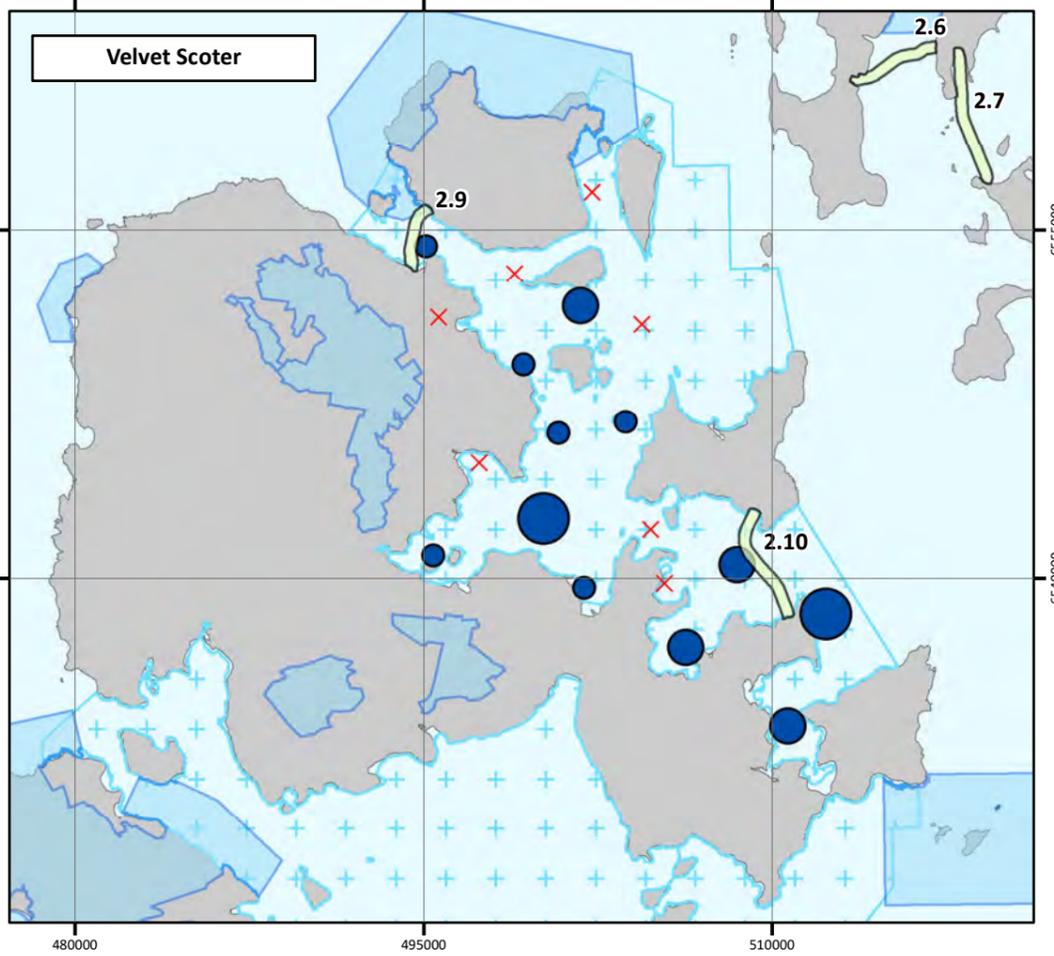
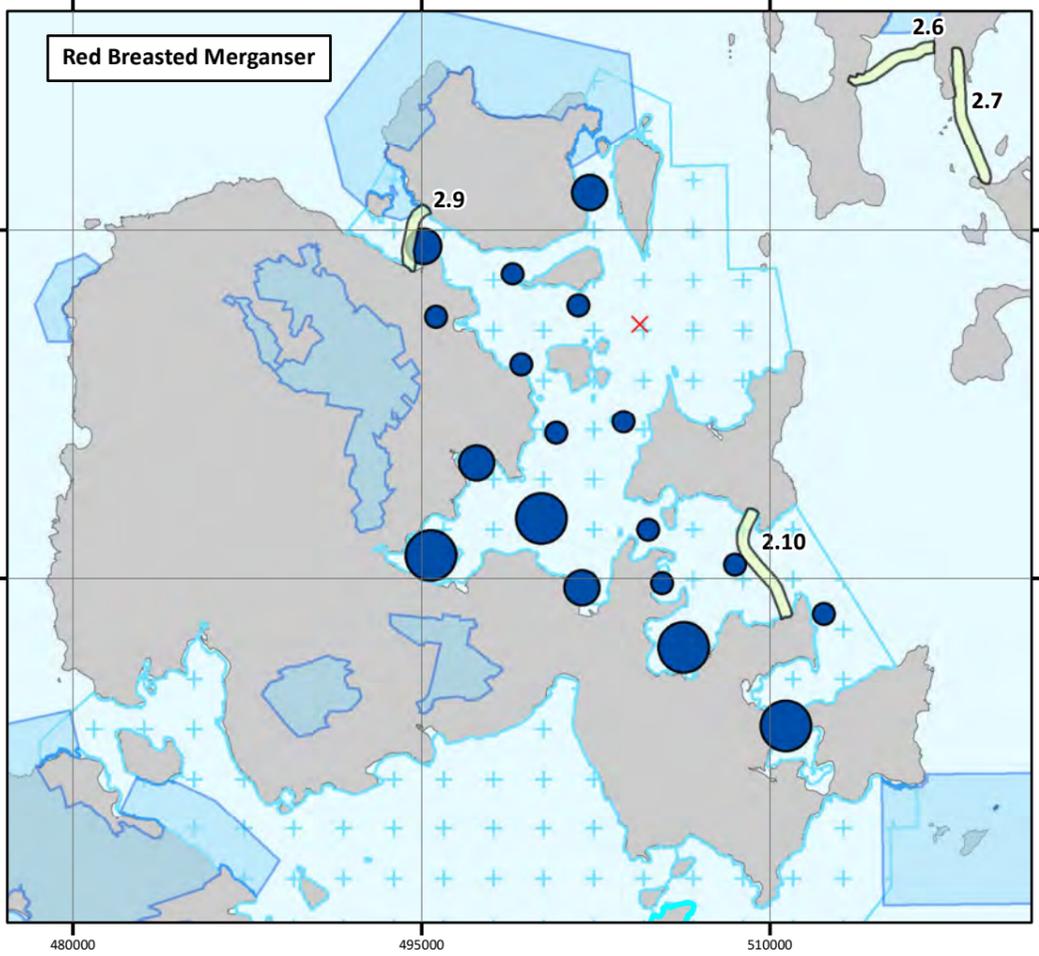
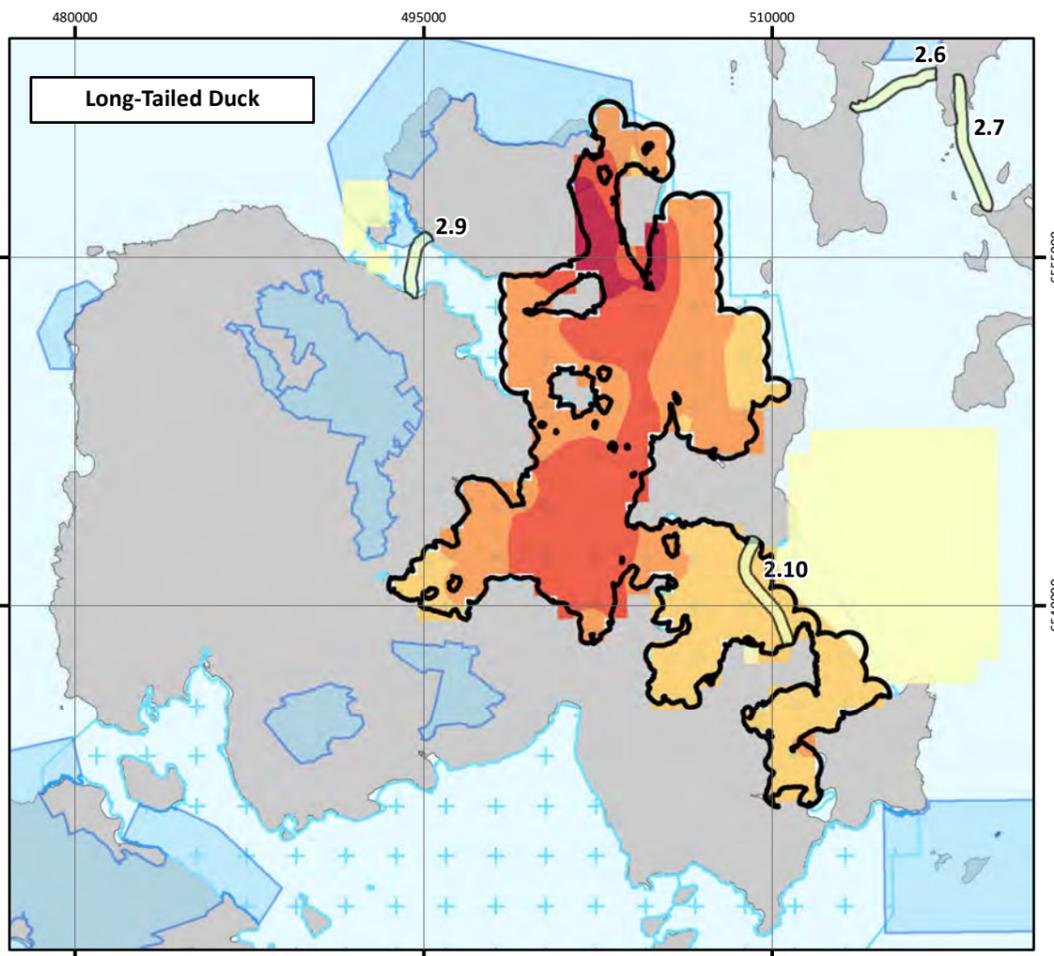
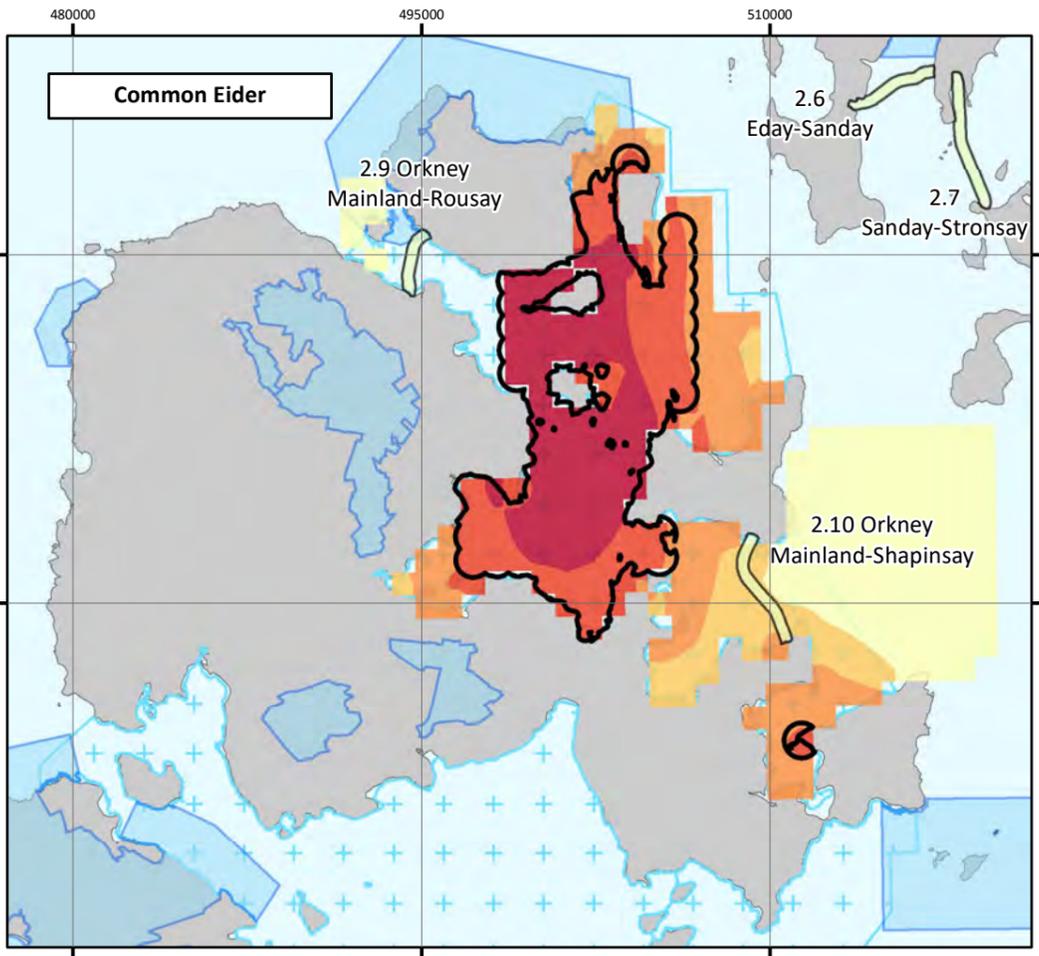


NOTE: Not to be used for Navigation

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Created By	Jessica Harvey
Reviewed By	Chris Dawe
Approved By	Jill Hobbs



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SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

BIRD ACTIVITY Bird Distribution in North Orkney pSPA Sheet 2 of 2

Drawing No: P2308-BIRD-002_OR

A

Legend

-  Cable Route Application Corridor
- Northern Diver Predictive Bird Distribution (per km²)**
 -  0.5 or less
 -  0.5 - 1
 -  1 - 1.5
 -  1.5 - 2
 -  2 or greater
- Red-Throated Diver Predictive Bird Distribution (per km²)**
 -  4 or less
 -  4 - 12
 -  12 - 24
 -  24 - 40
 -  40 or greater
- Distribution of Slavonian Grebe**
 -  0
 -  5 or less
 -  5 - 25
 -  25 or greater
- Protected Site**
 -  SPA
 -  pSPA

-  Maximum Curvature

- Distribution of European Shag**
 -  0
 -  10 or less
 -  10 - 25
 -  25 or greater

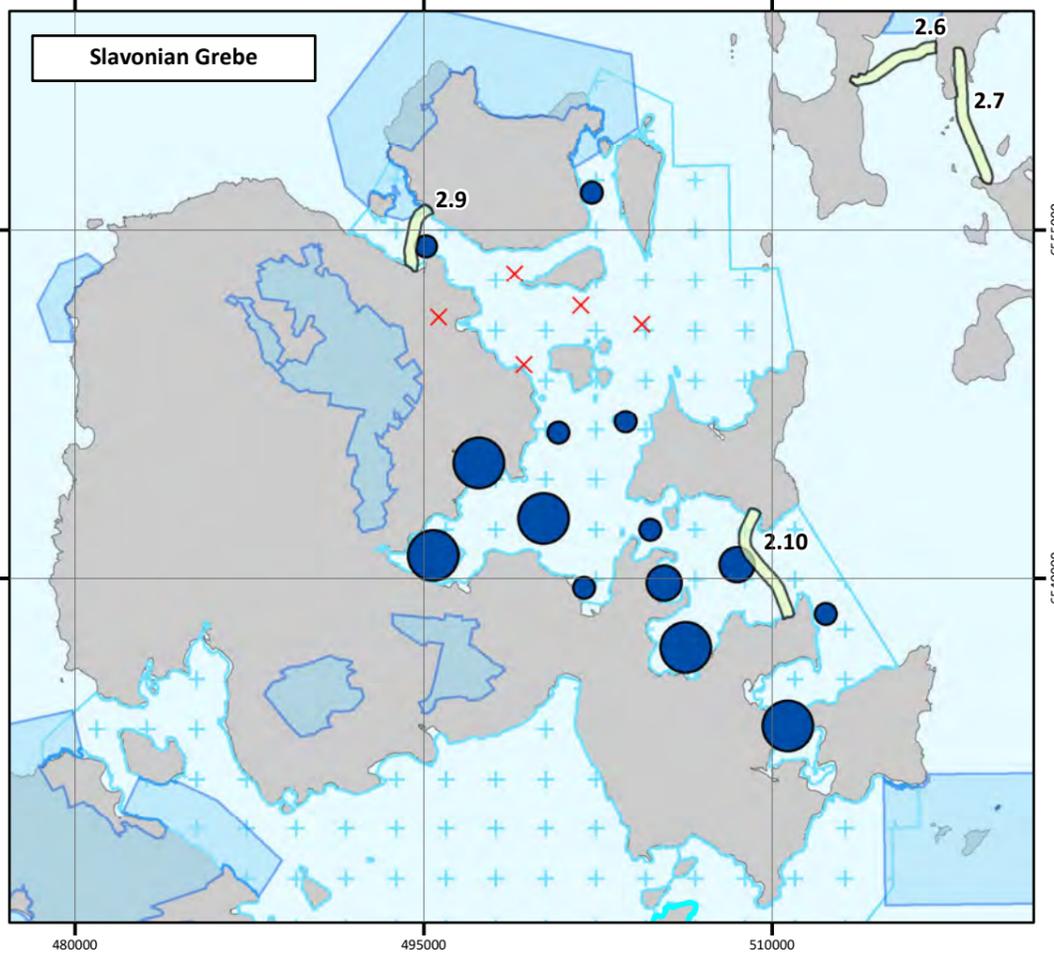
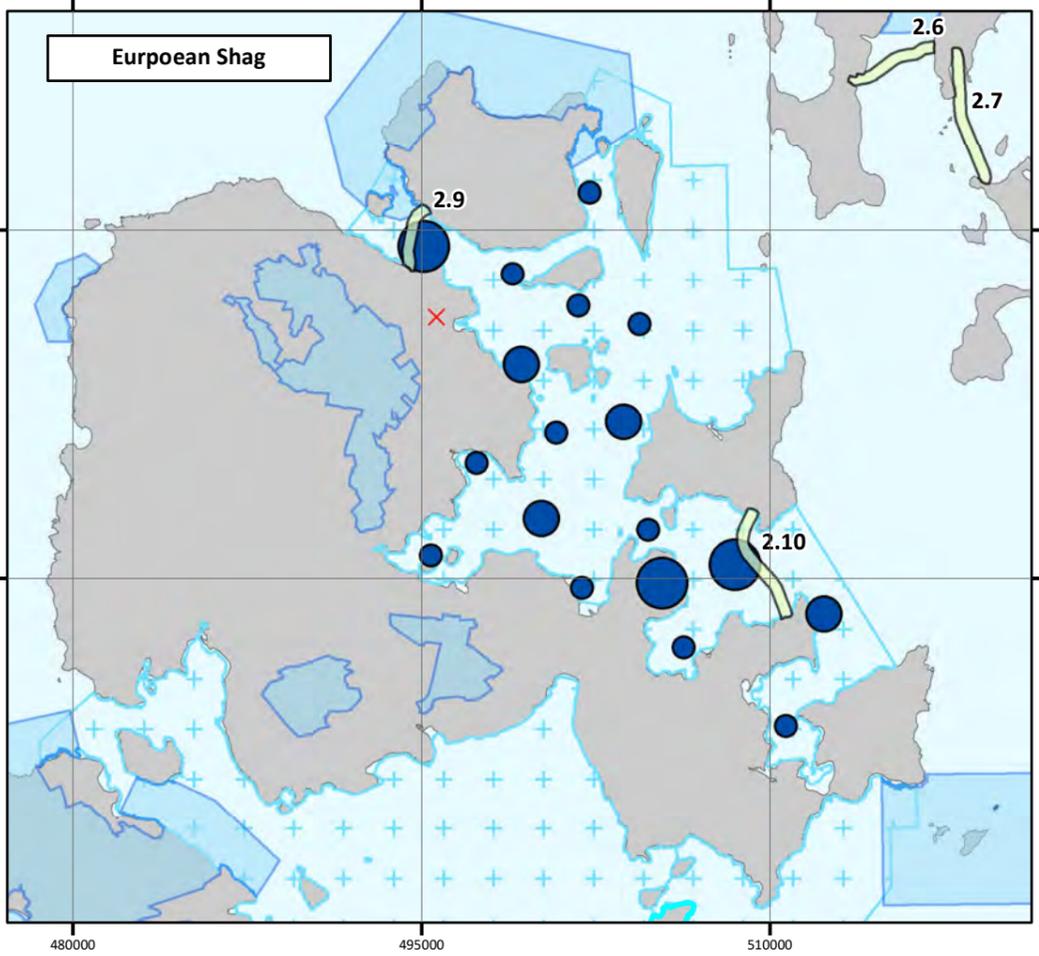
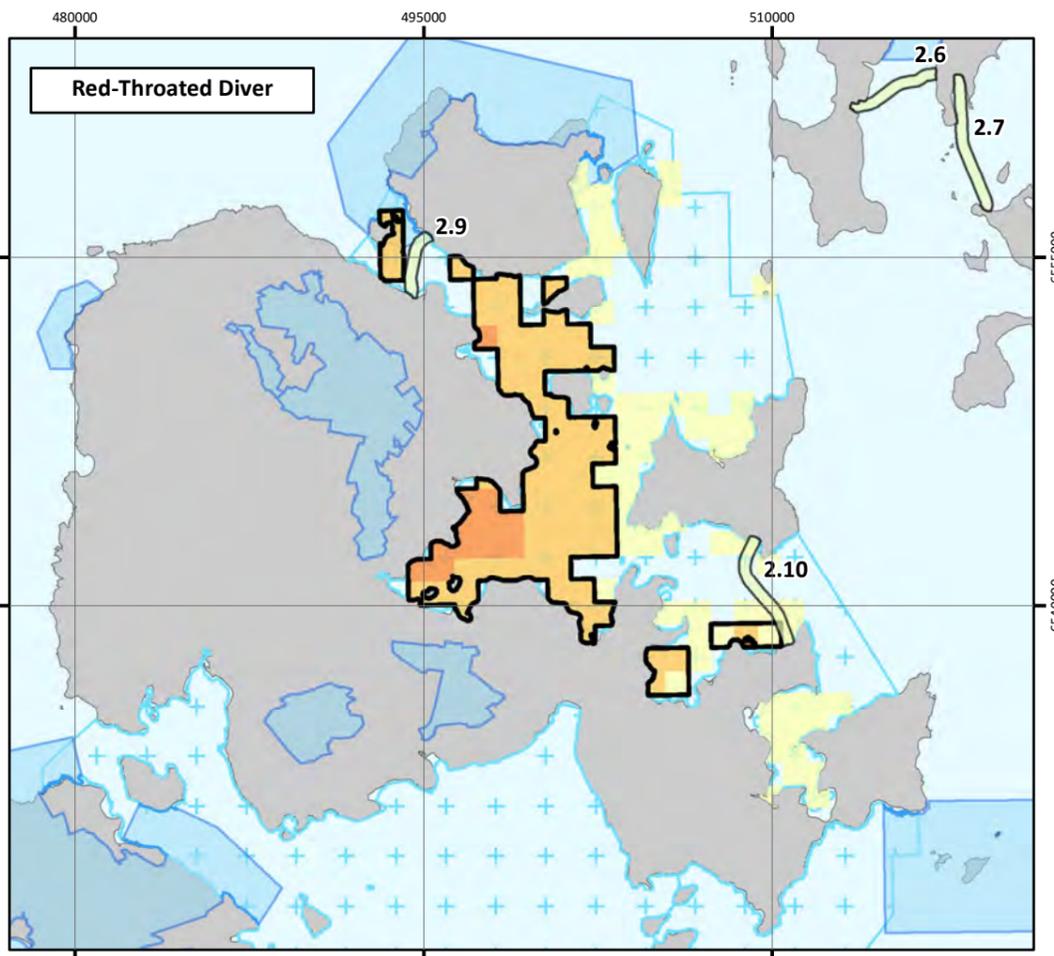
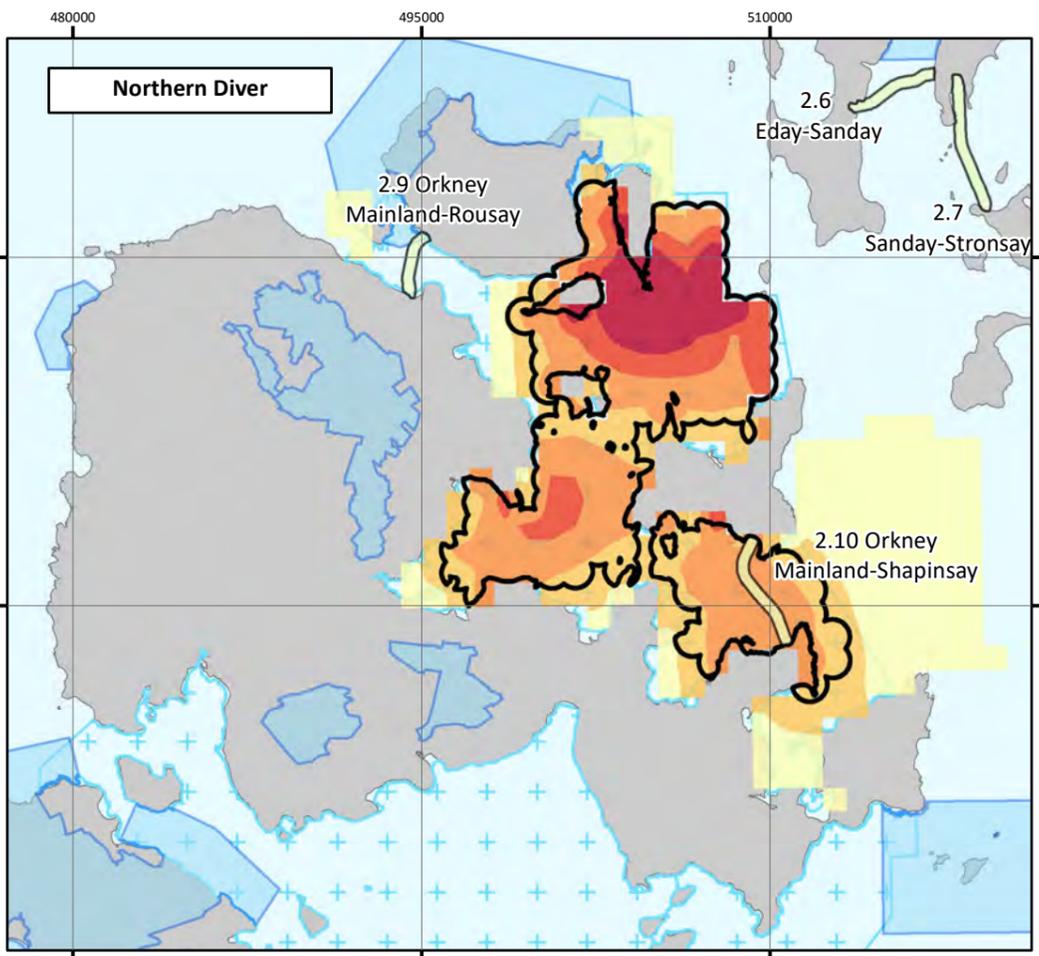


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Created By	Jessica Harvey
Reviewed By	Chris Dawe
Approved By	Jill Hobbs



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Red-throated diver (Breeding)

The Orkney Isles are considered to be a stronghold for the UK red-throated diver population, with the North Orkney pSPA supporting a population of European importance and behind only the Shetland Isles in population size (RSPB, 2021). While several SPAs for red-throated diver have been designated across Orkney, due to the small geographical area of Orkney the populations of these SPAs are thought to be part of the same overall population (O'Brien *et al.*, 2018). The last known adult population estimate of red-throated diver (recorded in 2014) at North Orkney pSPA is 52 pairs, which is equivalent to 4.4% of the GB population (NatureScot, 2016d). As the North Orkney pSPA is an exclusively marine site, there will be no disturbance to individuals nesting within the site. As such only individuals foraging within the cable corridors have the potential to be disturbed by the Project.

Red-throated diver have a mean-max foraging range of 9km (Woodward *et al.*, 2019). As such, individuals from the North Orkney pSPA could be found feeding in the vicinity of installation activities of Cable Corridors 2.5, 2.6, 2.7, 2.9 and 2.10. In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), red-throated diver is classed as having a high habitat specialisation (score of 4 out of 5) and very high susceptibility to disturbance (score of 5 out of 5). This finding is in line with other studies which indicate that red-throated divers are highly sensitive to anthropogenic activity and move away from ships in the marine environment (Schwemmer *et al.*, 2011).

The cable corridors for Cable Corridors 2.9 and 2.10 are located within the boundaries of the pSPA itself, and as such present the greatest potential for disturbance to occur to red-throated diver. Previous research data gathered for the North Orkney pSPA indicates that the waters between the Orkney mainland and Rousay (adjacent to where Cable 2.9 is located) are utilised by 4-12 pairs of red-throated diver, with Cable 2.10 being located in a lower density area of 4 or less pairs per km² (see Figure 5-4, Drawing P2308-BIRD-002_OR above) (NatureScot, 2016c). This is in contrast to the waters along the east coast of mainland Orkney, where the abundancies of red-throated diver range from 4 to 24 pairs (see Figure 5-4, Drawing P2308-BIRD-002_OR) (NatureScot, 2016c). This indicates that the cable corridors for Cable Corridors 2.9 and 2.10 are in areas of relative lower importance to red-throated diver in comparison to other areas of the pSPA.

In addition, whilst red-throated diver are sensitive to visual disturbance, negligible disturbance has been shown to occur to birds by vessels moving at less than 2km/hr (Burger *et al.*, 2019). Installation vessels will be slow moving, only reaching a peak of up to 2km/hr during surface laying of any stretches of cable. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Any disturbance to red-throated diver will be brief and localised.

Due to the low utilisation by red-throated diver within the cable corridors of Cable Corridors 2.9 and 2.10 and the temporary and localised nature of installation activities, there will be no significant disturbance of red-throated diver and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for all cables listed in Table 5-17 will occur on the qualifying feature breeding red-throated diver within North Orkney pSPA.

Common eider (Non-Breeding)

The last known adult population estimate of common eider (2015) at North Orkney pSPA is 1,450, which is equivalent to 2% of the GB population and would make the SPA (if fully designated) the 6th largest for common eider in Scotland (NatureScot, 2016d). Common eider is a resident species in Orkney (APEM 2013c). Their distribution is generally associated with inshore habitats up to around 10m depths; reflecting their preference for benthic mollusc prey (e.g. mussels [*Mytilus edulis*]) (APEM 2013c, Okill 2004). The largest numbers of common eider have been recorded in the area over the winter months, with populations peaking around February/March (APEM 2013).

Common eider have a mean-max foraging range of 21.5km (Woodward et al., 2019). As such, individuals from the North Orkney pSPA could be found feeding in the vicinity of all cable corridors in the Orkney region.

Common eider is predominantly distributed in the centre of the pSPA. Population distribution estimates suggest that common eider do not use the waters within the Cable Corridor 2.9, and between 1 and 5 individuals per km² may be found in the waters of cable corridor 2.10. Both cable corridors are away from the main distribution of the species in the centre of the SPA, shown by the maximum curvature line on Figure 5-3 (Drawing: P2308-BIRD-001_OR), where there are up to 10 or more individuals per km². In the most recent BTO survey (Winter 2015-2016), no common eider was identified at the Orkney Mainland landfall corridor for Cable Corridor 2.9, or the Shapinsay landfall corridor for Cable Corridor 2.10, and 7 individuals were found at the Orkney Mainland landfall for Cable Corridor 2.10.

Common eider are generally considered to be moderately sensitive to disturbance; however, within the North Orkney pSPA, common eider are considered to have low sensitivity to vessel disturbance, with some habituation to vessel presence having occurred within the population (NatureScot, 2016d). During periods of flightless moult (July to September), the ability of common eider to avoid vessel movements will be reduced (NatureScot, 2016d).

As there is local habituation to vessels by common eider, and low utilisation of all the cable corridors (with the exception of Cable Corridor 2.10) within the pSPA there will be no significant effects to individuals foraging in these cable corridors.

Whilst cable corridor 2.10 is not located within an area of peak abundancies, it is in an area where common eider numbers range from 1 to 5 and given the increased sensitivity of this species during their moulting period, significant effects on common eider cannot be ruled out during moulting.

To prevent any significant effects on common eider, the guidance to avoid disturbance to birds published in the 'Guide to Best Practice for Watching Marine Wildlife' will be followed where practicable. During cable installation activities the cable installation vessel will be at or below the speeds (up to 6 knots) recommended in this guidance. On approach to the cable corridor, if rafts of birds are sighted ahead, the speed will be reduced to less than 6 knots, and the cable installation vessel will avoid rafts of birds and navigate around them where practicable. Once at the cable corridor and installation activities have commenced, whilst the vessel will not be able to leave the cable corridor to avoid rafts of birds, it will be going at such slow speeds (approximately 1 knot (2km/hour) for surface lay and 0.3 knots (0.6km/hour) for plough installation) that any rafts of eider will be able to move away.

LSE cannot be ruled out for Cable Corridor 2.10 on the qualifying feature non-breeding common eider and project specific mitigation is proposed. The 'Guide to Best Practice for Watching Marine Wildlife' guidance on birds will be followed where practicable.

No LSE for all other cables listed in Table 5-17 will occur on the qualifying feature non-breeding common eider within North Orkney pSPA.

Long-tailed duck (Non-Breeding)

The last known adult population estimate of long-tailed duck (recorded in 2015) at North Orkney pSPA is 940 individuals in the winter months, which is equivalent to 9% of the GB population and would make the SPA (if fully designated) the 6th largest for long tailed duck in Scotland (NatureScot, 2016d). In Orkney, numbers of long-tailed duck have been recorded to peak around February – March when birds are likely gathering prior to migration to their Arctic breeding grounds (APEM, 2013).

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), long-tailed duck is classed as having a high habitat specialisation (score of 4 out of 5) and a moderate susceptibility to disturbance (score of 3 out of 5). However, within the North Orkney pSPA, long-tailed duck are considered to have

a low sensitivity to vessel disturbance, with some level of habitation to vessel presence having occurred within the population (NatureScot, 2016b).

Long-tailed duck is predominantly distributed in the centre of the pSPA. Population density estimates shown in Figure 5-3 (Drawing: P2308-BIRD-001_OR) indicate that Cable Corridors 2.9 and 2.10 are outside of the main distribution of the species, shown by the maximum curvature line, where there are up to 10 or more individuals per km². Densities are lower than the main distribution of birds within the cable corridors, with estimates indicating that the species do not use the waters within Cable Corridor 2.9, and densities of between 1 and 2 individuals per km² can be expected within Cable Corridor 2.10. In the most recent BTO survey (Winter 2015-2016), there were no long-tailed duck identified within the cable corridor at the Orkney Mainland landfall for Cable Corridor 2.9, or within Cable Corridor 2.10 at the Shapinsay landfall, and only 8 individuals were found within Cable Corridor 2.10 at the Orkney Mainland landfall.

Installation vessels will, however, be slow moving, only reaching a peak of up to 2km/hr during surface laying of any stretches of cable. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012).

While cable corridor 2.10 is located within an area of the main long-tailed duck concentration, due to the low sensitivity of the North Orkney pSPA population to vessel disturbance and the temporary and localised nature of installation activities, there will be no significant disturbance of long-tailed duck and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for all cable corridors listed in Table 5-17 will occur on the qualifying feature non-breeding long-tailed duck within the North Orkney pSPA.

Velvet scoter (Non-Breeding)

The last known adult population estimate of velvet scoter (recorded in 2015) at North Orkney pSPA is 150 individuals in the winter months, which is equivalent to 6% of the GB population and would make the SPA (if fully designated) the 3rd largest for velvet scoter in Scotland (NatureScot, 2016d). Within North Orkney pSPA velvet scoter is largely confined to the outer parts of large bays off the Mainland, with highest numbers in Wide Firth, Shapinsay Sound, Inganess Bay and entrance to Deer Sound (NatureScot, 2016b, 2016c).

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), velvet scoter is classed as having a moderate habitat specialisation (score of 3 out of 5) and a very-high susceptibility to disturbance (score of 5 out of 5). Within the North Orkney pSPA, velvet scoter are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016b). Vessel activity through areas where velvet scoter are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Within the North Orkney pSPA, velvet scoter is distributed across the site, with the highest abundances off the east coast of Orkney Mainland, and in the centre of the pSPA, where abundances are estimated to exceed 25 individuals per km² (Figure 5-3, Drawing: P2308-BIRD-001_OR). Cable Corridor 2.9 is located in an area of low relative numbers (an average of 5 or less per km²), while Cable Corridor 2.10 is located within an area of the moderate numbers (5 to 25 per km²) of velvet scoter within the North Orkney pSPA. No velvet scoter have been identified within the cable corridors at any of the Cable Corridor landfalls within the Orkney pSPA by BTO winter surveys

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little

disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to velvet scoter will be minimal. It is therefore concluded that any disturbance to individuals foraging within the cable corridor will be temporary and localised.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance to velvet scoter, and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for all other cables listed in Table 5-17 will occur on the qualifying feature non-breeding velvet scoter within North Orkney pSPA.

European shag (Non-Breeding)

The last known adult population estimate of European Shag (2015) at North Orkney pSPA is 1,740 individuals, which is equivalent to 2% of the GB population and would make the SPA (if fully designated) the 2nd largest for European shag in Scotland (NatureScot, 2016d). European shag have a mean-max foraging range of 13.2km (Woodward et al., 2019). As such, individuals from the North Orkney pSPA could be found feeding in the vicinity of installation activities of all cable corridors in the Orkney region with the exception of Cable Corridor 2.11.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), European shag is classed as having a moderate habitat specialisation (score of 3 out of 5) and a moderate susceptibility to disturbance (score of 3 out of 5). However, within the North Orkney pSPA, European shag are considered to have a low sensitivity to vessel disturbance, with some level of habituation to vessel presence having occurred within the population (NatureScot, 2016b). Vessel activity through areas where European shag are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Within the North Orkney pSPA, European shag are distributed across the site. Within the cable corridors for Cable Corridors 2.9 and 2,10, there is estimated to be an average of 25 per km² or greater European shag present, which are the highest abundances identified across North Orkney pSPA (Figure 5-4, Drawing: P2308-BIRD-002_OR-A).

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to European shag will be minimal.

As European shag have low sensitivity to disturbance within the North Orkney pSPA, and due to the temporary and localised nature of installation activities, there will be no significant disturbance of European shag and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for any cables listed in Table 5-17 will occur on the qualifying feature non-breeding European shag within North Orkney pSPA.

Great northern diver (Non-Breeding)

The last known adult population estimate of great northern diver (recorded in 2015) at North Orkney pSPA is 310 individuals in the winter months, which is equivalent to 12% of the GB population and would make the SPA (if fully designated) the 2nd largest for great northern diver in Scotland (NatureScot, 2016d).

In the Joint SNCB Interim Displacement Advice Note (JNCC, 2017), great northern diver is classed as having a very high habitat specialisation (score of 5 out of 5) and a moderate susceptibility to disturbance (score of 3 out of 5). Within the North Orkney pSPA, great northern diver are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016b). Vessel activity through areas where great northern diver are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Great northern diver are predominantly distributed in the centre and east of the pSPA. Population distribution estimates show that there are predicted to be no great northern diver in the waters within Cable Corridor 2.9, and low densities within Cable Corridor 2.10 with between 1 and 1.5 individuals per km² (Figure 5-4, Drawing: P2308-BIRD-002_OR). In the most recent BTO survey (Winter 2015-2016), there were no great northern diver identified within Cable Corridor 2.10 at the Shapinsay landfall, and only 2 and 3 individuals were observed within Cable Corridors 2.9 and 2.10 at the Orkney Mainland landfall, respectively.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to great northern diver will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance to great northern diver, and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for any cables listed in Table 5-17 will occur on the qualifying feature non-breeding great northern diver within North Orkney pSPA.

Red-breasted merganser (Non-breeding)

The last known adult population estimate of red-breasted merganser (recorded in 2015) at North Orkney pSPA is 340 individuals in the winter months, which is equivalent to 9% of the GB population and would make the SPA (if fully designated) the 3rd largest for red-breasted merganser in Scotland (NatureScot, 2016d). Red-breasted merganser are a short-distance migrant and utilise the coast at North Orkney pSPA in winter months.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), red-breasted merganser is classed as having a moderate habitat specialisation (score of 3 out of 5) and a high susceptibility to disturbance (score of 4 out of 5). Within the North Orkney pSPA, red-breasted merganser are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016b). Vessel activity through areas where red-breasted merganser are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Within the North Orkney pSPA, red-breasted merganser are distributed across the site. As shown in Figure 5-3 (Drawing: P2308-BIRD-001_OR), Cable Corridor 2.9 is in the vicinity of an area containing moderate point counts of individuals (an average of 10 to 25 per km²), while Cable Corridor 2.10 is located in the vicinity of an area containing low point counts of individuals (10 or less). In the most recent BTO survey (Winter 2015-2016), there were no red-breasted merganser identified within Cable Corridor 2.10 at the Shapinsay landfall, and only 4 individuals were found within Cable Corridors 2.9 and 2.10 at the Orkney Mainland landfall.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to red breasted merganser will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance to red-breasted merganser, and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for any cables listed in Table 5-17 will occur on the qualifying feature non-breeding red breasted merganser within North Orkney pSPA.

Slavonian grebe (Wintering)

The last known adult population estimate of Slavonian grebe (recorded in 2015) at North Orkney pSPA is 120 individuals in the winter months, which is equivalent to 11% of the GB population and would make the SPA (if fully designated) the 2nd largest for Slavonian grebe in Scotland (NatureScot, 2016d). As Slavonian grebe are an overwintering species in the pSPA, there is potential for disturbance of individuals foraging, but not nesting, within the pSPA.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), Slavonian grebe is classed as having a moderate habitat specialisation (score of 3 out of 5) and a high susceptibility to disturbance (score of 4 out of 5). Within the North Orkney pSPA, Slavonian grebe are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016b). Vessel activity through areas where Slavonian grebe are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

At the cable corridors for Cable Corridors 2.9 and 2.10, there is estimated to be an average of 10 or less, and 10 to 25 Slavonian grebe present, respectively. Slavonian grebe have the highest abundances in the south of the pSPA where abundances are estimated to exceed 25 individuals (Figure 5-4, Drawing: P2308-BIRD-002_OR-A). No Slavonian grebe have been identified at any of the landfalls within Orkney pSPA by BTO winter surveys.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing

grounds in the short term. Should any works overlap with the winter months, disturbance to Slavonian grebe will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance to Slavonian grebe, and their population as a viable component of (and distribution within) North Orkney pSPA will be maintained.

No LSE for any cables listed in Table 5-17 will occur on the qualifying feature non-breeding Slavonian grebe within North Orkney pSPA.

5.14.4 Project specific mitigation

- M2–The ‘Guide to Best Practice for Watching Marine Wildlife’ guidance on birds will be followed where practicable during installation activities for Cable Corridor 2.10 to prevent LSE to moulting common eider.

5.14.5 Conclusion

By following the ‘Guide to Best Practice for Watching Marine Wildlife’ where practicable, there will be no significant disturbance to moulting common eider or other birds within North Orkney pSPA, and their distribution and long-term viability within the site will not be affected. With the implementation of mitigation, no LSE will occur as a result of installation activities within the Orkney region for the North Orkney pSPA.

The distribution of the species within the site and their population as a viable component of the pSPA will be maintained. Therefore, there will be **no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

5.15 Scapa Flow pSPA

5.15.1 Screening conclusion

The HRA screening identified that the pressure ‘Visual (and above water noise) disturbance’ could have a potential LSE on the qualifying features:

- Red-throated diver
- Black-throated diver
- Great northern diver
- Slavonian grebe
- Common eider
- Long-tailed duck
- Red-breasted merganser
- Common goldeneye
- European shag

5.15.2 Preliminary conservation objectives

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long-term and it continues to make an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species.

This contribution will be achieved through delivering the following objectives for each of the site's qualifying features:

- Avoid significant mortality, injury, and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term; and
- To maintain the habitats and food resources of the qualifying features in favourable condition.
- Assessment against preliminary conservation objectives

The distribution of birds within the site are displayed in Figures 5-5, 5-6 and 5-7 (Drawings: P2308-BIRD-003_OR, P2308-BIRD-004_OR and P2308-BIRD-005_OR). Cable Corridors 2. 11 and 2.12 are found within the pSPA, with the remaining Cable Corridors all being found within the foraging ranges of the qualifying species.

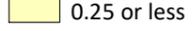
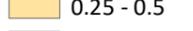
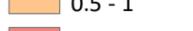
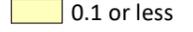
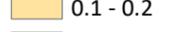
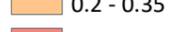
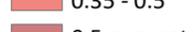
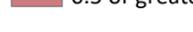
SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

BIRD ACTIVITY Bird Distribution in Scapa Flow pSPA Sheet 1 of 2

Drawing No: P2308-BIRD-003_OR

A

Legend

-  Cable Route Application Corridor
- Northern Diver Predictive Bird Distribution (per km²)**
 -  0.25 or less
 -  0.25 - 0.5
 -  0.5 - 1
 -  1 - 1.5
 -  1.5 or greater
- Red-Breasted Merganser Predictive Bird Distribution (per km²)**
 -  0.1 or less
 -  0.1 - 0.2
 -  0.2 - 0.35
 -  0.35 - 0.5
 -  0.5 or greater
-  Maximum Curvature
- Distribution of Black Throated Diver**
 -  0
 -  1 or less
 -  1 - 2
 -  2 or greater
- Distribution of European Shag**
 -  0
 -  25 or less
 -  25 - 75
 -  75 or greater
- Protected Site**
 -  SPA
 -  pSPA

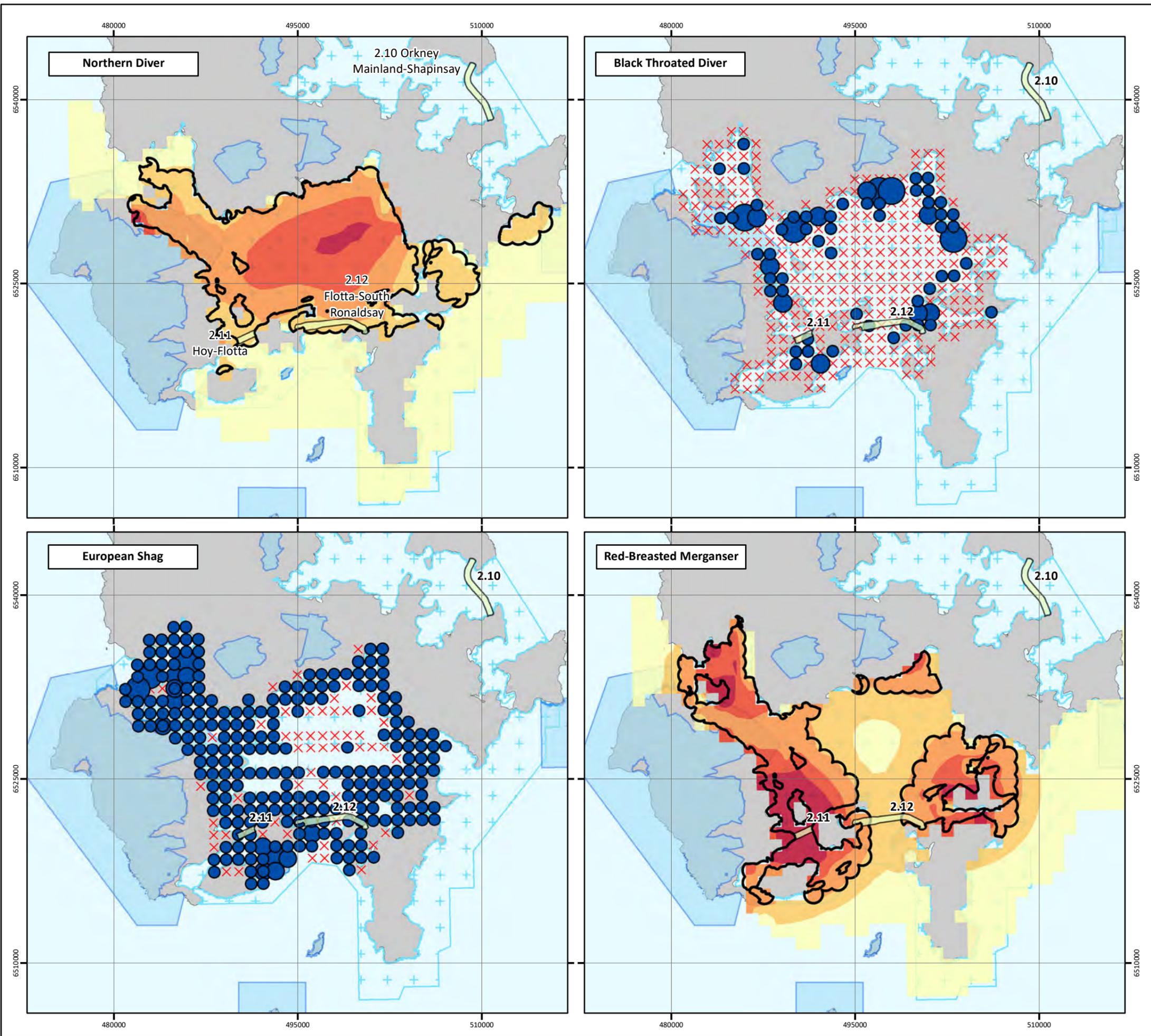


NOTE: Not to be used for Navigation

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Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; JNCC; OSOD; SNH
File Reference	J:\P2308\Mxd\11_BIRD\ P2308-BIRD-003_OR.mxd
Created By	Jessica Harvey
Reviewed By	Chris Dawe
Approved By	Jill Hobbs



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SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

BIRD ACTIVITY Bird Distribution in Scapa Flow pSPA Sheet 2 of 2

Drawing No: P2308-BIRD-004_OR A

Legend

Cable Route Application Corridor

Common Eider Predictive Bird Distribution (per km²)	Long-Tailed Duck Predictive Bird Distribution (per km²)
2 or less	1 or less
2 - 4	1 - 2
4 - 8	2 - 4
8 - 12	4 - 8
12 or greater	8 or greater

Maximum Curvature

Distribution of Slavonian Grebe

0

1 or less

1 - 5

5 or greater

Distribution of Common Goldeneye

0

3 or less

3 - 7

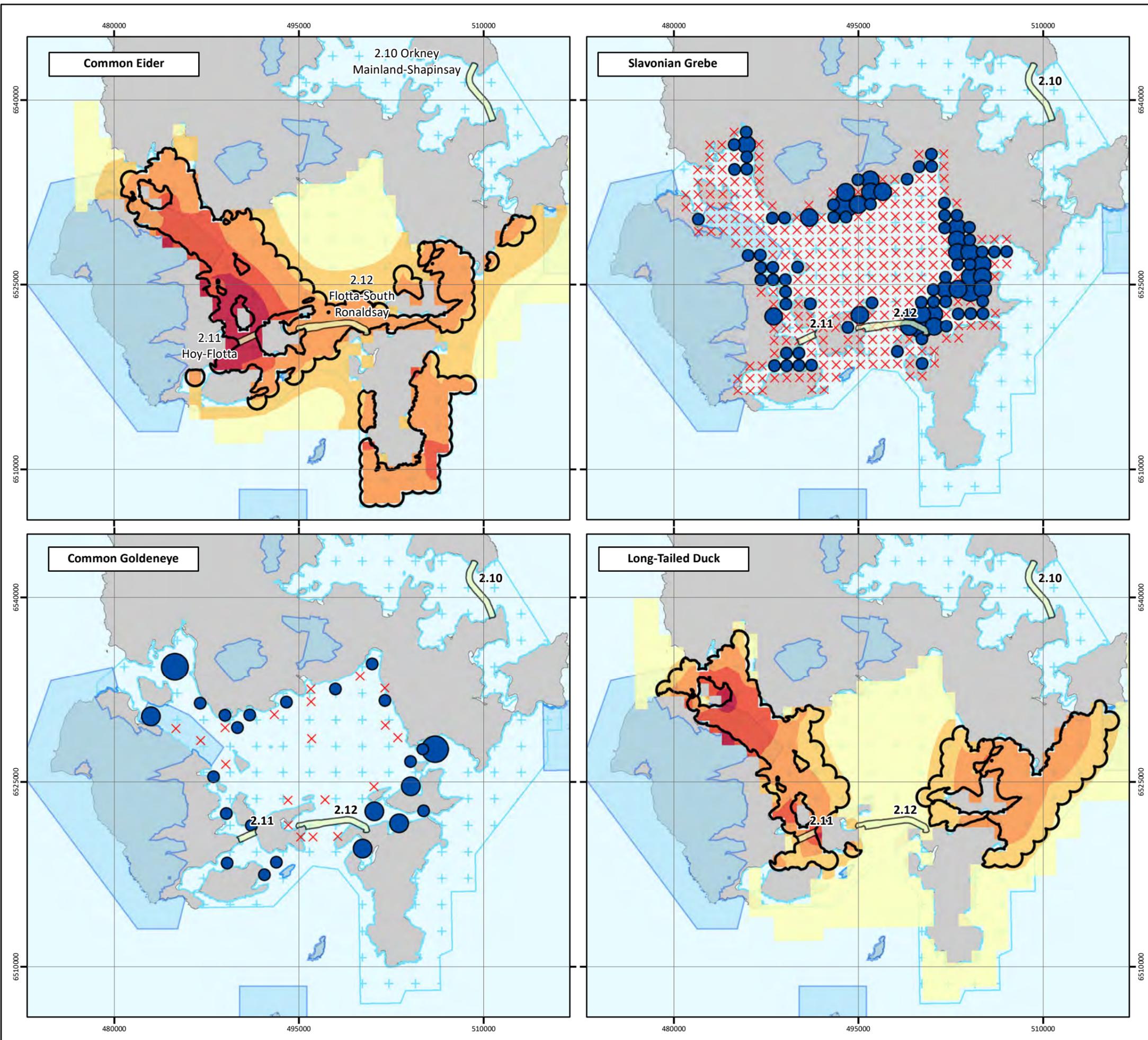
7 or greater

Protected Site

SPA

pSPA

NOTE: Not to be used for Navigation



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Projection	Transverse Mercator
Datum	WGS 1984
Data Source	ESRI; JNCC; OSOD; SNH
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**SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT
BIRD ACTIVITY
Red-Throated Diver Distribution
in Scapa Flow pSPA**

Drawing No: P2308-BIRD-005_OR

A

Legend

 Cable Route Application Corridor

**Red-Throated Diver Predictive
Bird Distribution (per km²)**

 4 or less

 4 - 12

 12 - 24

 24 - 40

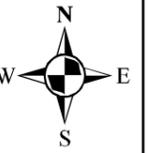
 40 or greater

 Maximum Curvature

Protected Site

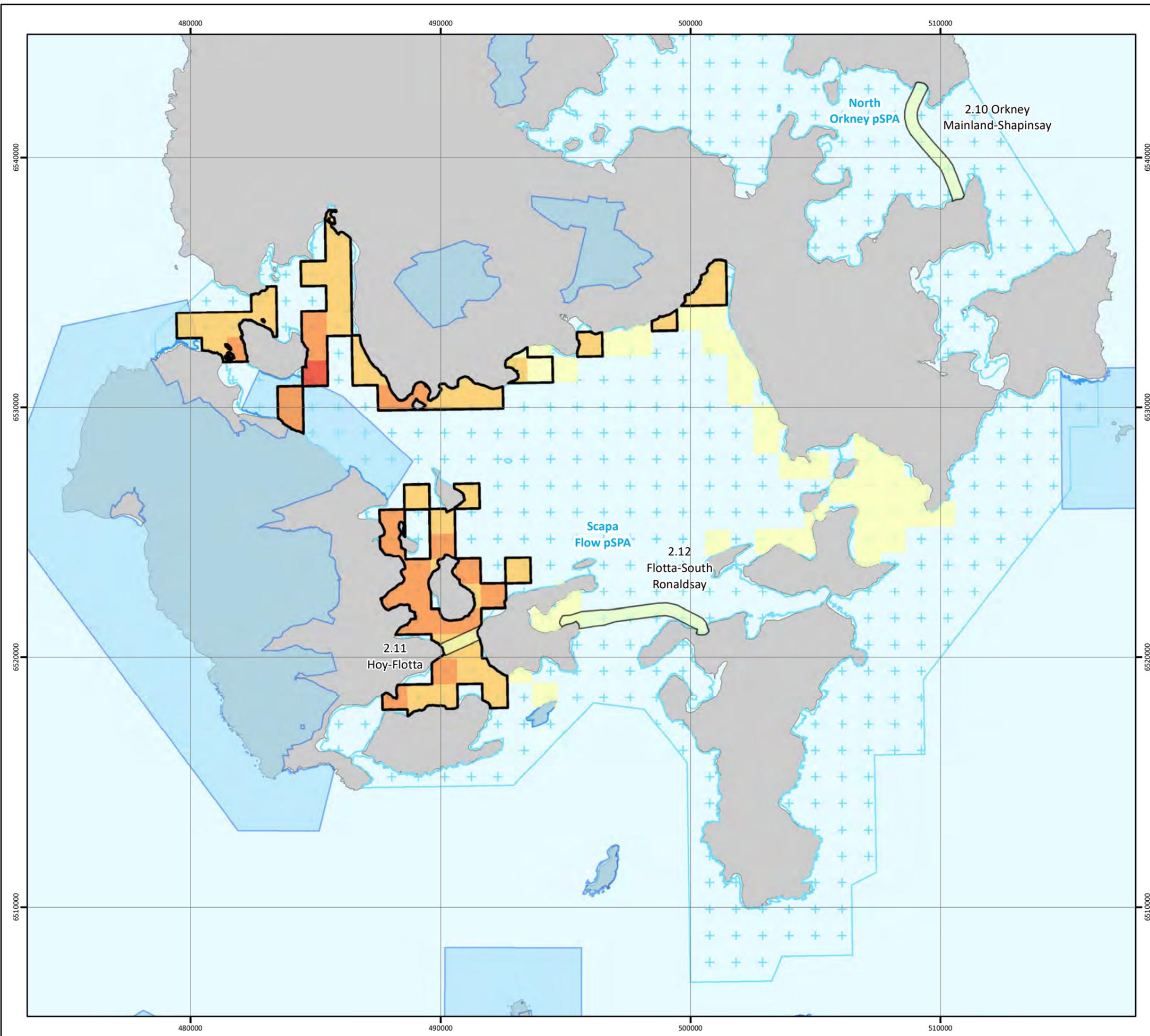
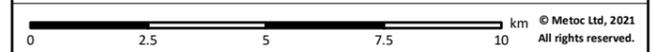
 SPA

 pSPA



NOTE: Not to be used for Navigation

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Datum	WGS 1984
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5.15.2.2 Visual (and above water noise) disturbance

A summary of the qualifying features and cable corridors screened in for visual (and above water noise) disturbance in Scapa Flow pSPA is provided in Table 5-18.

Table 5-18 Summary of LSE for visual (and above water noise) disturbance of the qualifying features of Scapa Flow SPA

Feature	Cable 2.5	Cable 2.6	Cable 2.7	Cable 2.9	Cable 2.10	Cable 2.11	Cable 2.12
Red-throated diver							
Black-throated diver							
Great northern diver							
Slavonian grebe							
Common eider							
Long-tailed duck							
Red-breasted merganser							
Common goldeneye							
European shag							

Note: Blue cells denote cable corridors where screening has identified a potential for LSE. Dark blue cells denote where cable corridors are within protected site.

The Scapa Flow pSPA covers an area of 370.66km². The main part of Scapa Flow is typically around 30m deep, but the Brings Deeps trench reaches just over 60m depth. There are also numerous shallower bays in the surrounding land, particularly to the north and east. Sediments in the main Scapa Flow basin and shallow bays are primarily muddy sands but areas of greater tidal flow are associated with cleaner sands and gravels. Kelp forests occur on bedrock and boulder slopes and there are maerl beds in the vicinity of Graemsay. These varied habitats, together with more localised features such as horse mussel beds and numerous wrecks, support a high diversity of marine life (NatureScot, 2016f).

The pSPA large populations of waterbirds, particularly during the winter months when frequent storms affect the surrounding North Sea and eastern Atlantic. Shag and common eider are resident throughout the year, but long-tailed duck, goldeneye, great northern diver, black-throated diver, and Slavonian grebe migrate long distances from their northern breeding grounds to reach wintering grounds such as Scapa Flow. Red-breasted merganser are typically short distance migrants, using coastal areas in winter. The concentration of Slavonian grebes is the largest in Scotland and GB. Scapa Flow pSPA was selected to provide protection to important wintering grounds for waterfowl, with the inshore area also selected as an important foraging area for red-throated diver breeding during the summer months. Red-throated divers nest on small lochans on the surrounding land (NatureScot, 2016g). The cable corridors for Cable Corridors 2.11 and 2.12 are in part located within the pSPA, and the cable corridors for Cable Corridors 2.5, 2.6, 2.7, 2.9 and 2.10 are within the foraging ranges of the site’s qualifying species.

Red-throated diver (Breeding)

While several SPAs for red-throated diver have been designated across Orkney, due to the small geographical area these are thought to be part of the same overall population (O’Brien *et al.*, 2018). The last population estimate of red-throated diver for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 81 pairs, which was equivalent to 7.6% of the Great Britain population

(NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine, and red-throated diver nest on small lochans on the surrounding land, there will be no disturbance to individuals nesting within the SPA. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

Red-throated diver have a mean-max foraging range of 9km (Woodward et al., 2019). Individuals from the Scapa Flow pSPA could be found feeding in the vicinity of installation activities of Cable Corridors 2.10, 2.11 and 2.12. Cable Corridor 2.10 is located within the North Orkney pSPA, which has been selected to provide protection to important foraging areas for red-throated diver breeding in Orkney, such as those breeding within Orkney Mainland Moors SPA and Hoy SPA. Therefore, red-throated diver from Scapa Flow pSPA foraging within Cable Corridor 2.10 have been assessed under this section.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), red-throated diver is classed as having a high habitat specialisation (score of 4 out of 5) and very high susceptibility to disturbance (score of 5 out of 5). This finding is in line with other studies which indicate that red-throated diver are highly sensitive to anthropogenic activity and move away from ships in the marine environment (Schwemmer et al., 2011). Breeding red-throated divers show a clear avoidance of areas with high shipping intensity and can take flight of small vessels approaching within 1km of them foraging (NatureScot, 2016e). The peak breeding and chick rearing period is from June to August (Hulka, 2010).

Red-throated diver are most abundant in the west and northern sides of the pSPA. Cable Corridor 2.11 is in the centre of the southern distribution of red-throated diver, with an estimated 4 to 24 individuals per km². Although greater abundances occur in the northern side of the pSPA, where up to 24-40 individuals per km² are present. Most of Cable Corridor 2.12 is estimated to have no red-throated diver, except at the Flotta landfall where up to 4 individuals per km² may be present (Figure 5-7, Drawing: P2308-BIRD-005).

However, installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). In addition, whilst red-throated diver are sensitive to visual disturbance, negligible disturbance has been shown to occur by vessels moving at less than 2km/h (Burger et al., 2019). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to red-throated diver will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of red-throated diver and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE for all cables listed in Table 5-18 will occur on the qualifying feature breeding red-throated diver within Scapa Flow pSPA.

Black-throated Diver (Non-Breeding)

The last population estimate of black-throated diver for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 57 foraging pairs in winter months, which was equivalent to 9.5% of the Great Britain (GB) population (NatureScot, 2016e). Scapa Flow pSPA also supports the only concentration of black-throated divers in the north of their GB range (NatureScot, 2016f). As black-throated diver are an overwintering species in the pSPA, there is potential for disturbance of individuals foraging, but not nesting, within the pSPA.

Black-throated diver have been recorded around Orkney over the winter months between November and March but are uncommon in the summer during the breeding season (APEM, 2013).

The foraging range for black-throated diver is unknown therefore as a precautionary measure, it has been assumed that the species could forage as far as all the cables corridors. However, the greatest disturbance is likely to be from cable installation activities within the cable corridors of Cable Corridors 2.11 and 2.12 which are located within the pSPA.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), great northern diver are classed as having a high habitat specialisation (score of 4 out of 5) and a very-high susceptibility to disturbance (score of 5 out of 5). Within the Scapa Flow pSPA, black-throated diver are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016e). Vessel activity through areas where black throated diver are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Within the Scapa Flow pSPA, black-throated divers were noted most frequently around the shores of Hoy, Mainland and South Ronaldsay. Within Cable Corridor 2.11, there is estimated to be between 0 and 1 or less black-throated diver present. Cable Corridor 2.12 is within an area where there are estimates of 1 or less individuals but adjacent to a cluster of 1-2 black-throated divers. Greater densities up to more than 2 identified on the Northern side of the pSPA (Figure 5-5, Drawing: P2308-BIRD-003). No black-throated diver were found in BTO surveys carried out at the landfalls in winter within Scapa Flow pSPA.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to black-throated diver will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of black-throated diver and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE for all cables listed in Table 5-18 will occur on the qualifying feature non-breeding black-throated diver within Scapa Flow pSPA.

Great Northern Diver (Non-Breeding)

The last population estimate of great northern diver for Scapa Flow pSPA (recorded in 2015) indicated that the site supports 506 individuals in winter months, which was equivalent to 20.2% of the GB population (NatureScot, 2016e). As great northern diver are an overwintering species in the pSPA, there is potential for disturbance of individuals foraging, but not nesting, within the pSPA.

Great northern diver has been recorded within Scapa Flow over the winter months between November and March but are uncommon in the summer during the breeding season (APEM 2013c).

The foraging range for great northern diver is unknown therefore as a precautionary measure, it has been assumed that the species could forage as far as all the cables corridors. However, the greatest disturbance is likely to be from cable installation activities within the cable corridors of Cable Corridors 2.11 and 2.12 which are located within the pSPA.

Whilst they are generally considered to be highly susceptible to disturbance, within the Scapa Flow pSPA great northern diver are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016e). Vessel activity through areas where great northern diver are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Great northern diver are predominantly distributed in the centre of the pSPA where there is estimated to be up to 1.5 or greater individuals per km². Whilst the cable corridors for both Cable Corridors 2.11 and 2.12 are within the maximum curvature line for northern diver, they are located on the southern margins of the distribution of great northern diver where estimates for great northern diver are between 0.25 and 1 northern diver per km² for the whole of cable corridor 2.11 and most of cable corridor 2.12. The area in the centre of the SPA is more important for the species, where more than 1.5 individuals per km² are found (Figure 5-6, Drawing Reference: P2308-BIRD-003). No great northern diver were found in winter BTO surveys carried out since 1998 at the landfalls within Scapa Flow pSPA.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to great northern diver will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of great northern diver and their population as a viable component of (and distribution within) the Scapa Flow pSPA will be maintained.

No LSE for all cables listed in Table 5-18 will occur on the qualifying feature non-breeding great northern diver within Scapa Flow pSPA.

Slavonian Grebe (Non-Breeding)

The last population estimate of Slavonian grebe for Scapa Flow pSPA (recorded in 2015) indicated that the pSPA supports 135 individuals in winter months, which was equivalent to 12.3% of the Great Britain population (NatureScot, 2016e). As Slavonian grebe are an overwintering species in the pSPA, there is potential for disturbance of individuals foraging, but not nesting, within the pSPA.

Slavonian grebe is non-breeding and therefore present in the winter months around the Orkney Isles, however the species is also sometimes present in the summer (APEM 2013c).

The foraging range for Slavonian grebe is unknown therefore as a precautionary measure, it has been assumed that the species could forage as far as all the cables corridors. However, the greatest disturbance is likely to be from cable installation activities within the cable corridors of Cable Corridors 2.11 and 2.12 which are located within the pSPA. Vessel activity through areas where Slavonian grebe are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Slavonian grebe are predominantly distributed on the eastern side of the pSPA. Cable Corridor 2.11 is not estimated to have any Slavonian grebe present. Cable Corridor 2.12 is estimated to have no Slavonian grebe present in approximately the first two third of the cable corridor from Flotta. The last third of the cable corridor to Ronaldsay, is within the eastern area of the SPA, with 1 to 5 Slavonian grebe (Figure 5-6, Drawing: P2308-BIRD-004). Slavonian grebe have not been identified in winter BTO surveys at any of the landfalls within Scapa Flow pSPA since 1985.

Within the Scapa Flow pSPA, Slavonian grebe are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to vessels (NatureScot, 2016e). Should cable installation activities within Cable Corridor 2.12 occur during the winter months (October to March, inclusive), there exists the potential that Slavonian grebe could be significantly disturbed by installation activities, affecting their distribution within the site.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to Slavonian grebe will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of Slavonian grebe and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE for all cables listed in Table 5-18 will occur on the qualifying feature non-breeding Slavonian grebe within Scapa Flow pSPA.

Common eider (Non-Breeding)

The last population estimate of common eider for Scapa Flow pSPA (recorded in 2015) indicated that the site supports 1994 individuals, which was equivalent to 3.3% of the GB population (NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine there will be no disturbance to nesting birds within the site. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

Common eider is a resident species in Orkney but the largest numbers of common eider have been recorded in the area over the winter months, with populations peaking around February/March (APEM 2013c). Vessel activity through areas where common eider are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Common eider has a mean-max foraging range of 21.5km, therefore there is potential for installation activities associated with Cable Corridors 2.9, 2.10, 2.11 and 2.12 to disturb foraging overwintering common eider.

Common eider are generally considered to be moderately sensitive to disturbance; however, within the Scapa Flow pSPA, common eider are considered to have a low sensitivity to vessel disturbance, with some level of habituation to vessel presence having occurred within the population (NatureScot, 2016e). However, during periods of flightless moult (July to September) their ability to avoid vessel movement will be reduced (NatureScot, 2016e).

Common eider are estimated to be predominantly distributed in the south west of the SPA. Cable Corridor 2.11 is located within the area where peak numbers (greater than 12 individuals per km²) of common eider are predicted to occur as illustrated in Figure 5-6 (Drawing: P2308-BIRD-004). Cable corridor 2.12 is also within the maximum curvature line for common eider, but with lower abundances of between 4 and 8 individuals per km² (Figure 5-6, Drawing: P2308-BIRD-004). In 2007, a total of 31 common eider were identified at BTO surveys across the landfalls in winter within Scapa Flow pSPA. However, none were identified in the most recent survey in 2016.

As there is local habituation to vessels by common eider, generally there will be no significant impact to individuals foraging in the cable corridors. However, given the increased sensitivity of this species during their moulting period, significant effects on common eider cannot be ruled out during moulting.

To prevent any significant effects on common eider, the guidance to avoid disturbance to birds published in the 'Guide to Best Practice for Watching Marine Wildlife' will be followed where practicable. During cable installation activities, the cable installation vessel will be at or below the speeds (up to 6 knots) recommended in this guidance. On approach to the cable corridor, if rafts of birds are sighted ahead, the speed will be reduced to less than 6 knots, and the cable installation vessel will avoid rafts of birds and navigate around them where practicable. Once at the cable corridor and installation activities have commenced, whilst the vessel will not be able to leave the cable corridor to avoid rafts of birds, it will be going at such slow speeds (approximately 1 knot (2km/hour) for surface lay and 0.3 knots (0.6km/hour) for plough installation) that any rafts of eider will be able to move away.

LSE cannot be ruled out for Cable Corridors 2.11 and 2.12 for the qualifying feature non-breeding common eider and project specific mitigation is proposed. The 'Guide to Best Practice for Watching Marine Wildlife' guidance on birds will be followed where practicable.

No LSE for all other cables listed in Table 5-18 will occur on the qualifying feature non-common eider within Scapa Flow pSPA.

Long-tailed duck (Non-Breeding)

The last population estimate of long tailed duck for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 1,393 individuals in winter months, which was equivalent to 12.7% of the GB population (NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine there will be no disturbance to nesting birds within the site. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

Long-tailed duck migrate from their northern breeding grounds to spend the winter (September to April) in Scapa Flow, with peak numbers occurring in February/March (APEM 2013).

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), long-tailed duck is classed as having a high habitat specialisation (score of 4 out of 5) and a moderate susceptibility to disturbance (score of 3 out of 5). However, within the Scapa Flow pSPA, long-tailed duck are considered to have a low sensitivity to vessel disturbance, with some level of habituation to vessel presence having occurred within the population (NatureScot, 2016b). Vessel activity through areas where long-tailed duck are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Long tailed duck are most abundant on the east and west sides of the pSPA. Cable Corridor 2.11 is within the maximum curvature for the SPA, with estimated abundances of 4 to 8 individuals per km². Cable Corridor 2.12 is outside of the main distributions of long tailed duck, with estimated abundances of less than 1 individual per km² (Figure 5-7, Drawing Reference: P2308-BIRD-004). No long-tailed duck were found in the 2007 or 2015 winter BTO surveys for landfalls within Scapa Flow pSPA. However, the most important area for Scapa Flow pSPA long-tailed duck is off the North coast of Hoy, which will be unaffected by the installation activities.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing

grounds in the short term. Should any works overlap with the winter months, disturbance to long-tailed duck will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of long-tailed duck and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE for all cables listed in Table 5-18 will occur on the qualifying feature non-breeding long-tailed duck population within the Scapa Flow pSPA.

Red-breasted merganser (Non-Breeding)

The last population estimate of red-breasted merganser for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 539 individuals in winter months, which was equivalent to 6.4% of the Great Britain population (NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine there will be no disturbance to nesting birds within the site. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), red-breasted merganser is classed as having a moderate habitat specialisation (score of 3 out of 5) and a high susceptibility to disturbance (score of 4 out of 5). Within the Scapa Flow pSPA red-breasted merganser are considered to have a moderate sensitivity to vessel disturbance, with avoidance behaviour being displayed when in close proximity to other vessels (NatureScot, 2016e). Vessel activity through areas where red-breasted merganser are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Red-breasted merganser are predominantly distributed on the western and eastern areas of the pSPA. Cable Corridor 2.12 is predominantly outside of the maximum curvature line and is estimated to have less than 0.2 individuals per km². Cable Corridor 2.11 also has predicted densities of more than 0.5 individuals per km² (Figure 5-5, Drawing: P2308-BIRD-003). In the most recent BTO survey (Winter 2015-2016), no red-breasted merganser were identified at any of the landfalls within Scapa Flow pSPA. In 2007, red-breasted merganser were present within the cable corridors at the landfall for Cable Corridor 2.11; and within the cable corridor at the landfall for Cable Corridor 2.12, between 1 and 5 individuals were found.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to red-breasted merganser will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of red-breasted merganser and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE for will occur on the qualifying feature non-breeding red-breasted merganser population within the Scapa Flow pSPA for all other cable corridors.

Common Goldeneye (Non-Breeding)

The last population estimate of common goldeneye for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 219 individuals in winter months, which was equivalent to 1.1% of the Great Britain population (NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine there will be

no disturbance to nesting birds within the site. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), common goldeneye is classed as having a high habitat specialisation (score of 4 out of 5) and a high susceptibility to disturbance (score of 4 out of 5). Within the Scapa Flow pSPA, common goldeneye are considered to have a low sensitivity to vessel disturbance, with some level of habitation to vessel presence having occurred within the population (NatureScot, 2016e). Vessel activity through areas where common goldeneye are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

Goldeneye are most abundant on the east and west sides of the pSPA. There are estimated to be up to 3 individuals within Cable Corridor 2.11, and none across Cable Corridor 2.12 except at the Ronaldsay landfall which is adjacent to areas of 3-7 goldeneye (Figure 5-6, Reference: P2308-BIRD-004). In the most recent BTO survey (Winter 2015-2016), only 2 goldeneye individuals were identified within Cable Corridor 2.12 at the South Ronaldsay landfall, with no individuals identified within any other Cable Corridor.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to common goldeneye will be minimal.

Due to the temporary and localised nature of installation activities, there will be no significant disturbance of common goldeneye and their population as a viable component of (and distribution within) Scapa Flow pSPA will be maintained.

No LSE will occur to the common goldeneye population within the Scapa Flow pSPA for all cable corridors.

European shag (Non-Breeding)

The last population estimate of European shag for Scapa Flow pSPA (recorded in 2015) indicated that Scapa Flow pSPA supports 2,929 individuals in winter months, which was equivalent to 2.9% of the Great Britain population (NatureScot, 2016e). As the Scapa Flow pSPA is entirely marine there will be no disturbance to nesting birds within the site. As such, only individuals foraging within the cable corridors have the potential to be disturbed by installation activities.

European shag have a mean-max foraging range of 13.2km (Woodward et al., 2019). As such, individuals from the Scapa Flow pSPA could be found feeding in the vicinity of installation activities associated with the cable corridors for Cable Corridors 2.10, 2.11 and 2.12.

In the Joint SNCB Interim Displacement Advice Note (Joint SNCB, 2017), European shag is classed as having a moderate habitat specialisation (score of 3 out of 5) and a moderate susceptibility to disturbance (score of 3 out of 5). However, within the North Orkney pSPA, European shag are considered to have a low sensitivity to vessel disturbance, with some level of habitation to vessel presence having occurred within the population (NatureScot, 2016b). Vessel activity through areas where European shag are present on the surface may result in temporary displacement from optimal areas for feeding/loafing.

European shag is abundant across the pSPA, with the greatest abundances occurring in the north-west and south-west of the pSPA where there are estimated to be between 25 and 75 individuals. Within the cable corridors for Cable Corridors 2.11 and 2.12, there is estimated to be 25 or less individuals present (Figure Reference 5-5, Drawing P2308-BIRD-003). In the most recent BTO survey (Winter 2015-2016), no European shag were found at any of the landfalls within Scapa Flow pSPA.

Installation vessels will be slow moving (approximately 2km/hr), slower than walking speed (generally assumed to be 5km/hr), and at times stationary. At such slow speeds, the vessels are effectively stationary in terms of bird displacement. Studies have shown that slow moving vessels cause little disturbance to birds and birds may habituate to frequent and relatively benign events and noises (Natural England and Suffolk Coast and Heaths, 2012). Additionally, any such disturbance will take place in the context of existing sources of disturbance such as commercial shipping, recreational boating etc. The duration of operations along the cable corridors in the region are approximately 6 days. Given the wider area available, birds are likely to be able to find alternative feeding / loafing grounds in the short term. Should any works overlap with the winter months, disturbance to European shag will be minimal.

As there is local habituation to vessels by European shag there will be no significant impact to individuals foraging in the cable corridors.

No LSE will occur to the European shag population within the Scapa Flow pSPA for all cable corridors.

5.15.3 Project specific mitigation

- M2 – The ‘Guide to Best Practice for Watching Marine Wildlife’ guidance on birds will be followed where practicable during installation activities for Cable Corridor 2.10, Cable Corridor 2.11 and Cable Corridor 2.12 to prevent LSE to moulting common eider.

5.15.4 Conclusion

By following the ‘Guide to Best Practice for Watching Marine Wildlife’ where practicable, there will be no significant disturbance to moulting common eider or other birds within Scapa Flow pSPA, and their distribution and long-term viability within the site will not be affected. With the implementation of mitigation, no LSE will occur as a result of installation activities within the Orkney region for the Scapa Flow pSPA.

The distribution of the species within the site and their population as a viable component of the pSPA will be maintained. **Therefore, there will be no adverse effect on the integrity of the site either alone or in combination with other plans or projects.**

6. CONCLUSIONS

The Protected Sites Assessment identified 13 European Sites and two SSSI's where there was a possible pressure-receptor pathway between the protected site and the proposed installation activities. There are no NCMPAs in the vicinity of the Orkney cable corridors and therefore no NCMPAs were assessed.

The SSSI assessment concluded that for both of the sites, Doomy and Whitemaw SSSI and Eynhallow SSSI, no potential adverse effect on the site's notifying features would occur due to the one off, short duration and localised nature of the installation activities from the site therefore the site integrity would be maintained.

With respect to the European Sites, many of which are also designated as SSSIs, the Habitats Regulation Appraisal process was followed. Stage 1 Screening of the 13 European sites concluded that for 11 of these sites a potential likely significant effect (LSE) could not be ruled out and therefore Stage 2 Appropriate Assessment (AA) is required.

Information to Inform AA has been provided (Section 5) and where appropriate mitigation measures have been proposed. The assessment concluded that of the 11 sites, in the absence of mitigation LSE could occur to the qualifying interests of Faray and Holm of Faray SAC, Hoy SPA, Orkney Mainland Moors SPA, North Orkney pSPA and Scapa Flow pSPA. As a result, the following project specific mitigation measures have been proposed to prevent LSE from occurring:

- M1 - Installation activities should not occur at Cable Corridor 2.5 during the peak grey seal breeding season from October to December (inclusive).
- M2 - The 'Guide to Best Practice for Watching Marine Wildlife' guidance on birds will be followed where practicable, for installation activities for Cable Corridor 2.10, Cable Corridor 2.11 and Cable Corridor 2.12 to prevent LSE to moulting common eider.

The seasonal restrictions for each cable corridor are summarised in Table 6-1 below.

Table 6-1 Seasonal restrictions per Cable Corridor

Key = Orange cell denotes month when installation activity should be avoided

Cable Corridor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2.5												

It is concluded that with the implementation of the mitigation measures prescribed above, the proposed installation activities will not have an adverse effect on the integrity of any Protected Sites.

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APPENDIX A

HRA and SSSI Assessment Processes

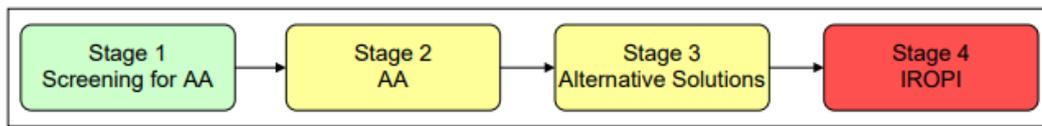
A.1 HABITATS REGULATIONS APPRAISAL (HRA) PROCESS

The Conservation (Natural Habitats, &c.) Regulations 1994 (CHSR) (as amended) in Scotland requires that any plan or project which has the potential to adversely affect a European site, no matter how far away from that site, be subject to the Habitats Regulations Appraisal (HRA) process in order to determine whether Appropriate Assessment (AA) is required.

Whilst the obligation to undertake the AA is derived from Articles 6(3) and 6(4) of EC Council Directive 92/43/EC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive), it is regulation 48 of the CHSR that sets out procedural requirements. It is the role of the designated competent authority (in this case Marine Scotland) to undertake the HRA process. However, the applicant is required to provide necessary information to inform the process or to enable them to determine whether an AA is required. The competent authority can only agree to the plan or project if, based on the findings of the AA, it has ascertained that it will not have an adverse effect on the integrity of the site concerned. It is important to note that the onus is on demonstrating the absence (rather than the presence) of negative effects.

The HRA process involves four stages (as outlined in EC 2002 and shown in Figure A-1) that need to be applied in sequential order. The outcome at each successive stage determines whether a further stage in the process is required. The results at each stage must be documented so there is transparency of the decisions made.

Figure A-1 Stages of HRA process



There is no statutory method for undertaking the HRA process, but The Planning Inspectorate (2017) guidance outlines the steps to be taken by the applicant at each Stage.

Stage 1 - Screening for Appropriate Assessment is the process that addresses and records the reasoning and conclusions in relation to the first two tests of regulation 48 of the CHSR:

- Whether a plan or project is directly connected to or necessary for the management of the site, and
- Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a European site in view of its conservation objectives.

Where significant effects are likely, uncertain, or unknown at screening stage, the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential effects clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan. The greatest level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no effect. Where a potential for significant effect has been identified the assessment must progress to Stage 2.

A.2 SSSI ASSESSMENT PROCESS

SSSIs represent the best of Scotland's natural heritage. They are 'special' for their plants, animals or habitats, their rocks or landforms, or a combination of these. They can include freshwater, and sea water down to the mean low water mark of spring tides, as well as land.

Operations requiring consent, or ORCs, are those activities that NatureScot believe could damage the natural features of an SSSI and for which NatureScot is responsible for giving consent. Developers can apply for consent under the Nature Conservation (Scotland) Act 2004 to carry out, cause or permit to be carried out, operations likely to damage the natural feature(s) of a Site of Special Scientific Interest (SSSI).

When applying for consent, the applicant should provide NatureScot with information about the proposed activities such as the nature and location of the proposed activities. Written consent for operations that can be done without damaging the site will be granted.