LT17 Orkney - Mainland HVAC 220 kV Subsea Link Environmental Appraisal

Non-Technical Summary

Scottish and Southern Energy plc

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1 INTRODUCTION

1.1 Background

This document is a Non-Technical Summary of the Environmental Appraisal (EA) carried out in support of a Marine Licence application for the subsea cable section of the Orkney – Mainland HVAC 220kV Subsea Link and prepared by Scottish Hydro Electric Transmission plc (SHE Transmission) in line with Part 4 of the Marine (Scotland) Act 2010.

The proposed cable route is shown in Figure 1-1. The purpose of this document is to provide a non-technical overview of the key findings of the EA undertaken for the Project.

SHE Transmission, part of the SSE plc group of companies, is the licensed electricity Transmission Owner (TO) in the north of Scotland. It owns the 5,000 km network of high voltage underground cables and overhead lines that provides electricity to people across northern Scotland and connects northern Scotland to central and southern Scotland and the rest of Great Britain. SHE Transmission is also responsible for maintaining and investing in this transmission network, which covers around 70% of Scotland.

SHE Transmission is currently looking at taking forward a number of strategic projects which are aimed at expanding the transmission network across northern Scotland. These projects, which involve both network reinforcements and upgrades, have been identified as being required to facilitate the substantial increase in renewable energy generation in the north of Scotland and the subsequent increasing demand for renewable energy connections and hence to support the growth of the low carbon economy. The Orkney to Mainland Scotland Transmission Connection is one of these projects.

1.2 Need for the Project

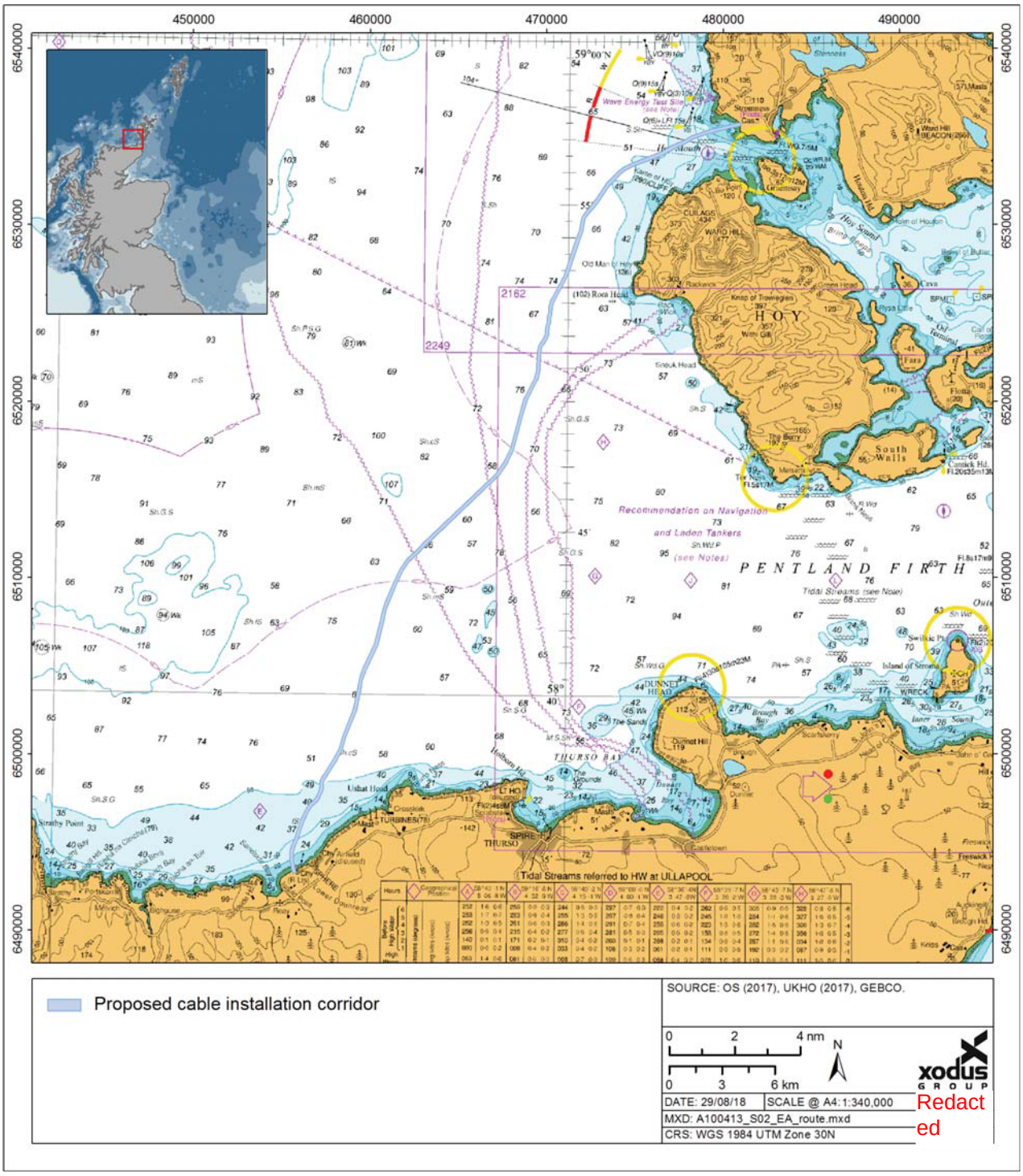
The need for a transmission link from Orkney is centred around the development and connection of a significant volume of new renewable generation on the archipelago. The area benefits from abundant wind, marine and tidal energy resources which have long been the subject of development as far back as the 1980s.

At present there is no transmission infrastructure as the local demand and existing renewable generation is connected via the distribution network owned and operated by Scottish Hydro Electric Power Distribution (SHEPD). The local network is connected to the transmission system on the Scottish mainland at Thurso Grid Supply Point (GSP) via two 33 kV circuits which are at present fully utilised in providing export for local renewable generation.

1.3 Environmental Appraisal Process

A Marine Licence is required for the installation and operation of submarine cables in Scottish waters. However, submarine cables do not require a formal Environmental Impact Assessment (EIA) as they are not listed on either Schedule 1 or Schedule 2 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended). The information provided in the EA, and summarised in this NTS, was finalised following consultation to determine the type of studies to be undertaken in support of the application for a Marine Licence.

Figure 1-1 Proposed cable installation corridor



2 PROJECT DETAILS

2.1 Overview

The Orkney to Mainland Scotland Transmission Connection is a proposed HVAC link, with a capacity of delivering a minimum of 220 MW, which will allow the transfer of electricity between a landfall at Warebeth, on the west coast of Orkney Mainland and Dounreay, Caithness on the north coast of the Scottish Mainland. The total length of the subsea cable route is approximately 53 km.

As the cable leaves land and enters the sea a Horizontal Directional Drilling (HDD) technique will be utilised to install ducts that are drilled under the seabed. The cable will then be pulled through these ducts from the Cable Lay Vessel. Where possible the subsea cable will be buried in the seabed. If the subsea cable cannot be buried, due to hard seabed conditions, the presence of sensitive environmental habitats/species or at crossings of other cable assets, it will be protected by alternative methods, for example High Density Polyethylene (HDPE) ducting, Cast Iron Shells (CIS), rock placement or concrete mattressing.

The EA considers the marine components of the cable route from the high-water mark at both landfalls. The onshore aspects of the Project above MHWS are not considered in this document.

2.2 Site selection and alternatives

In 2017, a route selection process was undertaken to identify strategic route options for the Project. A five-staged process was undertaken as follows:

1. Baseline information and connection components reviewed.
2. Rationalisation of technically feasible components utilising key assumptions.
3. Identification of strategic options based on the above.
4. Assessment of strategic options.
5. Identification of a preferred option.

The aim of the study was to select a technically feasible and economically viable route which causes the least disturbance to the environment and people who live, work, visit and enjoy it. The study involved the collation, mapping and analysis of various sources of data (environmental, social and technical) to identify potential landfall locations and subsea cable route options.

Detailed appraisal of the potential landfall locations was carried out during a site visit by the Project team to Orkney held between the 10th and 13th October 2017. An additional workshop was held on 2nd November 2017 for the Project team to review the findings from the desk studies and site visits (from both a marine and onshore perspective). A detailed appraisal of the shortlisted routes evaluated the potential strategic options and selected the Billia Croo (Warebeth) to Dounreay route.

A marine survey of the preferred Warebeth to Dounreay subsea cable corridor was undertaken between February and May 2018. The objective of the survey was to acquire geophysical, geotechnical and environmental data from a 1,000 m wide corridor to allow identification of a suitable route and to confirm the viability of the route selected during the desktop study. The information from the marine surveys has been combined with data on other marine factors including fishing, shipping and the suitability of the seabed sediments for cable burial to enable the development of the preferred subsea cable route.

2.3 Consultation

Consultation has been undertaken with statutory consultees, stakeholders and the public during key stages of the project. Consultation provided a focus and mechanism for gaining stakeholder views on the content of, and methodology for the EA. To ensure the EA covered the main issues of concern, a report (Report identifying additional studies required to support Orkney – Mainland subsea cable marine licence application) was produced and submitted to the Scottish Ministers on the 19th July 2018. The objective of the report was to provide sufficient information on the project and the environment in which it would be constructed and operated, so that the regulator (with the assistance of statutory and other consultees) could advise which

issues should be the focus of the EA. A response to this was received from Marine Scotland – Licensing Operations Team (MS-LOT) on the 26th November 2018, providing Advice as to the content and level of detail of information to be provided in the EA.

2.4 Installation programme overview

The pre- and post- cable installation surveys, preparatory works and cable installation activities will take place over a period of approximately three years from 2020 to 2022. An indicative installation programme is provided in Table 2-1.

Table 2-1 Indicative installation programme

Cable installation activity	Indicative time period*
HDD works	June 2020 – March 2021
UXO/PLGR	May 2022 – June 2022
Cable lay	June 2022 – July 2022
Trenching	June 2022 – August 2022
Rock placement	July 2022 – August 2022
Nearshore works	July 2022 – October 2022

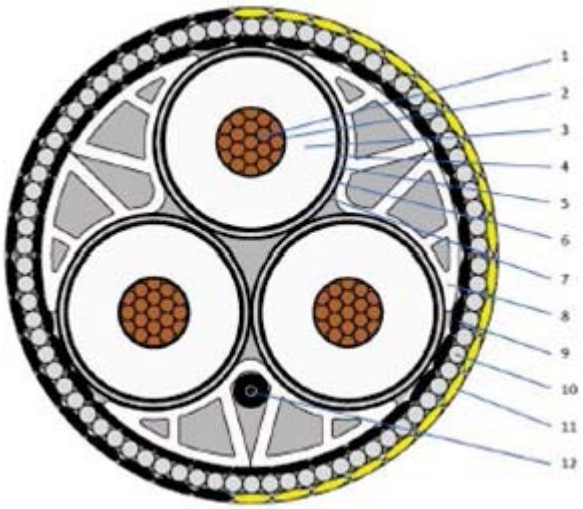
* Please note these times may vary dependent on weather and other factors.

2.5 Marine route

The subsea cable route extends for a distance of approximately 53 km in a southwest direction from Warebeth, Orkney across the western part of the Pentland Firth to Dounreay, Caithness. Water depths along the cable route range up to a maximum water depth of 91 m.

2.6 Cable design

Electricity will be transmitted using HVAC submarine cable technology. For similar HVAC systems the cable is approximately 250 - 300 mm in diameter and weighs approximately 100 - 150 kg/m. The cable will be laid along with a fibre-optic cable for control and communication purposes. A typical HVAC cable structure is shown below in Figure 2-1.



No.	Description
1	Conductor
2	Conductor screen
3	Insulation
4	Insulation screen
5	Water Blocking
6	Metal sheath
7	Inner sheath
8	Fillers
9	Armour bedding
10	Armouring
11	Serving
12	OF cable

Figure 2-1 Typical HVAC subsea cable structure

2.7 Pre-lay preparation

2.7.1 Route clearance

The cable route will be cleared of debris using a number of methods. Prior to cable installation a grapnel will be dragged along the seabed to ensure the cable route is free from obstructions such as discarded or lost fishing gear that could interfere with cable burial operations. The grapnel consists of a series of specially designed hooks and penetrates the surface of the seabed. The grapnel will not be deployed within 100 m of any live cables (unless an agreement is in place) and will only be used following close consultation with infrastructure owners and relevant authorities.

There may be a requirement to clear the route of large stones or boulders that may be present along parts of the route so that the installation equipment can operate. This would be undertaken using a specialist boulder clearance plough or, alternatively, in areas of limited boulders using a grab known as an 'Orange peel' grab.

Where there are sand waves along the route which could present a barrier to the safe lay and burial of the cable a plough or mass flow excavator system will be used to pre-sweep or 'flatten' the seabed sufficient to allow safe burial of cable. This operation is used in very localised and specific areas and is normally an alternative to rock-dumping or other means or other means of stabilising and protecting the cable.

If any unexploded ordnance not previously identified during the UXO Survey is discovered during this process, a registered Explosives and Ordnance Disposal (EOD) specialist will be available during installation to identify any potentially dangerous items and provide advice on appropriate remediation.

2.7.2 Crossing preparation

Any cable or pipeline crossing areas will be prepared to allow the cable to smoothly transition over the existing infrastructure. This crossing arrangement is normally in the form of rock bags, grout bags, rock berm or concrete 'link-lok' mattresses to lift the cable over the infrastructure.

2.7.3 Landfall preparation

The landfall locations at Warebeth (Orkney) and Dounreay have been selected, balancing a range of cost, technical and environmental factors. A review of potential options at each landfall was undertaken which considered both open cut and HDD techniques. An HDD landfall is the preferred option at each landfall as it:

- Minimises impact on the intertidal and nearshore areas;
- Protects the cable in high energy environments;
- Reduces the requirement for cable protection in shallow water; and
- Allows the landfall to be created prior to cable installation.

2.7.4 HDD construction

The HDDs bores will be drilled from a position on land approximately 100m behind MHWS and exit onto the seabed approximately 900 m offshore at the Warebeth landfall and 1005 m offshore at the Dounreay landfall. A duct, approximately 700 mm in diameter will be pushed through the HDD bore, to provide a continuous conduit for the cable to be pulled through. Should it be necessary rock bags, concreate mattresses or grout bags may be used to stabilise the HDD pop-out (location where the HDD bore exits the seabed) and liner.

The subsea cable will be joined to the onshore cable in a Transition Joint Pit (TJP) located above the high-water mark at the cable landfalls. Detail on the TJP, and associated works connected with the onshore aspects of the Project above MHWS, is presented in the environmental supporting documentation produced to support the onshore planning applications, under the Town and Country Planning (Scotland) Act 1990, to Orkney Islands Council (OIC) and The Highland Council.

2.7.5 Transition joint pit (TJP)

The subsea cable will be joined to the onshore cable in a TJP located above the high-water mark at the cable landfalls. Detail on the TJP, and associated works connected with the onshore aspects of the Project above MHWS, is presented in the environmental supporting information produced to support the onshore planning applications. No further assessment of these features is therefore undertaken in this report.

2.8 Installation

2.8.1 Pre-lay surveys

A pre-lay survey is normally performed by the Installation Contractor prior to the cable laying operation, to ensure that there is no debris present along the route, that has appeared since the previous surveys.

2.8.2 Pre-lay trenching

A potential installation option is to pre-cut a 'V' shaped trench along the cable route to facilitate achievement of the target burial depth as well as reducing the risk of cable damage during installation. This can often be undertaken in areas of potential high-strength cohesive seabed sediment. By cutting the trench prior to laying the cable the risk of damage to the cable from trenching equipment is significantly reduced. The laying of the cable is slightly more difficult as the cable should be laid in the deepest part of the shallow sloping 'V' profile.

2.8.3 Laying operations

The vessel will position itself using thrusters through a technique known as Dynamic Positioning (DP). The typical laying speed can vary between 200 m/hr to 800 m/hr, subject to the vessel equipment, weather and accuracy of lay required. The vessel will lay the cable from the turntable/carousel over a chute, using a tensioner to control the speed at which the cable is laid, whilst the vessel moves along the route on DP.

The cable will be laid onto the seabed for burial later. The cable will not be buried as it is laid, since this would slow down the laying speed significantly and introduce a range of risks in the operation including the potential of damage to the cable and exposure to weather risk. The cable lay vessel will be equipped with a remotely operated vehicle (ROV) and supporting camera equipment to monitor the cable as it is laid.

2.8.4 Cable jointing

Depending upon the vessel selected for cable installation, the final cable design and as-manufactured length's, there may be a requirement for a cable joint to join separate lengths of cable. Additionally, if there is a marine emergency then the cable may have to be cut and subsequently re-joined. The cable jointing or splicing operation will be performed onboard and the lay will re-commence once the separate sections of cable are successfully jointed together.

2.9 Cable protection

2.9.1 Cable burial

It is proposed to bury the cable along the majority of the submarine cable route for protection purposes and to reduce the risks associated with potential fishing gear interaction and anchoring. Where burial is not feasible, either at crossings with existing cables, or where seabed sediments are too firm to achieve burial to the target burial depth, it will be necessary to protect the cable by other means such as rock, CIS, split duct or concrete mattress placement.

The ability to bury the cable is heavily dependent upon the soils on which the cable is resting. Two principal methods are available to bury the cable, namely trencher and plough. Very soft or loose soils can be jetted using a trencher. In very hard soils and some types of rock a mechanical trencher may also be used to cut a slot shaped trench into the seabed into which the cable will be installed. The protection of the cable is afforded

by a combination of the depth of lowering into the seabed and the depth of cover achieved by the resettlement of fluidised sediment and natural sediment movement which will backfill the trench over time.

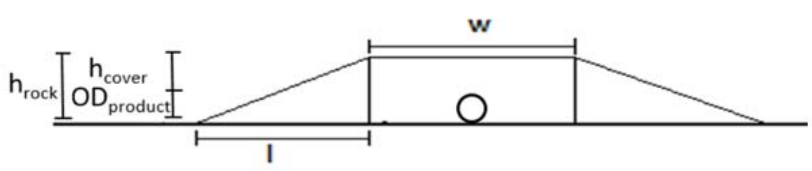
Alternatively, a plough can be used either to create a pre-cut trench or for post lay trenching. Pre-lay trenching creates a V shaped trench in the seabed, using one or more passes to achieve the required depth of lowering. The cable is then laid into the trench. The trench may be backfilled using either imported material i.e. rock or using a backfill tool, where the previously excavated material is pushed back into the trench. For post-lay trenching, the cable is picked up by the trencher and fed through the plough into the trench as the tool is pulled through the seabed. The excavated material then falls back into the trench burying the cable.

It may not be possible to trench or plough in areas of rock and rock protection or mechanical trenching may be required in these locations.

2.9.2 Rock placement

Where the cable cannot be buried, or the required depth of burial cannot be achieved, rock is usually placed to protect the cable from damage and from the effects of waves and currents. Rock of the required grade and specification is typically installed from a specialist vessel using a fall-pipe. The typical cross section design of rock placement over the cable is shown in Figure 2-2.

Figure 2-2 Typical rock placement cross section

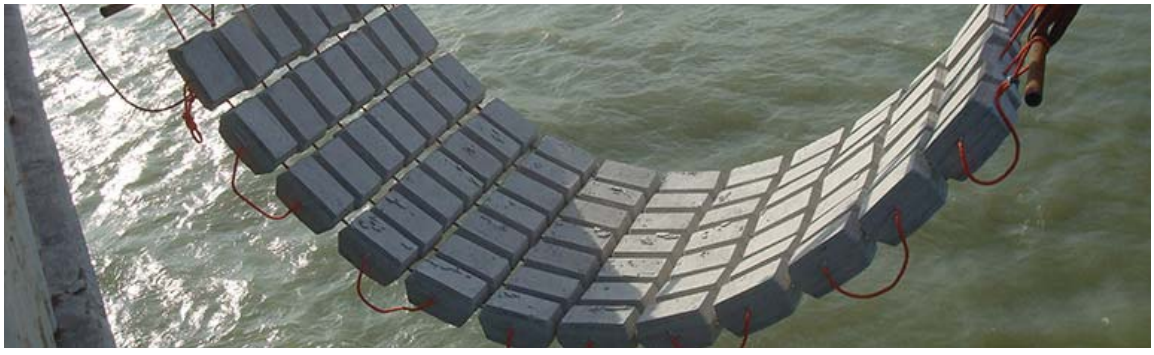


Cover height, hcover (m)	0.5
Product OD (m)	0.3
Rock height (hcover + Product OD) (m)	0.8
Rock dump width of berm top, w (m)	1
Rock dump slope length l (m)	2.4
Rock dump bulk density (Te/m3)	1.9
Rock dump requirement (Te/m)	5.168

2.9.3 Alternative cable protection options

In addition to rock placement there are a number of alternatives that are used in more localised areas. Concrete mattresses are frequently used to protect subsea cables and can also be used to construct crossings over existing subsea cables and pipelines (Figure 2-3). They are flexible and thus follow the contours of the seabed.

Figure 2-3 Concrete mattress



Smaller bags filled with either sand, grout (which sets in water to the profiled shape) or rock bags can also be used to provide very localised protection, where most mechanical means such as trenchers cannot be used.

Additional protection can be provided around the cable in the form of jointed half shells, which allow the cable to follow the contour of the seabed (Figure 2-4). These are often used in areas of stronger currents and can be installed on the cable during the laying operation, thus not requiring any post-lay intervention.

Figure 2-4 Cast iron casing cable protection

2.10 Offshore works – as built surveys

Following the completion of the installation activities, the Installation Contractor will compile an 'As-Built' report, part of which is the as-built drawings, imagery and video evidence that the cable has been safely installed. A key part of this report is the final route survey to confirm depth of burial and the position of the cable. This will be used as the baseline for subsequent surveys and to identify any movement of the cable, whether it is settling into the seabed or has become exposed due to the action of the sea.

2.11 In-service operations

Ongoing surveys of the cable will be undertaken of the laid cable at regular intervals which will consist of the measurement of the cable depth of burial, position and seabed profile. The objective is to determine whether the seabed has changed significantly, whether the cable is exposed or has moved and the status of any protection on or around the cable.

The cables themselves produce no external electric field due to the presence of a metallic outer sheath. The magnetic fields generated by the cable are expected to fall back to background levels within around 1 m. It is also proposed to bury the cable or for rock to be placed over the cables where burial cannot be achieved at crossings or in areas of harder seabed and therefore no magnetic fields are expected to be detectable outside of 1 m at the seabed.

The cables will produce some heat during operation; however, protection of the cables by burial or with rock placement will result in a negligible heating effect of the surrounding environment.

Once installed, submarine cables generally do not require any routine maintenance other than monitoring to confirm that there are no areas of exposure or significant movements indicative of external influence. The subsea cable will be monitored from onshore for electrical integrity to provide early indications of fault conditions. During the first few years of asset life surveys will be performed to confirm the depth of burial of the cable, the stability of any rock berms and protection arrangements. The surveys will utilise standard geophysical survey equipment /ROVs. When a subsea cable is damaged, whether as a result of cable failure or where it has been injured by fishing gear, anchors or dropped objects, a repair will be required. If required an offshore cable repair in the water depths typical of this route would follow the steps outlined below:

- Identify fault or damage location;
- Excavate the seabed to expose cable;
- Cut the cable and lift one end onto the vessel;
- Joint on additional new cable length;
- Recover second end and joint to new cable;
- Lay down both joints and repair section in a 'hairpin' or "omega" loop; and

- Bury and/or protect cable.

The repair vessel would be expected to be on location for between 2 and 3 weeks.

2.12 Decommissioning

Cables in Scottish territorial waters are installed on Crown Estate Scotland (CES) land and therefore a lease or licence is generally entered into for a set term. An Initial Decommissioning Plan (IDP) will be developed and appended to the Crown Estate's licence agreement entered into by SHE Transmission for this project.

The principal options for the cable are to either:

- Leave in-situ buried;
- Leave in-situ and provide additional protection where exposed;
- Remove sections of the cable which present a risk; and
- Remove entire cable.

The technical and environmental challenges in recovering power cables, can be difficult and potentially environmentally damaging. Therefore, there may be a case for the cables to be left in place if the environment is best served by doing so, effectively recognising that recovering cables may lead to more damage to the environment or other seabed interests than leaving them in place. If this were the case, SHE Transmission as the cable owner will retain liability for any residual cable sections in perpetuity. An Out of Service Deed will be entered into by SHE Transmission and CES to reflect this and the case for cable recovery will need to be the subject of an environmental and economic assessment in the years leading up to decommissioning.

The case for cable recovery will need to be the subject of an environmental and economic assessment in the years leading up to decommissioning.

3 THE BASELINE ENVIRONMENT

The north coast of Scotland and Orkney waters are a highly energetic region with strong tidal currents in the channels and the potential of large waves from the North Atlantic. Much of the coastline comprises of hard rock geology with sand beaches confined to embayment and sheltered regions. Within the offshore environment there are large areas of mobile sediment but in the nearshore region, substrate is commonly swept bed-rock or boulders and cobbles.

The north Scotland coastline, west Orkney coastline and Pentland Firth supports a variety of marine wildlife such as marine mammals, birds and fish as well as benthic habitats and species. The cable route passes through the North Caithness Cliff SPA and the Hoy SPA, both designated for the protection of a number of bird species.

Commercial fishing activity is dominated by traps. Along the proposed installation corridor vessel density is relatively low. Two areas of high vessel density are located 10-15 km north of Thurso where fishing and cargo routes run from east to west across the Pentland Firth, and west of the mouth of Hoy where the Scrabster to Stromness ferry route runs. The nearest known wrecks to the proposed cable route are the *Marandra* (motor fishing vessel) located less than 1 km south from the Orkney landfall, and the *Arnisdale* (motor fishing vessel), located 1.2 km north-east of the Caithness landfall. Existing infrastructure within the vicinity of the Project includes renewable energy project, telecoms cables and recreational activities.

4 ENVIRONMENTAL APPRAISAL RESULTS

4.1 Introduction

The Orkney – Mainland HVAC 220 kV Subsea Link is exempt from the requirement to conduct a statutory Environmental Impact Assessment (EIA). However, a proportionate assessment of environmental impacts has been undertaken to support the application for a Marine Licence. The assessment that has been undertaken identifies the potential impacts of the Project. It requires a detailed understanding of the Project e.g. proposed installation, operation and maintenance, and decommissioning activities, and the environment within which the marine cables will be located. Potential impacts have been evaluated to determine how the installation and operation of the cables could affect the environment and the significance of those impacts. Where potential impacts are likely to be significant, specific measures have been identified for implementation either directly or through design or as part of the construction, operation and decommissioning of the Project. Where necessary the assessment has identified the requirement for appropriate monitoring to either confirm impact predictions and/or demonstrate compliance with legal requirements.

4.2 Physical conditions and marine processes

Impacts to physical conditions and marine processes have been scoped out of the assessment in agreement with Marine Scotland – Licensing Operations Team (MS-LOT) . Baseline environment information has however been provided within the EA in order to provide a full characterisation of the environment and to inform other topic sections.

Strong winds are the main characteristic of the Orkney climate. Prevailing winds come from between the west and south-east for 60% of the year, with the windy months being October to March. The north coast of Scotland and Orkney waters are a highly energetic region with strong tidal currents in the channels and the potential for large waves from the North Atlantic. The maximum recorded water depth along the proposed cable route was 91 m. The north coast of Scotland is influenced by the North Atlantic Drift current, which carries oceanic water north and east through the Faroe – Shetland Channel to the Norwegian coast. The two closest designated bathing waters to the installation corridor are at Dunnet Bay and Thurso, which are located approximately 20.5 km and 12.1 km from the cable installation corridor.

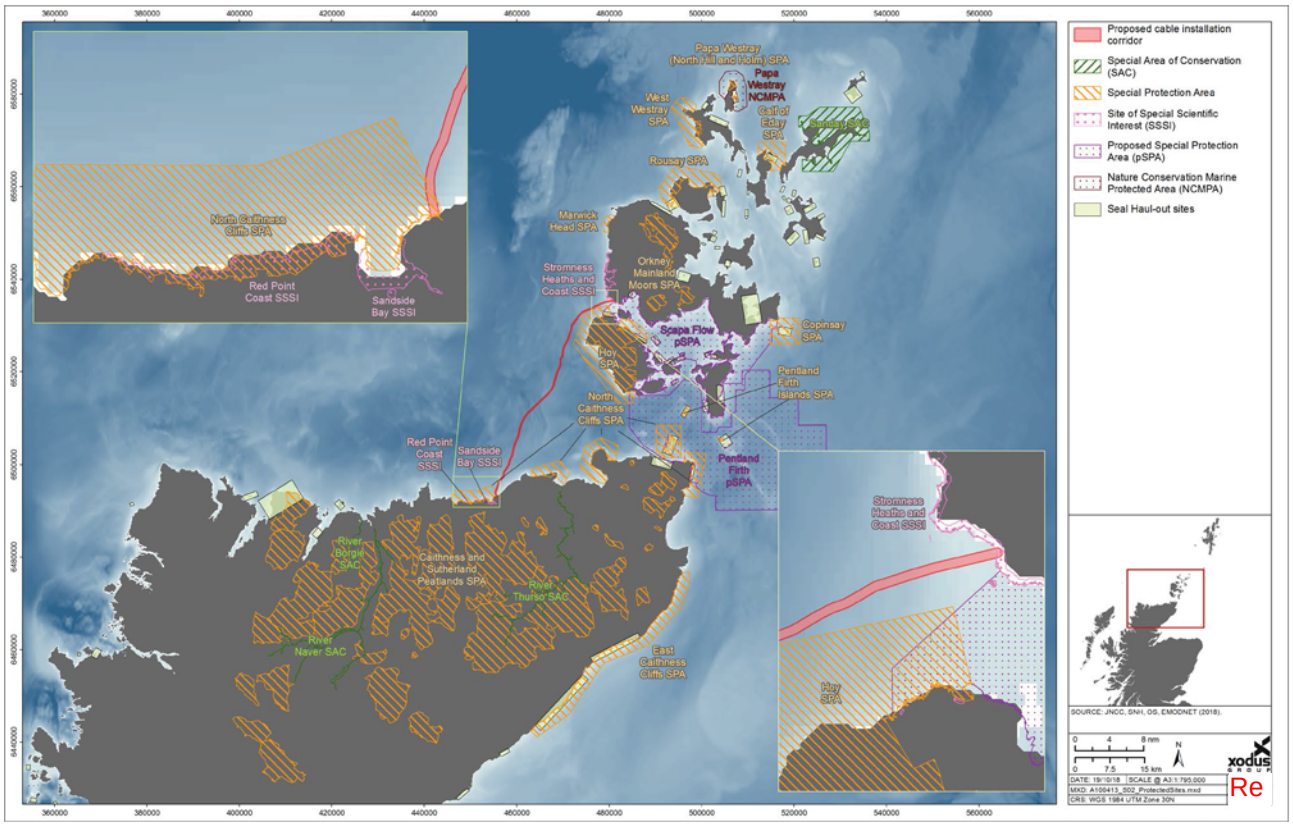
The underlying bedrock of the cable route is undifferentiated Devonian (geological period from 419.2 mya to 358.9 mya) mudstones, siltstones and sandstones deposited approximately 419 Ma. On top of this bedrock is unsorted sediment deposited up to 3 Ma during the Quaternary period. This comprises of predominantly gravelly sands and sandy gravel. The overall shallow geology along the cable route comprises of superficial sediments including sand, gravelly sand to sandy gravel generally observed as a thinly layered unit. Throughout the survey corridor, there are outcrops of sediment with alternating patches of rippled sand, gravelly sand and sandy gravel with a general north-south orientation.

There are four Sites of Special Scientific Interest (SSSI) with designated features of a geological and geomorphological nature located within 2 km of the cable corridor, these are; Stromness Heaths and Coast SSSI, Sandside Bay SSSI, Red Point Coast SSSI, Muckle Head and Selwick SSSI.

4.3 Ecological protected sites

Impacts to protected sites and species have been addressed within EA Appendix D: Nature Conservation Appraisal and the relevant topic impact assessments. The protected sites considered within the EA include; Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Site of Special Scientific Interest (SSSI), Nature Conservation Marine Protected Areas (NCMPA), National Scenic Areas (NSA) and seal haul-out sites (see Figure 4-1).

Figure 4-1 Protected sites in the Project vicinity



4.4 Benthic and intertidal ecology

The potential impacts of the Project on benthic and intertidal ecology have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.4.1 Baseline environment

The great majority of the installation corridor is occupied by biotopes of no specific conservation concern which are present on a wider scale throughout this area of the North Sea. Habitats of potential conservation importance were identified along the cable route; however, they were all classified as low – medium grade.

Potential habitat for the Priority Marine Feature (PMF) kelp beds was identified offshore of the Dounreay landfall, however, no kelp beds were observed in this habitat. There are no designated protected areas for benthic ecology in the vicinity of the Project.

Figure 4-2 example image of seabed along the proposed cable route; cobbles with patches of sand.

4.4.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

- Temporary direct loss or disturbance to benthic habitats and communities;
- Temporary increase in suspended sediments and associated deposition;
- Permanent habitat loss;
- Introduction of new substrate; and
- Increased risk of introducing or spreading INNS.

Physical disturbance by trenching and cable laying activities and the subsequent smothering of benthic habitat and species via sediment re-suspension and settlement are likely to be limited to within the footprint of the proposed works. Since cable burial is not possible in areas of harder seabed, the footprint will be limited to the width of the protection method (cast iron shells, sleeving or rock placement). The HDD method will limit any impact on ecology at the landfall approaches to the exit point of the HDD duct on the seabed.

A non-native species management plan / biosecurity plan for vessels will be developed prior to marine cable installation and will be detailed in the Project Construction Environment Management Plan (CEMP).

4.5 Marine mammals

The proposed impacts of the Project on marine mammals have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.5.1 Baseline environment

Key cetacean species occurring in the Project area include bottlenose dolphin, harbour porpoise, common dolphin, white-beaked dolphin, minke whale (see Figure 4-3) and Risso's dolphin. Two species of seal inhabit the waters of the Pentland Firth and West of Orkney: the grey seal and the harbour seal. The undisturbed coastlines in Orkney make excellent habitat for seal haul-outs, which is why over a quarter of the harbour seals in the UK can be found in this region.

Figure 4-3 Minke Whale

The nearest seal haul-outs are located 1.8 km away in Selwick (north Hoy) and 3.5 km away at the Bay of Ireland (Orkeny), both of which support grey and harbour seals. The nearest protected site for marine mammals is the Sanday SAC located approximately 49 km from the Project.

Scotland remains a stronghold for otters within Europe, with the greatest densities occurring in Shetland and the northern and western parts of the country.

4.5.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

- Increase suspended sediment;
- Potential disturbance at landfall sites; and
- Injury or disturbance from noise emissions.

Suspended sediment has the potential to inhibit foraging of marine mammals, however given the anticipated limited duration, localised extent and high reversibility of sediment suspension no significant impact has been identified. The cable will be installed using HDD at the landfall, there will be no direct disturbance to the coastline.

Of key concern to marine mammals in the vicinity of the Project is the potential impact as a result of underwater noise. Noise sources which are likely to occur during the installation of the cable and which have the potential to cause injury or disturbance to marine mammals are limited to the following: vessel activity, cable burial activities, and geophysical survey activities. Installation activities are expected to take place over a relatively short period and vessels will not be in one location for the whole period but will rather move along the proposed installation corridor. This means noise emissions will only occur within a particular location for a brief period of time. Marine mammals temporarily moving away from the temporary noise source will reduce any impacts.

Embedded mitigation measures and best practice measures will reduce the risk of injury and disturbance from underwater noise further.

4.6 Ornithology

The proposed impacts of the Project on Ornithology have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.6.1 Baseline environment

Within the vicinity of the Project there are a number of sites afforded protection through the designation of Special Protection Areas (SPAs) under the Birds Directive (Directive 2009/147/EC on the Conservation of Wild Birds). The key five sites within the vicinity of the Project are the North Caithness Cliffs SPA, Caithness and Sutherland Pentlands SPA, Hoy SPA, Scape Flow pSPA and Orkney Mainland Moors SPA.

4.6.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

- Physical disturbance and/or displacement due to vessel presence;
- Disturbance and/or displacement of seabirds due to increased turbidity in the water column;
- Indirect effects on seabirds due to changes in distribution of prey items
- Indirect effects on prey species due to EMF during cable operation

Project vessels could result in the physical disturbance/ displacement of seabirds. Any disturbance would be restricted to the export cable corridor footprint and at any one time to the immediate vicinity of the Project vessels when they are operating. The cable will be installed at the landfall using HDD, therefore the cable installation vessels will be mainly stationed approximately 900 m to 1000 m offshore from the shoreline limiting the disturbance to species along the shoreline.

An increase in suspended sediment has the potential to effect visual seabird foragers, yet because the increase will be temporary in nature and the suspended sediment will settle on the seabed (small spatial extent) it is not considered likely there will be a large effect on seabird foraging.

Indirect effects on seabirds can occur due to impacts on seabird prey species from seabed disturbance and electro-magnetic field (EMF) emissions. No significant impacts have been identified in relation to seabed disturbance or EMF emissions, therefore no significant impact is predicted on seabirds.

4.7 Marine archaeology

The proposed impacts of the Project on Marine Archaeology have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.7.1 Baseline environment

The marine archaeology assessment considers potential significant impacts on a range of features including submerged landscapes and prehistoric sites, shipwrecks and aircraft wrecks, historic minefields and unexploded ordnance (UXO) and geophysical and geotechnical survey contacts.

No marine cultural heritage statutory designations have been identified in the cable survey corridor and there are no shipwrecks or aircraft with known locations in proximity to the cable route.

The geophysical surveys have identified certain contacts and anomalies that are probably anthropogenic and may be of archaeological importance.

4.7.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

> Direct damage to or destruction of known marine historic environment assets including geophysical anomalies and UXO; and

> Potential indirect damage to or destruction of known and unknown marine historic environment assets including UXO.

The proposed installation corridor will avoid known archaeology sites and there is a low likelihood of the cable being accidentally laid over unknown sites.

Any accidental discoveries will be reported using appropriate procedures.

4.8 Commercial fisheries

The proposed impacts of the Project on Commercial Fisheries have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.8.1 Baseline environment

Fishing occurs along the entirety of the route for pelagic, shellfish and demersal species. A range of species are targeted in ICES rectangle 46E6 by vessels of various sizes, 30 species were recorded in the landings data from 2013 to 2017 for vessels under 10 m and 56 species were recorded for vessels over 10 m in length. Crab is the most valuable species in each year, for both vessel over 10 m and under 10 m, aside from 2015 where Haddock had a higher average landing value (vessels over 10 m). Other notable species which contribute significantly to the landings value include lobster, velvet crab and monk or angler fish.

Figure 4-4 Top species by value landed by vessels under 10 m (top) and above 10 m (bottom) in ICES rectangle 46E6

Two key species that are of commercial and conservation importance that depend on the seabed either throughout or at key stages in their life-cycle are herring and sandeel. The area of the proposed cable route is considered a nursery area for herring but does not support herring or sand eel spawning.

4.8.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

- Temporary loss of access to fishing grounds;
- Change in distribution of target species;
- Permanent loss of access to fishing grounds;
- Change in distribution of target species; and
- Snagging risk.

Some fishermen will experience a temporary loss of traditional fishing grounds in the immediate vicinity of the cable route due to the presence of installation vessels, which will have safety zones in place during operations. Project vessels will adopt a rolling safety zone so that disruption will not affect the entire route initially.

The proposed cable installation corridor does not intersect with the spawning area of any commercially important species, therefore there will not be an impact to spawning as a result of benthic habitat disturbance or removal. The habitat loss resulting from trenching is minimal and species have the ability to move away from the impact.

Cable protection may be required along certain sections of the route where burial is not possible. All protection measures will be designed to have a smooth overtrawlable profile in order to minimise any disturbance to commercial fisheries as much as possible. Static fishing gear, such as pots, are not anticipated to be affected due to the presence of the cable, as these will still be able to be placed in the vicinity of the Project.

Prior to marine cable installation a Construction Method Statement (CMS) and Cable Burial Plan (CBP) will be produced, including method statements for and requirements of cable protection for approval by the Regulators and in discussion with fisheries stakeholders. Following the installation of the cables, information will be provided to the UKHO for inclusion in admiralty charts, and the Kingfisher Cable awareness charts will be updated to advise fishermen on the Project location. Post installation inspection surveys and any necessary maintenance will be conducted along the length of the cable on a regular basis, this will ensure cables remain buried and protected, and that the cable protection remains overtrawlable.

4.9 Other infrastructure and other sea users

The proposed impacts of the Project on other infrastructure and other sea users have been assessed as **Not Significant**. The assessment that underpins this conclusion is summarised below.

4.9.1 Baseline environment

The other infrastructure and other sea user's topic considers the potential impact of the Project on other activities within the vicinity of the Project. The following receptors have been considered within the baseline characterisation; renewable energy projects (see Figure 4-5), cables and pipelines, oil and gas infrastructure, potential UXO, disposal sites and recreational activities.

No oil and gas infrastructure or UXOs have been located in the vicinity of the Project. The Project will cross two existing telecommunication cables, however crossing agreements will be in place and therefore no impact is anticipated. Potential impacts on these receptors was not considered further.

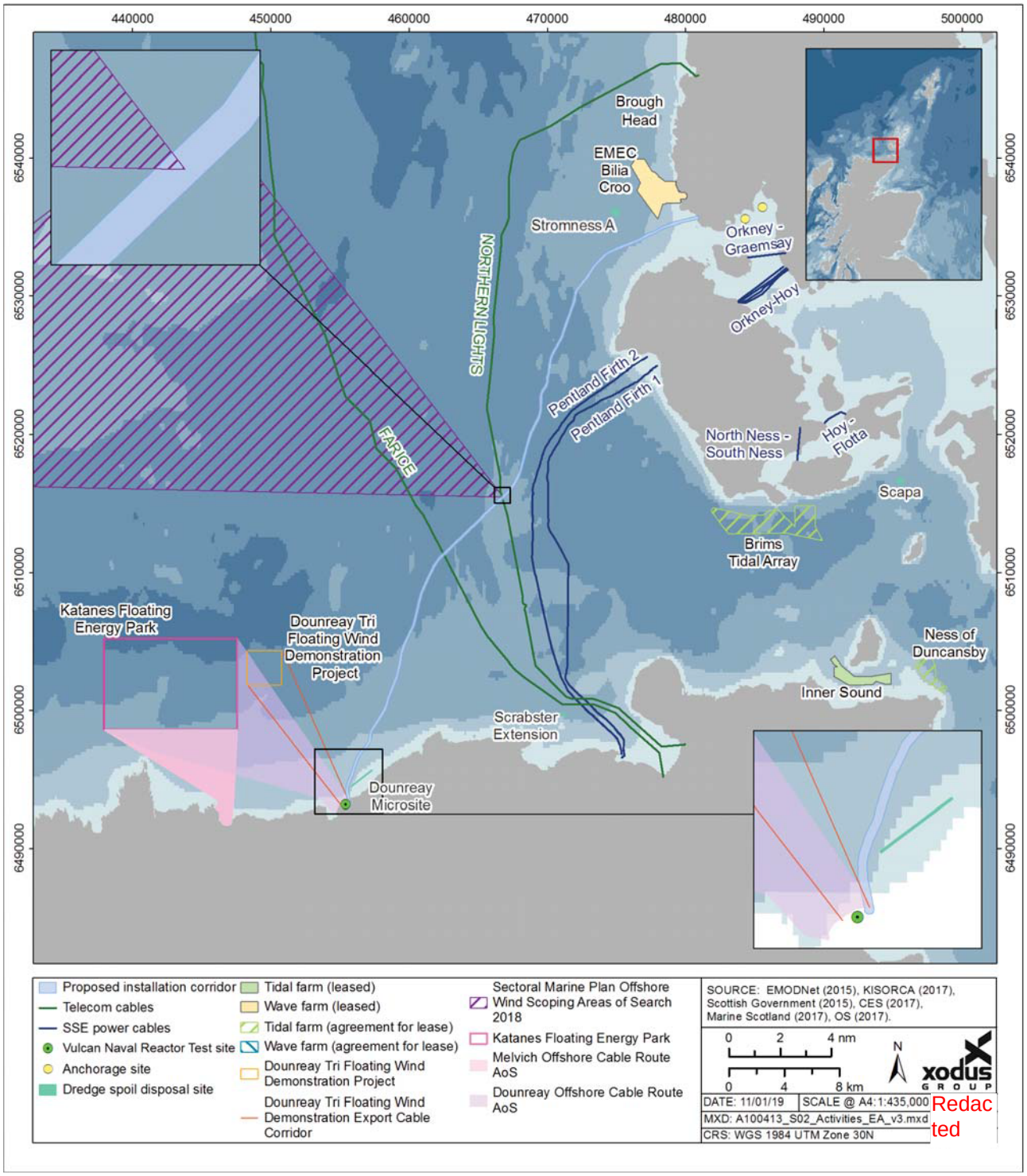


Figure 4-5 Offshore infrastructure and other sea users within the vicinity of the proposed cable route

4.9.2 Assessment of impacts

The potential impacts identified as a result of the Project are:

> Disruption to renewable energy projects planned routes and access to working areas;

- Disruption to aggregate extraction and disposal sites;
- Disruption to recreational activities;
- Permanent alteration to planned routes and access to working areas.

Project vessels have the potential to disrupt any planned routes and associated access areas associated with the receptors, however the proposed works will be highly localised and temporary.

Notice to Mariners (including local), Kingfisher bulletins, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings will be circulated in advance of any proposed works and a safety zone will be in place around Project vessels. A working zone is required either side of the proposed cable route to enable access for cable maintenance and repair operations.

5 CONCLUSIONS

5.1 Overview

This NTS reports upon the findings of the Orkney – Mainland HVAC 220kV Subsea Link Environmental Appraisal. The EA assessed the potential impacts of the installation, operation, maintenance and decommissioning of the subsea cables which are proposed to be installed between Warebeth on the west coast of Orkney and Dounreay on the Scottish mainland. The preferred route option represents the most technically feasible and least environmentally disturbing option, taking cognisance of directness of the route, seabed conditions, environmental sensitivities and potential interactions with other sea users.

Consultation was undertaken with MS-LOT with subsequent Advice provided on the content and level of detail to be provided in the EA in support of the Marine Licence application. This resulted in detailed information being provided in the EA, in relation to the Project alone and cumulatively.

5.2 Conclusions

The EA has determined that the proposed installation of the cable route between Warebeth and Dounreay does not pose any significant adverse effects to ecological protected sites, benthic and intertidal ecology, marine mammals, ornithology, marine archaeology, commercial fisheries, and other infrastructure and other sea users within the vicinity of the Project area. It is also concluded that there will be no significant cumulative environmental impacts with other existing and proposed marine developments during the installation and operation of the Orkney – Mainland HVAC 220kV Subsea Link. The EA has established a schedule of best practice and embedded mitigation measures that shall be implemented during the construction, operation and maintenance phases of the Project.

5.3 Opportunity to Comment

To find out more or comment on the proposal please visit either Maine Scotland's website consultation page or the Project website at the following link: https://www.ssen-transmission.co.uk/projects/orkney/.