MarineSpace Limited

Caithness-Moray HVDC Link -Additional Cable Replacement and Remediation Works: Environmental Appraisal Report

for

NKT

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Caithness-Moray HVDC Link -Additional Cable Replacement and Remediation Works: Environmental Appraisal Report

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Executive Summary

Scottish Hydro Electric Transmission Plc (SHET) have developed a High Voltage Direct Current (HVDC) electricity transmission link between Caithness (Noss Head) and Moray (Portgordon), collectively known as the Caithness HVDC Reinforcement (C-M) project. NKT commissioned the cable which was laid in late summer 2017.

In early 2018, information became available that suggested there was a fault in the (offshore) installed cable. The location was identified as being at KP 13.158 (approximately 13 km from Port Gordon landfall). A cable repair and associated activities were undertaken by NKT in early 2018.

Further to these works it is now understood that a new Marine Licence for a series of additional works associated with identified areas of cable faults and required cable remediation is needed. Additional works required will include the following:

- Cable remediation and backfill at KP1.6-3.6, including rock placement if required;
- Installation of 2 x new lengths of DC cables & 1 x FO of cable between KP11-16 and potentially KP83-86 (dependent on cable inspection results);
- Cable de-burial and inspection at KP 83-86;
- Burial of newly installed cable, use of rock placement if required; and
- Removal of old cables at KP11-16 and KP83-86 (dependent on cable inspection results).

MarineSpace Ltd (MarineSpace) has been commissioned by NKT to prepare an environmental appraisal (this report) that will consider and assess the potential environmental effect of these additional works. Therefore, this report represents the environmental appraisal of proposed cable remediation and replacement works on the Caithness-Moray HVDC subsea cable. The same methodology used for assessing environmental impacts in the original EIA as well as a previous environment appraisal prepared by MarineSpace in respect of additional rock protection and cable repair works along the cable route, were used within this report to ensure consistency.

The potential impact of the main cable installation was fully assessed within both the marine ES produced for the project and the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009). The proposed works assessed here, namely a discrete cable remediation event, cable de-burial and inspection, two potential areas of cable installation and cable removal along with cable protection, are similar in nature to the main installation works, and variations of, already assessed (and consented), albeit much more limited in terms of spatial extent, magnitude and duration. Other, additional potential impacts were also assessed, including but not limited to impacts on shipping and navigation due to reduced water depths in areas of rock placement, disturbance to navigation during cable installation and compass deviation due to shallow buried cables, impacts on commercial fisheries via increased vessel activity, impacts on marine non-native species and impacts on sites of nature conservation importance.

In summary, the majority of impacts predicted via increased rock placement were judged to result in no more than minor impacts. The only exception to this was a moderate residual impact predicted to marine mammals from disturbance via underwater noise but this would be reduced to minor if relevant mitigation measures were implemented.

The detailed MPA assessment undertaken for previous works of this nature identified associated pressures and footprints and screened the potential exposure of these footprints with MPAs in the vicinity of the cable repair works and their designated features within the study area;

- Annex I and MPA designated benthic habitats;
- Annex II marine mammals and migratory fish species designated within SACs;
- Annex I bird species classified within SPAs; and
- Where appropriate, Ramsar sites.

Where likely significant effects / risks could not be screened out, detailed assessment and determinations of any adverse effects / risk (or where no adverse effect / risk cannot be determined) is presented. **Overall, no adverse effects on the integrity of any of the MPAs was determined**.

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1. Introduction

1.1. Project Background

Scottish Hydro Electric Transmission Plc (SHET) have developed a High Voltage Direct Current (HVDC) electricity transmission link between Caithness (Noss Head) and Moray (Portgordon), collectively known as the Caithness HVDC Reinforcement (C-M) project. NKT commissioned the cable which was installed in late summer 2017.

1.2. Project Status

In early 2018, information became available that suggested there was a fault in the (offshore) installed cable. The location was identified as being at KP 13.158 (approximately 13 km from Port Gordon landfall). A cable repair and associated activities were undertaken by NKT in early 2018.

Further to these activities it is now understood that a new Marine Licence is required for additional works. Specifically, the following additional works are required. More details of these works, along with quantified parameters for impact assessment are presented later in this report.

Table 1-1: Summary of additional works covered in this assessment

KP1.6-3.6	KP11-16	KP83-86
1. Depth of Burial (DoB) survey of the existing cable 2. If DoB not adequate, remedial works via use of either a sub-sea standalone dredge (Fixed, ROV operated) or a sub-sea excavation vehicle Ejection of spoil via dredge to backfill 3. If remedial works not successful, protection of cable via rock deployment	1. UXO and debris survey of new area of cable installation 2. Recovery of a repair section previously inserted at KP13 and old, damaged cable 3. De-burial (via Mass Flow Excavator (MFE)) and cut in to the damaged cable near to KP11 and KP16 4. Installation of 2 x new lengths of cable (and fibre-optic cable) and Omega bight (20m offset and parallel to original cable which has been damaged) 6. Burial of new cables via jet trenching. 7. Where DoB is insufficient, additional rock protection may be required	1. Excavation of existing cable via use of standalone dredge and/or subsea excavation vehicle 2. Visual inspection of cable via ROV 3. If damage identified, installation of 2 x new lengths of cable (and fibre-optic cable) and Omega bight (20m offset and parallel to original cable which has been damaged) 4. Removal of length of old, damaged cable 5. Burial of new cable via jet trenching. 6. Where DoB is insufficient, additional rock protection may be required

1.3. Objective of this report

This report has been prepared by MarineSpace Ltd, on behalf of NKT, in order to support the end client (SHET) in discussions with Marine Scotland. The report focuses on the potential environmental impacts that may arise via this series of works which are additional to the works assessed via the original EIA for the project (SHET, 2009).

1.4. Domestic Nature Conservation Marine Protected Areas

The Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010 require Marine Scotland, to exercise its duties and commitments to designate an ecologically coherent network of Marine Protected Areas (MPAs). In designating the domestic Nature Conservation MPA (NCMPA) network, Marine Scotland has to have regard to a number of issues set out in the legislation, including the extent to which such designations would contribute to a UK network.

NCMPAs have been identified for a range of marine flora and fauna that are either considered to be rare, representative, and / or threatened and declining within Scottish territorial waters. Since 2013 30 NCMPAs have been designated.

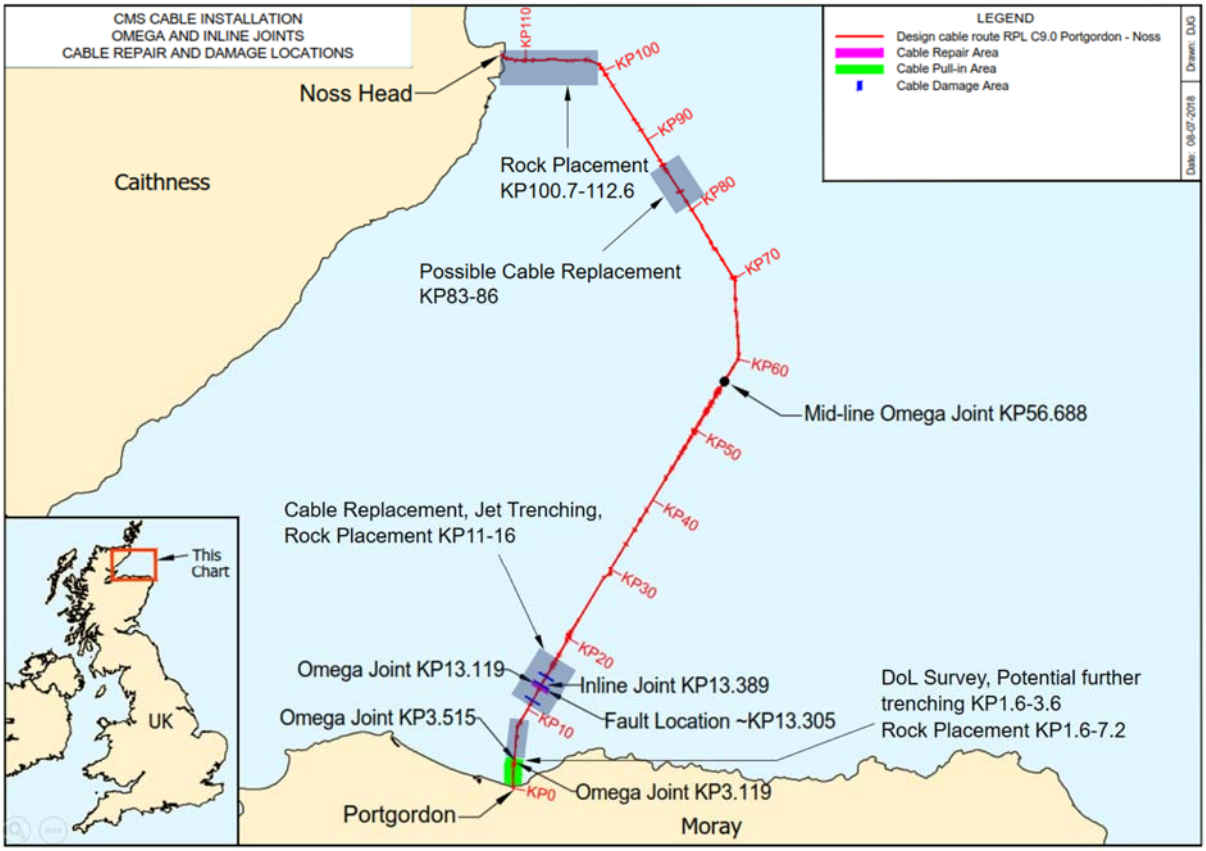
The rationale for the assessment process of NCMPAs follows the principles of the Habitats Regulation Appraisal (HRA) process related to the published or draft conservation objectives and designated features of any NCMPA screened for likely significant risks (effects); in relation to the pressures associated with these additional works.

1.5. European Protected Species licence and basking shark licence

Under the Habitats Regulations and the Offshore Habitats Regulations certain activities which would normally constitute an offence against Annex IV European Protected Species (EPS) can be carried out legally under a licence. In addition, under the Wildlife and Countryside Act (as amended), activities which would normally disturb basking shark *Cetorhinus maximus* and therefore constitute an offence are legally permitted under a licence. These licenses are granted by Scottish National Heritage (SNH) or the Scottish Ministers depending on the reason for the licence application. A previous EPS licence already existed for the CMS project which was due to expire at the end of 2017. A new EPS consent application was, therefore, submitted in late 2017 along with a basking shark consent application.

Both licences were granted by the Scottish Ministers through Marine Scotland in March 2018 for geophysical survey works, the use of subsurface positional equipment, and cable laying activities. The EPS licence reference is MS EPS 01 2018 1, and the basking shark licence reference MS BS 02 2018 0.

Figure 1.1: Location of the Caithness-Moray HVDC Link and proposed work areas (NKT, 2018)



2. Proposed Works

2.1. KP1.6-3.6: Depth of lowering survey and cable remediation (if required)

A post trenching Depth of Lowering (DoL) survey is required on the section of the route between KP1.6 (Portgordon HDD exits) and KP3.6 approximately. In this section the cables have previously been trenched by MFE. The survey will be undertaken via one of two methods:

- Option A - Cable Tracker Survey: Data from an industry standard cable tracker and multibeam echosounder (MBES) will be compared to determine the cable depth of burial relative to Mean Seabed Level (MSBL). The survey will be conducted from a shallow draft Dynamic Positioning (DP) vessel, with the cable tracker and multibeam sensors mounted on a Remote Operated Vehicle (ROV). The survey will require one or two passes over the cable route;
- Option B – Diver Survey: A 5-man dive team will track the cable and measure depth below seabed as found using an RDS8000 or similar cable tracker with diver held subsea antenna and umbilical. The cable position will be measured at approximately 10 m intervals along the cable. Depth of cover over the cable will be measured by placing the antenna in the base of the part backfilled trench and again recording the depth of cover on the topside unit.

2.2. KP1.6-3.6: Potential backfill and/or rock placement

Should the DoL survey indicate that further burial work is required between KP1.6-3.6, the work will be performed via one of the two following methods:

- **Option A**: Subsea Standalone Dredge: A fixed pump unit deployed in a safe distance from subsea assets and landed on the seabed. Hoses are connected to the Dredge in one end and to an ROV operated nozzle in the other end. The hose is typically 10-12 inch, however the largest hose utilized may be up to 16inch. The Dredge is powered from a Hydraulic Power Unit (HPU) placed on the vessel back deck via an umbilical that is deployed along with the Dredge. The hoses are typically deployed separately and connected subsea by the ROV. The ROV then grabs the nozzle and moves into position. The Dredge is powered up and the ROV operates and monitor the excavation. The dredged soil exits from the exhaust pipe on the subsea dredger unit, spreading out over the seabed. Residual berms will consist of rock where there is rock in trench and unconsolidated soil from the spoil plume and can be minimized by iteratively relocating the dredger by vessel crane as required. The spread of the plume is dependent on sea current and soil condition;
- **Option B**: Subsea Excavation Vehicle: The Subsea Excavator is a crawling excavation unit equipped with pump and typically a 10-12-inch hose attached to its hydraulic arm. The unit is deployed by the vessel crane and landed on the seabed in a safe distance from the subsea asset. The Excavator is equipped with caterpillars to allow moving along the seabed while DP vessel follow along. Main weather critical steps are deployment and recovery. The Excavator pump can reverse flow if required, working as either a suction- or blow unit. In suction mode, the dredged soil exits through the exhaust pipe. The soil spreads out as the unit

moves. However, there are also exhaust hoses and cribs available that can be used to dispose soil at chosen locations.

Upon completion of remedial works between KP1.6 and 3.6, a further post-burial survey will be carried out in order to assess whether the cable is at the correct position and required DoL. If this is still insufficient, then protection of sections of the cable via further rock protection may be required – see Section 2.7.1. The method of installing this will be as per detailed in previous method statements and environmental assessments submitted by NKT. See summary below:

1. **Fall-pipe set-up**: done away from existing cable to avoid risk of damage to the asset;
2. **On-site preparation**: series of positional, equipment and survey checks done on-site as well as launching of the fall-pipe;
3. **Pre-rock placement survey**: undertaken using a ROV as a stable platform;
4. **Rock placement operations**: will follow a carefully developed task plan which will be based on the results of the pre-rock placement survey data. This plan will function as a guideline for all personnel involved in the rock placement operations. Excavators in the bunkers will start loading the rock onto longitudinal conveyor belts located along the starboard side of the vessel. These two conveyor belts feed a central "buffer" hopper located adjacent to the Stone Dumping Unit (SDU) on the same side of the vessel. A feeder, underneath the central "buffer" hopper, controls the rate at which material is fed into the fall pipe by a central conveyor belt. The rock is guided to its destination by the fall pipe.
   During rock placement operations, outputs from the vessel mounted MBES and the vessel navigation screen will provide sufficient information to the ROV pilot to enable it to compare the actual rock berm deployed with the theoretical design in a continuous way; and
5. **Post-Rock Placement Survey:** After execution of the rock placement operations, a post-survey will be executed and will be compared to the pre- and eventual intermediate surveys to establish the fulfilment of the specifications (and the consented parameters / locations).

During all the works, an advisory exclusion zone of 50 m around the export cable and 500 m around all vessels involved in the works will be notified via Notice to Mariners (NtM).

2.3. KP11-16 and KP83-86: Cable excavations and inspections

Previous High Voltage (HV) testing has identified a fault within the negative DC cable that required investigation & repair of the subsea cable. Assessment of the backfill operations identified the possibility that the SCAR backfill plough had contacted the cables during its operation and several high-risk areas were identified between KP11-16 and KP83-86.

Excavation of the cable and subsequent inspections are planned for these two areas using the two methods outlined above (subsea standalone dredge / subsea excavation vehicle). Exact locations for excavation and inspection are still under discussion so for the purposes of this assessment worst-case parameters have been used of 7.5 km of excavation and inspection between KP11-16 (additional length here due to need to excavate the existing Omega bight in this location) and 3 km between KP83-86. Upon completion of the inspection, a MBES survey will take place to record the as-left status of the area. This will also be the final input for the rock design or other backfill method in this area.

2.4. KP11-16: New cable installation

It is intended to replace a section of cable between approximately KP11-16 which has been damaged previously during backfill ploughing. The replacement cable will be laid parallel to the already installed cable at an offset of approximately 20m (within the existing consent corridor). As this proposed alignment for the new length of cable is on the edge of the existing magnetometer survey coverage, an additional survey will be performed to ensure that the route is clear of UXO or other hazards. The survey will be performed using a survey vessel with towed or ROV mounted magnetometer.

2.4.1. Cable deburial

Deburial of the existing cable in this area will be performed by a vessel equipped with a MFE or with a subsea dredge similar to that described above. The deburial vessel will uncover the cable at each end (KP11 and 16) of the existing plough backfilled section for sufficient distance to enable recovery. It is expected that deburial will require only the removal of natural sediment backfill over a distance of approximately 150-200m at each end of this section of cable. Once the cable is exposed, the cable will be cut and sealed for subsequent jointing to the replacement section. The cut and seal could be done either by the deburial vessel or subsequently by the Cable Lay Vessel (CLV).

2.4.2. Cable recovery and lay procedure

Recovery of the cable ends, jointing and cable lay will be performed by *NKT Victoria* using her standard operating procedures. The sequence of work will be as follows:

- Cut of the cable bundle on seabed using the ROV, recovery to the vessel with the aid of ROV, and sealing of the cable ends. Cut and seal will be done at each end of the replacement section in turn (alternatively this work might be done by the deburial vessel);
- Recovery of the cable bundle at the initiation end, and inline jointing on all 3 cables of the bundle to the replacement cable section onboard the CLV;
- Laying of the replacement cable section as a bundle (20m offset from existing, damaged cable);
- At the completion end, lay down the replacement cable in an ‘Omega’ configuration for jointing;
- Recovery of the previously cut cable bundle at the completion end, and jointing of the cable bundle onboard the CLV; and
- Laydown of the jointed cable bundle at the completion end in an ‘Omega’ configuration. The Omega is expected to occupy an area of seabed approximately 350m x 30m.

2.4.3. Reburial of new length of cable

It is planned that the replacement cable section be buried by post lay jet trenching (such as the T1200 jet-trencher) with a minimum target cover depth of 0.6 m. This jet trenching will be required over the entire length of the new cable and omega bight (7.5 km). Exact rates of re-burial will vary depending on ground conditions and the final tool used, with a range of 100-250 m per hour. For the impact assessment, a 3 m wide footprint of impact via temporary seabed disturbance has been assumed.

Figure 2.1: T1200 jet-trencher

The primary backfill method for the jet trenched cable will be natural backfill. However, depending on the achieved DoL, rock placement may be required.

2.5. KP83-86: New cable installation

Subject to the results of the excavation and inspection works in this area (see Section 2.3), a new length of cable may also need to be installed between KP83-86. It is planned to inspect sections of this cable using the methodology described in in Section 4. The method of replacement will be the same as described for KP11-16 (above), with the exception that there will be no prior repair to recover any cable joint, as at KP11-16. Reburial will again be undertaken primarily via a jet-trencher with further rock deployment if burial is not achieved. As per the installation of new cable at KP11-16, a new cable joint and omega bight will need to be installed, with the same dimensions of seabed affected.

2.6. Scrap cable

On completion of the cable replacement works at KP11-16 and KP83-86, the previously performed cable repair section (approximately KP13), which has not been trenched, will be recovered. The Cable Lay Vessel (CLV) with the aid of ROV will cut in to the damaged cable close to the point where it re-joins the trenched cable at each end of the repair section. The repair section complete with associated inline and Omega joints (KP13-16 only) will be recovered to the CLV using her cable winches and crane. The recovered cable will be taken to shore and scrapped / recycled in accordance with environmental requirements. It is presently envisaged that the section of damaged cable which has been trenched and backfilled will be left *in situ* beneath the seabed. Optionally the trenched section may also be recovered by 'peeling' out from the seabed using the CLV equipment. If this latter process is required, there will be limited sediment mobilisation via jetting as the cable will be peeled out mechanically.

2.7. Rock placement

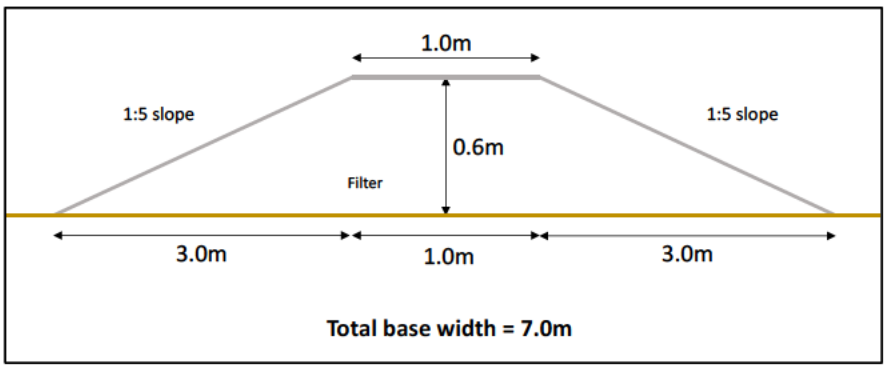
Further rock placement works are required on the CMS cable. **The impact of these planned works are already covered via previous assessments and the rock placement amounts are already licenced under Marine Licences ML04368/17/2, ML06043/18/2, ML04878/13/0 and ML06600/18/0.**

2.7.1. Cable excavation: KP1.6-3.6

If on completion of survey and remedial burial works at KP1.6-3.6, the DoL/DoC is deemed insufficient, post burial protection may be installed on the cable. The primary method of post burial protection will be by rock placement. The rock berm will be installed in compliance with the existing permit requirement (water depth not to be reduced by more than 5%). In the shallow water sections near to the HDDs at KP1.6 diver installed split pipe shells may be used as part of the protection.

A "Type D" rock design will be deployed in this region, with a berm height of up to 0.6 m and width of 7 m. This will result in a seabed footprint of (3,000 m x 7.0 m width = **21,000 m^2**).

Figure 2.2: "Type D" rock design



2.7.2. New cable: KP11-16

Using a worst-case scenario that inadequate DoL (or Depth of Cover) is achieved along the entire length of the new cable (7.5 km including cable bight) following reburial attempts by jetting, an estimate of approximately 8,000 t of rock has been calculated for this area of the cable. This would be used to install a 0.6 m high filter layer along this 7.5 km length of cable. Even though the rock in this area will mainly be rock in trench, for worst-case assumptions it is assumed that a filter layer above MSBL, with 0.6 m height will be created ("Type D"). This results in a seabed footprint of (7,500 m length x 7.0 m width = **52,500 m^2**.

2.7.3. Backfill of excavated cable: KP11-16

The areas of cable excavated to enable visual inspection between KP11-16 will also require potential protection via rock placement. The total amount of rock estimated to be needed for this activity amounts to a maximum of 8,000 t, deposited in the same type of 0.6 m filter layer as shown above.

Using a worst-case scenario, this would create a seabed footprint of 7,500 m x 7 m width = **52,500 m^2**.

2.7.4. New Cable: KP83-86

Using a worst-case scenario that inadequate DoL is achieved along the entire length of the new cable (4 km including cable bight) following reburial attempts by jetting, an estimate of approximately 8,000 t of rock has been calculated for this area of the cable. This would be used to install a 0.6 m high filter layer along this 4 km length of cable. Even though the rock in this area will mainly be rock in trench, for worst-case assumptions it is assumed that a filter layer above MSBL, with 0.6 m height will be created ("Type D"). This results in a seabed footprint of (4,000 m length x 7.0 m width = **28,000 m^2**.

2.7.5. Backfill of excavated cable: KP83-86

The areas of cable excavated to enable visual inspection between KP83-86 will also require potential protection via rock placement. The total amount of rock estimated to be needed for this activity amounts to a maximum of 1,000 t, deposited in the same type of 0.6 m filter layer as shown above. Using a worst-case scenario, this would create a seabed footprint of 4,000 m x 7 m width = **28,000 m^2**.

2.8. Summary of impact assessment parameters

The parameters that have been used as the basis of this environmental assessment are set out below.

Table 2-1: Impact assessment parameters

Parameter	Maximum	Notes
Temporary Seabed Disturbance		
A: KP1.6-3.6 - Cable Excavation and Backfill (Subsea Dredger, MFE, or SCAR Plough)		
Maximum width of (temporary) seabed disturbance	3 m	Maximum width of seabed disturbance created by cable excavation
Maximum length of (temporary) seabed disturbance	2,000 m	Maximum length of seabed disturbance via cable remediation and backfill events
A: Maximum footprint of (temporary) seabed disturbance	**6,000 m^2**	3 m width x 2,000 m length. This footprint of seabed would experience temporary disturbance via cable excavation
B: KP11-16 – Cable excavation/inspection (existing cable)		
Maximum width of (temporary) seabed disturbance	3 m	Maximum width of seabed disturbance created by cable excavation

Parameter	Maximum	Notes
Maximum length of (temporary) seabed disturbance	7,500 m	Maximum length of seabed disturbance via cable excavation
B: Maximum footprint of (temporary) seabed disturbance	**22,500 m^2**	3 m width x 7,500 m length. This footprint of seabed would experience temporary disturbance via cable excavation
C: KP11-16 - New cable installation		
Maximum width of (temporary) seabed disturbance	3 m	Maximum width of seabed disturbance created for new length of cable
Maximum length of (temporary) seabed disturbance	7,500 m	Maximum length of seabed disturbance via new cable installation
C: Maximum footprint of (temporary) seabed disturbance	**22,500 m^2**	3 m width x 7,500 m length. This footprint of seabed would experience temporary disturbance via installation of new cable
D: KP83-86 – Cable excavation/inspection (existing cable)		
Maximum width of (temporary) seabed disturbance	3 m	Maximum width of seabed disturbance created by cable excavation
Maximum length of (temporary) seabed disturbance	3.000 m	Maximum length of seabed disturbance via cable excavation
D: Maximum footprint of (temporary) seabed disturbance	**9,000 m^2**	3 m width x 3,000 m length. This footprint of seabed would experience temporary disturbance via cable excavation
E: KP83-86 – New cable installation		
Maximum width of (temporary) seabed disturbance	3 m	Maximum width of seabed disturbance created for new length of cable
Maximum length of (temporary) seabed disturbance	4,000 m	Maximum length of seabed disturbance via new cable installation
E: Maximum footprint of (temporary) seabed disturbance	**12,000 m^2**	3 m width x 4,000 m length. This footprint of seabed would experience temporary disturbance via installation of new cable

Parameter	Maximum	Notes
F: KP11-16 & KP83-86 - Removal of Old Cables		
Maximum cable trench width (at seabed surface) for cable removal	3 m	Width of trench that will be created during de-burial and cable removal activities
Maximum length of temporary seabed disturbance	11,500 m	Maximum length of seabed disturbance via cable de-burial and cable removal activities
F: Maximum footprint of (temporary) seabed disturbance for cable de-burial and removal	**34,500 m^2**	3 m width of trench x 11,500 m trench length. This footprint of seabed would experience temporary disturbance via cable de-burial via
TOTAL FOOTPRINT OF TEMPORARY SEABED DISTURBANCE VIA CABLE EXCAVATION / NEW CABLE INSTALLATION **(A+B+C+D+E+F) = 106,500 m^2 (0.11 km^2)**		

2.9. Impact assessment methodology

The cable replacement and remediation do not require a full EIA to be undertaken and, therefore, this report represents an environmental appraisal rather than a full Environmental Statement (ES). However, for consistency with the original EIA undertaken by Aquatera in 2011 (SSE, 2011) for the CMS project, and in line with an earlier environmental appraisal prepared by MarineSpace in November 2017, in respect of cable repair works along the entire cable, the same methodology for assessing environmental impacts as used in these previous reports has also been used here. Cable protection mentioned throughout Section 2 is included here for completeness, however the amounts proposed to be installed as a result of these final works along the cable fall within the totals already consented under existing Marine Licences. Therefore, the environmental impacts of rock placement have already been assessed and will not be discussed within Section 4 of this report.

Potential impacts of the proposed works have been categorised as shown in Table 2-2. As per the original EIA, the assessment of potential effects via the cable remediation, replacement and protection are based upon the sensitivity of key receptors and the magnitude of the impact. Definitions of receptor sensitivity and magnitude of impact vary between parameters (physical, biological, human), therefore, specific details of the criteria used are provided in Sections 4.2, 4.3 and 4.4, respectively.

Table 2-2: Summary of impact definitions used in this report

Impact Type	Definition
Neutral	No detectable change to the environment
Negligible	A change within existing variability, difficult to measure or observe
Minor	A detectable but non-material change to the environment
Moderate	A material but non-fundamental change to the environment
Major	A fundamental change to the environment.

Impacts categorised as being moderate or major (adverse or beneficial) are considered in this appraisal to be significant.

3. Planning and Policies

3.1. Introduction

This section of the EA provides a brief overview of key planning and policy issues related to the proposed cable replacement and remediation works (and potential cable protection). It is intended to place the works in the wider context of national plans and polices as well as providing comment on how the proposed works comply with relevant policies in the Scottish Marine Plan and also key directives including the Water Framework Directive.

3.2. Scottish Marine Plan

The Scottish Government adopted its National Marine Plan in early 2015 (Scottish Government, 2015b). The Plan has been prepared in accordance with, and gives consideration to, the EU Directive 2014/89/EU (establishing a framework for maritime spatial planning) which came into force in July 2014. This EU Directive introduces a framework for maritime spatial planning and aims to promote the sustainable development of marine areas and the sustainable use of marine resources.

The purpose of the plan is to provide an overarching framework for marine activity in Scottish waters, in an aim to enable the sustainable development and use of the marine area in a way that protects and enhances the marine environment whilst promoting both existing and emerging industries. This is underpinned by a set of core general policies which apply across all existing and future development and use of the marine environment and sectoral specific policies.

In addition to the core general policies, sector-specific policies are detailed which should be read as subject to the General Policies. These policies have been derived by considering issues specific to a sector which requires varying degrees of management to support economically productive activity; manage interaction with other users; respect environmental limits; and to consider climate change. These policies address issues relevant to a particular sector and need only be considered when there will be a direct or indirect implication for that sector.

Sector-specific policies for marine cables and fisheries are presented below as they are deemed to be most relevant to the works being considered.

Table 3-1: Scottish Marine Plan policies relevant to fisheries and subsea cables[1]

Policy	Definition	How this policy has been recognised in this appraisal
FISHERIES 1	Taking account of the EU's Common Fisheries Policy, Habitats Directive, Birds Directive and Marine Strategy Framework Directive, marine planners and decision makers should aim to ensure: • Existing fishing opportunities and activities are safeguarded wherever possible; • That other sectors take into account the need to protect fish stocks and sustain healthy fisheries for both economic and conservation reasons; • Mechanisms for managing conflicts between fishermen and / or between the fishing sector and other users of the marine environment.	A full assessment of the potential impact on commercial fishing activity of the CMS project was undertaken and presented in the original ES for the project (SSE, 2011). Since the EIA stage to date, consultation and liaison has continued between SHET and the Scottish Fishermen's Federation (SFF), including regular meetings to update the SFF on progress and project developments. The most recent meeting with SFF was held on 08/11/17 in which proposals for increased rock placement were presented and discussed in detail. SHET also employ a Fisheries Liaison Officer (FLO) on the project and have developed a project-specific Fisheries Liaison and Mitigation Action Plan. An updated version of this Plan was included as part of documentation submitted to Marine Scotland in Q4 2017 in support of a marine licence application to increase amounts of rock placement.
FISHERIES 2	The following key factors should be taken into account when deciding on uses of the marine environment and the potential impact on fishing: • The cultural and economic importance of fishing, in particular to vulnerable coastal communities; • The potential impact (positive and negative) of marine developments on the sustainability of fish and shellfish stocks and resultant fishing opportunities in any given area; • The potential effect of displacement on: fish stocks; the wider environment; use of fuel; socio-economic costs to fishers and their communities and other marine users.	

[1] Only selected elements of these Scottish Marine Plan policies are shown here to highlight specific issues/policies relevant to this proposed appraisal.

Policy	Definition	How this policy has been recognised in this appraisal
FISHERIES 3	Where existing fishing opportunities or activity cannot be safeguarded, a Fisheries Management and Mitigation Strategy should be prepared by the proposer of development or use, involving full engagement with local fishing interests (and other interests as appropriate) in the development of the Strategy. All efforts should be made to agree the Strategy with those interests. Those interests should also undertake to engage with the proposer and provide transparent and accurate information and data to help complete the Strategy. The Strategy should be drawn up as part of the discharge of conditions of permissions granted. The content of the Strategy should be relevant to the particular circumstances and could include: • An assessment of the potential impact of the development or use on the affected fishery or fisheries, both in socio-economic terms and in terms of environmental sustainability; • A recognition that the disruption to existing fishing opportunities/activity should be minimised as far as possible; • Reasonable measures to mitigate any constraints which the proposed development or use may place on existing or proposed fishing activity; • Reasonable measures to mitigate any potential impacts on sustainability of fish stocks (e.g. impacts on spawning grounds or areas of fish or shellfish abundance) and any socioeconomic impacts. Where it does not prove possible to agree the Strategy with all interests, the reasons for any divergence of views between the parties should be fully explained in the Strategy and dissenting views should be given a platform within the Strategy to make their case.	SHET have developed a project-specific Fisheries Liaison and Mitigation Action Plan. An updated version of this Plan was included as part of documentation submitted to Marine Scotland in Q4 2017 in support of marine licence applications to increase amounts of rock placement. A wide range of measures have been adopted to date by SHET and their installation contractor (NKT) to minimise the amount of rock placement needed.

Policy	Definition	How this policy has been recognised in this appraisal
FISHERIES 3	***Interactions with Other Users*** 6.23 Development: Energy developments can displace fishing. The cabling arrays associated with energy and telecoms developments, and other physical infrastructure associated with development, have the potential for short-term displacement of fishing activity during the installation phase. 6.24 There is also potential for damage to occur to both infrastructure and fishing equipment as a result of interactions, with obvious safety implications. New developments should take into account the intensity of fishing activity in the proposed development area and any likely displacement which the development and associated activity could precipitate, with resultant increased pressure on remaining, often adjacent, fishing grounds. 6.26 Where relevant, Fisheries Liaison with Offshore Wind and Wet renewables (FLOWW) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison should be followed. 6.33 Displacement: Displacement of fishing activity can occur as a result of: interactions with other marine activities (whether commercial or conservation based); closing areas to fishing; or restricting fishing vessels' access to areas. Displacement of fishing effort has a number of features that require careful consideration. 6.34 Displaced effort may move to areas that are already fished but where the fishing pressure is then greater than otherwise would have been the case. This could be a concern if this results in a greater impact on recovery of fish stocks or increased pressure on fish stocks or damage to the environment. 6.35 Displaced effort may also impact on grounds that previously have not experienced any fishing effort. These areas can be readily identified in the offshore fisheries by vessel monitoring systems. The displaced activity may have a new and unknown environmental impact on these areas.	6.23 – This potential interaction is recognised and is assessed in the impact assessment section. 6.24 – The distribution and nature of commercial fishing activity is fully recognised by SHET and has been considered at all stages of the project. Consultation and liaison with SFF continues, including recent meetings where increased rock placement activities have been discussed. 6.26 – A project-specific FLO has been in post for the duration of this project and follows best practice as defined in FLOWW documents. 6.33 to 6.35 – issues around displacement are noted and were assessed in detail via the original EIA process. Further consideration of this potential impact is provided within the impact assessment section of this appraisal document.

Policy	Definition	How this policy has been recognised in this appraisal
CABLES 2	The following factors will be taken into account on a case by case basis when reaching decisions regarding submarine cable development and activities: • New cables should implement methods to minimise impacts on the environment, seabed and other users, where operationally possible and in accordance with relevant industry practice; • Cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with other marine users and to protect the assets and infrastructure; • Where burial is demonstrated not to be feasible, cables may be suitably protected through recognised and approved measures (such as rock or mattress placement or cable armouring) where practicable and cost-effective and as risk assessments direct; • Consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required. ***Interactions with Other Users*** 14.9 Fishing Activity: There is a risk of adverse interaction between seabed cables and fishing activity and this increases as activity levels rise. Submarine cables can cause localised obstruction to fishing practices in some circumstances, while fouling a cable can be extremely hazardous to fishing vessels and the cable itself. Damage to submarine cables is expensive to repair and can cause disruption to power distribution and international telecommunications at a national and international level. Submarine cables should be buried, where feasible, or suitably protected, to reduce conflict with other users and prevent damage to cables. Cable burial and protection is considered on a case-by-case basis due to the variables that influence it (see CABLES 2).	All these key elements of the Marine Plan related to subsea cables have been considered to date via the EIA process and ongoing consent compliance works. ***Interactions with Other Users*** 14.9 – All attempts to bury the CMS cable are being made and these proposals are being driven by a desire by SHET to minimise any risk to both the cable and other marine users. Where there is a need for cable protection this is being communicated with the fishing industry via the project specific FLO.

Policy	Definition	How this policy has been recognised in this appraisal
CABLES 2	14.10 Engagement with affected stakeholders is supported to ensure appropriate awareness of the risks and consequences. 14.11 The fishing sector can gain access to accurate and comprehensive information held by Kingfisher under the KIS-ORCA154 (Kingfisher Information Service – Offshore Renewable & Cable Awareness) project on NMPi on the majority of submarine cables within UK waters. The KIS-ORCA project provides free cable awareness charts, electronic route position lists and digital information for chart plotters to fishing vessels and legitimate marine stakeholders. Key fishing organisations and stakeholders are working with the sector to promote this project and assist with the local distribution of the data	14.10 & 14.11 - SHET have developed a project-specific Fisheries Liaison and Mitigation Action Plan. An updated version of this Plan was included as part of documentation submitted to Marine Scotland in Q4 2017 in support of marine licence applications to increase amounts of rock placement. All details of planned work will continue to be disseminated via regular Notice to Mariners (NtMs) and ensuring that these details are also passed to Kingfisher for inclusion in their charts and KIS-ORCA project.

3.3. Water Framework Directive

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive (WFD)) is transposed into Scottish legislation by the Water Environment and Water Services (Scotland) Act 2003, as amended (WEWSSA). The purpose of this Act is to protect the water environment by preventing deterioration; protecting and enhancing aquatic ecosystems; promoting sustainable water use; reducing pollution and mitigating against floods and droughts. The main regulatory bodies are the Scottish Ministers and the Scottish Environmental Protection Agency.

An assessment of the scope for cable replacement and remediation works activities to conflict with the WFD is provided in later sections of this report.

4. Environmental appraisal

4.1. Overview

The potential impact of the main cable installation was fully assessed within both the marine ES produced for the project (SSE, 2011) and the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009). The proposed works assessed here, cable remediation and replacement, are similar in nature to the main installation works already assessed (and consented), albeit much more limited in terms of spatial extent, magnitude and duration.

Table 4-1: Summary of receptors assessed within this appraisal

Receptor	Scope for Potential Impact
Physical Environment	
Seabed sediments	Temporary, localised increase in suspended sediment levels via cable remediation, repair and replacement
Water Quality (Pollution Prevention)	Accidental discharge from vessels during cable works
Biological Environment	
Benthic Ecology	Temporary, localised increase in suspended sediment levels and disturbance to benthic habitats via cable remediation, repair and replacement
Marine Non-Native Species (MNNS)	Introduction of MNNS via ballast water of cable works and installation vessels
Fish and Shellfish Ecology	Temporary, localised disturbance via suspended sediment levels and vessel noise via cable works
Marine mammals	Impact from increase of subsea noise due to cable works on marine mammals
Ornithology	Disturbance / displacement of bird populations during cable works and vessels
Nature Conservation	Temporary and localised disturbance via suspended sediment levels to benthic invertebrates, fish and shellfish Displacement of seabirds during cable works to designated site features Potential in-combination impacts (HRA Requirement) Direct seabed footprint impacts on designated site features (SAC, SPA, MPA)
Human Environment	
Commercial Fisheries	Temporary disturbance / displacement around cable works

Receptor	Scope for Potential Impact
Shipping and Navigation	Temporary restrictions around cable remediation, repair and replacement Compass Deviation
Marine Archaeology	Damage to seabed archaeological resources via cable remediation, repair and replacement
Water Framework Directive	Works resulting in deterioration of waterbody status
Scottish National Marine Plan	Works resulting in conflict with Scottish Marine Plan policies
Cumulative Impacts	Cumulative effect on range of receptors via cable remediation, repair and replacement works combined with rock placement on other nearby projects (Beatrice, Moray East, Moray West OWF's)

4.2. Overview

4.2.1. Existing environment

This section of the report provides brief details of the existing physical environment in the area where the cable repair works are proposed, (KP1.6-3.6, KP11-16 & KP83-86). The information provided is largely based on data presented in the ES produced for the project (SSE, 2011), the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Bathymetry

The seabed along the cable route is relatively flat. Water depth ranges from 25 m (at the cable emergence points) to 69 m LAT.

Tidal/Wave Regime

Tidal current speeds of 0.25 m/s to 0.5 m/s during neaps, and 1 m/s to 1.25 m/s during springs can be predicted along the entire cable route (except for the landfall approach). The range of spring and neap tides along most of the cable route is 2.5-3 m.

Seabed Sediments

The seabed sediments consist mainly of sandy gravel (up to 100 % shell fragments), gravelly sand and sand, with some patches of silty clay also present in the mid-section. Sand ripples are common in sandy gravel and sand areas.

Sediment transport

A predominantly sandy seabed with extensive areas of ripples indicates the presence of relatively strong tide-driven currents or wave action capable of transporting the surface seabed layers.

4.2.2. Impact assessment (physical environment)

The impact assessment criteria used to assess impacts on physical receptors in the original EIA process (and this updated appraisal) is summarised below.

Table 4-2: Definitions of receptor sensitivity for physical receptors assessed in this appraisal

Level of Value	Example of Criteria
High	• Seabed features that are vulnerable to change and damage, which are not subject to other forms of disturbance, and which may in turn support rare and valued communities, which will often be designated at international levels; these areas may also be quite restricted in extent amounting to perhaps less than 0.1 % of the study area • Sediments that are already heavily polluted where any disturbance could release currently unavailable contaminants into the water column and nearby sediments • Areas where water quality guidelines indicate that conditions are unfavourable or areas that are considered to be polluted to the extent that local wildlife is affected; areas where added pollutants would lead to water quality objectives not being met.
Medium	• Seabed features that are reasonably robust to change and are likely to be subject to modest existing disturbance and may support species and communities of national and local importance; in extent may cover an area at between 0.1 % to 10 % • Seabed sediments generally be considered clean and uncontaminated; discharges would not result in exceeding water quality objectives • Water quality generally be considered clean and achieving good water quality objectives for degradable pollutants; discharges would not result in exceeding water quality objective.
Low	• Seabed features not particularly vulnerable to change/damage, often subject to existing natural/long term disturbance; features that are distributed extensively within the study area (> 10 % coverage) Sediment which has chronic levels of pollutants associated with it at more than trace or background levels; such areas may be affected by plumes from current discharges or legacy areas from previous industrial activities; this would also include areas subject to high concentrations of naturally occurring "contaminants"; discharges would not result in exceeding water quality objectives.

Table 4-3: Definitions of magnitude of effect for physical environment impacts

Level of Value	Example of Criteria
High	Major change to the baseline, e.g.; • a change that affects more than 5 km² of the seabed; • a change returning to baseline/undetectable levels within 10 km of works.
Medium	A moderate shift from the baseline conditions, e.g. • a change that affects 0.5 km² to 5 km² of seabed • a change returning to baseline/undetectable levels within 10 km of works.
Low	A minor shift from baseline conditions over a local area, e.g. • a change that affects 0.05 km² to 0.5 km² of seabed • a change returning to baseline / undetectable levels within 1 km of works; detectable levels but not to concentrations that cause noticeable effects on biota
Very Low	A very slight change to the baseline condition; change barely distinguishable, approximating the 'no change' situation: • a change that affects up to 0.05 km² of seabed • a change returning to baseline / undetectable levels within 100 m of works; changes that are difficult to detect against background, no effects on biota.

Table 4-4: Assignment of impact significance for the physical environment based on sensitivity of receptor and magnitude of effect

Sensitivity of receptor	Magnitude of effect								
	High	Medium	Low	Very Low	None	Very low	Low	Medium	High
High	Major	Major	Moderate	Minor	Neutral	Minor Positive	Moderate Positive	Major Positive	Major Positive
Medium	Major	Moderate	Minor	Minor	Neutral	Minor Positive	Minor Positive	Moderate Positive	Major Positive
Low	Moderate	Minor	Minor	Negligible	Neutral	Negligible Positive	Minor Positive	Minor Positive	Moderate Positive
None	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

4.2.2.1. Temporary, localised increase in suspended sediment levels via cable remediation, repair and replacement

The proposed cable works have the potential to temporarily impact the localised sediment levels due to increased suspension in the water column. Sediment along the majority of the cable route is coarse in nature, mostly consisting sandy gravel, gravelly sand and sand. Some finer sediment exists in the mid-sections of the cable route, however, none of the additional works proposed will occur within this region. Coarse sediments are less vulnerable to re-suspension due to the proposed works (excavation via subsea dredging and/or jet trenching), therefore, the majority of any suspended sediment is expected to settle out of quickly within <10 m of any works. The original ES for the cable installation works (SSE, 2011) predicted that burial associated cable installation works would not create a plume of >5 m from the seabed. The seabed sensitivity remains the same as determined during both the ES and previous assessment undertaken by MarineSpace (2017) for additional rock placement.

The magnitude of the impact is assessed as 'low' due to the works being 0.11 km^2 and therefore within the range of 0.05 km^2 and 0.5 km^2. With the nature of seabed sediments in the areas of proposed works mind and the fact that the absolute worst-case scenario in terms of length of seabed disturbance is 16.5 km (this assumes that cable deburial, reburial, installation of new and excavation of old cables will be required at both KP11-16 and KP83-86) which is 14.6% of the total cable length and that the works and impacts will be temporary means that a **minor impact** on suspended sediment levels is predicted when using the criteria detailed in Table 4-4.

Table 4-5: Impact assessment: increased SSC via cable remediation, repair and replacement

Sensitivity of receptor	Low
Magnitude of effect	Low (footprint of disturbance judged to be between 0.05 km^2 and 0.5 kM^2).Plumes will be localised (10-100ms) and will return to background levels quickly (within hours).
Significance of impact	**Minor**

4.2.2.2. Accidental discharge from vessels during cable works

The impact pathway present here for the potential for the proposed works to adversely effect water quality (via works and rock placement) due to accidental discharge is the same as in the original ES and in a previous assessment (MarineSpace, 2017). The sensitivity of the receptor (water quality) has not changed and remains as 'medium', however the magnitude of the potential impact has increased here from 'very low' in the ES to 'low' due to a larger scope of works, resulting in increased vessel activity offshore.

The combination of a medium sensitivity of receptor and low magnitude of effect results in a **minor impact** for water quality.

Table 4-6: Impact assessment: reduction in water quality due to accidental discharge

Sensitivity of receptor	Medium
Magnitude of effect	Low (combined footprint of disturbance and rock placement judged to be between 0.05 km² and 0.5 kM²)
Significance of impact	**Minor**

4.3. Biological Environment

4.3.1. Existing environment

This section of the report provides details of the existing biological environment in the area where cable repair / de-burial works /new cable installation works are proposed, between KP1.6-3.6, KP11-16 & KP83-86. The information provided is largely based on data presented in the ES produced for the project (SSE, 2011), the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Subtidal Benthic Ecology

The Moray Firth coastline comprises a mix of rocky shores, sandy bays and large sheltered firths (bays that often form parts of estuaries) and some parts of these shores are considered to be of high marine biological importance due to the presence of rich assemblages.

In deeper lying areas, where mixed sandy sediments dominant the epifauna present is typically sparser than nearshore areas, with only occasional crabs, scallops and starfish recorded. Benthic infauna is typical of similar benthic infauna in this region. There are no known sensitive benthic habitats in the areas of the proposed cable repair and/or rock placement. A particularly sensitive seabed habitat occurs in another part of the cable route (horse mussel bed off the Noss Head landfall area) but this area will not be affected by these additional works.

Fish and Shellfish Ecology

A recent review by Marine Scotland indicated that Atlantic salmon travel in both directions along the north and northeast coasts of Scotland. Freshwater pearl mussel (FWPM) is dependent on salmonids for part of their freshwater life cycle. Therefore, a development that has the potential to affect salmonids may also indirectly affect FWPM.

Sea lamprey is a qualifying feature of the River Spey SAC, located some 70 km from the project area.

The basking shark is particularly associated with tidal fronts on the continental shelf and shelf edge where they feed on plankton. They have been recorded from around the whole Scottish coast, with sightings peaking in the summer months especially at a number of hot spots on the west coast. There are occasional but regular summer sightings in the outer Moray Firth. The basking shark is of conservation importance as an internationally recognised endangered species.

Fish populations are rich and varied within the Moray Firth. The following species are known to spawn in the area: sandeel, Nephrops, Atlantic cod, whiting, sprat, Atlantic herring, lemon sole and plaice. Five of these also use the inshore waters as nursery grounds (sandeel, sprat, Atlantic herring, whiting and lemon sole). All these species are likely to occur in and around the area of proposed works at certain times of year.

Marine Mammals

To date, a total of 14 cetacean species and two pinnipeds have been recorded within the Moray Firth (Moray Offshore Windfarm (West) Limited, 2017), with four key species occurring all year round – bottlenose dolphin, harbour porpoise, grey seal and harbour seal (Natural Power, 2017). Two of these are European Protected Species (EPS) (bottlenose dolphin and harbour porpoise).

A fifth EPS occurs in late summer – minke whale – although spring and early summer sightings are now being made more regularly. Other EPS including short-beaked common dolphin, Risso's dolphin, white-beaked dolphin, humpback whale, killer whale and long-finned pilot whale occur in the Moray Firth on a more occasional basis (Natural Power, 2017).

Harbour porpoise was the most commonly encountered species by Thompson et al. (2010), being seen throughout inshore and offshore waters of the Moray Firth. Harbour porpoise is considered to be in favourable condition in respect of range, population, habitat, prospects and overall status (Scottish Government, 2011a). This is the species of cetacean most likely to be encountered by the project during proposed cable works.

The Moray Firth is an area of the Scottish east coast where high concentrations of common seal have been recorded. The majority of seals are found within the inner Moray Firth. The Moray Firth Special Area of Conservation (SAC) and Dornoch Firth and Morrich More SAC, are designated for a range of features including the presence of bottlenose dolphin and common seal. There are a number of small haul-outs along the coast and common seal have been recorded at Seal Skerry, near to the landfall.

The Moray Firth does not contain any of the main breeding colonies.

Marine Ornithology

Auks (guillemot, razorbill, and puffin), kittiwake and fulmar are known to forage widely in the Moray Firth, especially over Smith Bank. Gannet can range widely throughout the Moray Firth and beyond and for this reason is also considered in this assessment. The nearest gannet colonies are at Troup Head on the southern coast of the Moray Firth but gannet can forage at distances of hundreds of kilometres from breeding sites.

The black guillemot unlike the other auks present in the region, does not nest colonially or on cliffs, tending to favour low rocky shores often on islets. It is generally observed in ones or twos in nearshore waters. Its distribution includes the Caithness coast and Orkney.

During baseline surveys to inform the original EIA process, the following results were obtained:

- the most frequently recorded bird species / species groups in this area were auks, with high numbers of fulmar, kittiwake and other gulls also recorded;
- other bird species recorded included gannet, along with very low numbers of divers, Leach's petrel, Arctic skua, great skua, and unidentified terns;
- seasonal variations in bird numbers present included:
    - increasing numbers of fulmar in November compared to other months;
    - highest numbers of gannet and kittiwake in June and August, with low numbers during the winter; and
    - higher numbers of auks during May and June compared to the winter.

4.3.2. Impact assessment (biological environment)

The impact assessment criteria used to assess impacts on biological receptors in the original EIA process (and this updated appraisal) is summarised below.

Table 4-7: Definitions of receptor sensitivity for biological receptors assessed in this appraisal

Level of Value	Example of Criteria
Very High	• Internationally important sites include: SACs, SPAs and Ramsar sites. Candidate SACs, potential SPAs and proposed Ramsar sites should be given the same consideration as designated sites • A qualifying feature of a SAC, SPA or Ramsar site or notified feature of a SSSI • A regularly occurring population of an internationally important species (listed on Annex I of the Birds Directive or Annex II or IV of the Habitats Directive) • Rare, easily disturbed, low populations, threatened populations or distribution
High	• A nationally important designated site e.g. SSSI, or a site considered worthy of such designation • A viable area of a habitat type listed in Annex I of the habitats directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole • A regularly occurring population of a nationally important species, e.g. Listed on schedules 1 and 5 of the Wildlife and Countryside Act (1981) (as amended) • Uncommon, quite easily disturbed, declining or diminished population or distribution
Medium	• UK BAP Priority species and habitats • Areas of internationally or nationally important habitats which are degraded but are considered readily restored • A regularly occurring, regionally significant population of a species listed as being nationally scarce • Sites supporting species in regionally important numbers (>1 % of regional population) • Abundant, normal response to disturbance, stable population and distribution
Low	• Viable areas of UK BAP priority habitat or smaller areas of such habitat which are essential to maintain the viability of a larger whole • A regularly occurring, substantial population of a nationally scarce species,

Level of Value	Example of Criteria
	including species listed in the UK and Local BAPs • Common, quite resilient to disturbance, rising populations and distribution
Very Low	• Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration • A good example of a common or widespread habitat in the local area, Species of national or local importance, but which are only present very infrequently or in very low numbers within the subject area • Any other species or habitats for which there are no designations

Table 4-8: Definitions of magnitude of effect for biological environment impacts

Level of Value	Example of Criteria
High	• A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group; if adverse, this is likely to threaten its sustainability • Major loss or major alteration to key elements of the baseline (pre-development) conditions such that the post-development character / composition / attributes will be fundamentally changed • Affects over 1 % of the seabed area • Multiple mortalities to marine mammals or larger sea life, change in regional distribution of marine mammal population
Medium	• A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group; if adverse, this is unlikely to threaten its sustainability • Loss or alteration to one or more key elements / features of the baseline conditions such that post-development character / composition / attributes will be partially changed • Affects over 0.1 % of the seabed area • A single mortality to a marine mammal or larger sea life, change in local distribution to marine mammal population
Low	• A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group that is within the range of variation normally experienced between years • Minor shift away from baseline conditions; change arising from the loss / alteration will be discernible but underlying character / composition / attributes of the baseline condition will be similar to the pre-development situation • Affects over 0.01 % of the seabed area • Change in behaviour of marine mammals or larger sea life
Very Low	• A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group that is within the normal range of annual variation • Very slight change to the baseline condition; change barely distinguishable

Level of Value	Example of Criteria
	approximating the 'no change' situation • Affects over 0.001 % and less of the seabed area • A noticeable response from marine mammals or large sea life

Table 4-9: Assignment of impact significance for the biological environment based on sensitivity of receptor and magnitude of effect

Sensitivity of receptor	Magnitude of effect								
	High	Medium	Low	Very low	None	Very low	Low	Medium	High
Very high	Major	Major	Moderate	Minor	Neutral	Minor Positive	Moderate positive	Major positive	Major positive
High	Major	Moderate	Moderate	Minor	Neutral	Minor Positive	Moderate positive	Moderate positive	Major positive
Medium	Major	Moderate	Minor	Minor	Neutral	Minor Positive	Minor Positive	Moderate positive	Major positive
Low	Moderate	Moderate	Minor	Negligible	Neutral	Negligible Positive	Minor Positive	Moderate positive	Moderate positive
Very low	Moderate	Minor	Minor	Negligible	Neutral	Negligible Positive	Minor Positive	Minor Positive	Moderate positive

4.3.2.1. Temporary, localised increase in suspended sediment levels and disturbance to benthic habitats via cable remediation, repair and replacement works

Sediment suspended into the water column during the cable works proposed here has the potential to adversely impact the benthic habitats along sections of the cable route. As already discussed in Section 4.2.2.1, the sediment along the majority of the cable route is coarse and therefore expected to settle out rapidly following disturbance, resulting in a short-term impact in the localised area with plumes expected to suspend no more than 10 m from the seabed.

The sensitivity of the receptor (benthic habitats) in the region of proposed works was assessed as low within the ES and is also here as it is expected that benthic communities will be used to suspension of sediment occurring due to strong tidal currents and storm action and will therefore be naturally resilient. It was concluded in the ES that a 'seabed fluidisation' technique, such as jet trenching proposed here, would keep a suspended sediment plume to a minimum, likely to be <10 m (SSE, 2010). With this in mind the magnitude of the impact is assessed as low.

Using the criteria outlined in Table 4-9 the potential impact arising from the proposed cable works here on benthic habitats is assessed as **minor**.

Table 4-10: Impact assessment: increased SSC on benthic habitats via cable remediation, replacement and protection works

Sensitivity of receptor	Very Low
Magnitude of effect	Low
Significance of impact	**Minor**

4.3.2.2. Introduction of MNNS via ballast water of cable works and installation vessels

The risk of the introduction of marine invasive non-native species is determined to be low. All vessels and plant to be used in the cable works will follow standard biosecurity requirements such as not unloading ballast water tanks or flushing hoppers whilst at the location of the cable works. These, and other measures are set out in the project-specific Biosecurity Plan (1JND14006D000603) which aims to manage the risk of introduction of MNNS via project specific works. Whilst not a specific requirement of the existing marine licences, such Biosecurity Plans have become common practice for offshore construction projects planned to take place around the UK.

More details with respect to project-specific control measures related to MNNS are set out in Section 5.6 (Biosecurity Measures) of the project-level EMP (ABB, 2015).

Table 4-11: Impact assessment: potential introduction of MNNS via ballast water

Sensitivity of receptor	Low
Magnitude of effect	Low
Significance of impact	**Minor**

4.3.2.3. Temporary, localised disturbance via suspended sediment levels and vessel noise due to cable works on fish and shellfish

For the purpose of this assessment the existing environment in terms of fish and shellfish remains the same as that detailed within previous MarineSpace (2017) supporting environmental report and as the assessment criteria is the same, the sensitivity of this receptor will remain the same; low for disturbance from suspended sediment and high for disturbance from underwater noise.

Using the assessment criteria outlined in Table 4-9, the footprint of the proposed rock placement activities sit above the 0.01% level of disturbance (as a % of overall Moray Firth region), therefore the magnitude of effect is low for seabed disturbance. As receptor sensitivity is also defined as low, a minor impact is predicted on fish via seabed disturbance.

Fish continue to be either not sensitive to, or able to avoid indirect disturbances such as those associated with vessel noise, therefore, the magnitude of disturbance by vessel noise for the proposed works is assessed here as low.

Referring to the assessment criteria, the impact significance on fish communities due to disturbance from suspended sediments is assessed to be minor and the significance of the impact due to underwater noise (without mitigation) remains the same with a moderate impact expected, reduced to **minor** through the implementation of mitigation measures. The mitigation measures referred to here are presented in detail in Section 7 of the EPS Risk Assessment for Work Proposed in 2018 Caithness to Moray HVDC Project (Natural Power, 2017) but are primarily pre-work searches and transit watches.

Table 4-12: Impact assessment: increased SSC and noise effects on fish and shellfish ecology

Sensitivity of receptor	Localised seabed disturbance = increased SSC: Low Underwater noise via increased vessel activity: High
Magnitude of effect	Localised seabed disturbance = increased SSC: Low Underwater noise via increased vessel activity: Low
Significance of impact	Localised seabed disturbance: **Minor** Underwater noise via increased vessel activity: Moderate (**residual impact = Minor**)

4.3.2.4. Impact from increase of subsea noise due to cable works on marine mammals

The sensitivity of marine mammals as a receptor to disturbance from increased underwater noise as a result of this proposed cable works activities is considered very high and remains the same as in the previous assessment by MarineSpace (2017) and in the original EIA (SSE, 2011). As stated in earlier sections, whilst the works proposed here are expected to be of a longer duration than previous activities, it is considered here that the proposed works can still be assessed as short-term and expected to result in only a minor shift from baseline conditions. Referring to the criteria for assessing the significance of an impact on a biological receptor, the magnitude here is considered to be low.

Using Table 4-9Table 4-9, the initial impact significance is assessed as moderate but with implementation of mitigation measures, is judged to reduce to **minor**.

Table 4-13: Impact assessment: increased subsea noise effects on marine mammals

Sensitivity of receptor	Disturbance via underwater noise: Very High
Magnitude of effect	Disturbance via underwater noise: Low
Significance of impact	Disturbance via underwater noise: Moderate **(Residual impact = Minor)**

4.3.2.5. Disturbance / displacement of bird populations during cable works and vessels

The cable route was chosen to avoid known or likely important feeding areas of seabirds and the original EIA for cable installation did not predict any significant impacts. Whilst these works are expected to be of longer duration than that assessed within the EIA, the proposed works here are still being assessed as short-term. Whilst there may be a number of vessels present on site it is likely that support vessels will only be present for short durations (hours to days).

Table 4-14: Impact assessment: disturbance and displacement effects on marine ornithology

Sensitivity of receptor	Very High
Magnitude of effect	Very Low
Significance of impact	**Minor**

4.3.2.6. Impact of cable works on nature conservation

Previous assessments of similar works have concluded no adverse effect on the integrity of any designated sites in and around the CMS cable. The proposed works are of the same nature and scope of works previously assessed and, although it is accepted that the duration of works is greater, a re-assessment of the scope for impacts of designated sites has concluded that there is still no risk of adverse impacts on the integrity of any sites in the region.

4.4. Human Environment

4.4.1. Existing Environment

This section of the report provides details of the existing human environment in the area where the cable remediation and replacement are proposed, i.e. between KP1.6-36, KP11-16 & KP83-86.

The information provided is largely based on data presented in the ES produced for the project (SSE, 2011), the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Commercial Fisheries

According to the ES (SSE, 2011) there are no recorded inshore or offshore fisheries around the cable route. Vessels fishing the northern Moray Firth are mainly local, registered in the Moray Firth ports of Wick, Lybster, Buckie, Burghhead, MacDuff, Whitehills and Fraserburgh. A total of 129 active vessels were recorded in the Wick district for the years 2008 and 2009.

A comparison of data records completed within the ES showed the majority of fishing vessels catching within the vicinity of the proposed marine facilities are small creel boats (<15 m) without VMS equipment. It is estimated that approximately 40 to 50 creel boats (targeting crab and lobster)

are currently working the Moray Firth north coast, although not all of these are likely to be full-time fishermen.

Approximately 30-40 trawlers work the outer Moray Firth, most of which are greater than 15 m length. These boats are targeting demersal fish during the summer and autumn months, including haddock, whiting, monkfish and cod. Nephrops is also trawled all year round and king scallops also support several vessels. In summer, small trawlers work in pairs. Summer and autumn also bring abundant herring for the pelagic trawlers. Seine netting is not common but is carried out around the Beatrice field in summer months.

Shipping and Navigation

Anatec Ltd was commissioned to produce a Shipping Traffic Survey and Collision Risk Assessment for the original EIA (SSE, 2011). This study identified six shipping routes transited by an estimated 828 ships per year within 10 nm of the cable route. This corresponds to an average of two to three vessels per day.

Typical commercial marine traffic in this region includes oil tankers transiting between the Gullfaks Oil Terminal and the Moray Firth and merchant vessels heading between the Pentland Firth and the northeast coast of Scotland (passing off Rattray Head). This includes regular offshore support vessel traffic between Aberdeen and the Foinaven Oil Field, west of Shetland.

There are also vessels undertaking survey and other support work for oilfield and renewable energy projects operating in or planned for the area. This low intensity vessel traffic includes the servicing of the Beatrice oilfield and demonstration wind turbines, seismic surveys for prospective oilfields and consenting and / or construction traffic for the Beatrice Offshore Windfarm Ltd (BOWL) and Moray Offshore Renewables Limited (MORL) offshore wind farm projects.

Another type of commercial shipping activity relates to fishing vessels which travel between the various fishing grounds and their home ports as well as between the ports in the Moray Firth and more distant fishing grounds outside the area. They are distributed more widely than merchant vessels but again at lower density. The main fishing ports are on the south coast of the Moray Firth at Fraserburgh, Banff and Buckie. The closest harbour to the proposed cable route is Staxigoe, a small village 2.5 km north of Wick and about 1.4 km from the cable emergence points.

The principal commercial and general ports in the region are Inverness and Cromarty Firth (Invergordon).

Archaeology

According to the ES (SSE, 2011) there are no areas, sites or wrecks protected, designated or controlled under the Ancient Monuments and Archaeological Areas Act 1979, the Protection of Wrecks Act 1973, the Protection of Military Remains Act 1986 or the Marine (Scotland) Act 2010 within 250 m of the proposed offshore cable route. During surveys completed to inform the EIA some ship wrecks were identified near the corridor along the subsea cable route, however, no known wrecks lie within it. Two highly sensitive military aircraft are known to have crashed in the area but have not been located to date, and other losses have been reported in the general region.

Other Marine Users

The hub and part of the adjoining cable route lie within area D809(S), which is used by the Royal Air Force (RAF), the nearest RAF base is RAF Lossiemouth. The following offshore renewable energy projects are located / proposed in the Moray Firth, the Pentland Firth and Orkney waters:

- BOWL;
- MORL (Moray East and Moray West);
- Shetland-Moray Firth HVDC cable link;
- Tidal energy developments in the Pentland Firth and Orkney waters strategic area, including:
    - Duncansby Head;
    - South Ronaldsay;
    - Inner Sound;
    - Cantick Head;
    - Westray Firth; and
- Wave energy developments in the Pentland Firth and Orkney waters strategic area.

No existing cables or pipelines intersect the cable corridor.

Water Framework Directive

Under the Water Environment and Water Services (Scotland) Act 2003, SEPA is responsible for producing and implementing River Basin Management Plans (RBMPs). River basins comprise all surface waters (including transitional (estuaries) and coastal waters) extending to three nm seaward from the Scottish territorial baseline. Any proposed development within these waters must have regard to the requirements of the WFD to ensure that all surface water bodies achieve 'Good Ecological Status (GES)' and that there is no deterioration in status. Five classifications of water quality status are defined: High (near natural), Good, Moderate, Poor and Bad; and each classification is accorded a degree of confidence (high, medium or low) in the overall quality assessment.

The most relevant RBMP areas to the first 3 nm of the Portgordon to 12 nm zone of the CMS cable are the Portgordon to Findochty Water Body and the Lossiemouth to Portgordon Water Body. Based on the most recent (2014) classifications, both these waterbodies are defined as "Good". Both these areas lie several nm inshore of the area of proposed works assessed via this appraisal.

4.4.2. Impact Assessment (Human Environment)

The impact assessment criteria used to assess impacts on human environment receptors in the original EIA process (and this updated appraisal) is summarised below.

Table 4-15: Definitions of receptor sensitivity for human receptors assessed in this report

Level of Value	Example of Criteria
High	• Site of national commercial significance as a source of revenue and employment (e.g. important fishing ground) lies within or overlaps the project footprint • International shipping route traverses the project footprint • Intensively used and localised charted sea use area (i.e. MoD exercise area, disposal site, aggregate extraction site etc.) lies within or adjacent to the project footprint • Existing leased area for oil and gas overlaps the project footprint • Major renewables site with predicted capacity over 100MW • Site of commercial significance for mainstay local industry (e.g. for specific fishing port in the Moray Firth) lies within or overlaps the project footprint • Regionally or nationally important recreation area lies adjacent to (within 2km of) the project footprint • Internationally recognised, war grave, Marine Protected Area (MPA); scheduled site or feature (e.g. known wreck)
Medium	• Site of regional (Moray Firth) commercial significance as a source of revenue and employment (e.g. important fishing ground) or lies adjacent to (within 2km) national area • Regionally or nationally important shipping route traverses the project footprint • Extensive charted sea use area (i.e. MoD exercise area, disposal site, aggregate extraction site etc) lies adjacent to (within 2 km of) or overlaps the project footprint • Oil and gas infrastructure nearby, lease area nearby • Renewables site with predictive capacity between 1 and 100MW • Site of commercial significance for mainstay local industry (e.g. for specific fishing port in the Moray Firth) lies adjacent to (within 2km of) the project footprint • Established recreation area for local activities lies within or overlaps the project footprint • Areas of sea lying close to important coastal facilities/amenity areas/tourist attractions where there is a link to the sea • Areas regularly frequented by ferries, boat trips, cruise liners and other activities that particularly relate to the sea • Notified feature (e.g. wreck site)
Low	• Local fishing area • No regionally or nationally important shipping routes traverse the project footprint • No designated MoD areas nearby • No special interest for oil and gas activities • No renewables developments planned in the area • Site of commercial significance for non-mainstay local industry lies adjacent to (within 2 km of) the project footprint • No established recreation area for local activities lies adjacent to (within 2 km of) the project footprint • Un-notified features present or area with potential for archaeology to be present

Table 4-16: Definitions of magnitude of effect for human environment impacts

Level of Value	Example of Criteria
High	• Change to fishing activity leading to a threat to the viability of business • A barrier to shipping, MoD operations, or oil and gas activities beyond that normally experienced in the area • Essential piece of enabling infrastructure for renewables development • Major contract opportunities for local companies • A barrier to recreation beyond that normally experienced in the area • Visibility of large structure, or large vessels in the seascape over a long period of time (e.g. a period of years) • Destruction of archaeological or cultural heritage feature
Medium	• Change to fishing activity leading to a loss of income or opportunity beyond normal business variability / risk • Presence of a long-term obstacle to shipping, MoD operations, or oil and gas activities beyond that normally experienced in the area • Development advantageous to renewables development • Many contract opportunities for local companies • An obstacle to recreation beyond that normally experienced in the area • Visibility of a moderate sized structure, or larger than average vessel(s) in the seascape over a period of months • Damage to archaeological or cultural heritage feature
Low	• Change to fishing activity leading to a loss of income or opportunity within normal business variability / risk • Presence of a long-term obstacle to shipping, MoD operations, or oil and gas activities typical to those normally experienced in the area • Slightly advantageous to renewables development • Few contract opportunities for local companies • An obstacle to recreation typical to those normally experienced in the area • Visibility of small structure, or average sized vessels in the seascape over a period of weeks • Disturbance, destabilisation, movement within archaeological feature
Very Low	• Change to fishing activity creating a nuisance but having no effect on income or opportunity • A temporary consideration/nuisance to shipping, MoD operations, or oil and gas activities in the area • No obvious benefit to renewables development • Limited contract opportunities for local companies (value >£1,000) • A typical consideration / nuisance to recreation in the area • Visibility of structure that is barely discernible or smaller than average vessels in the seascape over a period of days • Change to local setting for cultural heritage site

Table 4-17: Assignment of impact significance for the human environment based on sensitivity of receptor and magnitude of effect

Sensitivity of receptor	Magnitude of effect								
	High	Medium	Low	Very Low	None	Very low	Low	Medium	High
High	Major	Major	Moderate	Minor	Neutral	Minor Positive	Moderate Positive	Major Positive	Major Positive
Medium	Major	Moderate	Minor	Minor	Neutral	Minor Positive	Minor Positive	Moderate Positive	Major Positive
Low	Moderate	Minor	Minor	Negligible	Neutral	Negligible Positive	Minor Positive	Minor Positive	Moderate Positive
None	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

4.4.2.1. Temporary disturbance/displacement around cable works

The presence of vessels undertaking these additional works has the potential to displace and disrupt fishing activities at discrete sections along the cable route.

A variety of commercial fishing activities occur at some of the locations proposed for cable works. The sensitivity of the receptors, inshore creeling vessels and larger trawling/dredging vessels remains as per the original EIA, medium and low respectively.

The magnitude of effect for displacement/disturbance is judged to be medium for both creeling vessels and trawler/dredging vessels, based on the following definition – "*a change to fishing activity leading to a loss of income or opportunity beyond normal business variability/risk*" – see Table 4-17. The duration of works means that the magnitude of this effect is low. Therefore, without mitigation, the impact via disturbance/displacement is judged to be **major**. However, with appropriate mitigation measures implemented (see below), the significance of this impact is judged to be **minor**.

Table 4-18: Impact assessment: Disturbance and displacement to fishing activities (commercial fisheries)

Sensitivity of receptor	Disturbance/displacement during works: **Medium**
Magnitude of effect	Disturbance/displacement during works: **Low**
Significance of impact (pre-mitigation)	Disturbance/displacement during works: **Minor**

The significance of this impact will be reduced to **minor** significance by implementation of the following mitigation measures, all of which are already being implemented by SHE Transmission as part of the ongoing installation phase:

- Preparing and disseminating cable burial depth and cable awareness information to the fishing industry;
- Appointment of project specific **FLO**;
- Use of **Notice to Mariners** and dissemination of information via the **Kingfisher** bulletin service; and
- Production and adherence to the **CMS Fisheries Liaison and Mitigation Action Plan (FLAMP)** (SHET, 2016) – the FLMAP sets out the fisheries liaison and mitigation action measures to be implemented on the CMS project. These procedures have been established to ensure that the cable is planned, installed and operated as safely as possible in accordance with the licence consent conditions for the project. The FLAMP has drawn on the approach adopted in the FLMAP documents produced elsewhere in Scotland for similar projects subject to similar licence requirements. The FLMAP was issued to the fishing industry organisations as part of the formal consultation process that commenced in 2015.

4.4.2.2. Temporary restrictions around cable works and potential compass deviation

The following impacts on shipping and navigation have been assessed within this updated assessment;

- Potential impact on shipping and navigation via disturbance/restrictions during installation phase and;
- Potential impact on compasses due to presence of subsea cable at shallower depths than previously assessed.

Disturbance/Restriction to Navigation during Installation Phase

With respect to the first impact, the change (increase) in the duration of this activity will not impact upon the sensitivity of the receptor but does have the potential to change the magnitude of effect. In terms of receptors, the CMS cable is located to the west of a main shipping lane. However, based on the effect magnitude criteria in Table 4-17Table 4-16, as any disturbance to shipping will still only be a "A temporary consideration/nuisance to shipping….in the area", the magnitude of effect is assessed as low, and the overall impact will remain as **minor**.

Impact on Compass Operation due to Shallow Buried Cables

The presence of subsea cabling has the potential to cause interference with magnetic compasses used for navigation. This impact is only likely to affect small vessels relying on magnetic compasses as a primary means of navigation in the absence of more sophisticated equipment on board. The sensitivity of receptors to this potential effect is judged to be medium as areas of shallower burial that will now require cable protection correspond to areas of the Moray Firth where important fishing grounds occur and regionally important shipping routes exist.

The magnitude of effect however is judged to be very low as this potential effect is unlikely to occur in reality due to the low electromagnetic emissions from the type of cable installed and also the fact that whilst although not buried fully in the sediment, the rock protection being proposed will also

provide a good degree of protection from any such emissions. Therefore, a minor impact is predicted

Table 4-19: Impact assessment: potential impacts on shipping and navigation

Sensitivity of receptor	Disturbance/restriction to shipping/navigation: Low Impact on compass operation due to shallow buried cables: Medium
Magnitude of effect	Disturbance/restriction to shipping/navigation: Low Impact on compass operation due to shallow buried cables: Very Low
Significance of impact	Disturbance/restriction to shipping/navigation: **Minor** Impact on compass operation due to shallow buried cables: **Minor**

4.4.2.3. Damage to seabed archaeological resources via cable works

Cable works will be undertaken in areas already subject to disturbance via cable installation, or in the case of newly installing cables, this will occur adjacent to the original cable trench.. The overall sensitivity of the receptor remains as low here, as in the EIA.

It is unlikely that archaeology or wartime debris will be identified within the area of the cable route, more specifically within the areas proposed for cable works (KP1.6-3.6, KP11-16 and KP83-86), and the fact that an Archaeological finds plan is in place it is not considered that the magnitude of the impact will change due to an increase in rock protection tonnage. Therefore, it is concluded that the magnitude of the effect is low. As a result, the significance level of the impact will be minor.

Table 4-20: Impact assessment: potential effects on marine archaeology

Sensitivity of receptor	Low
Magnitude of effect	Low
Significance of impact	**Minor**

4.4.2.4. Works resulting in deterioration of waterbody status and impact on Water Framework Directive (WFD)

With respect to water quality in terms of re-suspended sediments from cable works it is considered here that sensitivity of the receptor has not changed since the EIA (SSE, 2011) or previous MarineSpace assessment (2017) and for the purpose of this appraisal will remain as moderate. It is not anticipated that the current 'Good' status of the nearby Water Bodies (Portgordon to Findochty and Lossiemouth to Portgordon) will be adversely impacted by the proposed rock placement works, therefore, no impact is predicted on the existing WFD waterbody status in the area of works.

The impact assessment of accidental discharge via work vessels is considered in Section 4.2.2.2.

4.4.2.5. Works resulting in conflict with the Scottish National Marine Plan (SNMP)

An assessment of an "impact" on key policies within the Scottish Marine Plan using the same methodology and criteria as other environmental receptors is not appropriate or relevant. An appraisal of key policies related to subsea cables and other sectors, such as commercial fishing, has been undertaken and is presented in Table 3-1Table 3-1.

4.5. Cumulative effect on range of receptors via cable works combined with rock placement on other nearby projects

Since the original impact assessment was undertaken (SSE, 2011), certain projects in the Moray Firth region have progressed to full construction and / or have changed in scope / design. Notable projects in this region that have the capacity to create cumulative impacts with the cable repair on the C-M cable are:

- Beatrice OWF (under construction);
- Moray East OWF (updated Scoping Report submitted 2017); and
- Moray West OWF (updated Scoping Report submitted 2017).

None of these projects overlap with the proposed cable repair activities assessed within this appraisal. Due to the fact that any increases in SSC via cable de-burial works will be temporary and very localised, no cumulative impacts via this pathway are predicted.

Table 4-21: Revised cumulative impact assessment – physical environment

Sensitivity of receptor	Low (Seabed features not particularly vulnerable to change/damage, often subject to existing natural/long term disturbance; features that are distributed extensively within the study area)
Magnitude of effect	Medium (a moderate shift from the baseline conditions, e.g. a change that affects 0 5km^2 to 5 km^2 of seabed)
Significance of (cumulative) impact	**Minor**

Table 4-22: Revised cumulative impact assessment – biological environment

Sensitivity of receptor	Seabed habitat/SSC impacts: Very Low (A good example of a common or widespread habitat in the local area, Species of national or local importance, but which are only present very infrequently or in very low numbers within the subject, any other species or habitats for which there are no designations) Subsea noise impacts (marine mammals): Very High
Magnitude of effect	Seabed habitat/SSC impacts: Medium (Affects over 0.1 % of the seabed area) Subsea noise impacts: Low "Although these additional works will result in more subsea noise effects than previously assessed, the distance of these works from other activities in the Moray Firth region makes it unlikely that the magnitude of any cumulative impact will be any greater than "low"."
Significance of (cumulative) impact	Seabed habitat/SSC impacts: **Minor** Subsea noise impacts: Moderate (Residual impact = Minor)

Table 4-23: Revised cumulative impact assessment – human environment

Sensitivity of receptor	Medium (Site of regional (Moray Firth) commercial significance as a source of revenue and employment (e.g. important fishing ground) or lies adjacent to (within 2 km) national area; Site of commercial significance for mainstay local industry (e.g. for specific fishing port in the Moray Firth) lies adjacent to (within 2 km of) the project footprint; Areas of sea lying close to important coastal facilities / amenity areas / tourist attractions where there is a link to the sea
Magnitude of effect	Medium (Change to fishing activity leading to a loss of income or opportunity beyond normal business variability/risk)
Significance of (cumulative) impact	**Moderate** (*residual impact reduced to **Minor** if appropriate mitigation measures adopted – see below)

*Appointment of a Fisheries Liaison Officer (FLO) for the planning and duration of all cable/hub installation activities; Adherence to the project-specific FLAMP; issue of NtM's in a timely manner via Kingfisher.

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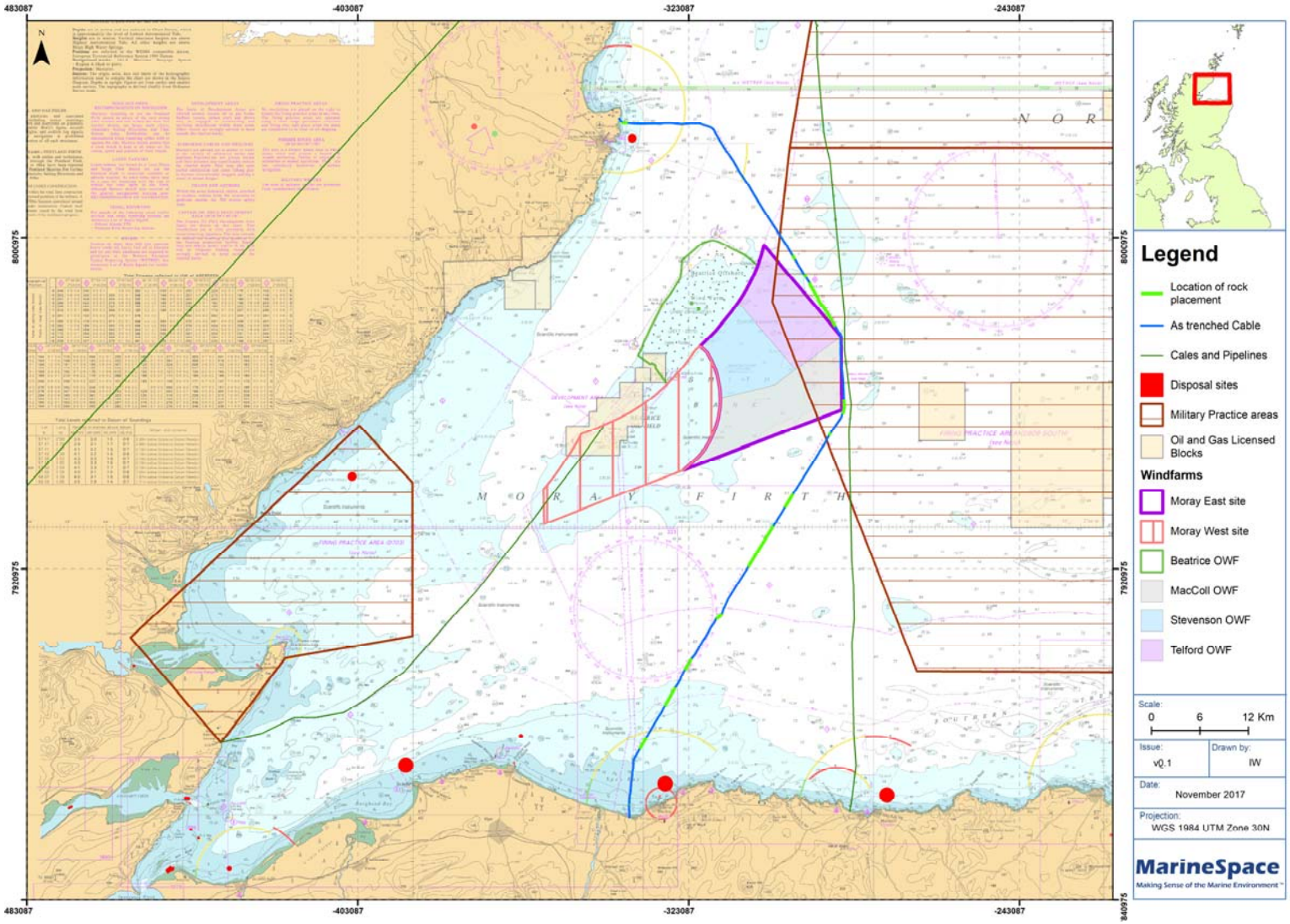
Figure 4.1: Current plans and projects within the vicinity of the Caithness-Moray HVDC Link



5. Conclusions

Table 5-1: Summary of potential impacts of cable repair / rock placement works

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Physical Environment			
Increased SSC via cable works	Low	Low	**Minor**
Impact on water quality *Significant impacts on water quality via pollution could arise in the event of a major spill, however, this risk is mitigated by the presence of a well-established SOPEP.	Medium	Low	**Minor**
Biological Environment			
Benthic Ecology Increased SSC on benthic habitats via cable works	Very Low	Low	**Minor**
Potential introduction of MNNS via ballast water	Low	Low	**Minor**
Fish and Shellfish Ecology: Increased SSC effects on fish and shellfish ecology	Low	Medium	**Minor**
Increased noise effects on fish and shellfish ecology	High	Low	**Moderate (residual impact = minor)**
Marine Mammals: Disturbance via underwater noise	Very high	Low	**Moderate**
Ornithology: Disturbance and displacement effects on marine ornithology	Very High	Very Low	**Minor**
Human Environment			
Commercial Fisheries: Disturbance/restrictions around cable works	Medium	Low	**Minor**
Shipping and Navigation: Disturbance/restriction	Low	Low	**Minor**

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Impacts on compass operation	Medium	Very Low	**Minor**
Marine Archaeology Potential effects on marine archaeology	Low	Low	**Minor**
Water Framework Directive (WFD)	**See Section 4.4.2.4**		
Scottish National Marine Plan (SNMP)	**See Section 3.2**		
Cumulative Impacts: Physical Environment Biological Environment Human Environment	 Low Very Low Medium	 Medium Medium Medium	 **Minor** **Minor** **Moderate (Minor if mitigation is adopted)**

The following additional works have been assessed in this environmental assessment report:

- Cable remediation and backfill at KP1.6-3.6, including rock placement if required;
- Installation of 2 x new lengths of DC cables & 1 x FO of cable between KP11-16 and potentially KP83-86 (dependent on cable inspection results);
- Cable de-burial and inspection at KP 83-86;
- Burial of newly installed cable, use of rock placement if required; and
- Removal of old cables at KP11-16 and KP83-86 (dependent on cable inspection results).

The same methodology used for assessing environmental impacts in the original EIA as well as a previous environment appraisal prepared by MarineSpace (MarineSpace, 2017) in respect of additional rock protection and cable repair works along the cable route, were used within this report to ensure consistency.

The potential impact of the main cable installation was fully assessed within both the marine ES produced for the project and the Shetland HVDC Connection Marine Environmental Appraisal (SHET, 2009). The proposed works assessed here, namely a discrete cable remediation event, cable de-burial and inspection, two potential areas of cable installation and cable removal along with cable protection, are similar in nature to the main installation works, and variations of, already assessed (and consented), albeit much more limited in terms of spatial extent, magnitude and duration. Other, additional potential impacts were also assessed, including but not limited to impacts on shipping and navigation due to reduced water depths in areas of rock placement, disturbance to navigation during cable installation and compass deviation due to shallow buried cables, impacts on commercial fisheries via increased vessel activity, impacts on marine non-native species and impacts on sites of nature conservation importance.

In summary, the majority of impacts predicted via increased rock placement were judged to result in no more than minor impacts. The only exception to this was a moderate residual impact predicted to marine mammals from disturbance via underwater noise but this would be reduced to minor if relevant mitigation measures were implemented.

The detailed MPA assessment undertaken for previous works of this nature identified associated pressures and footprints and screened the potential exposure of these footprints with MPAs in the vicinity of the cable repair works and their designated features within the study area;

- Annex I and MPA designated benthic habitats;
- Annex II marine mammals and migratory fish species designated within SACs;
- Annex I bird species classified within SPAs; and
- Where appropriate, Ramsar sites.

Where likely significant effects / risks could not be screened out, detailed assessment and determinations of any adverse effects / risk (or where no adverse effect / risk cannot be determined) is presented. **Overall, no adverse effects on the integrity of any of the MPAs was determined**.

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