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Caithness-Moray HVDC Link Rock Placement Env Appraisal

Project Title:

Caithness – Moray – Shetland HVDC Link

ABB Project No: G14006

Contractor:		Employer:
NKT	**NKT HV Cables AB**	Scottish & Southern Electricity Networks

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MarineSpace

MarineSpace Limited

Caithness-Moray HVDC Link: Additional Rock Placement Marine Licence Application – Environmental Appraisal Report

for

NKT

NKT

Project Ref: J/7/54/17	Originator: Claire Griffiths
Date: November 2017	Circulation: Restricted - commercial in-confidence

Caithness-Moray HVDC Link: Additional Rock Placement Marine Licence Application – Environmental Appraisal Report

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Executive Summary

The Caithness-Moray High Voltage Direct Current (HVDC) electricity transmission link between Caithness (Noss Head) and Moray (Portgordon) is required to reinforce the existing electricity transmission system in the north of Scotland.

The contract to provide and install the subsea cables has been awarded to NKT. Offshore installation of the cable commenced in Q2 2017 and is currently ongoing. Initial offshore works involved trenching along the cable route so that the cable could then be laid in the trench and backfilled. The trenching works were undertaken over the course of summer 2017. The cable laying and backfill operations were subsequently undertaken in late summer. Whilst for parts of the route, the cable has been successfully laid in the trench, in other areas it is surface laid, due to the initial trenching works not being able to create a suitably sized trench. Additional jet trenching works are ongoing to deepen the trench in places but there are now also plans to increase the amount of rock placement in order to ensure adequate protection of the cable in areas where trench depths cannot be reached

New marine licence applications are required to be submitted to Marine Scotland for these increased amounts of rock placement. SHE Transmission have been advised by Marine Scotland that a review of potential environmental effects needs to be undertaken in support of these applications. SHE Transmission have, in turn, requested that NTK, as lead installation contractor, prepare all necessary documentation to support the licence applications. MarineSpace Ltd (MarineSpace) has been commissioned by NKT to prepare an environmental appraisal (this report) that will consider and assess potential environmental effects. Therefore, this report represents the environmental appraisal of proposed rock placement works on the Caithness-Moray HVDC subsea cable.

Details of the proposed amounts of rock placement being sought (and therefore, assessed within this report), are presented below divided up by specific parts of the cable route. As can be noted from the table, additional rock placement, over and above amounts already permitted, are only actually required in the Portgordon to 12nm area (southern part of cable) and the 12nm to Noss Head area (northern part of cable), i.e. no additional rock placement over and above amounts already permitted under licence 06043/16/0 is required in the offshore region (12nm to 12nm). Therefore, only two new marine licence applications are being submitted, with the potential environmental effects in both these regions assessed within this single report.

Cable Area	Existing Marine Licence	Amount of rock placement currently permitted (Te) *	Total amount of rock placement now required (Te)	Variance in rock placement amount (Te) **
Portgordon to12nm	04878/13/0	67,260	111,450	**+ 44,190**
12nm to 12nm (offshore)	06043/16/0	122,369	101,043	**- 21,326**
12nm to Noss Head	04368/17/2	18,000	127, 187	**+109,937**

* via existing marine licences.

** These are the amounts of additional rock placement being sought in these two new marine licence applications made by SHE Transmission. **As no additional rock placement is required in the offshore (12nm – 12nm) region over that already permitted via 06043/16/0, no new marine licence is being sought for this area.**

Assessments of impacts from rock placement presented in the original Environmental Statement for the C-M project (SSE, 2011) were reviewed and re-assessed, using the impact assessment methodology used in the original Environmental Impact Assessment (EIA) process. 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 and compass deviation due to electromagnetic emissions, impacts on commercial fisheries via increased rock, impacts on marine non-native species and impacts on sites of nature conservation importance. On the latter issue, a stand-alone Appendix A has been produced that presents a full Marine Protected Areas (MPA) assessment of the proposed increased rock placement.

In summary, the majority of impacts predicted via increased rock placement were judged to result in no more than minor impacts. The only exceptions to this were a moderate adverse impact predicted on inshore fishing vessels via loss of fishing grounds due to rock placement in these areas. However, the exact significance of this impact may well reduce in reality, as the majority of vessels that fish in inshore areas are creel boats. Whilst the physical presence of rock on the seabed may well equate to a loss of fishing grounds, it may also provide additional habitat for key target species including crab and lobster.

The detailed MPA assessment undertaken identified pressures and footprints associated with the rock placement activities and screened the potential exposure of these footprints with the following MPAs 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) was presented. **Overall, no adverse effects on the integrity of any of the MPAs were determined**.

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1. Introduction

1.1. Project Background

Scottish Hydro Electric Transmission Plc (SHE Transmission) 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.

1.2. Project Status

The contract to provide and install the subsea cables has been awarded to NKT. Offshore installation of the cable commenced in Q2 2017 and is currently ongoing. Initial offshore works involved trenching along the cable route so that the cable could then be laid in the trench and backfilled. The trenching works were undertaken over the course of early/mid-summer 2017, with cable laying and backfill operations subsequently undertaken in late summer. Whilst for parts of the route, the cable has been successfully laid in the trench, in other areas it is surface laid, due to the initial trenching works not being able to create a suitably sized trench. Additional jet trenching works are ongoing to deepen the trench in places but there are now also plans to increase the amount of rock placement in order to ensure adequate protection of the cable in areas where trench depths cannot be reached.

1.3. Marine Licence Application(s)

A certain amount of rock placement is already covered via three existing marine licences – see Table 2.1. However, due to the increased amount of rock placement required over and above that already permitted via these existing marine licences, Marine Scotland have advised SHE Transmission that new marine licence applications are required to be submitted. As additional amounts of rock placement are only required in the Portgordon to 12nm one and the 12nm to Noss Head zone, two separate marine licence applications will be made, i.e. there will be no new marine licence application for the 12nm to 12nm (offshore) zone of the CMS cable.

1.4. Need for Environmental Impact Assessment

SHE Transmission have been advised by Marine Scotland that a full Environmental Impact Assessment (EIA) **is not required with respect these proposals**. However, a review of potential environmental effects does need to be undertaken in support of these applications. SHE Transmission have, therefore, requested that NTK, as lead installation contractor, prepare all necessary documentation to support the licence applications. MarineSpace Ltd (MarineSpace) has been commissioned by NKT to prepare an environmental appraisal (this report) that will consider and assess potential environmental effects. Therefore, this report represents the environmental appraisal of proposed additional rock placement works on the Caithness-Moray HVDC subsea cable.

1.5. Need for Habitats Regulation Assessment

Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, also known as "The Habitats Directive", provides for the conservation of natural habitats and of wild flora and fauna including in offshore areas. The EC Directive on the conservation of wild birds (Birds Directive) applies to the conservation of all species of naturally occurring wild birds including in offshore areas. In the UK, sites designated as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) form part of the Natura 2000 network, delivering the requirements of the Directives.

Both Directives have been transposed into Scottish Law by The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (the Habitats Regulations) and in the offshore marine area by The Offshore Marine Conservation (Natural Habitats &c) Regulations 2007 (as amended) (Offshore Habitats Regulations). The Habitats Regulations and Offshore Habitats Regulations require that any project that is not directly connected to, or necessary to the management of a Natura 2000 site, must undergo a Habitats Regulations Assessment (HRA). The project is assessed for any likely significant effects on the conservation objectives of the site (directly, indirectly, alone or in-combination with other plans or projects). Where this is the potential for a likely significant effect to occur then 'Appropriate Assessment' must be undertaken by the competent authority. The Appropriate Assessment must be carried out before consent or authorisation can be given for the project.

Information is presented within **Appendix A** of this environmental appraisal that is intended to enable Marine Scotland (as the competent authority) to undertake an Appropriate Assessment if required.

1.6. 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 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 31 NCMPAs have been designated.

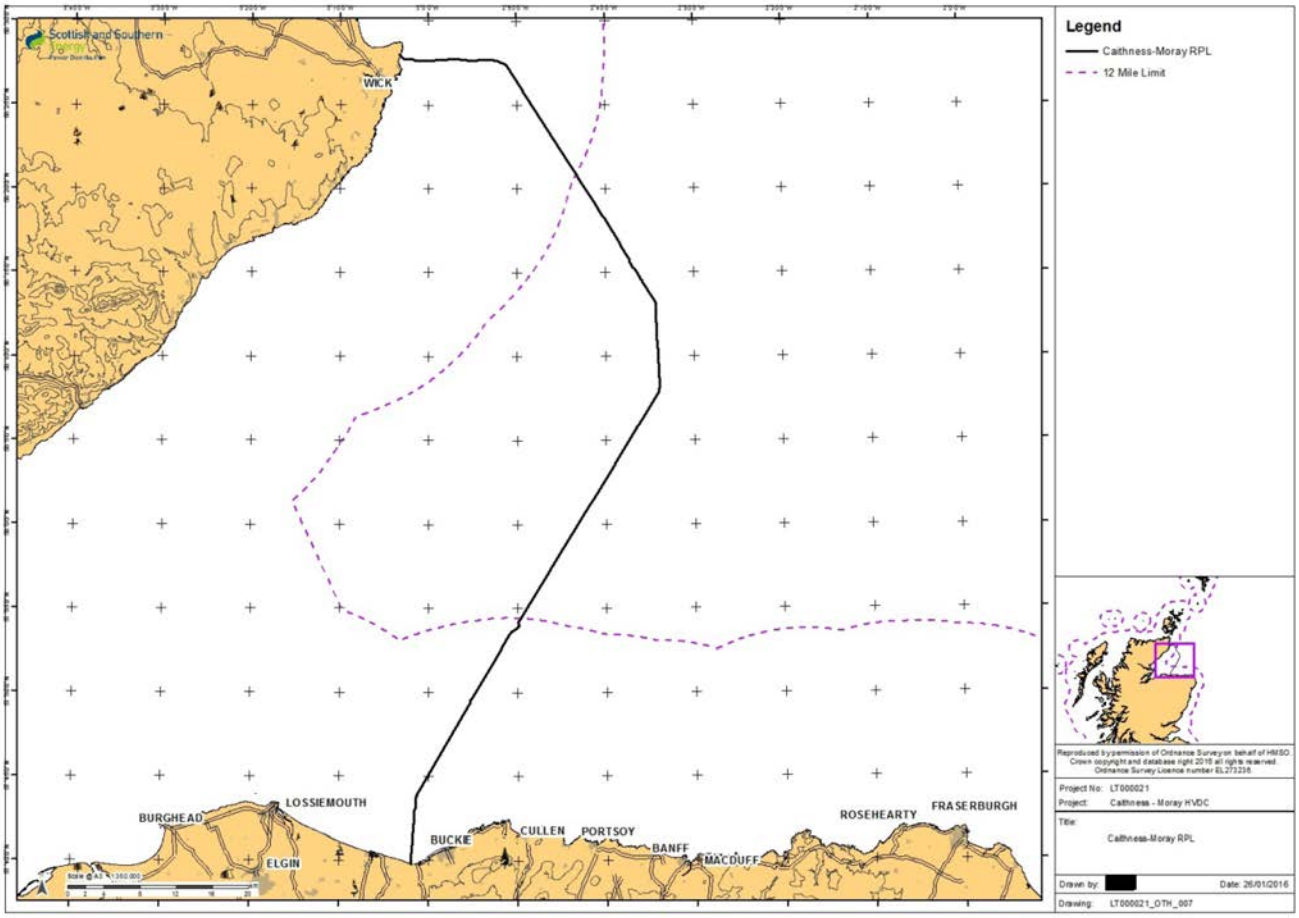
The rationale for the assessment process of NCMPAs follows the principles of the HRA process related to the published or draft conservation objectives and designated features of any NCMPA screened for likely significant risks (effects); in relation to the pressures associated with the cable installation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

1.7. European Protected Species 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. The licenses are granted by Scottish National Heritage (SNH) or the Scottish Ministers depending on the reason for the licence application. An EPS licence already exists for the CMS project which is due to expire at the end of 2017. As the proposed rock placement works will now extend into 2018, an application for a new EPS licence has been prepared on behalf of SHE Transmission and submitted to the relevant authorities in parallel with this environmental appraisal and marine licence applications.

To ensure consistency of approach and assessment, the EPS Risk Assessment report (Natural Power, 2017) has been reviewed and where relevant, incorporated into this document (**Appendix A**).

Figure 1-1: Location of the Caithness-Moray HVDC Link (from SSE, 2011)



2. Proposed Works

2.1. Overview

The proposed works applied for within this Marine Licence application are summarised below.

Table 2-1: Summary of rock placement amounts sought via new marine licence applications

Cable Area	Existing Marine Licence	Amount of rock placement currently permitted (Te) *	Total amount of rock placement now required (Te)	Variance in rock placement amount (Te) **
Portgordon to12nm	04878/13/0	67,260	111,450	**+ 44,190**
12nm to 12nm (offshore)	06043/16/0	122,369	101,043	**- 21,326**
12nm to Noss Head	04368/17/2	18,000	127, 187	**+109,937**

* via existing marine licences.

** These are the amounts of additional rock placement being sought in these two new marine licence applications made by SHE Transmission. **As no additional rock placement is required in the offshore (12nm – 12nm) region over that already permitted via 06043/16/0, no new marine licence is being sought for this area**.

The quantities and locations of additional rock placement being applied for by the two marine licence applications have been determined via a series of engineering studies and assessments, including, but not limited to the following reports produced on behalf of NTK (SHE Transmission):

- Technical report rock berm stability and impact calculations;
- Technical report rock losses by settlement and penetration;
- Technical report carrying capacity of soil; and
- Quantity estimate report.

2.2. Type of rock placement

The planned rock placement campaign comprises stabilisation and protection works at various locations along the CMS route. The rock placement is required in (a) areas where no trenching is foreseen; (b) where the soil conditions are deemed unsuitable for trenching and (c) in areas where the required Depth of Lowering (DOL) was not met during the trenching campaign.

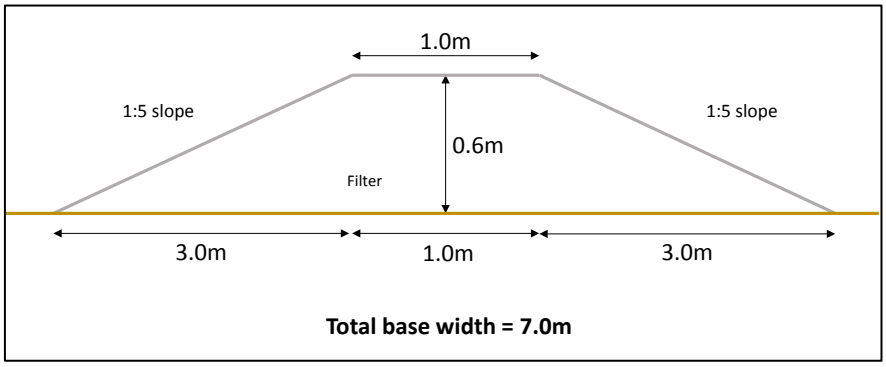
In order to reach sufficient cover of the cable in all sections and to fulfil the hydraulic stability requirements, six different design types have been defined with respect to the rock placement.

- **Type A:** Trench fill, DOL >0.8m <1.0m;
- **Type B:** Trench fill, DOL >0.7m <0.8m;
- **Type C:** Trench fill, DOL >0.7m;
- **Type D:** Single layer above Mean Sea Bed Level (MSBL), DOL < 0.6 m or no trench;
- **Type E:** 2 layer berm above MSBL, DOL < 0.6 m or no trench; and
- **Type F:** 2 layer berm above MSBL, DOL < 0.6 m or no trench.

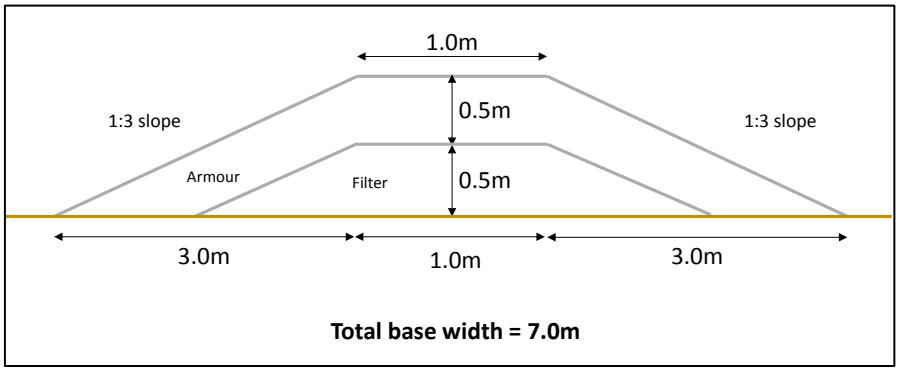
All rock placement via Type A to C above will be completely within the existing trench. For some limited areas of "Type C" design, and all "Type D, E and F" designs, rock will be placed above seabed level in the form of berms. The maximum height above seabed level of any berm will be 1.0m.

Figure 2.1: Proposed rock berm types

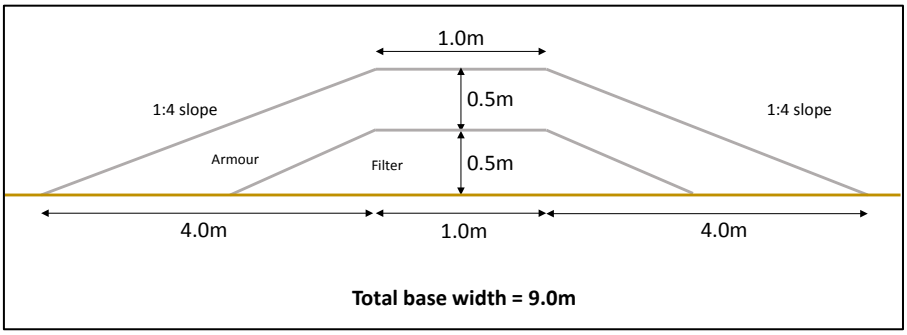
Type D:



Type E:



Type F:



2.3. Method of placement

A separate Method Statement has been prepared as part of the package of documentation issued to Marine Scotland in support of these marine licence applications which provides details of the methods of rock placement. However, a brief summary is presented here to enable later impact assessment sections to be placed into context.

The rock placement activities will be executed with Dynamic Positioned Fall Pipe Vessels (DPFPV's) such as the *Flintstone, Tideway Rollingstone* or *Seahorse*. This type of DPFPV are purpose built vessels for the accurate placement of rock/gravel material in a controlled manner by using a fall pipe. The fall pipe is deployed through a "Moonpool" in the centre of the vessel. A remotely operated vehicle (ROV) operates at the bottom end of the fall pipe. Additionally, some DPFPV's (such as *Tideway Rollingstone* and *Seahorse* are also equipped with an inclined fall pipe system (IFPS) or Rock Side Dumping Unit (RSDU). The inclined systems are used for hard to reach location in shallow waters or close to structures.

The sequence of works are as per 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 Remote Operated Vehicle (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 Multi-Beam Echo-sounder (MBE) 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).

2.4. Summary of impact assessment parameters

Table 2.1 provides a summary of the volumes of rock placement proposed within the three sections of the CMS route, along with the volumes that have been applied for in the two new marine licence applications for the Portgordon to 12 nm section and the 12 nm to Noss Head section.

However, in terms of the impact assessment process presented in the following sections of this report, the key parameters that need to be clearly defined are not volume of rock per se, but rather the **footprint of this rock on the seabed** (expressed as m^2 or km^2) and also **the height of any rock above seabed level**. The footprint of rock enables the loss/change in type of seabed habitat to be quantified whilst the height of any rock above seabed level enables impacts on receptors such as navigation and fishing activity to be assessed.

Footprint of impact

For the purposes of a worst-case scenario of impact assessment, the following assumptions have been used:

- For rock placement design types A to C (see Section 2.2), all rock will be placed in the existing trench, with none being above seabed level. The rock in the trench will then be subject to natural sediment deposition processes and it is assumed that at least a veneer of sediment will accumulate in these areas. Therefore, areas where rock designs A to C are proposed have not been considered in any calculation of habitat loss/change due to rock placement;
- For rock placement design types C (above sea level), D and E the footprint of this impact will be **7 m**. Therefore, the total footprint of impact in areas of the cable where these design types will be used will be 7 m x the total length of cable = a value expressed as m^2/km^2;
- For rock placement design type F, the footprint of this impact will be **9 m**. Therefore, the total footprint of impact in areas of the cable where these design types will be used will be 9 m x the total length of cable = a value expressed as m^2/km^2;
- Based on data provided by Tideway, the total length and footprint of rock placement of type C (above sea level), D, E and F are shown below.

Table 2-2: Summary of impact assessment parameters for additional rock placement amounts in the Portgordon to 12nm and 12nm to Noss head sections of the CMS cable

Cable Area	Length of exposed rock placement (km) – Types C (above MSBL), D & E	Footprint of rock placement (km^2) – Types C (above MSBL), D & E	Length of exposed rock placement (km) – Type F	Footprint of rock placement (km^2) – Type F
Portgordon to12nm	5.84	0.040	0.23	0.002
12nm to 12nm (offshore) *	NA	NA	NA	NA
12nm to Noss Head	9.50	0.066	0	0.000

* Although rock placement will occur in the 12nm to 12nm zone, as the amount needed in this section is already permitted via existing marine licence 06043/16/0, **these amounts are not considered in this assessment.**

Therefore, the overall footprint of rock that will exist above seabed level will be 0.043 km^2 between Portgordon and the 12 nm limit and 0.066 km^2 between Noss Head and the 12 nm limit (**total of 0.109 km^2**).

Height of rock

Based on information provided by the specialist rock placement contractor (Tideway), the maximum height of any rock berm will be 1.0m above seabed level. This value has been used later in the assessment to identify areas along the cable route where existing water depths will be reduced by >5% due to rock placement, which is a key issue raised by stakeholders.

Figure 2.2: Location of proposed cable protection along the Caithness-Moray HVDC (Portgordon to 12nm limit)

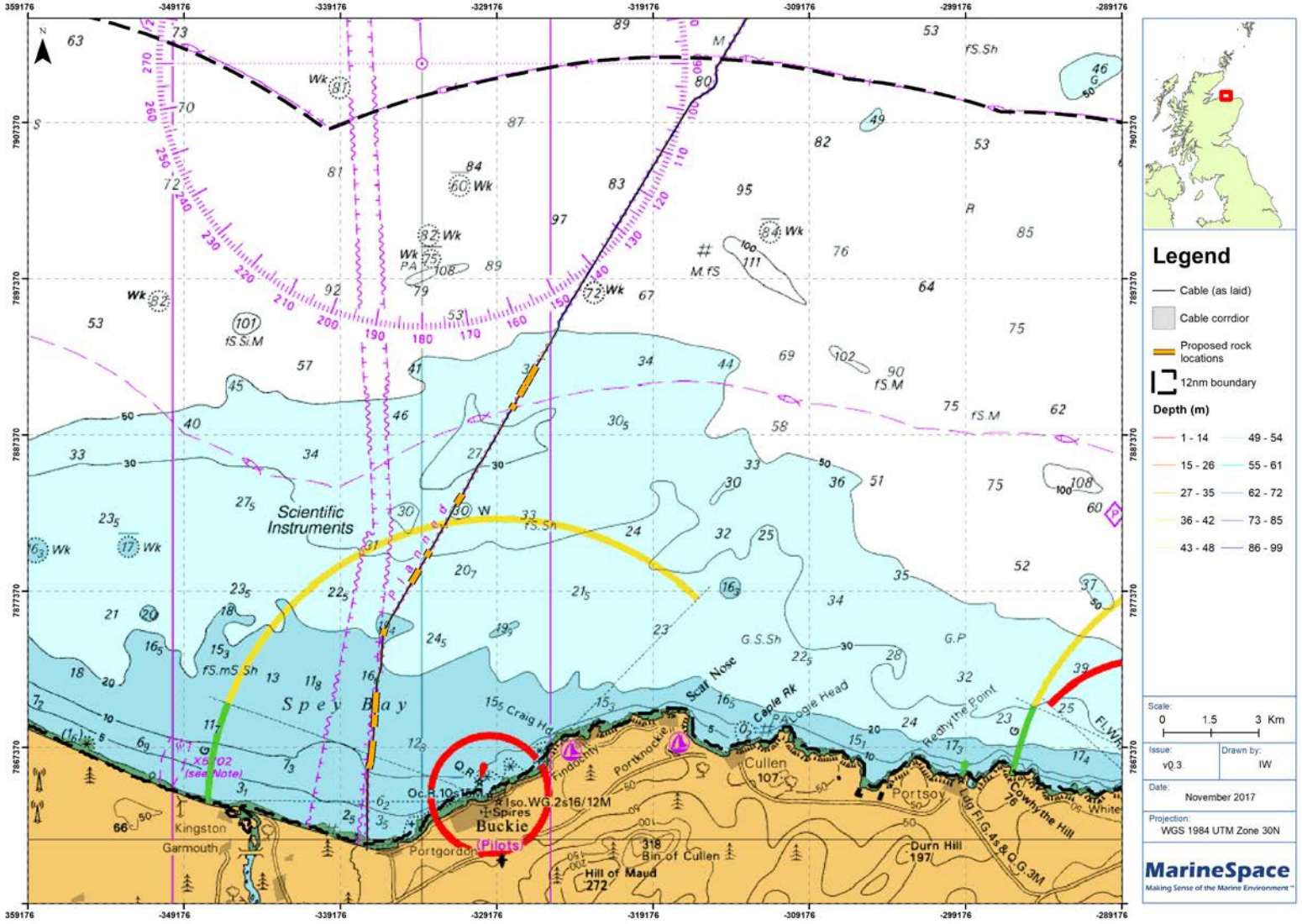
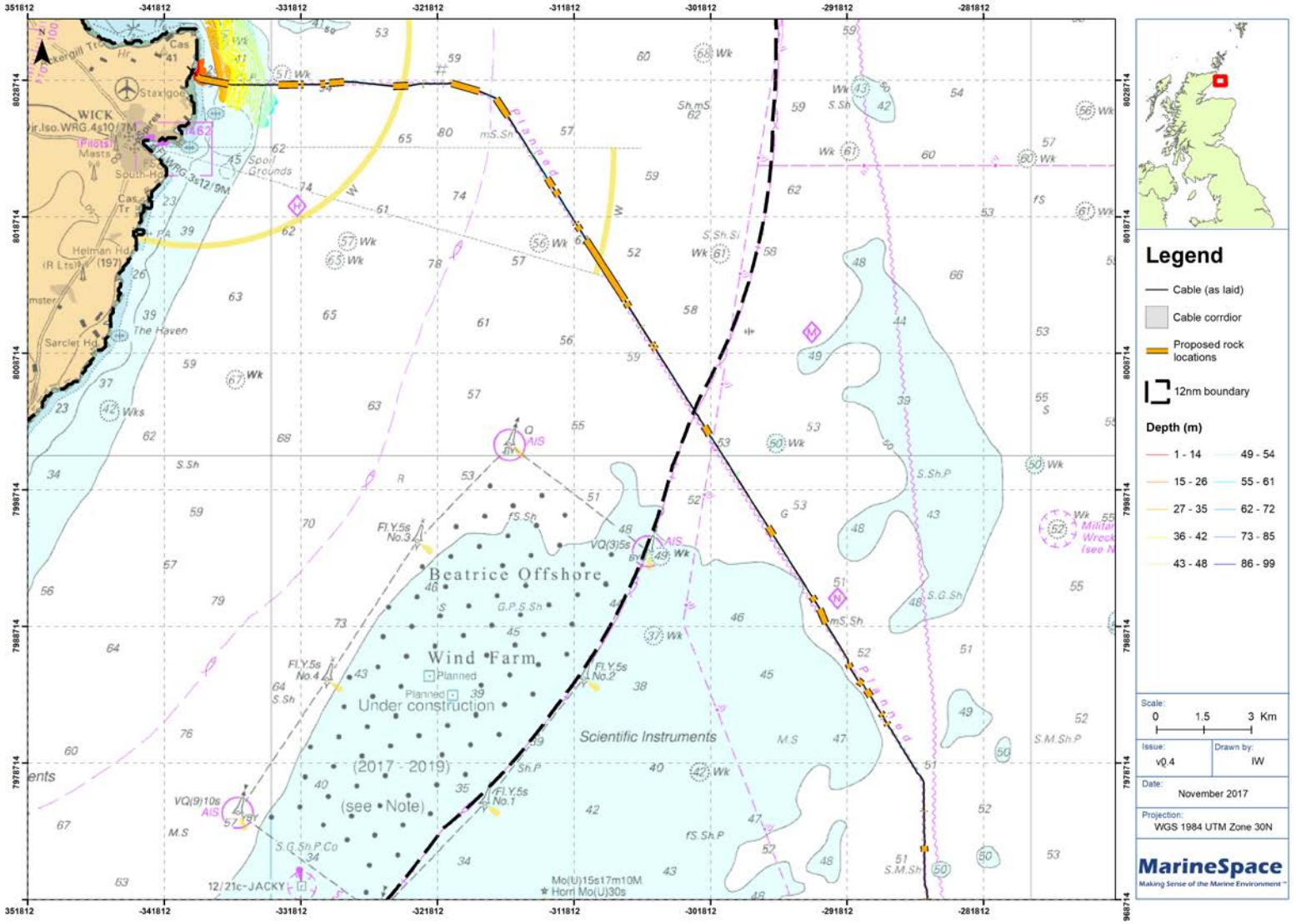


Figure 2.3: Location of proposed cable protection along the Caithness-Moray HVDC (Noss Head to 12nm limit)



2.5. Impact assessment methodology

Based on correspondence to date between SHE Transmission and Marine Scotland, the proposed rock placement activities covered in the two marine licence applications 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), which assessed the impact of the original amounts of rock placement proposed, the same impact assessment methodology and criteria have been used in this environmental appraisal.

Potential impacts of the rock placement have been categorised as shown in Table 2.3. As per the original EIA, the assessment of potential effects via the rock placement 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 2-3: 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 environmental appraisal provides a brief overview of key planning and policy issues related to the proposed rock placement works. 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 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 require 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 SHE Transmission 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 the proposals for increased rock placement were presented and discussed in detail. SHE Transmission 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 has been included as part of the documentation submitted to Marine Scotland a part of these marine licence applications.
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.	SHE Transmission have developed a project-specific Fisheries Liaison and Mitigation Action Plan. An updated version of this Plan has been included as part of the documentation submitted to Marine Scotland a part of these marine licence applications. A wide range of measures have been adopted to date by SHE Transmission and their installation contractor (NKT) to minimise the amount of rock placement needed including additional jet trenching activities.

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 SHE Transmission and has been considered at all stages of the project. Consultation and liaison with SFF continues, including recent meetings where these 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. The additional rock placement works being applied for via these marine licence applications (and assessed via this appraisal document) are primarily aimed at ensuing compliance with both existing marine licence requirements and commitments in the original ES, but also these higher-level Marine Plan policies, such as "*where burial is demonstrated not to be feasible, cables may be suitable 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).* ***Interactions with Other Users*** 14.9 – All attempts to bury the CMS cable are being made and these proposals to increase the amount of rock placement are being driven by a desire by SHE Transmission to minimise any risk to both the cable and other marine users.

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 - SHE Transmission have developed a project-specific Fisheries Liaison and Mitigation Action Plan. An updated version of this Plan has been included as part of the documentation submitted to Marine Scotland a part of these marine licence applications. Meetings have been held with SFF as recently as 08/11/17 to outline these proposals for increased rock placement and the locations of planned works. 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 these rock placement activities to conflict with the WFD is provided in later sections of this report.

4. Environmental appraisal

4.1. Overview

The potential impact of rock placement on marine receptors was fully assessed within both the marine ES produced for the project (SSE, 2011) and the Shetland HVDC Connection Marine Environmental Appraisal (SHE Transmission, 2009). Rock placement (based on the amounts assessed previously) was judged to result in no significant impacts on the marine environment, resulting in the existing marine licences being issued. The impact assessments presented below focus on the potential for these current, planned recent rock placement operations to affect certain key receptors identified via consultation with Marine Scotland (and their consultees).

For each individual impact assessed within this section, the findings of the same impact from the original EIA process are also presented for context and to place any "new" impacts from the increased rock placement in the context of previous impacts. The "new" impacts presented here have been re-assessed (using the assessment criteria defined in Section 2.5 and below) using the increased amounts of rock placement now proposed – see Table 2.1 and Section 2.4

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
Water Quality (Pollution Prevention)	Accidental discharge from vessels during rock placement operations
Biological Environment	
Benthic Ecology	Temporary, localised increase in suspended sediment levels Increased loss of/change to benthic habitats via increased rock placement
Marine Non Native Species (MNNS)	Introduction of MNNS on imported rock and/or via ballast water of rock placement vessels
Fish and Shellfish Ecology	Temporary, localised disturbance via suspended sediment levels and vessel noise
Marine mammals	Temporary, localised disturbance via suspended sediment levels Noise impacts from rock placement activities/vessels
Ornithology	Disturbance/displacement of bird populations during rock placement activities
Nature Conservation	Temporary and localised disturbance via suspended sediment levels to benthic invertebrates, fish and shellfish Displacement of seabirds during repair/remediation 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/restrictions around rock placement activities Increased loss of potential fishing grounds due to presence of rock on seabed

Receptor	Scope for Potential Impact
Shipping and Navigation	Temporary restrictions around rock placement vessels Compass Deviation Reduced water depths leading to increased navigational risk
Marine Archaeology	Damage to seabed archaeological resources via increased rock placement activities
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 increased rock placement on CMS cable 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 areas where additional rock placement is proposed, i.e. from 'Portgordon to 12 nm' and from '12 nm to Noss Head'. 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 (SHE Transmission, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Bathymetry

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

Tidal/Wave Regime

Tidal current speeds of 0.25m/s to 0.5m/s during neaps, and 1m/s to 1.25m/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 2.5-3m.

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. There are only very small sections (<1km) where sand waves are evident. Sediments are generally more than 5m in depth. A ~1km wide horse mussel bed is found in the inshore region of the Noss Head end of the route.

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. The cable route avoids areas of larger sand waves with the exception of two short sections where sandwaves are crossed.

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 5km^2 of the seabed; • a change returning to baseline/undetectable levels within 10km of works.
Medium	A moderate shift from the baseline conditions, e.g. • a change that affects 0.5km^2 to 5km^2 of seabed • a change returning to baseline/undetectable levels within 10km of works.
Low	A minor shift from baseline conditions over a local area, e.g. • a change that affects 0.05km^2 to 0.5km2 of seabed • a change returning to baseline/undetectable levels within 1km 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 0.05km^2 of seabed • a change returning to baseline/undetectable levels within 100m 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. Impact of Rock Placement on Seabed Character (Seabed Sediments)

Table 4-5: Summary of impact assessment on seabed character from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Low (Moderate in area of horse mussel bed at off Noss Head)
Magnitude of effect	Low (footprint of rock placement judged to be less than 0.5 km^2
Significance of impact	**Minor ***

* although the original EIA concluded a moderate impact for the horse mussel bed area off Noss Head due to higher sensitivity of this area of seabed, this was in relation to cable burial works, not protection via rock placement. Rock placement was not considered (and is still not being considered) in the area of the horse mussel bed within the Noss Head MPA.

Updated Impact Assessment

The amount of rock placement now proposed is greater than that originally assessed (see Table 2.1). However, the mechanism or pathway for this activity to create adverse effects on seabed character are the same as those presented in the original ES (SSE, 2011). Where rock is placed as part of cable protection works, the seabed character will change from predominantly sandy gravel with areas of harder substrate and sandwaves to one dominated by the rock, i.e. there will be a change in seabed character in these areas.

An important aspect of the total rock amounts being proposed via these marine licence applications is that some of the rock will be placed in the existing cable trench beneath/at existing seabed level, i.e. not proud of the seabed, and it is expected that, over time, natural sediment processes will result in a veneer of sediment accumulating over the placed rock in these areas. Therefore, these areas have not been considered in the following calculations of "change to seabed character" as although rock will be placed within the cable trench, the fundamental character of the existing seabed will remain unchanged. Therefore, only areas where rock placement will be above seabed level have been considered in these calculations of "change to seabed character".

With respect to the sensitivity of the seabed, this has not changed since the original EIA and is therefore defined as having a low sensitivity, As per the previous assessment, the only exception to this is the horse mussel bed off Noss Head. This area of seabed now falls within the boundary of the Noss Head MPA which was designated in 2014 and remains defined as moderate sensitivity.

In terms of magnitude of impact, the overall footprint of impact for the two areas being assessed within this appraisal are as per below (also see Table 2.2).

- Portgordon to 12nm: 0.043 km^2;
- 12nm to Noss Head: 0.066 km^2;
- **TOTAL: 0.109 km^2.**

Using the criteria set out in Table 4.3, this still results in an impact of low magnitude as the footprint of rock that will be placed above seabed level falls within the range of 0.05 to 0.5 km^2. Therefore, the combination of low sensitivity of receptor and low magnitude of effect results in a **minor** impact for all parts of the seabed defined other than the moderate sensitivity habitat within the Noss Head MPA.

A more detailed assessment of the potential impact of this increased rock placement on the Noss Head MPA is provided in Section 4.3.6.

Table 4-6: Revised impact assessment on seabed character

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Low (Moderate in area of horse mussel bed at off Noss Head)
Magnitude of effect	Low (footprint of rock placement judged to be less than 0.5 km^2
Significance of impact	**Minor**

4.2.2.2. Impact of Rock Placement on Water Quality

Table 4-7: Summary of impact assessment on water quality from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Medium
Magnitude of effect	Very Low
Significance of impact	**Minor**

The assessment of the potential impacts upon water quality due to accidental contamination within the ES stated the following:

"*Water quality may be impacted…by chemical contamination during construction activities... Chemical contamination of water during construction activities is expected to result in residual effects that are minor and not significant*.

The residual effects of an accidental fuel spill could be significant should a spill occur. However, implementation of the mitigation plan will ensure that the probability of an accidental spill occurring is very low." (SSE, 2011).

Mitigation measures proposed within the original ES relevant to water quality included the preparation of an emergency plan to ensure a rapid response to any accidental spillages, along with a safety plan, to reduce the risk of such events.

Updated Impact Assessment

As stated above, the amount of rock placement now proposed is greater than that originally assessed (see Table 2.1). However, the mechanism or pathway for this activity to create adverse effects on water quality via accidental spillage remains the same as assessed within the original EIA (SSE,2011), i.e. spills from vessels involved in the rock placement activities.

Within this appraisal the sensitivity of the receptor (water quality) remains the same as that assessed within the original ES. Referring to the criteria summaries in Table 4.3, the increased volume of rock dumping will result in the footprint falling in the range of 0.05 to 0.5 km^2, meaning that the magnitude of effect would change from very low to low.

However, the combination of a medium sensitivity of receptor and low magnitude of effect still results in a **minor** impact for all water quality.

Table 4-8: Revised impact assessment on water quality

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Medium
Magnitude of effect	Low
Significance of impact	**Minor**

Even though only a minor adverse impact is predicted on water quality due to the relatively limited scale and nature of proposed works, in reality, significant impacts on water quality could arise if a major spill event occurred during these works. Key to managing any impact on water quality during the proposed rock placement works will be adherence to the existing project-level Environmental Management Plan (EMP), produced in 2015 (ABB, 2015). This plan details specific measures and processes designed to reduce the risk of any impacts on the environment during the construction phase.

With specific reference to water quality, the project-level EMP sets out a requirement for all vessels working on the project to provide a Safety and Water Protection Plan. The commitments relating to Safety and Water Protection stipulate that the following must be provided, or adhered to, by contractors:

- Method statements and best practice procedures for vessel safety and prevention of pollution in order to control the risk of pollution from fuelling / fuel handling operations, storage and from accidental spillage of oils, fuels and chemicals;
- Evidence to demonstrate that materials are secured on deck to prevent loss overboard;
- Evidence to demonstrate that wastes will be contained on board vessels for appropriate disposal on return to port; and
- Evidence to demonstrate that all chemicals used offshore will be compatible with the principles of the offshore chemical notification scheme (OCNS) used in the oil and gas industry under the Offshore Chemicals (Amendment) Regulations 2010.

Pollution prevention measures utilised by each vessel are also required to be provided by contracted vessels and all vessel involved in the works will have Ship Oil Pollution Emergency Plans (SOPEP), which is a MARPOL 73/78 requirement under Annex I.

The Master of the ship has overall charge of the SOPEP of the ship, along with the chief officer as subordinate in charge for implementation of SOPEP on board. SOPEP's also describes the plan for the master, officer and the crew of the ship to tackle various oil spill scenario that can occur on a ship.

The SOPEP's already in place for the CM project contain the following:

- Duty and role of each crew member at the time of any spill, including emergency muster and actions;
- General information about the ship and the owner of the ship etc.;
- Steps and procedure to contain the discharge of oil into the sea using SOPEP equipment;
- On board Reporting procedure and requirement in case of oil spill is described;
- Authorities to contact and reporting requirements in case of oil spill are listed in SOPEP. Authorities like port state control, oil clean up team etc. are to be notified;
- Drawings of various fuel lines, along with other oil lines on board vessel with positioning of vents, save all trays etc.;
- General arrangement of ship including location of all the oil tanks with capacity, content etc.; and
- The location of the SOPEP locker and contents of the locker with a list inventory.

As the CMS project is already underway, these processes and measures are well-established and the proposed additional rock placement works will also be undertaken within the framework of these processes.

4.3. Biological Environment

4.3.1. Existing environment

This section of the report provides details of the existing biological environment in the areas where additional rock placement is proposed, i.e. from Portgordon to 12nm and from 12nm to Noss Head. 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 (SHE Transmission, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Subtidal and Intertidal 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.

There is less known about near-shore seabed communities and habitats but the marine inlets of the Moray Firth often hold characteristic soft-sand substrate fauna dominated by oligochaete and polychaete (worms), amphipods and bivalves. Where hard substrate is present (such as in Dornoch Firth) extensive mussel beds are present.

In deeper lying areas, where mixed sandy sediments dominated, the epifauna present were sparser with only occasional crabs, scallops and starfish observed.

A horse mussel bed is located in the 20-55m depth band and measures approximately 1km wide and runs for 10km north/south parallel with the Staxigoe to Noss Head coastline. They are sensitive to smothering and physical disturbance.

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 70km 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: Sand eel, Nephrops, Cod, Whiting, Sprat, Herring, Lemon sole and Plaice. Five of these also use the inshore waters as nursery grounds (sand eel, sprat, herring, whiting and lemon sole). Other species of commercial interest in this region include brown crab, lobster, mussels and squid.

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, whitebeaked 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 operations.

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 common seal and bottlenose dolphin. 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 4-9: 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 an 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, 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 4-10: 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 discernable 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 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 4-11: 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. Impact of Rock Placement on Benthic Ecology

Table 4-12: Summary of impact assessment on benthic ecology from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Very low
Magnitude of effect	Low
Significance of impact	**Minor**

The assessment of the impacts upon benthic communities from the deployment of rock protection within the ES states the following:

"*where the cables emerge on the seabed to the point where cable burial can be achieved, the exposed cables will be protected through rock placement, perhaps affecting some 300m^2 to 500m^2 of seabed. Although there will be a loss of the existing seabed habitats and species from this area, the deposited rock will act as a new substratum for colonisation by seabed animals and some algae. At the depths involved and given the types of material involved, a covering of red algae and encrusting animals can be expected on the rock. There should be no environmental impacts beyond the immediate vicinity of the deposited rock fragments.*

The contractor will ensure the volume of rock used in rock placement is kept to the minimum required for the works."

Within the ES the sensitivity of the benthic communities has been assessed as Very low. The magnitude of the impact has been assessed as Low. The criteria for this assessment is detailed above in Table 4.9 and Table 4.10.

Updated Impact Assessment

The additional rock placement proposed via these two new marine licence applications will result in an increased footprint of seabed loss compared to that previously assessed. The overall footprint of seabed loss will now be 0.109 km^2.

The increased footprint of rock placement will result in the magnitude of effect increasing to medium as the loss of seabed now exceeds 0.1% of the surrounding sea area (defined as the Moray Firth region which is estimated to be 1,000 km^2). The sensitivity of the benthic communities remains as very low as the communities in this area remain the same as those assessed in the original assessment. As a result, and using Table 4.11, even though effect magnitude has changed, the impact significance on benthic communities due to the increased quantity of rock protection remains as **minor**.

Table 4-13: Revised impact assessment on benthic ecology

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Very Low
Magnitude of effect	Medium
Significance of impact	**Minor**

4.3.2.2. Impact of Rock Placement on Marine Non Native Species (MNNS)

The specific impact of rock placement on MNNS was note assessed within the original EIA.

Updated Impact Assessment

The risk of the introduction of marine invasive non-native species is determined to be **low**. The source of the rock for emplacement on the seabed is terrestrial in origin. All vessels and plant to be used in the installation of additional rock will follow standard biosecurity requirements such as not unloading ballast water tanks or flushing hoppers whilst at the location of the rock emplacement activity. 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 4-14: Revised impact assessment on MNNS

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Low
Magnitude of effect	Low
Significance of impact	**Minor**

4.3.2.3. Impact of Rock Placement on Fish and Shellfish Ecology

Table 4-15: Summary of impact assessment on fish and shellfish ecology from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Localised seabed disturbance via suspended sediments: Medium to Very High Underwater noise via increased vessel activity: High to Very High
Magnitude of effect	Localised seabed disturbance via suspended sediments: Very Low Underwater noise via increased vessel activity: Low
Significance of impact	Localised seabed disturbance via suspended sediments: **Minor** Underwater noise via increased vessel activity: Moderate **(Residual impact = minor)**

The assessment of the impacts upon fish due to disturbance and underwater noise within the ES states the following:

"*The area of the cable corridor and the hub is considered to be of medium sensitivity because it holds regionally important sea fish resources. Migrating species such as salmon and sea lamprey may also pass through the area and are considered to be of very high sensitivity. Basking sharks are classed as a high sensitivity species. Overall residual effects on all fish are considered to be minor at worst. The subsea cable route has avoided important habitats for fish, including most areas of sand waves (except for 500m), reefs and wrecks, and is located far from river systems with migrating fish populations. Construction activities will also be of short duration. Fish are either not sensitive to or will be able to avoid direct and indirect disturbance caused by construction activities, such as noise, and presence of the hub and subsea cables are expected to have only minor effects on fish.*" (SSE, 2011).

Updated Impact Assessment

Within this appraisal, the existing environment in terms of fish species has not changed and so the sensitivity of this receptor will remain the same; medium to very high for disturbance due to increased suspended sediment and high to very high for disturbance due to underwater noise.

Within the original EIA the cable installation works were assessed to be of short duration and therefore low to very low magnitude for disturbance and vessel noise, respectively. Referring to the criteria outlined in Table 4.10, 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 has increased to moderate for seabed disturbance. However, as receptor sensitivity is defined as low, a **minor** impact is predicted on fish via seabed disturbance.

The proposed rock placement works are still assessed as being of short-term, despite them being of a longer duration that assessed within the original ES. 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.

Using Table 4.11, the impact significance on fish communities due to disturbance from suspended sediments is now assessed to be minor and the significance of the impact due to underwater noise (without mitigation) remains the same with a moderate impact expected. With implementation of mitigation measures this impact is reduced to **minor**. Specific impacts on fish in the context of MPA's are detailed in **Appendix A.**

Table 4-16: Revised impact assessment on fish and shellfish ecology

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Localised seabed disturbance: Low Underwater noise via increased vessel activity High
Magnitude of effect	Localised seabed disturbance: Medium 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 of Rock Placement on Marine Mammals

Table 4-17: Summary of impact assessment on marine mammals from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
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)**

Within the original EIA the specific pathway for disturbance of marine mammals via rock placement is not assessed. However, the following is stated with regards to the impact of underwater noise during cable installation:

"*The sensitivity of marine mammals in the Moray Firth is considered to be very high. As outlined above the potential impacts on marine mammals from cable installation activities are expected to be short-term and result in a minor shift from baseline conditions in an area which has seen a high level of offshore activity over recent years. With agreed mitigation in place, the residual effect of noise from cable installation activities is expected to be minor and not significant*." (SSE, 2011).

Updated Impact Assessment

With respect to this appraisal of the proposed rock placement works, the sensitivity of marine mammals as a receptor to disturbance via increased underwater noise is considered to remain very high, the same as originally assessed in the EIA. As stated previously, whilst the works proposed here are expected to be of a longer duration than previous rock placement activities, the assessment above from the EIA relates to the entire cable installation activities which was anticipated to last three to four months. Therefore, it is considered that the proposed works can be assessed as short-term and expected to result in only a minor shift from baseline conditions. Referring to Table 4.10, the magnitude here is considered to be low.

Using Table 4.11, the impact significance is assessed as **moderate** and remains the same as that originally assessed within the EIA (SSE,2011) for cable installation.

A detailed HRA of marine mammal qualifying features of MPAs is presented in **Appendix A**.

No adverse effects on the integrity of all sites assessed was determined.

Table 4-18: Revised impact assessment on marine mammals

Revised Impact Assessment (MarineSpace, 2017)	
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. Impact of Rock Placement on Ornithology

Table 4-19: Summary of impact assessment on ornithology from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Disturbance/displacement due to increased vessel presence: Very High
Magnitude of effect	Disturbance/displacement due to increased vessel presence: Very Low
Significance of impact	Disturbance/displacement due to increased vessel presence: **Minor**

The assessment of the impacts upon ornithology due to increased vessel presence and indirect changes to prey within the ES states the following:

"*Although seabird densities in the area are not particularly high, birds from nearby SPAs may be present in the area of the proposals. As such, seabirds are considered to be of very high sensitivity in the area. However, seabirds and their prey are unlikely to be significantly affected by construction activities, as the construction activities will be of short duration and birdlife present in the area will have already have habituated to shipping activity.*

There are not expected to be aggregations of birds in area of proposals; however, if support vessels enroute to the development area from port for any reason encounter any intense aggregations of seabirds, they will be required to avoid sailing through them where possible (E4). Any potential impacts on seabirds will remain minor and non-significant."

Updated Impact Assessment

The sensitivity of seabirds in the vicinity of the proposed rock placement works to disturbance/ displacement via vessel presence is considered to remain as very high with respect to this appraisal. As stated previously, whilst the works proposed here are expected to be of a longer duration than previous rock placement activities, the assessment above from the EIA relates to the entire cable installation activities and not specifically to previous rock placement activities, which was anticipated to last three to four months. It is considered that the proposed works can be assessed as short-term.

Whilst the footprint of works proposed here is now greater than 0.01% used within the original EIA, the resultant surface disturbance to seabirds via the presence of work vessels will not directly reflect this increase. Therefore, the rock placement is expected to result in only a minor shift from baseline conditions. Referring to Table 4.10, the magnitude here is considered to be low.

Using Table 4.11, the impact significance is assessed as **moderate** and remains the same as that originally assessed within the EIA (SSE,2011) for cable installation.

Table 4-20: Revised impact assessment on ornithology

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Disturbance/displacement due to increased vessel presence: Very high
Magnitude of effect	Disturbance/displacement due to increased vessel presence: Very low
Significance of impact	Disturbance/displacement due to increased vessel presence: **Minor**

A detailed HRA of qualifying ornithological features of MPAs is presented in Appendix A.

No adverse effects on the integrity of all sites assessed was determined.

4.3.2.6. Impact of Rock Placement on Nature Conservation

See Appendix A for detailed HRA and NCMPA Assessments.

No adverse effects on the integrity of all sites assessed was determined.

4.4. Human Environment

4.4.1. Existing Environment

This section of the report provides details of the existing human environment in the areas where additional rock placement is proposed, i.e. from Portgordon to 12nm and from 12nm to Noss Head. 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 (SHE Transmission, 2009) and the CMS HVDC Cable Plan (LR Senergy, 2015).

Commercial Fisheries

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 comparison of data records completed within the original ES (SSE, 2011) showed the majority of fishing vessels catching within the vicinity of the proposed marine facilities are small creel boats (<15m) 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 15m 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. Squid is another key target species for certain vessels, particularly in the Portgordon/Spey Bay region.

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 10nm of the cable route. This corresponds to an average of two to three vessels per day.

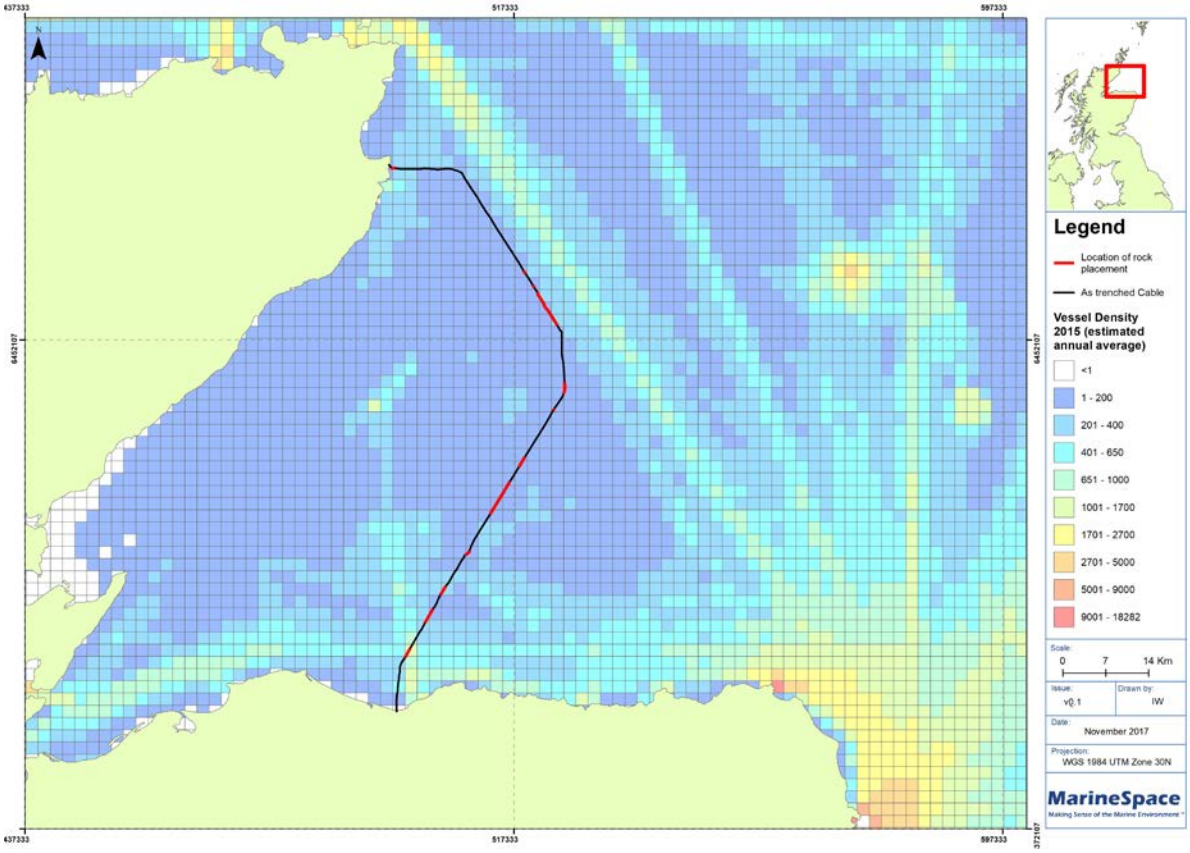
Typical commercial marine traffic in this region includes oil tankers transiting between the Gullfaks Oil Terminal and the Moray Firth and merchant vessels heading between the Pentland Firth and the northeast coast of Scotland (passing off Rattray Head). This includes regular offshore support vessel 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 2.5km north of Wick and about 1.4km from the cable emergence points.

The principal commercial and general ports in the region are Inverness and Cromarty Firth (Invergordon). As part of this updated environmental appraisal, recent (2015) commercial shipping data has been obtained and is shown below in Figure 4.1.

Figure 4.1: Estimated annual average vessel density (2015) in Moray Firth region



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 250m 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 proposed 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 3nm of the Portgordon to 12nm 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".

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 4-21: Definitions of receptor sensitivity for human receptors assessed in this appraisal

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 2km 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 2km of) the project footprint • No established recreation area for local activities lies adjacent to (within 2km of) the project footprint • Un-notified features present or area with potential for archaeology to be present

Table 4-22: 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 & 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 & 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 & 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 & 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 discernable or smaller than average vessels in the seascape over a period of days • Change to local setting for cultural heritage site

Table 4-23: 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. Impact of Rock Placement on Commercial Fisheries

Table 4-24: Summary of impact assessment on commercial fisheries from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Presence of cables creating a snagging risk: Medium Loss of access to fishing grounds: Low (Medium for inshore and creeling)
Magnitude of effect	Presence of cables creating a snagging risk: High Loss of access to fishing grounds: Low (Medium for inshore and creeling)
Significance of impact (pre-mitigation)	Presence of cables creating a snagging risk: Major * **(Residual impact = minor)** Loss of access to fishing grounds: Minor (Moderate * for inshore and creeling) **(Residual impact = Minor)**

*With mitigation measures such as cable protection, updated cable burial depth, cable awareness and safety monitoring the magnitude of effect of snagging risk and loss of access to fishing grounds were assessed in the original EIA to be reduced to low magnitude, resulting in minor residual effects.

Other key mitigation measures were also set out in the original ES, including the appointment of a Fisheries Liaison Officer (FLO) for the planning and duration of all cable/hub installation activities who would be responsible for making timely contact with all fishermen using the affected areas.

Updated Impact Assessment

The increased rock placement proposed within these two marine licence applications will result in more areas of seabed containing rock above seabed level than previously assessed. This has the potential to increase the significance of impacts on commercial fishing activity in this area.

More recent data on the spatial distribution of commercial fishing activity in the region of the CMS cable has been collated by SHE Transmission for the purposes of on-going planning on the project.

Relevant data are shown below (2016 datasets) to highlight the potential overlap of these new areas of rock placement with fishing activity.

Figure 4-2: Spatial distribution of otter trawl activity (Nephrops and shrimps), 2016

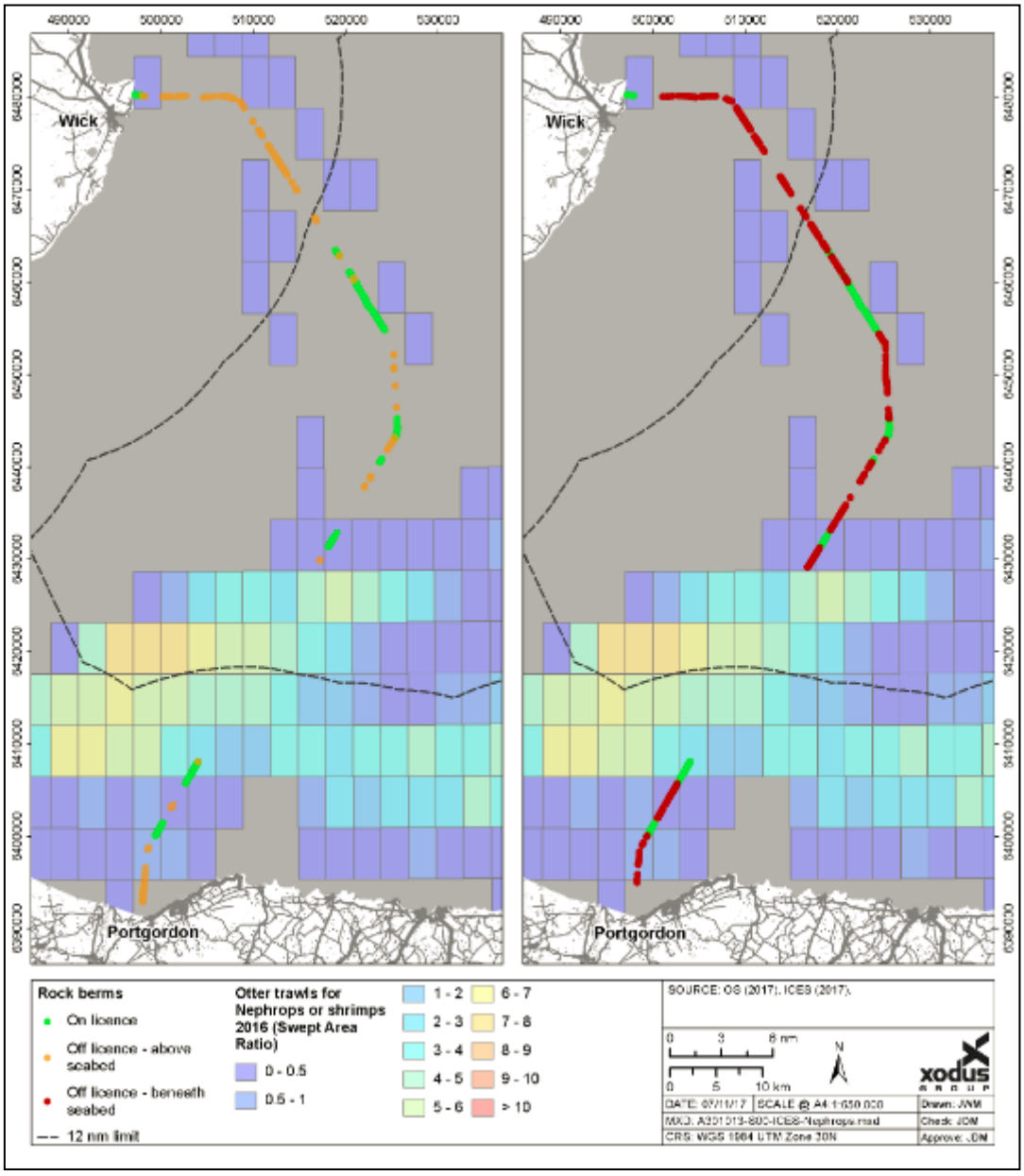


Figure 4-3: Spatial distribution of otter trawl activity (other species), 2016

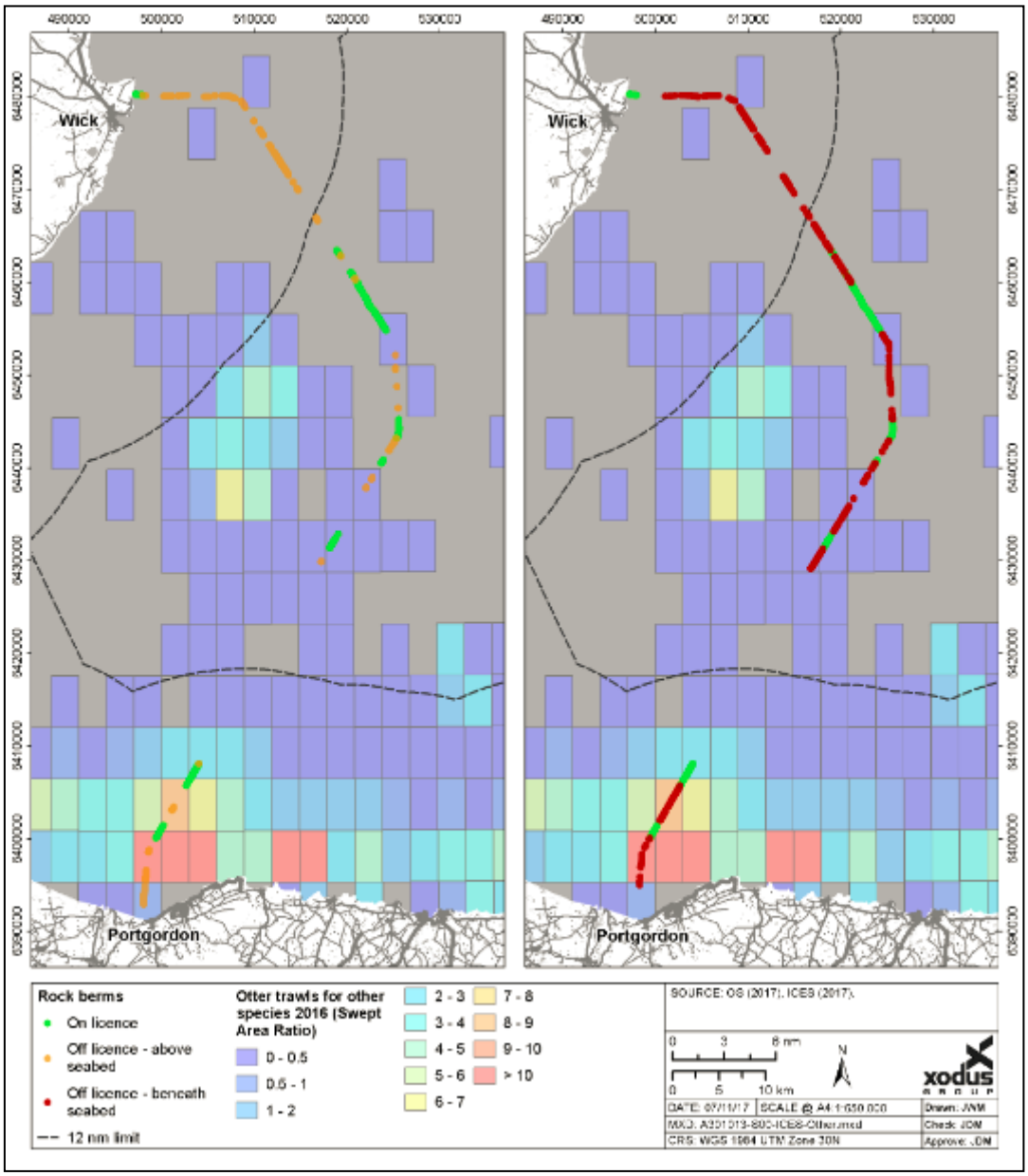


Figure 4-4: Spatial distribution of dredging (scallops and mussels), 2016

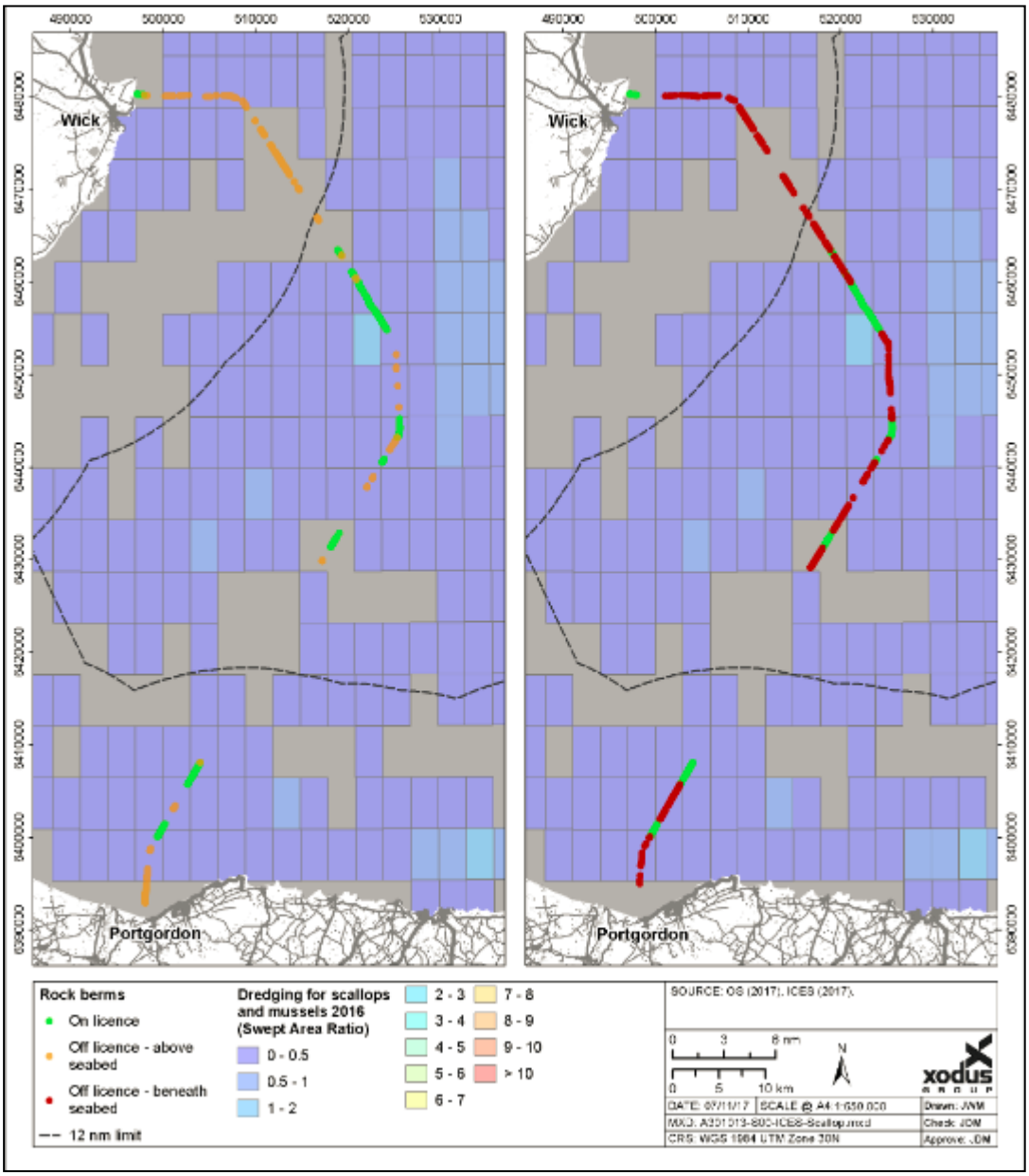
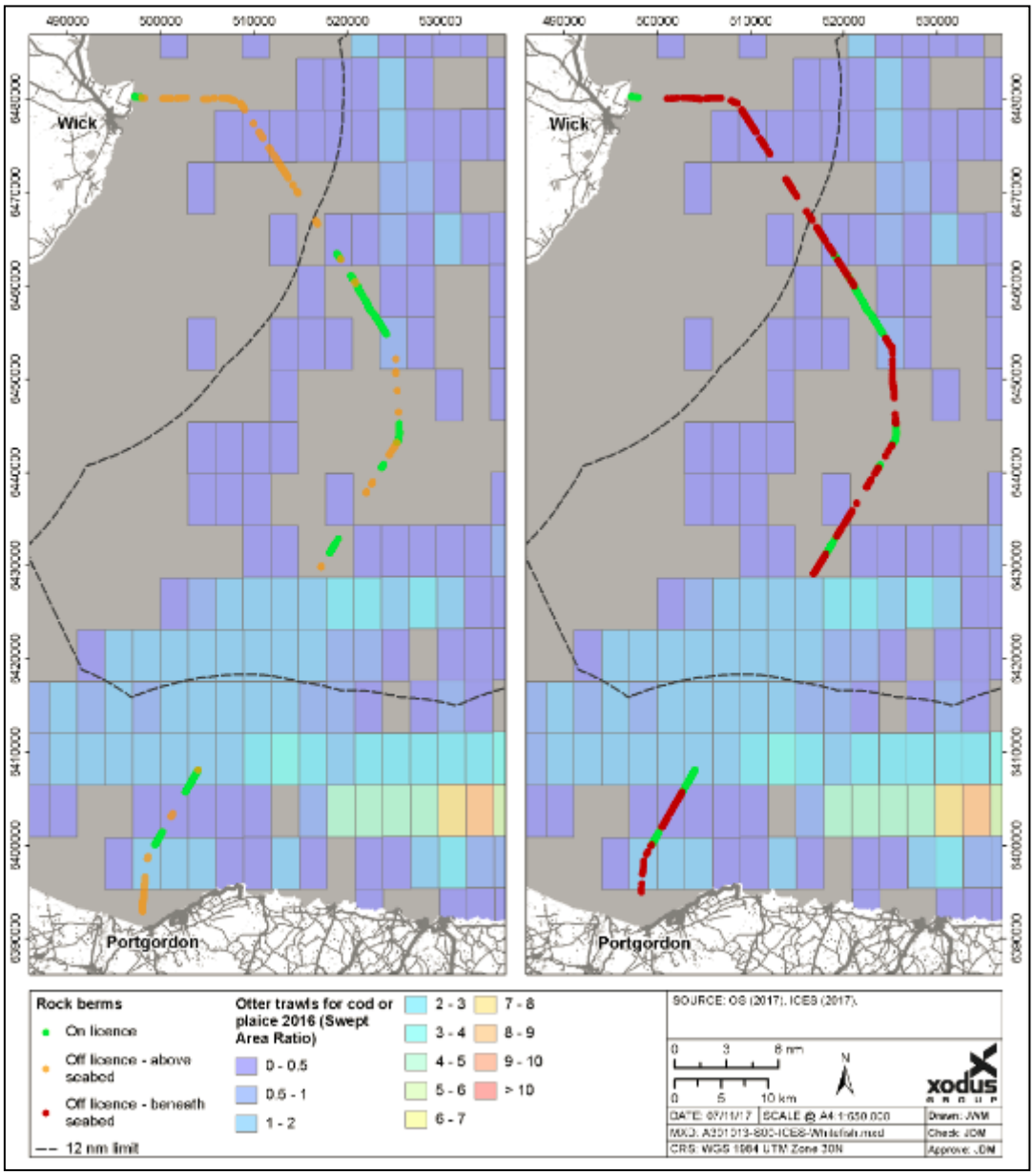


Figure 4-5: Spatial distribution of otter trawls (cod and plaice), 2016



From these figures it is apparent that certain types of commercial fishing activity take place in the area where above seabed level rock placement is planned. With respect to the revised impact assessment, the main effects being assessed are (a) increased disturbance/displacement of fishing activity during the installation phase due to a longer duration of rock placement works and (b) loss of fishing grounds in the operational phase. Impacts from cable damage/snagging are not re-assessed as the primary purpose of the additional rock placement works is to remove this possibility via cable protection.

The sensitivity of the receptors, namely inshore creeling vessels and larger trawling/dredging vessels remains as per the original assessment, namely medium and low respectively.

The magnitude of effect for displacement/disturbance (installation phase) 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 4.25. The increased duration of works as previously assessed also means that the magnitude of this effect is higher than previously assessed (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**.

The magnitude of effect for loss of access to fishing grounds due to presence of rock above seabed level (operational phase) is judged to be low based on the following definition – *"a change to fishing activity leading to a loss of income or opportunity within normal business variability/risk*". Therefore, without mitigation, the impact of loss of access to fishing grounds is assessed as **minor** (creeling vessels) and **moderate** (trawling/dredging vessels).

Table 4-25: Revised impact assessment on commercial fisheries

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Disturbance/restrictions around rock placement: Medium Loss of access to fishing grounds: Low (Medium for inshore and creeling)
Magnitude of effect	Disturbance/restrictions around rock placement: Medium Loss of access to fishing grounds: Low (Medium for inshore and creeling)
Significance of impact (pre-mitigation)	Disturbance/restrictions around rock placement: Major **(Residual impact = Minor** Loss of access to fishing grounds: Minor (Moderate for inshore and creeling) **(Residual impact = Minor)**

The significance of both these impacts 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:

- 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)** (SHE Transmission, 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. Impact of Rock Placement on Shipping and Navigation

Table 4-26: Summary of impact assessment on shipping and navigation from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Disturbance/restriction to shipping/navigation: Low Obstacles due to cables: Low
Magnitude of effect	Disturbance/restriction to shipping/navigation: Very Low Obstacles to anchoring due to cables: Medium
Significance of impact	Disturbance/restriction to shipping/navigation: **Negligible** Obstacles to anchoring due to cables: **Minor**

The assessment of the impacts upon navigation and shipping from nuisance to shipping navigation caused by vessels working in the area during construction within the ES states the following:

"*During the construction phase the main impacts will arise from the support vessels associated with installation operations. These will create a navigational obstacle to other shipping. The area of operations is however not constrained by other navigational hazards and charting a safe route around any working vessels will be very straight forward for passing shipping. Maritime works are also commonly undertaken in the area and so the presence of support vessels is a typical consideration for local shipping. The work vessels will be present for a short period of time (3-4 months), therefore will present only a temporary nuisance to other shipping. This is therefore considered to be a very low magnitude impact. This combined with the low sensitivity makes the residual impact negligible."* (SSE, 2011).

"*The selected cable route lies away from designated anchorages and there should be little or no reason for vessels to try and anchor near to the cables. There is a designated anchorage in the south of Sinclair's Bay some 3-5km away from the cable route. However, the unlikely event of a shipping vessel dropping anchor near the buried cables could present a risk to both the cables and the shipping vessel. Although the probability is low, the magnitude of impact is classed as medium as the cables present an obstacle to shipping activities beyond what is normally experienced.*

The presence of the installed cables will be notified to mariners and will be displayed on electronic and paper charts. This will be accompanied by a warning that mariners should avoid anchoring near to any cables. Provision of this information will reduce the risk of ships anchoring near the cables. The residual effect is considered to be minor and not significant." (SSE, 2011).

Updated Impact Assessment

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;
- Reduction in water depth resulting in increased navigation risk; 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, Figure 4.2, highlights the fact that the CMS cable is located to the west of a main shipping lane. However, based on the effect magnitude criteria in Table 4.25, as any disturbance to shipping will still only be a "A temporary consideration/nuisance to shipping….in the area", the magnitude of effect will remain as Very Low, and the overall impact will remain as **minor**.

On the water depth reduction issue, this has been assessed and all areas where the existing water depth will be reduced by >5% are shown below and in Figure 4-6 and Figure 4-7.

- **Portgordon to 12nm**: The proposed rock placement will lead to water depths being reduced by > 5% of existing depth over 2.8km of the cable route in this section. This will all be in the nearshore region of the cable within Spey Bay;
- **12nm to Noss Head**: The proposed rock placement will lead to water depths being reduced by > 5% of existing depth over 0.7km of the cable route in this section. As at Portgordon, the areas where water depth will be reduced are focussed on the nearshore part of the cable.

Reduction in Water Depths due to Rock Placement

The key receptors that may be affected by reduced water depths include commercial ships, fishing vessels and recreational vessels. Due to the fact that the areas in question are nearshore, the sensitivity of these receptors is judged to be low, based on the criteria in Table 4.24, i.e. local fishing area, no regionally important shipping routes, no established recreational area. The magnitude of effect is assessed as low (an obstacle to recreation typical to those normally experienced in the area). The combination of low sensitivity and low magnitude results in a **minor** impact. It should also be noted that the 0.7km of rock placement in the Noss Head area has already been approved by the Maritime and Coastguard Agency (MCA).

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.

Figure 4-6: Areas where existing water depth will be reduced by >5% due to rock placement (Portgordon to 12nm)

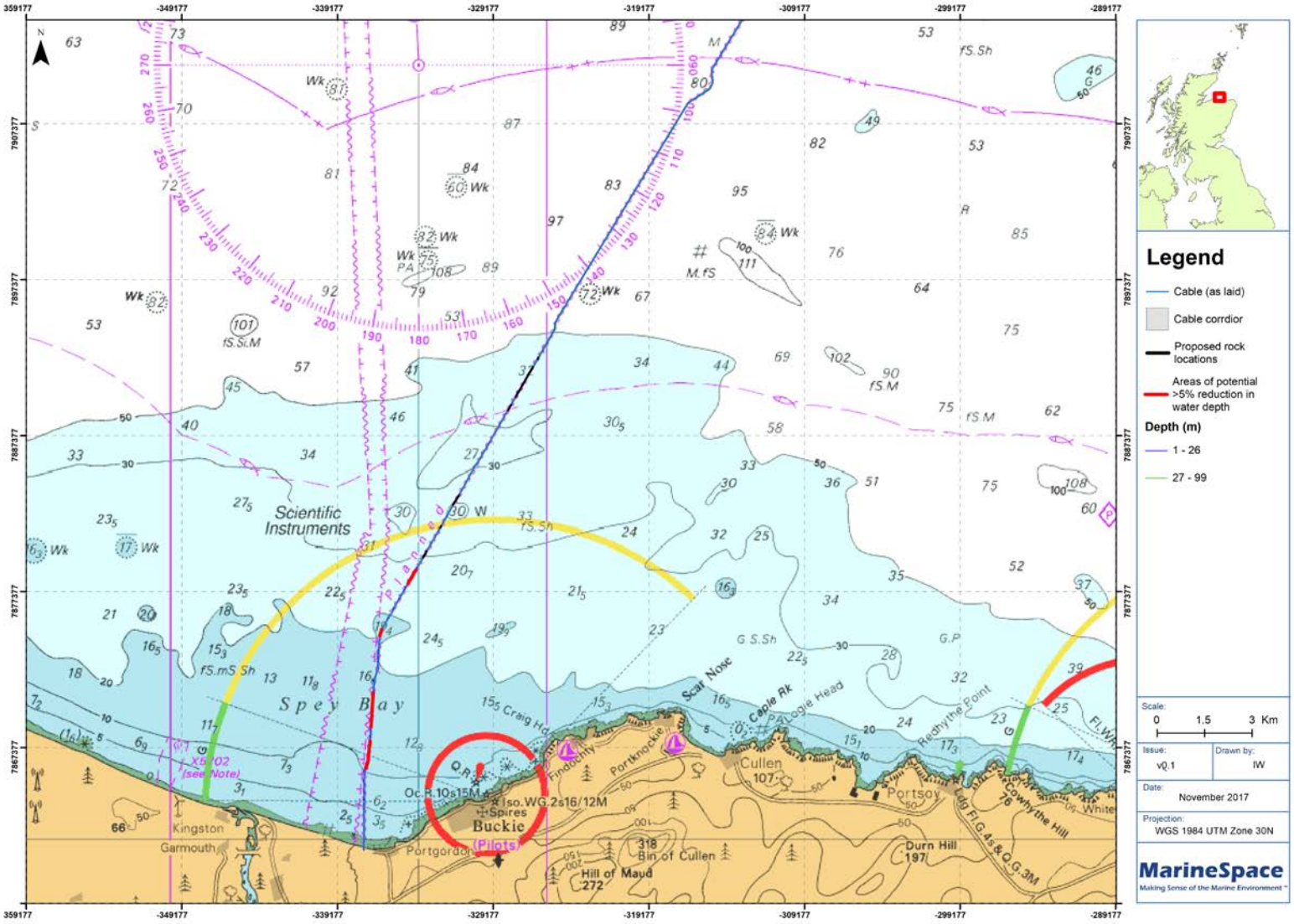


Figure 4-7: Areas where existing water depth will be reduced by >5% due to rock placement (12nm to Noss Head)

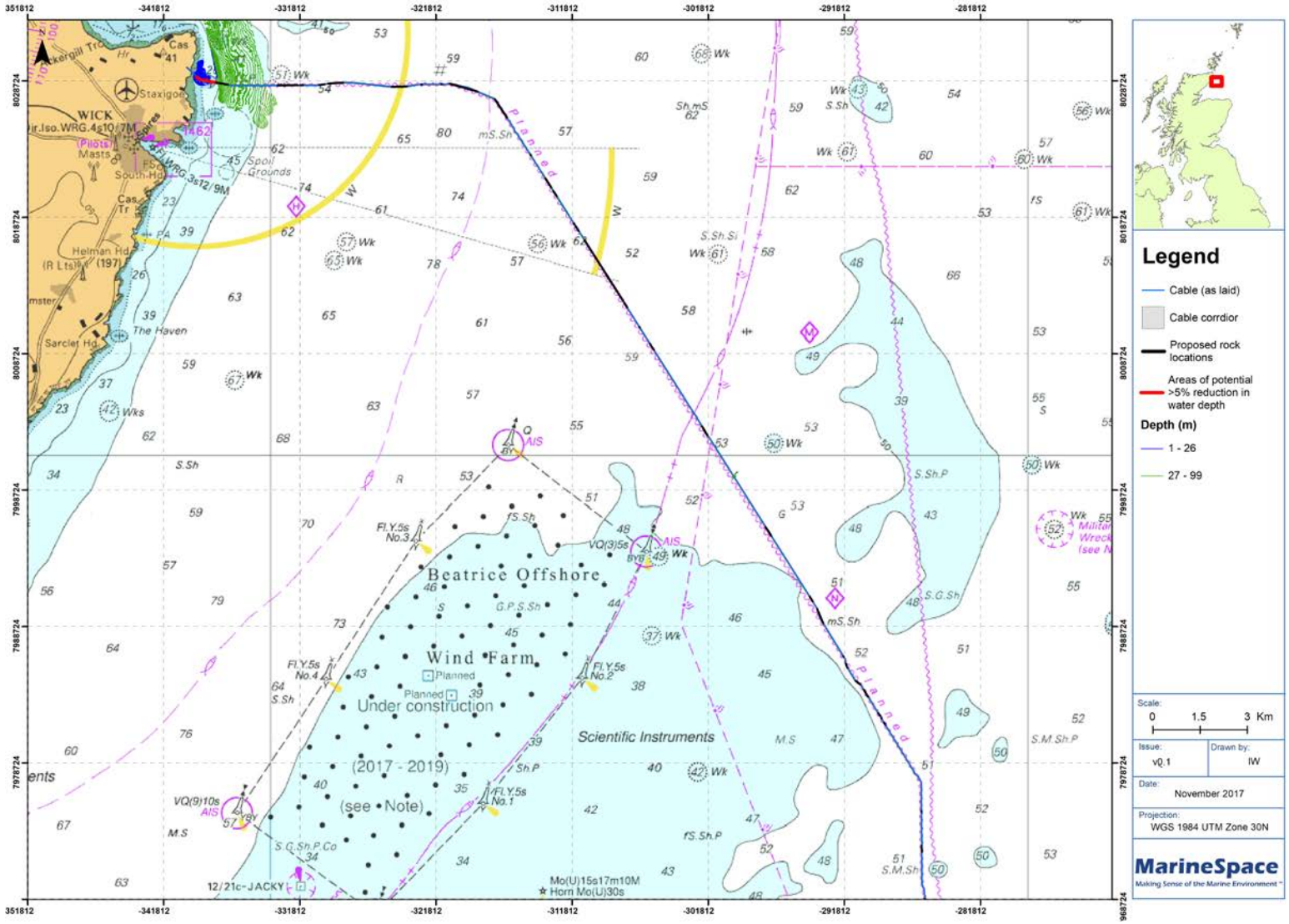


Table 4-27: Revised impact assessment on shipping and navigation

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Disturbance/restriction to shipping/navigation: Low Reduced water depth and resultant navigational risk: Low Impact on compass operation due to shallow buried cables: Medium
Magnitude of effect	Disturbance/restriction to shipping/navigation: Low Reduced water depth and resultant navigational risk: Low Impact on compass operation due to shallow buried cables: Very Low
Significance of impact	Disturbance/restriction to shipping/navigation: **Minor** Reduced water depth and resultant navigational risk: **Minor** Impact on compass operation due to shallow buried cables: **Minor**

4.4.2.3. Impact of Rock Placement on Marine Archaeology

Table 4-28: Summary of impact assessment on marine archaeology from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Low
Magnitude of effect	Low
Significance of impact	**Minor**

The assessment of the impacts upon archaeological features from disturbance to uncharted historical artefacts during operation within the ES states the following:

"*Along the cable route the burial operation could disturb unknown or uncharted sites or artefacts. There are known to be sunken military aircraft in the area that are uncharted. There may also be items of unexploded ordinance in the area. Such items are not uncommon in Scottish waters and include unexploded mines, as well as bombs which failed to explode when dropped, from ditched aircraft, sunken ships and ammunition dumps.*

Fishermen and divers most often come across such ordinance and in such circumstances a team from RN Rosyth bomb disposal unit is dispatched to deal with the hazard. Such finds are more common around strategic wartime facilities and the Central Belt where wartime activity was concentrated. Wick harbour and the nearby waters were not of key strategic importance and therefore it is less likely that such hazards exist in the area. The detailed surveying already undertaken has not revealed any particular hazards.

The magnitude of this impact is considered to be low. Impacts on archaeology are, therefore, considered to be minor.

In the unlikely event that submerged archaeology or wartime debris are located during installation of the subsea cables and hub, SHE Transmission will implement a reporting protocol as set out in the CEMD for any unplanned archaeological discoveries made during the construction works. The protocol will be agreed with Historic Scotland and will be part of the site induction for all site workers. If the item is suspected to be an unexploded ordinance, work will stop and the coastguard will be informed.

These measures will ensure that any residual effects to archaeology remain minor and nonsignificant."

Updated Impact Assessment

Increasing the amount of rock protection that is deployed will not affect the sensitivity of the receptor. Due to it being unlikely that archaeology or wartime debris will be identified within the area of the cable route, 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 can be concluded that the magnitude of effect will remain as Low. As a result, the significance level of the impact will remain as **minor**.

Table 4-29: Revised impact assessment on marine archaeology

Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Low
Magnitude of effect	Low
Significance of impact	**Minor**

4.4.2.4. Impact of Rock Placement on Water Framework Directive

Table 4-30: Summary of impact assessment on WFD from original EIA (SSE, 2011)

Original EIA (SSE, 2011)	
Sensitivity of receptor	Medium
Magnitude of effect	Medium
Significance of impact	**Moderate**

The impact pathway for the potential for deterioration of Water Body status under the WFD was assessed within the EIA (SSE, 2011) via re-suspended sediments occurring during installation works. The following is stated within the ES:

"*Re-suspension of sediments in the water column may occur during the cable burial process and installation of platform foundations affecting water quality.*

Burial of the offshore cables, any necessary cable repairs, and piling during hub installation will result in a temporary increase in turbidity in the lower reaches of the water column. The contractor will bury the cables using seabed fluidisation techniques wherever possible. This will minimise the impact on water quality through reducing the amount of re-suspended sediment relative to other methods of cable burial.

Temporary re-suspension of sediments into the water column could result in a moderate shift in baseline conditions, an impact of medium magnitude for a short period of time (several minutes to hours). This is expected to result in a moderate residual effect on water quality over a short period of time."

Updated Impact Assessment

With respect to water quality in terms of re-suspended sediments it is considered here that sensitivity of the receptor has not changed 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.

4.4.2.5. Impact of Rock Placement on the Scottish National Marine Plan (SNMP)

The Scottish Marine Plan had not been produced at the time of the previous EIA that was submitted in 2011. Therefore, there was no assessment of the potential for the proposed works to be non-compliant with key policies in this plan.

Updated Impact Assessment

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 3.1.

4.4.3. Cumulative impacts as a result of rock placement

Original Impact Assessment

Cumulative impacts were assessed within the original ES (SSE, 2011). A number of existing and future projects were considered including offshore wind farms, oil and gas projects and other renewables projects. The ES concluded the following:

"The cable laying activities and hub construction can take place with minimal potential for adverse cumulative effects with other planned activities such as offshore wind farm construction and oil and gas exploration activities. Construction activities will be over a widely spaced set of sites, for a short duration. The various stages of the proposals themselves have little cumulative potential due to their wide geographical separation and low intensity of impacts. Significant cumulative noise impacts could result if other noisy projects were under construction within 5km of the proposals. However, noise impacts from these proposal will be of short duration, and at this stage no projects have been identified which are likely to be under construction at the same time at that range." (SSE, 2011)".

Updated Impact Assessment

Since the original impact assessment was undertaken, 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 additional rock placement 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 this projects overlap with the proposed rock placement activities within this Marine Licence application. With respect to the additional amounts of rock placement proposed via these two new marine licences compared to other amounts from other projects, consent compliance documents relevant to the Beatrice OWF (which is currently under construction) have been obtained and reviewed;

- Construction Method Statement for the offshore transmission works (BOWL, 2016a) states (in Appendix A) that the total amount of cable protection on the transmission assets equates to a footprint of 0.036 km^2;
- Construction Method Statement for the offshore wind farm (BOWL, 2016b) states (in Appendix A) that the total amount of cable protection on the array cables will equate to a maximum footprint of 0.48 km^2;
- Therefore, a total footprint of 0.516 km^2 for cable protection from the Beatrice OWF project.

Whilst specific details of rock protection amounts have not been obtained for the revised Moray East and Moray West projects, if it is assumed that similar cable protection quantities are required, then a total of 1.54 km^2 of cable protection may be deposited in the Moray Firth region via these three projects. If the 0.109 km^2 of additional cable protection from the C-M project is added, this amounts to a footprint of 1.657 km^2. Taking the approximate area of the Moray Firth region as approximately 1000 km^2, this cumulative loss of seabed habitat via rock placement equates to a 0.16% loss of seabed habitat.

The following tables describe general cumulative impacts on physical, biological and human receptors, using the criteria and definitions of receptor sensitivity and effect magnitude presented in relevant preceding sections.

Table 4-31: Revised cumulative impact assessment – physical environment

Revised Impact Assessment (MarineSpace, 2017)	
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 5km^2 of seabed)
Significance of (cumulative) impact	**Minor**

Table 4-32: Revised cumulative impact assessment – biological environment

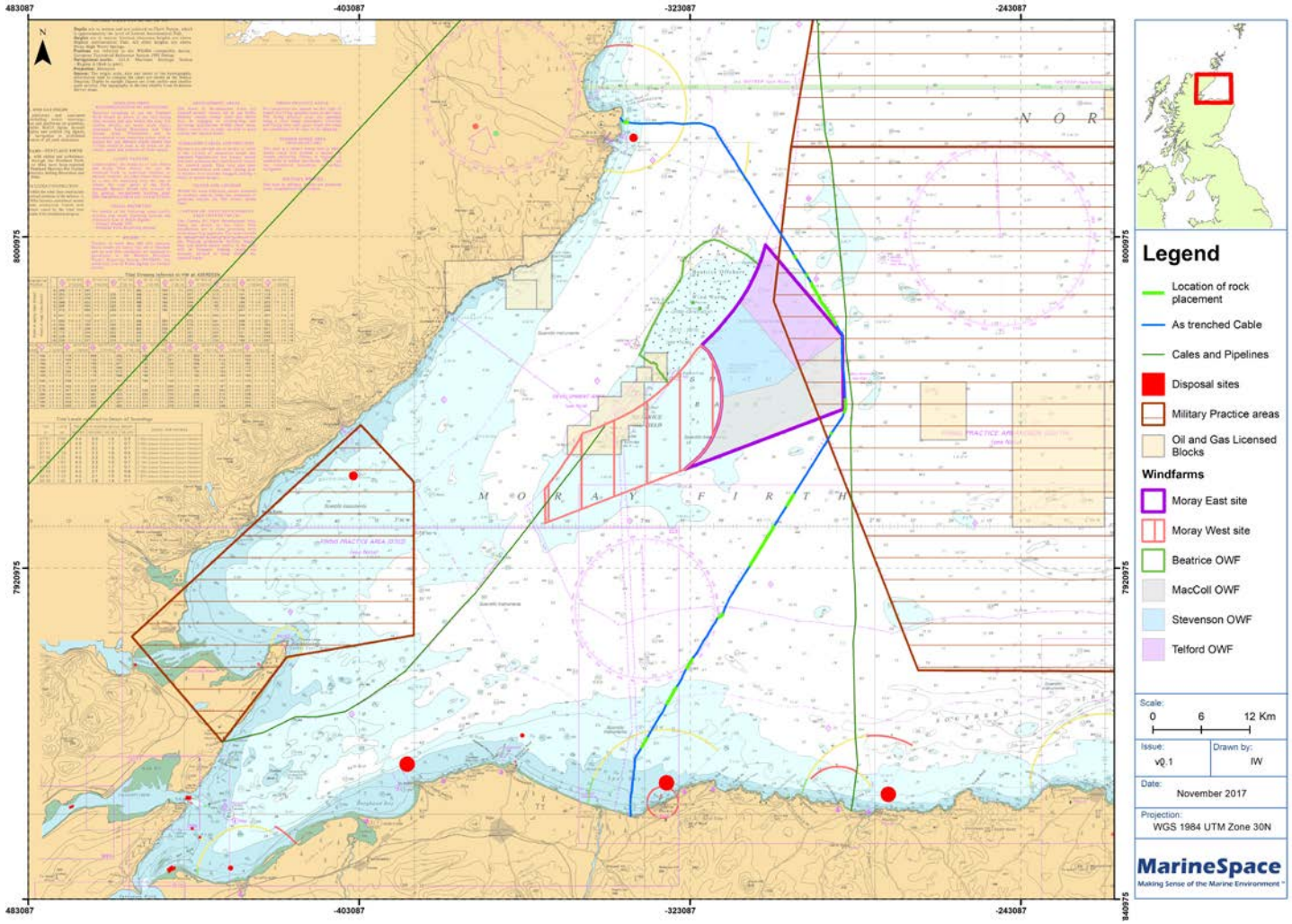
Revised Impact Assessment (MarineSpace, 2017)	
Sensitivity of receptor	Very Low (A good example of a common or widespread habitat in the local area, Species of national or local importance, but which are only present very infrequently or in very low numbers within the subject, any other species or habitats for which there are no designations)
Magnitude of effect	Medium (Affects over 0.1% of the seabed area)
Significance of (cumulative) impact	**Minor**

Table 4-33: Revised cumulative impact assessment – human environment

Revised Impact Assessment (MarineSpace, 2017)	
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 2km) national area; 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; 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.

Figure 4.8: Current plans and projects within the vicinity of the Caithness-Moray HVDC Link



5. Conclusions

This report presents an environmental appraisal of proposed additional rock placement works on the C-M project. Potential impacts on physical, biological and human environment receptors have been assessed using the same EIA methodology and criteria as used in the original EIA for elements of this cable (SSE, 2011). A detailed, stand-alone MPA assessment has also been produced.

In summary, the following key conclusions can be reached with respect to the potential environmental impacts of the proposed additional rock placement works.

Table 5.1: Summary of impacts of proposed additional rock placement

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Physical Environment			
Seabed Character	Low (moderate in areas of horse mussel bed off Noss Head)	Low	**Minor**
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	Very Low	Medium	**Minor**
Marine Non-Native Species (MNNS)	Low	Low	**Minor**
Fish and Shellfish Ecology: Localised seabed disturbance Underwater noise via increased vessel activity	 Low High	 Medium Low	 **Minor** (Moderate) Residual impact = **Minor**
Marine Mammals: Disturbance via underwater noise	Very High	Low	(Moderate) Residual impact = **Minor**
Ornithology: Disturbance/displacement due to increased vessel presence	Very High	Very Low	**Minor**

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Human Environment			
Commercial Fisheries: Disturbance/restrictions around rock placement	Medium	Medium	(Major) Residual impact = **Minor**
Loss of access to fishing grounds	Low (Medium for inshore & creeling)	Low (Medium for inshore & creeling)	(Minor, Moderate for inshore and creeling) Residual impact = **Minor**
Shipping and Navigation: Disturbance/restriction	Low	Low	**Minor**
Reduced water depths and resultant risk	Low	Low	**Minor**
Impacts on compass operation	Medium	Very Low	**Minor**
Marine Archaeology	Low	Low	**Minor**
Water Framework Directive (WFD)	No impact predicted on existing WFD waterbody status		
Scottish National Marine Plan (SNMP)	An "impact" assessment under the described methodology used here was not relevant/appropriate. Refer to Table 3.1 for an appraisal of key policies.		
Cumulative Impacts: Physical Environment	Low	Medium	**Minor**
Biological Environment	Very Low	Medium	**Minor**
Human Environment	Medium	Medium	(Moderate) Residual impact = **Minor**

The detailed MPA assessment also identified pressures and footprints associated with the rock placement activities and screened the potential exposure of these footprints with the following MPAs 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) was presented. **Overall, no adverse effects on the integrity of any of the MPAs were determined**.

6. References

ABB, 2015. Caithness to Moray HVDC Transmission Appendix 11 - Subsea Cable Environmental Management Plan. Prepared on behalf of ABB by Natural Power Ltd. Document Number 1JND14006D000231.

APS Group Scotland (APS), 2015. *Scotland's National Marine Plan*. The Scottish Government, March 2015.

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7. Appendix A: Caithness-Moray HVDC Link: Marine Protected Areas Assessment