MarineSpace

MarineSpace Limited

Scotland to Northern Ireland Pipeline: Rock Placement Marine Licence Application – Environmental Assessment Report

for

Lloyd's Register

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Scotland to Northern Ireland Pipeline: Rock Placement Marine Licence Application – Environmental Assessment Report

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Executive Summary

Mutual Energy is the ultimate holding company for one licensed electricity company, Moyle Interconnector Ltd and three licensed gas operating companies (Premier Transmission Ltd (PTL); Belfast Gas Transmission Ltd (BGTL); and West Transmission Ltd (WTL). It was formed with the objective of owning and operating energy infrastructure in the island of Ireland for the long-term benefit of the energy consumers of Northern Ireland. The present principal activities of the company and its subsidiaries are the ownership and operation of Northern Ireland's energy links with Great Britain.

Mutual Energy own and operate a gas transmission pipeline and a HVDC electrical interconnector comprised of two cables (operating companies Premier Transmission Ltd and Moyle Interconnector, respectively) between Scotland and Northern Ireland. Additionally, Belfast Gas Transmission Limited own two gas pipelines in Northern Ireland, crossing Belfast Lough and Larne Lough. Interconnector Services Limited (ISL) is a wholly owned subsidiary of Mutual Energy. ISL exists to contract services which are shared across the three operating companies.

In line with their on-going maintenance programme, during the summer of 2016 Mutual Energy carried out non-obtrusive geophysical surveys of these cable and pipeline assets. The surveys allowed for an inspection of these assets for damage, seabed erosion, changes in burial depth and the presence of unidentified risks.

The results of the 2016 survey did not report any free spans that exceeded the maximum allowable free span length criteria as calculated in a recent 2016 free span fatigue assessment (Xodus Assure, 2016). However, around KP 2.920, two adjacent free spans were identified (12 m and 16 m in length, separated by a rock dumped section of pipeline). Although there has been no significant increase in the length of the freespan identified in recent surveys 2010 – 2018, Mutual Energy are concerned that a major storm event could reduce the central rock dumped section and create a longer span which would be greater than the allowable length. Any increase in freespan length would also lead to a potential increase in vortex induced vibrations and consequent fatigue of the pipeline structure. Therefore, rock protection works are proposed in this area of freespan.

A marine licence application is required to be submitted to Marine Scotland for the proposed rock placement work. A review of potential environmental effects needs to be undertaken in support of the marine licence application. Mutual Energy have, in turn, requested that Lloyd's Register, as Mutual Energy's Submarine Advisors, prepare all necessary documentation to support the licence applications. MarineSpace Ltd (MarineSpace) has been commissioned by Lloyd's Register to prepare an environmental assessment (this report) that will consider and assess potential environmental effects. Therefore, this report represents the environmental assessment of proposed rock placement works on the Scotland to Northern Ireland Pipeline (SNIP). In addition to this report, a separate Habitats Regulation Assessment (HRA), Marine Conservation Zone (MCZ) and Water Framework Directive Assessment (WFD) assessment report has been produced by MarineSpace and also submitted in support of this marine licence application – see Appendix A.

Details of the proposed amounts of rock placement being sought (and therefore, assessed within this report), are presented below.

Location of Pipeline Free span		Total Rock Volume (m^3)	Total Rock Weight (Te)	Footprint of Rock Placement (m^2)
KP from	KP to			
2.904	**2.916**	1,503.8	2,330.8	**999.0**
2.925	**2.941**			

Potential impacts on physical, biological and human environment receptors have been assessed within this report. This has included, but not been limited to, impacts sites of nature conservation importance, on shipping and navigation, on commercial fisheries and on marine non-native species.

In summary, the majority of impacts predicted with the rock placement were judged to result in no more than **minor impacts**.

Under the Conservation (Natural Habitats, & C.) Regulations 1994 (as amended by the Conservation of Habitats and Species Regulations 2010 as amended by The Conservation of Habitats and Species (Amendment) Regulations 2012, S.I. 2010/490, amended by S.I. 2011/603 and 625 and 2012/637), and the Offshore Marine Conservation (Natural Habitats, & C.) (Amendment) Regulations 2010), where a development is proposed in or near to a Natura 2000 site, or in an area recognised as an important site for marine species which are a feature of a Natura 2000 site, the competent authority determine, and inform the developer as early as possible, on the requirement to undertake an Appropriate Assessment (AA) prior to granting the relevant consents and licences for development.

The detailed HRA undertaken (see Appendix A) 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 Special Areas of Conservation (SACs);
- Annex I bird species classified within Special Protection Areas (SPAs);
- MCZ site; 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 designated sites were determined**.

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1. Introduction

1.1. Project Background

The Scotland to Northern Ireland Pipeline (SNIP) currently transports all gas into Northern Ireland. It specifically supplies Ballylumford Power Station and Coolkeeragh Power Stations, the Phoenix Natural Gas natural gas distribution system in Belfast and the Greater Belfast area, the Firmus distribution system in its 'Ten Towns' license area and the SGN distribution system in the 'Gas to the West' license area.

The SNIP was installed in 1995 and 1996 across the North Channel section of the Irish Sea and is a 24-inch diameter steel pipeline which operates at pressures up to 75bar. During construction the pipeline was trenched where possible and protected by rock berm in other locations. The total length of the pipeline is 135 km, with the subsea section of SNIP running 40 km from Portnaughan Bay on the Rhinns Peninsula, Scotland to Castle Robin Bay, Islandmagee, Northern Ireland.

1.2. Project Status

The SNIP was originally surveyed annually from 1996 to 2000 and then biennially from 2002 to 2008. An assessment of the historic surveys was undertaken in 2009 and concluded the SNIP was increasing in burial depth (due to sediment accumulation in many places) and had a reducing number of small freespans. From this it was determined a full survey (acoustic, visual and cathodic protection) was proposed to be extended to four-year intervals and an acoustic only survey to be undertaken in the intervening biennial years.

The results of the 2016 survey did not report any free spans that exceeded the maximum allowable free span length criteria. Calculation of maximum allowable length (24 m) is based on a 2016 assessment of strength and fatigue at the SNIP freespan (Xodus Assure, 2016). However, around KP 2.920 two adjacent free spans were identified (12 m and 16 m in length, separated by a rock dumped section of pipeline). From the previous surveys undertaken before the 2016 survey, results show that there has been no significant increase in freespan length identified. However, Mutual Energy are concerned that a major storm event could reduce the central rock dumped section and create a longer span which would be greater than the allowable length. Any increase in freespan length would also lead to a potential increase in vortex induced vibrations and consequent fatigue of the pipeline structure. In addition, current freespan height (1.7 m) and length exceed the FishSafe threshold (heights in excess of 0.8 m and length in excess of 10 m) to be considered a reportable trawl hazard. A further survey was undertaken in 2018, this survey concluded that the length of pipeline freespan had not increased.

To reduce the risk of the potential long span being created Mutual Energy propose to deposit rock placement in the infill of the freespan and rock berm to the be installed on top of the pipeline.

1.3. Marine Licence Application

Certain activities require a marine licence before they can be carried out in Scotland's seas.

Under the Marine (Scotland) Act 2010, Scottish Ministers are responsible for the marine licensing and enforcement in the Scottish inshore region from 0-12 nautical miles (nm). The licensing regime allows regulation of the deposit and removal of substances and objects in the seas around Scotland. Activities must take place in accordance with licence conditions. The deposit of rock on the seabed constitutes 'the deposit of substances or objects into the sea or onto the sea bed' and thus requires a marine licence.

1.4. Need for Environmental Impact Assessment

While a full Environmental lmpact Assessment (EIA) is not required with respect the proposed works, a review of potential environmental effects does need to be undertaken in support of the marine licence application. Mutual Energy have, therefore, requested that Lloyd's Register, as Mutual Energy's Submarine Advisors, prepare all necessary documentation to support the licence applications. MarineSpace Ltd (MarineSpace) has been commissioned by Lloyd's Register to prepare an environmental appraisal (this report) that will consider and assess potential environmental effects. Therefore, this report represents the environmental assessment of proposed rock placement works on the SNIP.

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 (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 rock placement activities.

Figure 1-1: Location of the proposed Rock Placement works

2. Proposed Works

2.1. Overview

The proposed works applied for within this Marine Licence application are rock placement. Details are provided in Table 2.1.

Table 2.1: Summary of Rock Placement Amounts sought via Marine Licence Application

Location of Pipeline Free span		Total Rock Volume (m^3)	Total Rock Weight (Te)	Footprint of Rock Placement (m^2)
KP from	KP to			
2.904	**2.916**	1,503.8	2,330.8	**999.0**[1]
2.925	**2.941**			

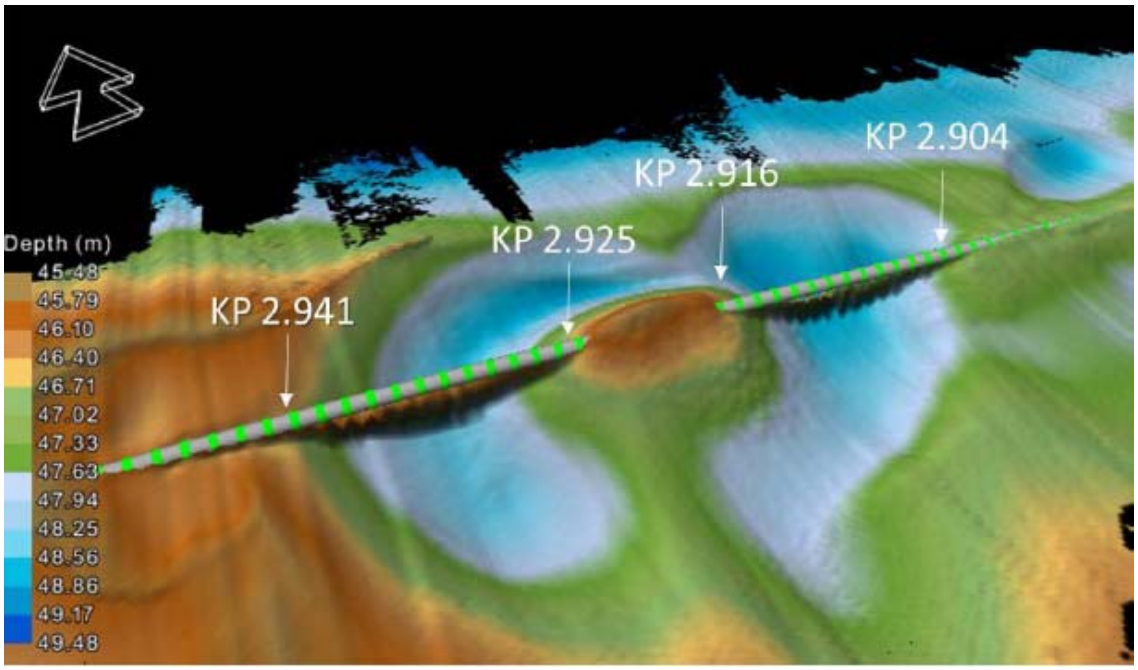
The quantities of rock placement being applied for have been determined via a series of engineering studies and assessments produced on behalf of Mutual Energy.

The proposed works are within the area bounded by joining the below points:

54° 59.489’ N	005° 13.254’ W
54° 59.489’ N	005° 13.209’ W
54° 59.479’ N	005° 13.208’ W
54° 59.479’ N	005° 13.253’ W

[1] This overall footprint has been requested to account for possible material change when the pre-survey is completed. 999m² is being applied for because it is the maximum square metres allowed before a Pre-Application consultation is required under the Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013.

Figure 2-1: Multibeam Echosounder Showing the Areas of Freespan. From, Xodus (2017)



2.2. Type of rock placement

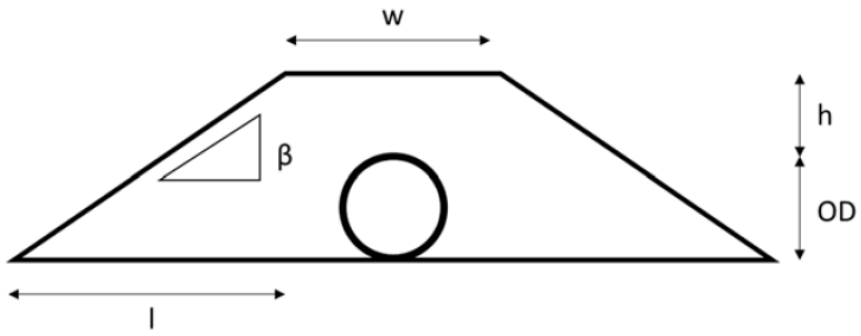
The planned rock placement works comprises stabilisation and protection work at two locations, within very close proximity to each other, along the pipeline. The rock placement is required for (a) to mitigate the pipeline integrity risks and (b) to mitigate the navigational safety hazard for other marine users.

In order to reach sufficient cover of the pipeline the following design type has been defined with respect to the rock placement:

Figure 2-2: Proposed Infill and Rock Berm Design. Source, Xodus (2017)

Component	Parameter	Symbol	Unit	Value
Rock Infill	Rock Grade	-	" (inches)	1-3
	Dry Bulk Density	ρR_infill	kg/m3	1,550
	Required Rock Volume	vinfill	m^3	885.0
	Required Rock Tonnage	minfill	Te	1,371.8
Rock Berm	Rock Grade	-	" (inches)	1-5
	Dry Bulk Density	ρR_infill	kg/m3	1,550
	Berm Height to ToP	h	m^3	0.4

Component	Parameter	Symbol	Unit	Value
	Berm Width	w	m	1.7
	Slope Angle	β	-	1:4
	Slope Length	l	m	4:8
	Required Rock Volume	v_{berm}	m^3	482.0
	Required Rock Tonnage	m_{berm}	Te	747.2
10% Contingency	Required Rock Volume	v_{berm}	m^3	136.7
	Required Rock Tonnage	m_{berm}	Te	211.9
Total	**Required Rock Volume**	**v_{berm}**	**m^3**	**1,503.8**
	Required Rock Tonnage	**m_{berm}**	**Te**	**2,330.8**



Slope of Rock Berm

A rock berm slope of either 1 in 2.5 (~21.8°), 1 in 3 (~18.4°) or 1 in 4 (~14.0°) is proposed for the rock berm in order to be 'fishing friendly' and not pose a significant hazard to, or from, fishing activities. During the operations the actual slope angle shall be driven by stability of the pipeline.

2.3. Method of placement

A separate Method Statement has been submitted as part of the package of documentation issued to Marine Scotland in support of the marine licence application 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.

It is expected the works will take approximately 8 hours (1 day) to complete. The rock placement activities will be executed with Dynamic Positioned Fall Pipe Vessels (DPFPV's) such as the *Bravenes, Nordnes* or *Stornes*. 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.

The sequence of works proposed are as per below:

1. **Pre-installation survey:** The pre-installation survey will be undertaken using a Remote Operated Vehicle (ROV) as a stable platform over the area where the installation of rock materials is planned;
2. **Infill gap:** The lowest acceptable grade of rock shall be used to infill the gap below and around the pipeline to MSBL in order to reduce the risk of future scour at the edge of the placed rock. The gap shall be filled in sequence such that the gap on one side of the pipeline is filled first and then the gap on the other side of the pipeline is filled second;
3. **Rock berm:** Once the gap is filled to MSBL and a positive load bearing support is provided to the pipeline then rock shall be placed on top of the pipeline in order to build the berm as per the design specified above in Section 6.1; and
4. **Post-Rock Placement Survey:** After execution of the rock placement, a post-survey will be executed to confirm installation status.

2.4. Summary of impact assessment parameters

Table 2.1 (above) provides a summary of the volumes of rock placement proposed. 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) 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

Although the predicted rock placement will have an overall footprint of 952m², it could be subject to change if material change is found when the pre-survey is completed. In order to account for any additional rock placement, the overall footprint of rock placement will be **999 m²**.

Height of rock

Based on information provided by the specialist rock berm design contractor (Xodus), the maximum height of any rock berm will be 0.4 m above seabed level. This value confirms that rock placement will not reduce existing water depths by >5% due to rock placement as the water depth in the area is between 45 – 49 m.

2.5. Impact assessment methodology

Potential impacts of the rock placement have been categorised as shown in Table 2.2. 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 0, 0 and 4.4 respectively.

Table 2.2: Summary of impact definitions used in this report

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

Impacts categorised as being **moderate** or **major** (adverse or beneficial) are considered in this assessment 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 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.

Following advice from Marine Scotland sector-specific policies for submarine cables has been identified as the most relevant chapter in relation to pipeline maintenance. Fisheries are also presented below as they are deemed to also be the most relevant to the works being considered.

Table 3.1: Scottish Marine Plan Policies Relevant to Fisheries and Subsea Cables[2]

Policy	Definition	How this Policy has been Recognised in this Assessment
GEN 4 Co-existence	Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision-making processes, when consistent with policies and objectives of this Plan.	Potential interactions have been recognised and are assessed in the impact assessment section.
GEN 18 Engagement:	Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.	Engagement has been undertaken with Marine Scotland who advised to engage with the SFF and Clyde's Fishermen Association. SSF advised that as long as rock protection is used to the usual specification, i.e. 1-5 gradient, the coordinates are provided to Kingfisher and a post-installation survey is conducted the proposed works should not impact the SFF members (SFF, 2019). At the time of writing engagement with Clyde's Fishermen Association has been requested and information about the proposed works has been disseminated to their members.

[2] Only selected elements of these Scottish Marine Plan policies are shown here to highlight specific issues/policies relevant to this proposed assessment. Following the advice from Marine Scotland, cable policies have been used to inform specific issues/policies relevant to pipelines.

Policy	Definition	How this Policy has been Recognised in this Assessment
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.	All details of planned work will be disseminated via regular Notice to Mariners (NtMs), ensuring that these details are also passed to Kingfisher for inclusion in their charts. A rock berm slope of either 1 in 2.5 (~21.8°), 1 in 3 (~18.4°) or 1 in 4 (~14.0°) is proposed in order to be 'fishing friendly' and not pose a significant hazard to, or from, fishing activities. The actual slope angle shall be driven by stability. A post-installation survey will be undertaken to confirm installation status.
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.	

Policy	Definition	How this Policy has been Recognised in this Assessment
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).	This proposal is being driven by the desire of Mutual Energy to mitigate the pipeline integrity risks as well as the navigational safety hazard for fishing fleet and mariners in general due to pipeline exposure. All details of planned work will be disseminated via regular Notice to Mariners (NtMs), ensuring that these details are also passed to Kingfisher for inclusion in their charts.

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 **Appendix A**. The assessment concluded that due to the scale, nature and location of the planned activities, they do not pose a risk of deterioration in status of surrounding water bodies, or of jeopardising any nearby water body achieving 'good' status.

4. Environmental Assessment

4.1. Overview

Table 4.1 below list the potential receptors assessed within this assessment. The impact assessments presented below focus on the potential for planned rock placement operations to affect certain key receptors identified.

Table 4.1: Summary of Receptors Assessed within this Assessment

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 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 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
Shipping and Navigation	Temporary restrictions around rock placement vessels Reduced water depths leading to increased navigational risk
Marine Archaeology	Damage to seabed archaeological resources via 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 rock placement on SNIP combined with other nearby projects

4.2. Overview

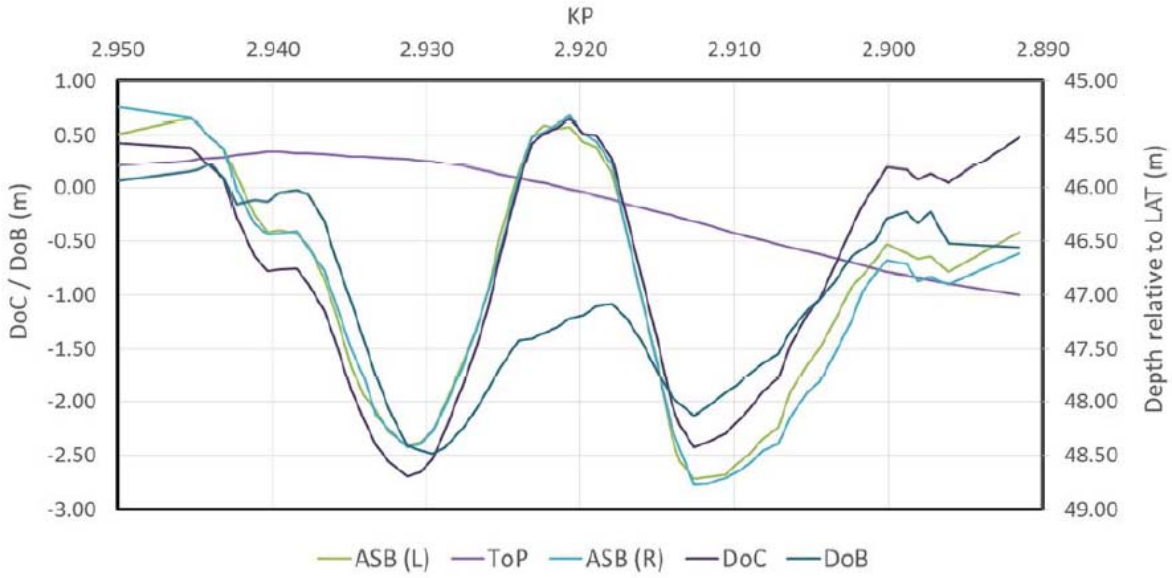
4.2.1. Existing environment

This section of the report provides brief details of the existing physical environment in the areas where additional rock placement is proposed.

Bathymetry

Water depth, relative to Lowest Astronomical Tide (LAT), is presented below. This data is from the 2016 survey, water depth ranges from 45 – 49 m.

Figure 4-1: Water Depths relation to LAT. From, Xodus (2017)



Tidal/Wave Regime

The annual average wave height within in the proposed rock placement works is between 1.01 – 1,25 m (ABPMer, 2019). Tidal current speeds of 0.26m/s to 0.5m/s during neaps, and 0.51m/s to 0.75m/s during springs can be predicted (ABPMer, 2019).

Seabed Sediments

The seabed sediments consist mainly of Sand, with some patches of mobile sediment close to the proposed works.

Sediment transport

A predominantly sandy seabed with no extensive areas of ripples indicates the presence of relatively low tide-driven currents or wave action, which reduces the capability of transporting the surface seabed layers.

4.2.2. Impact assessment (physical environment)

The impact assessment criteria used to assess impacts on physical receptors is summarised below.

Table 4.2: Definitions of Receptor Sensitivity for Physical Receptors Assessed in this Assessment

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; • Sediments that are already heavily polluted where any disturbance could release currently unavailable contaminants into the water column and nearby sediments; and • 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; • Seabed sediments generally be considered clean and uncontaminated; discharges would not result in exceeding water quality objectives; and • 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; • 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 or Physical Environment Impacts

Level of Value	Example of Criteria
High	Major change to the baseline, e.g.; • a change returning to baseline/undetectable levels within 10km of works.
Medium	A moderate shift from the baseline conditions, e.g. • 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 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 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)

Where rock placement is proposed, the seabed character will change from predominantly sand to an area dominated by the rock, i.e. there will be a change in seabed character in the area. An important aspect of the proposed works is that there are already areas of rock protection in the vicinity. The spatial extent of proposed works (< 1,000 m^2) is also very limited, resulting in a low magnitude of effect. It is expected that over a period of years, natural sediment processes will result in a veneer of sediment accumulating over some parts of the rock proposed to be placed via these works. Therefore, whilst the deposit of rock will result in a change in seabed character, this change wil be small in the context of the wider, surrounding environment.

Table 4.5: Summary Impact Assessment on Seabed Character

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

4.2.2.2. Impact of Rock Placement on Water Quality

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 following:

- 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;
- Materials are secured on deck to prevent loss overboard; and
- Wastes will be contained on board vessels for appropriate disposal on return to port.

Table 4.6: Impact Assessment on Water Quality

Impact Assessment	
Sensitivity of receptor	Medium
Magnitude of effect	Very Low
Significance of impact	**Minor**

4.3. Biological Environment

4.3.1. Existing environment

This section of the report provides details of the existing biological environment in the areas where rock placement is proposed.

4.3.1.1. Subtidal and Intertidal Benthic Ecology

Seabed substrate off the coast of the Rhins of Galloway is characterised by a mix of sandy and coarse sediments. Benthic communities are dominated by annelid worms in terms of both abundance and biomass (Bario Frojan *et al.* 2012). Broadscale habitat mapping of the region categorises seabed sediments in this region as primarily offshore circalittoral sand, with areas of offshore circalittoral coarse sediment, and offshore circalittoral mud (EMODnet, 2019).

Joint Nature Conservation Committee (JNCC) habitat type descriptions note that offshore circalittoral sand is characterised by a diverse range of polychaetes, amphipods, bivalves and echinoderms. Offshore circalittoral coarse sediment is generally characterised by robust infaunal polychaete and bivalve species and animal communities in this habitat are closely related to offshore mixed sediments. Offshore circalittoral mud is recognised to support a variety of faunal communities, depending upon the level of silt/clay and organic matter in the sediment. These communities are typically dominated by polychaetes but often with high numbers of bivalves such as *Thyasira* spp., echinoderms and foraminifera (JNCC, 2019)

The Clyde Sea Sill nature conservation marine protection area (NCMPA) is located less than 1 km north of the proposed works site. This area contains a 'sill' which leads cooler, saline waters from the North Channel to mix with warmer, less saline waters from the Clyde. This creates a front, which concentrates nutrients and plankton. The resultant feeding hotspots for fish and other higher marine predators forms an important local fish stock. Despite the species rich areas in the central ‘sill’, benthic biodiversity, with particular emphasis on protected features, was low in the area closest to the proposed pipeline protection works.

4.3.1.2. Fish and Shellfish Ecology

Coastal waters offshore from the Rhins of Galloway are highlighted as spawning areas for whiting (February – June), sprat (May – August) and nephrops (January – December). The area is also recognised as nephrops nursery area (Coull *et al*. 1998).

Diadromous fish species such as sea lamprey *Petromyzon marinus*, Atlantic salmon *Salmo salar* and European eel *Anguilla anguilla* are present in Scottish coastal waters including those at the site of the proposed repair works. However, the only SACs in southwest Scotland designated for these species are: the River Bladnoch SAC, which drains into Wigtown Harbour, over 100 km from the site of the proposed works (designated for Atlantic salmon); and the Solway Firth SAC, over 120 km away (designated for river lamprey).

4.3.1.3. Marine Mammals

Monitoring of cetacean species the Northern Irish Sea has recorded the presence of 15 species (Evans and Shepherd, 2001). However, only 3 of these are sighted with any frequency; the northern minke whale *Balaenoptera acutorostrata*, bottlenose dolphin *tursiops truncates* and harbour porpoise *Phocoena phocoena* (Reid et al., 2003). The grey seal *Halichoerus grypus* and common seal Phoca vitulina are also regularly sighted in this area. The grey seal is known to travel long distances when foraging offshore (McConnell et al., 1999; Matthiopoulos et al., 2004) and is more likely to be encountered offshore.

4.3.1.4. Marine Ornithology

Assessment of ornithological conservation designations was completed as part of the accompanying HRA report and includes details of SPA and Ramsar sites within the vicinity of the proposed works (Appendix A). The following bird species are designated for bird species for bird species have been identified as designated taxa with foraging ranges that overlap with the proposed works site:

- Herring Gull;
- Common guillemot;
- Lesser black-backed gull;
- Northern gannet;
- Northern fulmar;
- Manx shearwater; and
- Sandwich tern.

The sensitivity of these species to disturbance and displacement from anthropogenic activities was determined based on published literature (Garthe and Hüppop, 2004; Furness and Wade, 2012; Furness, 2013; Furness et al., 2013) and all receptors were classified as having low or moderate sensitivity.

4.3.2. Impact assessment (biological environment)

The impact assessment criteria used to assess impacts on biological receptors is summarised below.

Table 4.7: Definitions of Receptor Sensitivity for Biological Receptors Assessed in this Appraisal

Level of Value	Example of Criteria
Very High	• Internationally important sites include: SACs, SPAs and Ramsar sites. Candidate SACs, potential SPAs and proposed Ramsar sites should be given the same consideration as designated sites • A qualifying feature of 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.

Level of Value	Example of Criteria
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 4.8: Definitions of Magnitude of Effect for Biological Environment Impacts

Level of Value	Example of Criteria
High	• A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group; if adverse, this is likely to threaten its sustainability • Major loss or major alteration to key elements of the baseline (pre-development) conditions such that the post-development character / composition / attributes will be fundamentally changed • Affects over 1% of the seabed area • Multiple mortalities to marine mammals or larger sea life, change in regional distribution of marine mammal population.

Level of Value	Example of Criteria
Medium	• A permanent or long-term effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group; if adverse, this is unlikely to threaten its sustainability • Loss or alteration to one or more key elements / features of the baseline conditions such that post-development character / composition / attributes will be partially changed • Affects over 0.1% of the seabed area • A single mortality to a marine mammal or larger sea life, change in local distribution to marine mammal population
Low	• A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group that is within the range of variation normally experienced between years • Minor shift away from baseline conditions; change arising from the loss /alteration will be discernible but underlying character / composition / attributes of the baseline condition will be similar to the pre-development situation • Affects over 0.01% of the seabed area • Change in behaviour of marine mammals or larger sea life
Very Low	• A short-term but reversible effect on the integrity of a site or conservation status of a habitat, species assemblage / community, population or group that is within the normal range of annual variation • Very slight change to the baseline condition; change barely distinguishable approximating the 'no change' situation • Affects over 0.001% and less of the seabed area • A noticeable response from marine mammals or large sea life

Table 4.9: Assignment of Impact Significance for the Biological Environment based on Sensitivity of Receptor and Magnitude of Effect

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

4.3.2.1. Impact of Rock Placement on Benthic Ecology

Rock placement activities will cause permanent loss of the existing seabed habitats and species from this area. However, the deposited rock will act as a new substratum for colonisation by seabed animals. Biodiversity in complex rocky substrates is increased relative to homogenous sandy seabed (Kostylev *et al.* 2005) and consequently the change in substrate types will have negative short-term effect but potentially positive medium to long term effect. Although the wider benthic environment is characterised by sandy sediments, the two freespans proposed for repair are either side of a 9 m extent of rock protection already in place. As such, the newly introduced hard substrate will represent a less discernible change from baseline conditions and will provide habitat to be colonised by communities already present on the existing rock armour. The sensitively of benthic substrate to effects from rock placement is therefore considered to be low.

The small spatial extent of the proposed works (< 1,000 m^2) ensures that the loss of benthic habitat in this largely homogenous seabed will cause minimal impact on a regional scale. There should be no environmental impacts beyond the immediate vicinity of the deposited rock fragments. The magnitude of effect from impacts to benthic substrate is therefore considered to be very low.

Table 4.10: Impact Assessment on Benthic Ecology

Impact Assessment	
Sensitivity of receptor	Low
Magnitude of effect	Very Low
Significance of impact	**Negligible**

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

The proposed works will not take place within any designated or protected area, and there are no nearby features or habitats of conservation importance. In view of this the area is considered to have low sensitivity to introduction of marine non-native species. The risk of the introduction of marine non-native species is very 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. In addition, works will be carried out by a single vessel and will take place over a short (approximately 8 h across a single day). As such, magnitude of any effect is considered to be very low.

Table 4.11: Impact Assessment on MNNS

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

4.3.2.3. Impact of Rock Placement on Fish and Shellfish Ecology

The site of the proposed works is considered medium sensitivity to localised seabed disturbance as it falls within known spawning grounds for whiting, sprat and *Nephrops* and lies within *Nephrop* nursery areas. However, sprat spawning occurs between May and August and is therefore not considered susceptible to impacts from rock placement works (scheduled for late May). Migrating species such as salmon and sea lamprey may also pass through the area. Anthropogenic sources of subsea noise can form a barrier to migratory routes and thus migratory fish species are considered to be of high sensitivity to disturbance from subsea noise. Due to the short duration of the proposed works, the magnitude of effect from both local seabed disturbance and subsea noise has been classed as very low.

In the longer term the increased habitat complexity associated with a larger rock berm is likely to increase local biodiversity and could positively impact fish communities through increases in food availability and creation of refuge for small juveniles.

Table 4.12: Impact Assessment on Fish and Shellfish Ecology

Impact Assessment	
Sensitivity of receptor	Localised seabed disturbance: Medium Underwater noise via increased vessel activity: High
Magnitude of effect	Localised seabed disturbance: Very Low Underwater noise via increased vessel activity: Very Low
Significance of impact	Localised seabed disturbance: **Minor** Underwater noise via increased vessel activity: M**inor**

4.3.2.4. Impact of Rock Placement on Marine Mammals

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.

The sensitivity of marine mammals in is considered to be very high. However, potential impacts on marine mammals from the proposed rock placement works will be completed within a single days and noise levels associated with the proposed works are low. The magnitude is therefore classed as very low.

Table 4.13: Impact Assessment on Marine Mammals

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

4.3.2.5. Impact of Rock Placement on Ornithology

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.

The proposed works fall within foraging ranges of bird species from surrounding SPA conservation designations. However, based in review of relevant literature (Furness, 2013; Furness and Wade, 2012; Furness et al., 2013; and Garthe and Hüppop, 2004), these species were classified as low-medium sensitivity to disturbance from visual disturbance. In order to maintain a precautionary approach, the most conservative of these outcomes, medium, was taken forward as overall sensitivity of this receptor.

A detailed assessment of the potential for subsea noise to affect foraging seabirds is provided in the accompanying HRA report (Appendix A). This assessment concluded that the proposed works do will not create sufficient noise to cause injury to seabirds and overall area of seabed affected by extended period of underwater sound emissions will not substantially affect areas of sea that are suitable for seabird foraging. In view of this, the magnitude of effect from both localised seabed disturbance and underwater noise is determined to be very low.

In view of the short works duration and the low increase predicted for both suspended sediment and subsea noise, the magnitude of effect is determined to be very low.

Table 4.14: Impact Assessment on Ornithology

Revised Impact Assessment	
Sensitivity of receptor	Medium
Magnitude of effect	Very Low
Significance of impact	**Minor**

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 rock placement is proposed.

Commercial Fisheries

For the area along the pipeline route only Northern Ireland, Scottish and English vessels can fish in the area. Foreign fishing activity is precluded by legislation as the area is within the territorial 12 nm limits from Northern Ireland and Scottish coastlines.

The following fishing activity is carried within the North Channel:

- Semi pelagic trawling;
- Demersal trawling/*Nephrops* trawling; and
- Dredging.

Within the International Council for the Exploration of the Sea (ICES) rectangle 38E4, where the proposed rock placements work is located, dredging gear followed by trawls had the highest fishing effort (days) from 2014-2018 (Marine Scotland, 2018a). In this same period the most valuable species within the area were scallops (Marine Scotland, 2018b). Semi pelagic trawling does not involve any significant interaction with the seabed as it uses mid-water trawling, both demersal/*Nephrophs* trawling and dredging (used to harvest scallops), do interact with the seabed.

Figure 4-2: Estimated Annual Average Fishing Density within the Region

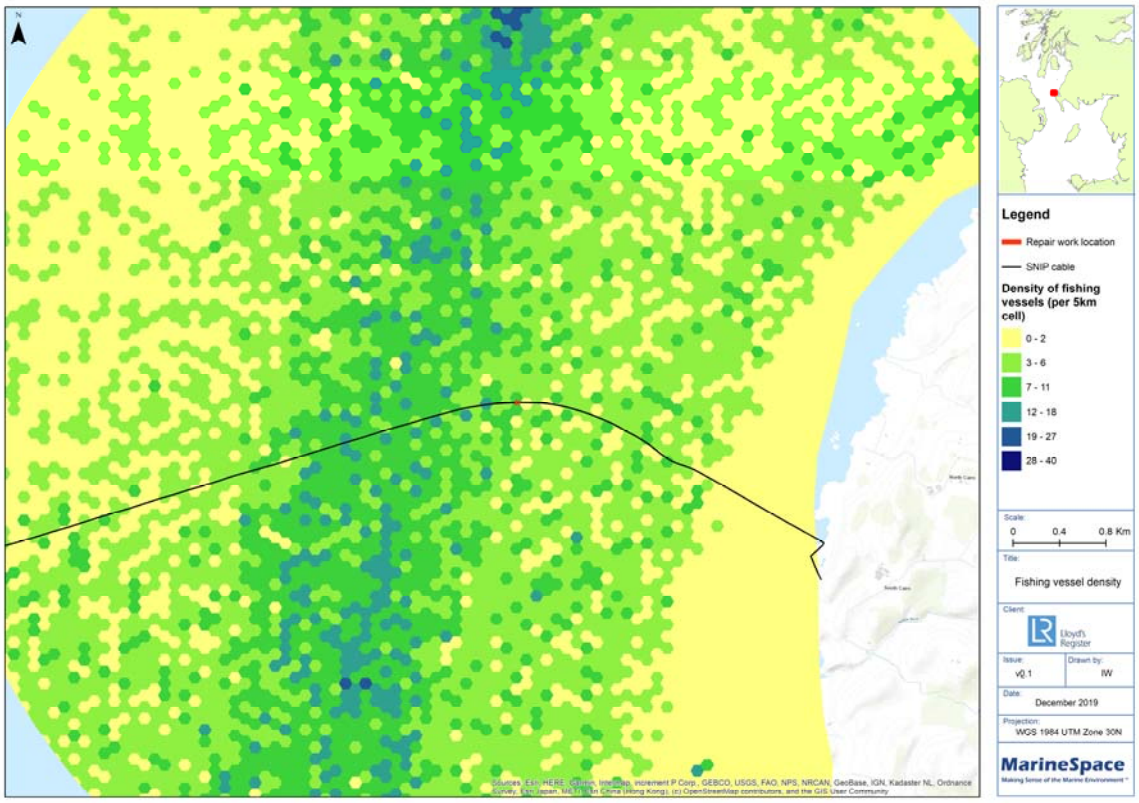


Figure 4-3: Fishing Vessel Density Heat Map (January 1st 2016 to December 31st 2018), from Lloyds Registry, 2019)

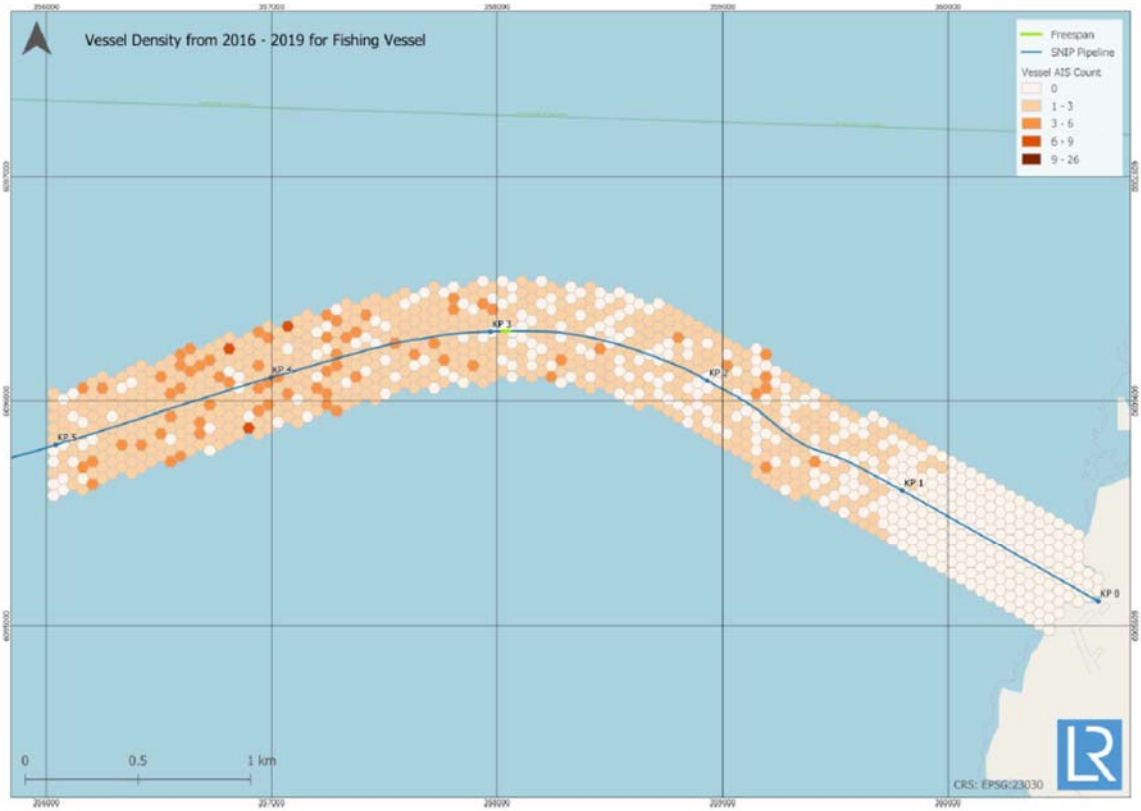


Figure 4-4: Fishing Vessel Track Freespan Interactions (January 1st 2016 to December 31st 2018), from Lloyds Registry, 2019)

Shipping and Navigation

Typical commercial marine traffic in this region includes ferry routes to and from Scotland and Northern Ireland. Six ferries leave Loch Ryan Port and sail to Belfast daily, while up to sixteen scheduled daily ferries, both passenger and freight, sail from the Port of Cairnryan to Larne in Northern Ireland. The rock placement works do not cross over either of these ferry routes.

From Figure 4-5 the estimated annual average vessel density within the region is low within the rock placement works, with a high vessel density area to the north of the rock placement. Figure 4-6 indicates that cargo vessels increase in density to the west of the rock placement works.

Figure 4-7 and Figure 4-8 Present data from specific marine traffic surveys undertaken in the area of the freespan over the period January 1st 2016 to December 31st 2018.

Figure 4-5: Estimated Annual Average Vessel Density within the Region

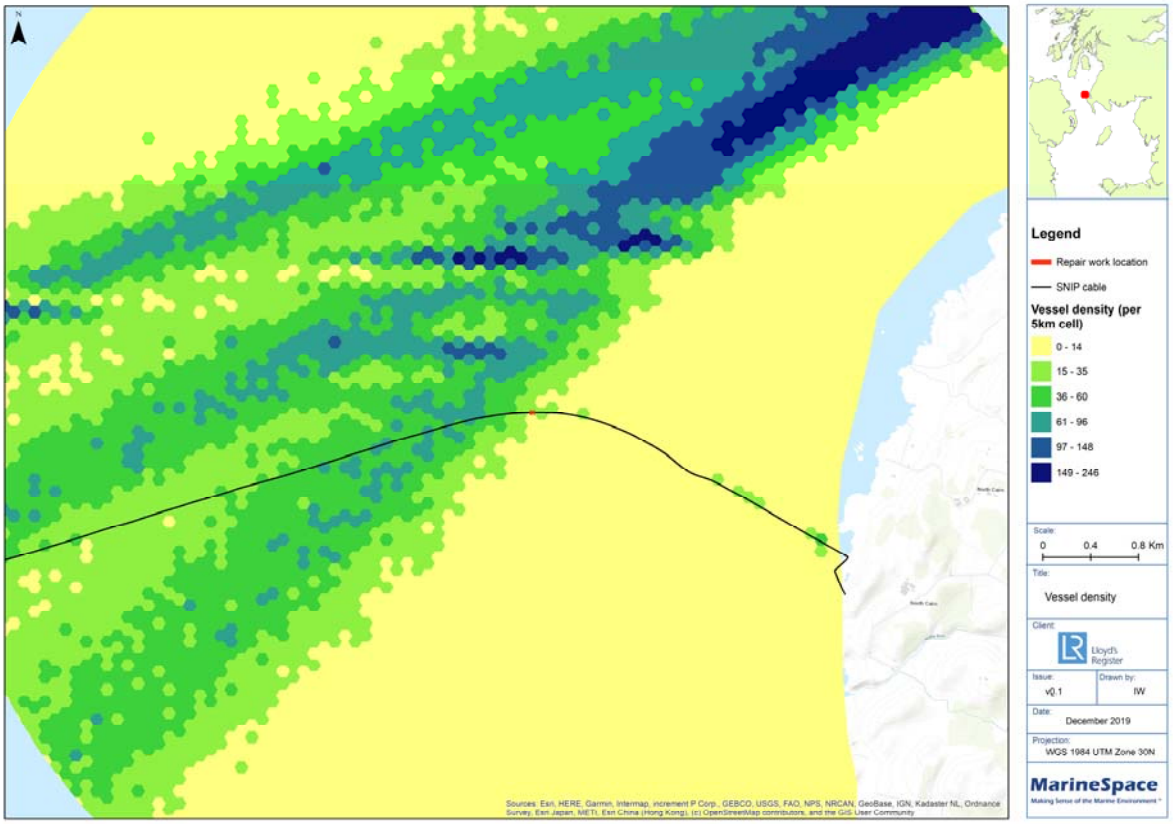


Figure 4-6: Estimated Annual Cargo Density within the Region

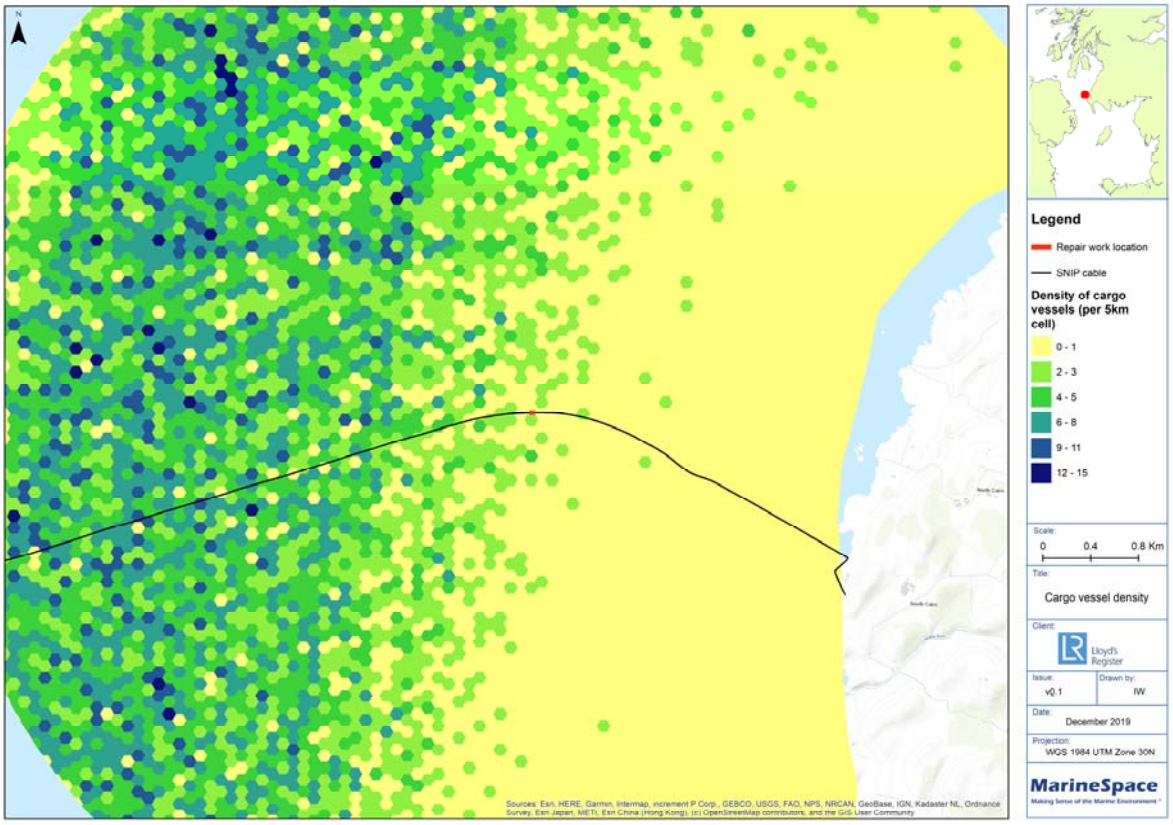


Figure 4-7: Vessel types recorded within 200 m of SNIP (January 1st 2016 to December 31st 2018), from Lloyds Registry, 2019)

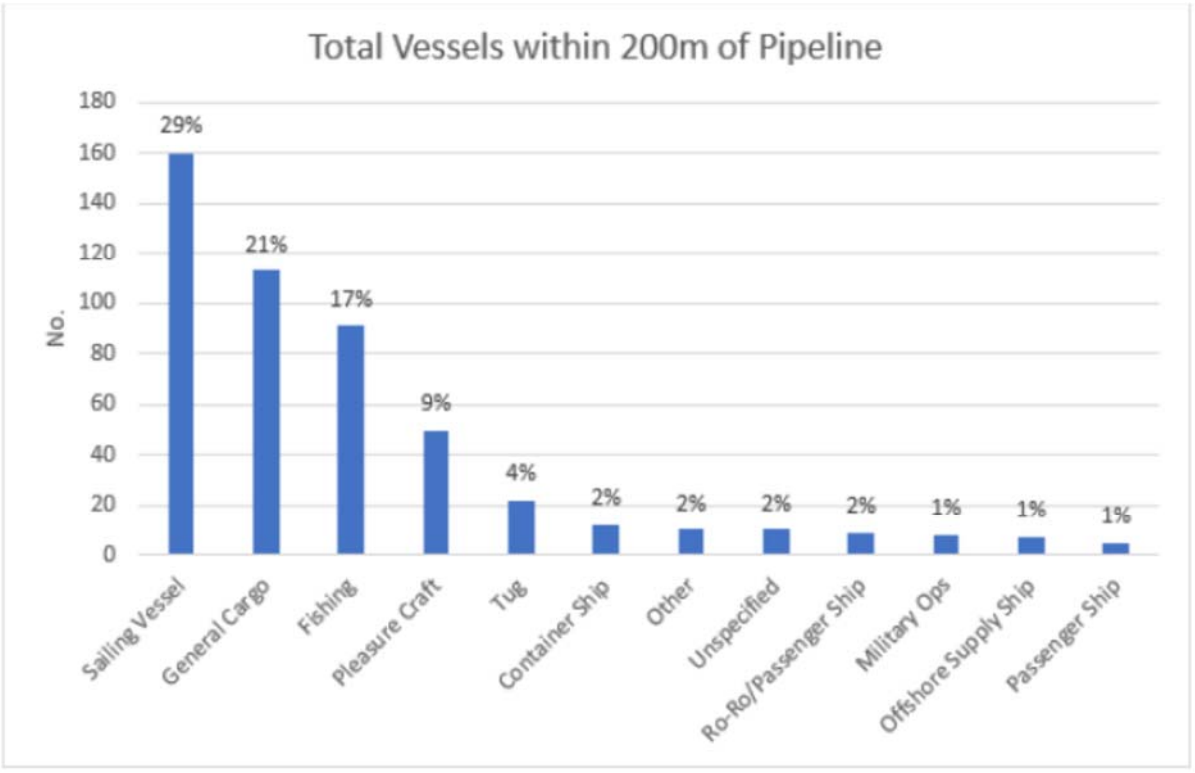
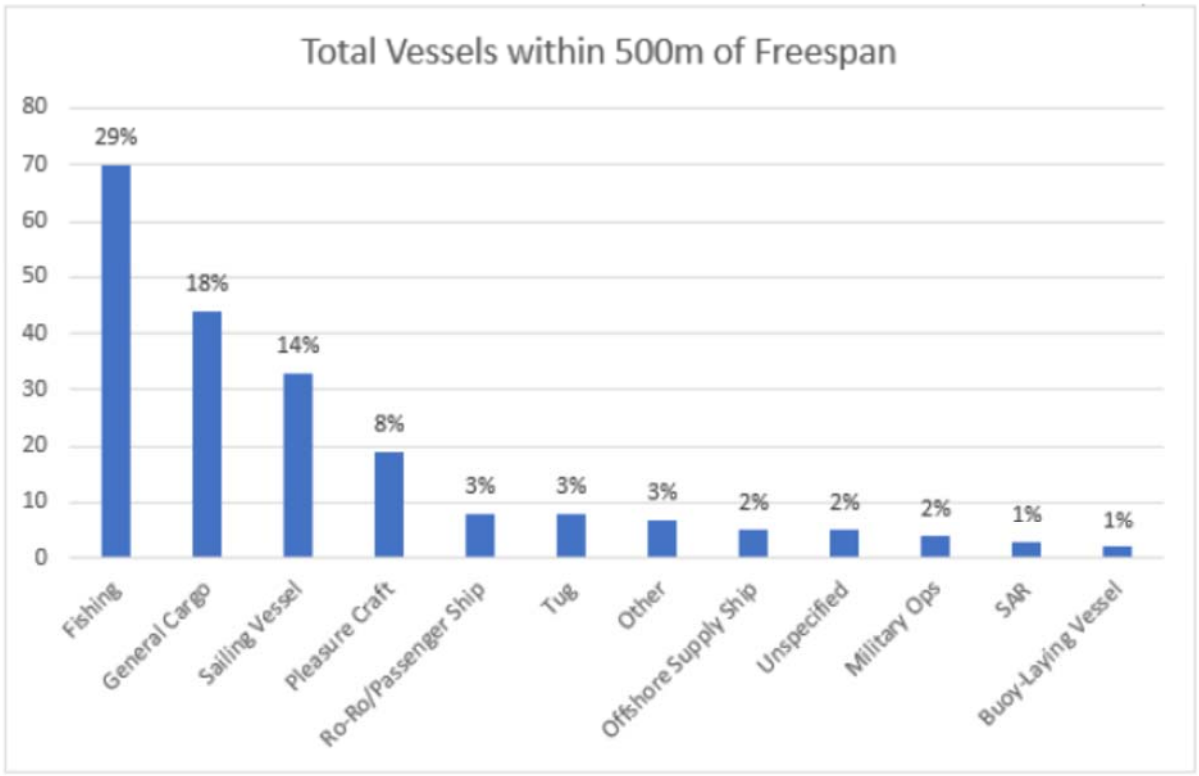


Figure 4-8: Vessel types recorded within 500 m of Freespan section (January 1st 2016 to December 31st 2018), from Lloyds Registry, 2019)



Archaeology

No charted or protected wrecks are located in the direct vicinity of the deposit area. The closest known wreck is located over 700 m southwest of the deposit area, identified in 1982 on Kingfisher trawling plots (Ref. 101669; Marine Scotland, 2019c), two further sites are located approximately 1 km or greater from the deposit site (Ref. 102632 and 299078; Marine Scotland, 2019c). No other cultural heritage sites have been identified within 1 km of the deposit site (Marine Scotland, 2019c).

Other Marine Users

Although the proposed rock placement works are not in a Ministry of Defence (MOD) area, the nearest MOD areas are:

- Cabletown and Corsewall (approx. 2 km);
- Luce Bay (approx. 2.5 km); and
- Beaufort and Juniper Rock (approx. 5.8 km).

Water Framework Directive

A WFD screening exercise was carried out to assess the potential for the proposed works to impact the status of surrounding water bodies (see **Appendix A**). The proposed work shave potential to impact surrounding waterbody through 'habitat loss' or impacts to 'water quality. However, works were screened out of full impact assessment for the following reasons:

- The works footprint is <0.5 km^2; covers <1% of the waterbody extent; is >500 m from the nearest conservation designation; <1% of any lower sensitivity habitat and
- Are not expected to affect water clarity for longer thana spring neap tidal cycle; is not in a water body with phytoplankton status of moderate, poor or bad; is not in a water body with a history of harmful algae.

Based on these scoping criteria, the proposed works do not require an impact assessment under the WFD. It has been demonstrated that the project does not pose a risk of deterioration in status of surrounding water bodies, or of jeopardising any nearby water body achieving 'good' status. In view of this assessment, additional impact assessment will not be included within this report.

4.4.2. Impact Assessment (Human Environment)

The impact assessment criteria used to assess impacts on human environment receptors is summarised below.

Table 4.15: 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

Level of Value	Example of Criteria
	• 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) lies within or overlaps the project footprint • Internationally recognised, war grave, Marine Protected Area (MPA); scheduled site or feature (e.g. known wreck)
Medium	• Site of regional 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) 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) • Established recreation area for local activities lies within or overlaps the project footprint • 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 4.16: Definitions of Magnitude of Effect for Human Environment Impacts

Level of Value	Example of Criteria
High	• Change to fishing activity leading to a threat to the viability of business • A barrier to shipping , MOD operations, or oil & 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

Level of Value	Example of Criteria
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 discernible or smaller than average vessels in the seascape over a period of days • Change to local setting for cultural heritage site

Table 4.17: Assignment of impact significance for the human environment based on sensitivity of receptor and magnitude of effect

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

4.4.2.1. Impact of Rock Placement on Commercial Fisheries

Figure 4-2 to Figure 4-4 highlight the potential overlap of proposed rock placement with fishing activity. From these figures it is apparent that certain types of commercial fishing activity take place in the area where rock placement is planned. The main effects being assessed are (a) disturbance/displacement of fishing activity during the installation phase due to rock placement works and (b) loss of fishing grounds in the operational phase. Impacts from pipeline damage/snagging are not assessed as one of the purposes of the additional rock placement works is to remove this possibility via pipeline protection.

The proposed works are expected to take approximately 8 hours to complete and are within an area of commercial fishing. Therefore, without mitigation, the impact via disturbance/displacement is judged to be **medium**.

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 pipeline already being exposed, therefore already creating an area of seabed restricted to certain types of fishing activity (mainly dredging).

Pre-application feedback has also been received from the SFF who stated that as long as the proposed rock protection is used to the usual specification, i.e. 1-5 gradient, the coordinates are provided to Kingfisher and a post-installation survey is conducted the proposed works should not impact the SFF members (SFF, 2019).

Table 4.18: Impact Assessment on Commercial Fisheries

Impact Assessment	
Sensitivity of receptor	Disturbance/restrictions around rock placement: Medium Loss of access to fishing grounds: Low
Magnitude of effect	Disturbance/restrictions around rock placement: Medium Loss of access to fishing grounds: Low
Significance of impact (pre-mitigation)	Disturbance/restrictions around rock placement: **Moderate** Loss of access to fishing grounds: **Minor**

The significance of both these impacts will be reduced to **minor** significance by implementation of the following mitigation measure:

- Use of **Notice to Mariners** and dissemination of information via the **Kingfisher** bulletin service.

4.4.2.2. Impact of Rock Placement on Shipping and Navigation

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

- Potential impact on shipping and navigation via disturbance/restrictions during installation phase.

Disturbance/Restriction to Navigation during Installation Phase

In terms of receptors, Figure 4-5 and Figure 4-6, highlight the fact that the rock placement works are located to the south of a high shipping density area and cargo vessels are located to the west of the rock placement, the receptor sensitivity will be low. Based on the effect magnitude criteria in Table 4.16, as any disturbance to shipping will still be a "A temporary consideration/nuisance to shipping….in the area" due to the works taking approximately eight hours to complete, the magnitude of effect will be Very Low, and the overall impact will be **minor**.

Table 4.19: Impact Assessment on Shipping and Navigation

Impact Assessment	
Sensitivity of receptor	Disturbance/restriction to shipping/navigation: Low
Magnitude of effect	Disturbance/restriction to shipping/navigation: Very Low
Significance of impact	Disturbance/restriction to shipping/navigation: **Minor**

4.4.2.3. Impact of Rock Placement on Marine Archaeology

The proposed rock placement will not affect the sensitivity of the receptor. Due to it being unlikely that archaeology or wartime debris will be identified within the area rock placement area. Therefore, it can be concluded that the magnitude of effect will be Low. As a result, the significance level of the impact will be **minor**.

Table 4.20: Impact Assessment on Marine Archaeology

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

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

An assessment of an "impact" on key policies within the Scottish Marine Plan using the same methodology and criteria as other environmental receptors is not appropriate or relevant. An appraisal of key policies related to pipelines 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

Cumulative effect pathways can be synergistic (occurring through several separate pressures pathways on environmental receptors) or can be additive (where the same pressures from separate plans or projects combine to affect a sensitive receptor). The main driver for addressing cumulative effects of proposed plans is to ensure that the cumulative effects are monitored and if necessary, mitigated.

The cumulative assessment should include developments that are at various stages of the consenting process:

- Under construction;
- Permitted, but not yet constructed;
- Submitted applications where the decision has not yet been determined; and
- Projects identified in plans or guidance as reasonably likely to come forward.

Details of projects in the region of the proposed works identified as meeting these criteria are provided below. It should be noted that currently on-going and historical projects are included within the baseline environment as it is not possible to determine what the baseline conditions would be without the influence of these activities.

- Sound of Islay Demonstration tidal array (planned project);
- Crown Estate and Crown Estate Scotland forthcoming leasing rounds; and
- Subsea telecommunication cable lease options licenced to BT PLC.

All identified projects are noted to be at an early stage of planning. Where little information is available it is not possible to inform an in-combination assessment against their possible impact environmental receptors. The potential for cumulative effects between the proposed developments will be assessed as part of the environmental assessment if and when those projects are to proceed to operational production. This determination will not affect the proposed pipeline repair works assessed herein as any adverse effects will be associated with the subsequent tender sites.

In consideration of this and due to the scale, duration of the proposed repair works, it has been concluded that cumulative effects from the proposed works will be **negligible**.

5. Conclusions

This report presents an environmental assessment of proposed rock placement works on the Scotland to Northern Ireland Pipeline (SNIP). Potential impacts on physical, biological and human environment receptors have been assessed. A detailed, stand-alone HRA has also been produced.

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

Table 5.1: Summary of Impacts of Proposed Rock Placement

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Physical Environment			
Seabed Character	Low	Low	**Minor**
Water Quality (Pollution Prevention)	Medium	Very Low	**Minor**
Biological Environment			
Benthic Ecology	Low	Very Low	**Negligible**
Marine Non-Native Species (MNNS)	Low	Very Low	**Minor**
Fish and Shellfish Ecology: Localised seabed disturbance	Medium	Very Low	**Minor**
Underwater noise via increased vessel activity	High	Very Low	**Minor**
Marine Mammals: Disturbance via underwater noise	Very High	Very Low	**Minor**
Ornithology: Disturbance/displacement due to increased vessel presence	Medium	Very Low	**Minor**
Human Environment			
Commercial Fisheries: Disturbance/restrictions around rock placement	Medium	Medium	**Moderate (reduce to Minor following mitigation)**
Loss of access to fishing grounds	Low	Low	**Minor**

Impact	Sensitivity of Receptor	Magnitude of Effect	Impact Significance
Shipping and Navigation: Disturbance/restriction	Low	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 Biological Environment Human Environment	Low	Very Low	**Negligible**

The detailed HRA 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**.

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7. Appendix A: Scotland to Northern Ireland Pipeline: Rock Placement Habitat Regulations Assessment and Water Framework Directive Assessment