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Scotland to Northern Ireland Pipeline: Rock Placement Habitat Regulations Assessment and Water Framework Directive Assessment



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Project Ref:	J/4/82/19	Originator:	Damien Kirby
Date:	20/12/2019	Status:	First draft - external

Scotland to Northern Ireland Pipeline: Rock Placement Habitat Regulations Assessment and Water Framework Directive Assessment

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Date	Originator	Version	Action	Signature
13/12/2019	Damien Kirby	0.1	Internal Draft	[Redacted]
18/12/2019	Dafydd Lloyd Jones	0.2	Editorial Review	
20/12/2019	Damien Kirby	0.3	Internal Draft	
19/12/2019	Dafydd Lloyd Jones	0.4	Editorial Review	
20/12/2019	Damien Kirby	0.5	Internal Draft	
20/12/2019	Ian Reach	0.6	Technical Review / Editorial Review	
20/12/2019	Phil Durrant	1.0	Director Sign-off / External Document	
23/12/2019	Phil Durrant	1.1	Director Sign-off / External Document	

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MarineSpace Ltd, 2019. Scotland to Northern Ireland Pipeline: Rock Placement Habitat Regulations Assessment, and Water Framework Directive Assessment.

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Acknowledgements

MarineSpace Ltd thank Shane Rafferty at Mutual Energy and Chris Komar at Lloyd's Register for their support in developing the assessments contained within this report.

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Executive Summary

Geophysical exploratory works at the Scotland to Northern Ireland Pipeline identified two adjacent free spans 12 m and 16 m in length, separated by a rock dumped section of pipeline. Mutual Energy is concerned that a major storm event could reduce the central rock dumped section and create a long span which would be above the allowable length and subject to vortex induced vibrations and hence fatigue. To reduce the risk of the potential long span being created Mutual Energy proposes to deposit rock placement in the infill of the freespan and rock berm to be installed on top of the pipeline. The proposed works will affect an area <1,000 m² and take 8 hours to complete and will be carried out by 1 vessel in a single day.

HRA Process

Article 6(3) of the Habitats Directive, for any proposed plan or project, which is not directly connected or necessary to the management of the European marine site, competent authorities, in this case Scottish Natural Heritage, should complete a Habitats Regulation Assessment to establish whether the plan or project is likely to have a significant effect on the European marine site.

The proposed works do not occur directly within any designated conservation site, and as such the potential for direct impacts is restricted to impacts upon protected taxa travelling to the site of the proposed works, or indirect impacts, such as sediment plume or underwater noise, impacting more distant receptors. There are two Special Areas of Conservation designated for Annex I habitats within 30 km of the proposed pipeline repair site: Luce Bay and Sand Special Area of Conservation, designated for large shallow inlets and bays; embryonic shifting dunes; shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); fixed coastal dunes with herbaceous vegetation ("grey dunes"); Atlantic decalcified fixed dunes (*Calluno-Ulicetea*); and The Maidens Special Area of Conservation, designated for 'sandbanks which are slightly covered by seawater all of the time' and 'reef'.

There are four Marine Conservation Zones or Nature Conservation Marine Protected Areas within 100 km of the works site, however none of these sites has been designated for far ranging taxa other than The Rathlin Marine Conservation Zone (91 km distant) which supports black guillemot *Cephus grille*. However, the distribution of species is limited to within 2 km of their colonies. Black guillemot are also a designated feature of the Clyde Sea Sill Nature Conservation Marine Protected Area, which is situated 740 m to the northwest of the proposed works. However, the bird populations are located at the northern extent of this site, considerably more than 2 km away, and therefore there is no pathway for interaction between this receptor and the works effect envelope.

Assessment of Annex II listed harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus* was carried out based on the maximum known foraging distances for these species. All Special Areas of Conservation within this range from the proposed works site were screened in for further assessment. In accordance with current, best practice, assessment of harbour porpoise *Phocoena phocoena*, and bottlenose dolphin *Tursiops truncatus* involved screening into assessment all Special Areas of Conservation within the same Marine Mammal Management Unit as the proposed works. In view of the works site proximity to the Marine Mammal Management Unit boundary for both

species, a precautionary approach was adopted, and both Management Units were included for each species. Consideration of conservation designations for ornithological features was based on foraging distances as stipulated in Thaxter *et al.* (2012) any designated site within the maximum known foraging range (plus one standard deviation) was screened in for further assessment.

Following Habitats Regulations Assessment screening for likely significant effects, the following direct impacts were assessed within the Habitats Regulations Assessment Appropriate Assessment: 'visual disturbance'; and 'death or permanent or temporary injury caused by risk of collision with installation vessels'. In addition, the following indirect effects were evaluated: 'changes in suspended solids (water clarity)'; 'underwater noise changes'; 'visual disturbance'. The small spatial and temporal extent of the proposed works was assessed to have a relatively negligible impact on all receptors. No adverse effect on the integrity of all sites assessed was determined in all cases.

Water Framework Directive

A Water Framework Directive screening exercise was carried out to assess the potential for the proposed works to impact the status of surrounding water bodies. The proposed works have 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 km²;
- Covers <1% of the waterbody extent;
- Is >500 m from the nearest conservation designation;
- <1% of any lower sensitivity habitat;
- The works are not expected to affect water clarity for longer than a spring neap tidal cycle;
- The works are not in a water body with phytoplankton status of moderate, poor or bad; and
- The works are 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 Water Framework Directive. 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.

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1. Introduction

The Scotland to Northern Ireland Pipeline (SNIP) currently transports all gas into Northern Ireland supplying 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' licence area and the Scotia Gas Network (SGN) distribution system in the 'Gas to the West' licence 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 75 bar. 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 (Figure 1.1).

A 2016 survey identified two adjacent free spans 12 m and 16 m in length, separated by a rock dumped section of pipeline. Mutual Energy, the owner and operator of the SNIP, is concerned that a major storm event could reduce the central rock dumped section and create a long span which would be above the allowable length, subject to vortex induced vibrations and, hence, fatigue. Determination of maximum allowable length (24 m) is based on a 2016 assessment of strength and fatigue at the SNIP freespan (Xodus Assure, 2016). 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. The occupational safety/marine navigational benefits to fishing and general vessels respectively.

To reduce the risk of the potential long span being created Mutual Energy proposes to deposit rock to infill the cavity below the freespan and build up a protective rock berm on top of the pipeline.

4. Post-rock placement survey: after execution of the rock placement, a post-placement survey will be executed to confirm installation status.

2. Regulatory Context

This environmental report provides details of an initial Habitats Regulation Assessment (HRA) screening exercise that was conducted (see Section 5.1 of this report for the determinations of the screening exercise and the Natura 2000 sites required to be screened into ‘Appropriate Assessment’ (AA)).

The following sub-sections provide an overview of the European Commission (EC) Habitats Directive AA process, as required through transposition into UK domestic statutory instruments (the Habitats Regulations) and the associated HRA process. Section 6 presents the specific AA information for the proposed works (‘the project’).

2.1. The Habitats Regulations Assessment Process

2.1.1. The EC Habitats Directive and UK Regulations

The UK is bound by the terms of the EC Habitats Directive, the Birds Directive and the Convention on Wetlands of International Importance, also known as the Ramsar Convention. The aim of the Habitats Directive is to conserve natural habitats and wild species across Europe by establishing a network of sites known as Natura 2000 sites (for the purpose of this advice note, and as defined under the 2010 Habitats Regulations, these are referred to as European site(s), or European marine site(s) where the site exists below highest astronomical tide (HAT)).

Under Article 6(3) of the Habitats Directive, for any proposed plan or project, which is not directly connected or necessary to the management of the European marine site, competent authorities¹ should make an initial consideration, in consultation with Natural England, to establish whether the plan or project is likely to have a significant effect on the European marine site.

“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to Appropriate Assessment of its implications for the site in view of the site’s conservation objectives” Article 6(3).

¹ “Competent authority” as defined in the 2010 Habitats Regulations (as amended) Regulation 7(1), is a Minister, government office, statutory undertaker or public body, and is any such body with authority to give consent, or with authority to undertake projects themselves. The competent authority must ensure the requirements of the Regulations are met before undertaking or permitting any plan or project. Regulation 61 of the 2010 Habitats Regulations (as amended) and Regulation 25 of the Offshore Marine Regulations.

This Article has been interpreted as meaning that any project is to be subject to an AA if it cannot be proven, beyond reasonable scientific doubt, that there is no likely significant effect on that site (a precautionary approach), either alone or in-combination with other plans or projects².

The protection given by the Habitats Directive is transposed into UK legislation through the 2010 Habitats Regulations (as amended)³. The 2010 Habitats Regulations (as amended) require the competent authority, before deciding to authorise a project which is likely to have a significant effect on a European site *“to make an Appropriate Assessment of the implications for that site in view of that site’s conservation objectives”*⁴.

In accordance with the 2010 Habitats Regulations (as amended) 61(2), anyone applying for consent must provide the competent authority with such information as may reasonably be required *“for the purposes of the assessment”* or *“to enable them to determine whether an Appropriate Assessment is required”*⁵.

Sites of Community Importance (SCIs), afforded protection under the 2010 Habitats Regulations (as amended), are designated in the UK as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). As a matter of policy, the Government also applies the procedures described below to Ramsar sites, possible SACs, candidate SACs and potential SPAs. These sites are generally referred to as European sites or European marine sites where site boundaries exist below HAT.

2.1.2. The Role and Requirements of the Competent Authority

Although the 2010 Habitats Regulations (as amended) do not specify the methodology for carrying out an HRA, they do specify the obligations of the competent authority, Marine Scotland in this respect, and the applicant. The role of the competent authority is to determine if there are likely significant effects and carry out the AA⁶, if required, before a decision is made. The competent authority is also required to consult with the relevant nature conservation bodies, Marine Scotland in this case (and the public, if considered appropriate), before deciding to give consent, and where

² Decision of the ECJ in Waddenzee (C-127/02) – determined that in light of Article 6(3) of the Habitats Directive, a probable risk of significant effect of a plan or project exists (in particular, in view of the precautionary principle) if such a risk cannot be excluded on the basis of objective information that the plan or project will have significant effects on the site concerned.

³The Conservation of Habitats and Species Regulations 2010. Statutory Instrument 2010/490.

⁴ Regulation 61 of the 2010 Habitats Regulations (as amended) and Regulation 25 of the Offshore Marine Regulations.

⁵ Regulation 61(2) of the 2010 Habitats Regulations, Regulation, and Regulation 25(2) of the Offshore Marine Regulations,

⁶The 2010 Habitats Regulations (as amended) 61(1)

adverse effects remain they must undertake further assessments on alternatives and prepare a justification statement for Imperative Reasons of Overriding Public Interest (IROPI).

It is the responsibility of the applicant to include 'sufficient information' with the ability to identify the European sites, including European marine sites, and to enable an AA to be made if required⁷.

2.1.3. The Habitats Regulations Assessment (HRA) Approach

The approach to the HRA has followed that set out in '*Planning Circular 06/2005 on Biodiversity and Geological Conservation – Statutory obligations and their Impact within the Planning System*' produced by the Office of the Deputy Prime Minister (ODPM). It has also taken account of a range of other guidance material including that produced by the Infrastructure Planning Commission (IPC) (2011)⁸ and the EC 2007⁹; 2002¹⁰, 2000¹¹.

2.1.4. Overview of the HRA Process

The HRA process comprises four main stages as shown in the bullet points below (extracted from Circular 06/2005 produced by the Office of the Deputy Prime Minister (ODPM)). The stages are:

- Stage 1: screening to identify the likely impacts of a project on a European site and consider whether the impacts are likely to be significant;
- Stage 2: AA to determine whether the integrity of the European site will be adversely affected by the project;
- Stage 3: assessment of alternative solutions to establish if there are any that will result in a lesser effect on the European site;
- Stage 4: Imperative Reasons of Overriding Public Interest (IROPI) and Compensatory Measures to establish whether it is necessary for the project to proceed despite the effects on the European site, and to confirm that necessary compensatory measures are in place to maintain the coherence of the Natura 2000 network.

All four stages of the process are referred to collectively as the HRA, to clearly distinguish the whole process from the step within it referred to as the 'Appropriate Assessment'. The stages are discussed

⁷The 2010 Habitats Regulations (as amended) 61(2)

⁸ Infrastructure Planning Commission (2011) *Habitats Regulations Assessment for Nationally Significant Infrastructure Projects*. IPC.

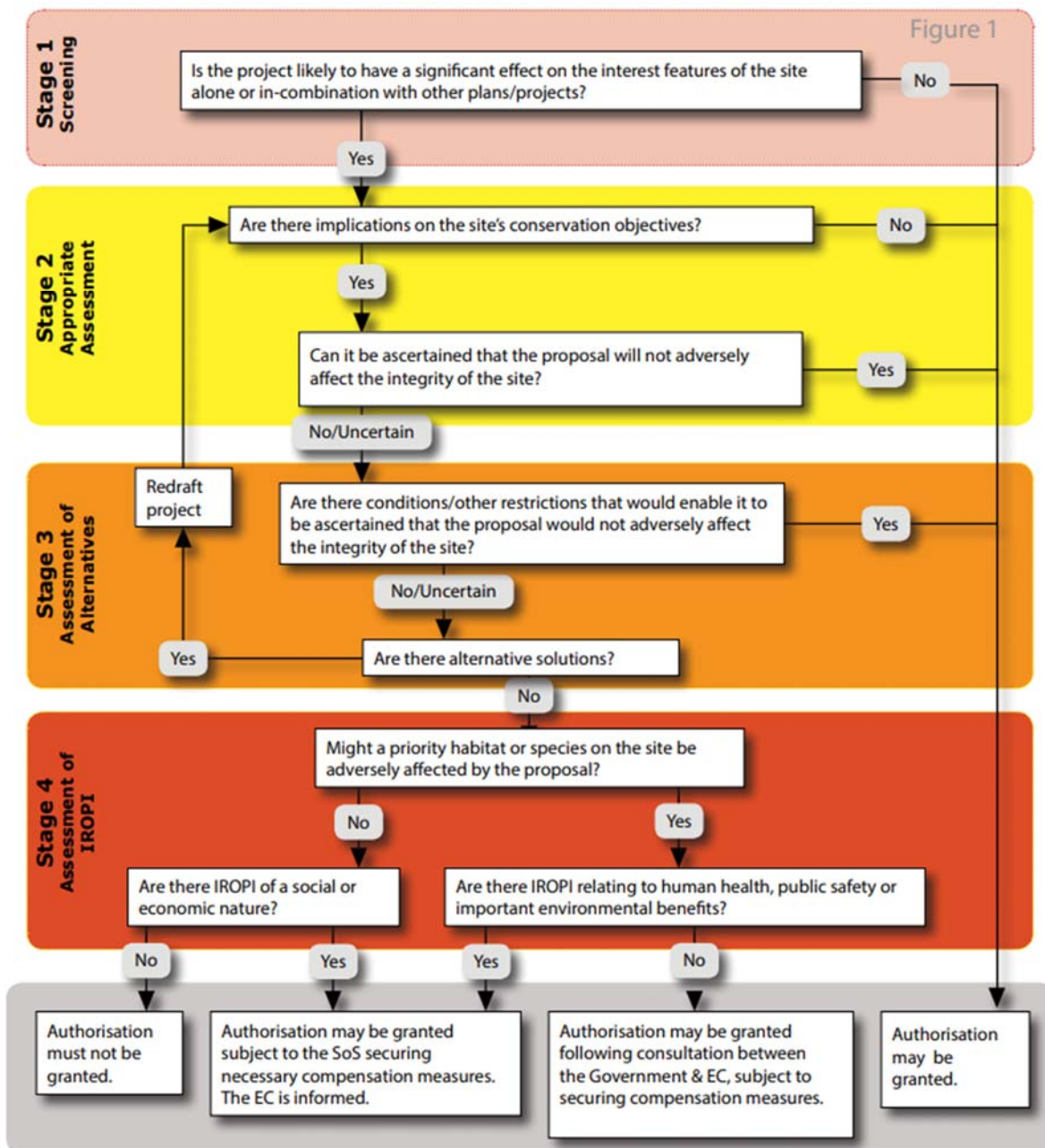
⁹European Commission (2007) *Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC*. EC

¹⁰European Commission (2002) *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites. Methodological Guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. EC

¹¹European Commission (2000) *Managing Natura 2000 Sites - The Provisions of Article 6 of the 'Habitats' Directive 92/43/CEE*. EC

in more detail in the following sections. Stage 3 and Stage 4 (if necessary) will result from the AA, once undertaken by Marine Scotland. Figure 2.1 shows the decision-making flow process within the HRA (PINS, 2017).

Figure 2.1: Decision flow chart for the Habitat Regulations Assessment process (From: PINS, 2017)



2.1.4.1. Stage 1 - Screening

The screening stage examines the likely effects of a project either alone, or in combination with other projects and plans on a Natura 2000 site, and seeks to answer the question “*can it be concluded that no likely significant effect will occur?*” To determine if the activities in question are likely to have any significant effects on the designated site the following issues have been considered:

- Could the proposals affect the qualifying interest and are they sensitive/vulnerable to the effect;
- The probability of the effect happening;
- The likely consequences for the site's conservation objectives if the effect occurred; and
- The magnitude, duration and reversibility of the effect.

The screening stage has therefore sought to conclude one of the following three outcomes:

1. No likely significant effect;
2. A likely significant effect; or
3. It cannot be concluded that there will be no likely significant effect.

Where the assessment concludes outcomes 2 or 3, then the need for an AA is triggered.

'Likely significant effect' in this context is any effect that may reasonably be predicted as a consequence of the project, that may significantly affect the conservation or management objectives of the features for which a site was designated¹², but excluding trivial or inconsequential effects.

The screening for likely significant effect also has to be compliant with the recent Court of Justice of the European Union (CJEU) caselaw '*People Over Wind & Sweetman* (Case C-323/17)'. The CJEU's ruling in '*People Over Wind*' – that it is not appropriate at the screening stage of HRA to take account of measures to avoid or reduce harmful effects on a European site – has been considered and applied. Therefore, screening for likely significant effects is based solely upon the presence/absence of a spatial interaction between pressure envelopes/footprints (from activity/sub-activities associated with plan or project) and the boundary of any designated site.

2.1.4.2. Stage 2 - Appropriate Assessment (AA)

An AA is an assessment carried out under Article 6(3) of the Habitats Directive or under Regulation 61 or Regulation 63 of the 2010 Habitats Regulations. The aim is to assess whether the proposals will have any adverse effects on the integrity of the European site, or European marine site. Site integrity is defined as:

“the coherence of its structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified”¹³.

¹²Habitats Regulations Guidance Note 3. The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c) Regulations 1994. English Nature, 1999.

¹³European Communities (2000) Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE. EC

The aim of an AA is to answer the question “*can it be demonstrated that the proposals will not adversely affect the integrity of the site?*” In accordance with the Waddenzee judgment (ECJ Case 127/02), the European Court of Justice ruled that a plan or project may be authorised only if a competent authority has made certain that the plan or project will not adversely affect the integrity of the site. “*That is the case where no reasonable scientific doubt remains as to the absence of such effects*”. In terms of what is reasonable, guidance from Scottish Natural Heritage (SNH) states “*to identify the potential risks, so far as they may be reasonably foreseeable in the light of such information as can be reasonably obtained.*”¹⁴

Within the UK Habitats Regulations or the EU Directive, there is no legal definition of the term ‘integrity’. ‘*Managing Natura 2000*’ (EC, 2000) delivers a definition of the term ‘integrity of the site’:

“the coherence of the site’s ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified”.

The ‘*Managing Natura 2000*’ guidance document (EC, 2000) emphasises the conservation objectives of a site as the basis for defining adverse effect:

“The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site’s conservation objectives”.

The decision on whether the integrity of the site could be adversely affected by the proposals should focus on, and be limited to, the site’s conservation objectives.

The conservation objectives set out what needs to be achieved for the European marine site to make the appropriate contribution to the conservation status of the features for which the site is designated, and thus deliver the aims of the Habitats and Birds Directives i.e. favourable conservation status for the Natura 2000 network as described under Article 17 of the Habitats Directive.

The assessment also accounts for any avoidance or mitigation measures which will be implemented to avoid or reduce the level of impact from the activity. The competent authority may also consider the use of further/additional conditions or restrictions to help avoid adverse effects on site integrity.

If the AA concludes that the proposals will not adversely affect the integrity of the European marine site, then permission may be granted. However, if the AA concludes that there will be an adverse effect on the integrity of the European marine site, or that there is uncertainty and a precautionary approach is taken, then consent can only be granted if there are no alternative solutions, and there are IROPI and compensatory measures have been secured.

¹⁴Scottish Natural Heritage (SNH), 2001. *Natura Casework Guidance: Consideration of Proposals Affecting SPAs and SACs*. SNH Guidance Note Series.

2.1.4.3. Stage 3 – Assessment of Alternative Solutions

All feasible alternatives have to be analysed to ensure that there are none which “*better respect the integrity of the site in question*” and its contribution to the overall coherence of the Natura 2000 network (EC, 2007). Alternatives could include the location of the site, its scale and design, and the way in which it is constructed and operated. The do-nothing option also has to be considered.

The comparisons of alternatives should not allow other assessment criteria (e.g. economics) to overrule ecological criteria (EC, 2007). However, the same guidance also refers to the opinion for the case C-239/04, where the opinion of the Advocate General was that:

“...the choice does not inevitably have to be determined by which alternative least adversely affects the site concerned. Instead, the choice requires a balance to be struck between the adverse effect on the integrity of the SPA and the relevant reasons of overriding public interest”.

2.1.4.4. Stage 4 – Imperative Reasons of Overriding Public Interest (IROPI) and Compensation Measures

Where a development has an adverse effect on the integrity of a European marine site, and there are no alternative solutions, consent can only be granted in one of the following ways as described in Regulation 62 of the 2010 Habitats Regulations (as amended):

- If the site hosts a priority habitat or species which is affected, proposals can only be consented if:
 - The site does host a priority habitat or species then IROPI must be demonstrated, and the reasons can include those of a social or economic nature;
 - Any other reasons which are considered by the competent authority to be IROPI, taking account of the opinion of the EC; and/or
 - There are implications for human health, public safety or beneficial consequences of primary importance to the environment.

If the importance of the proposed development is deemed to outweigh the effects which will result to the European marine site, and there are no alternatives, compensatory measures must be secured before consent is granted. Compensatory measures are independent of the project and intended to offset the adverse effects of a project. The compensatory measures must ensure that the overall coherence of the Natura 2000 network is maintained. Article 6(3) describes Natura 2000 as:

“a coherent European ecological network of special areas of conservation that shall enable the natural habitat types and species’ habitats concerned to be maintained, or where appropriate, restored at a favourable conservation status in their natural range” (EC, 2007).

To be acceptable compensatory measures should:

- Take account of the comparable proportions of habitats and species which are adversely affected;
- Be within the same bio-geographical range within which the European site is located;

- Provide functions which are comparable to those which justified the selection of the of the original site; and
- Have clearly defined implementation and management objectives so the measures can achieve the aim of maintaining the overall coherence of the network.

An AA is not the same as an environmental assessment and does not replace the requirement for such a study. Environmental assessments may also be required additionally, under the EIA Directive (85/337/EEC), in this case transposed under the *Marine Works (Environmental Impact Assessment) (Amendment) Regulations 2017 (Statutory Instrument 2017/588)*¹⁵.

2.2. Marine and Coastal Access Act (2009)/Marine Conservation Zones

Under the Marine and Coastal Access Act (MCAA) (2009) a series of Marine Conservation Zones (MCZs) has been designated. MCZs have been designated in three tranches; the first tranche was designated in 2013, the second in 2016, and recently the third tranche in 2019 (JNCC, 2019a). MCZs aim to conserve areas of our seas, protecting rare, threatened and representative habitats and species, in English inshore and English, Welsh and Northern Irish offshore waters (JNCC, 2010). There are currently 91 MCZs designated.

The MCZ process specifically takes into account the socio-economic data alongside the ecological data during the designation process, taking into account the views and interests of sea users and interest groups.

2.2.1. Marine Conservation Zone Risk Assessment Process

Under Section 126 of the MCAA (2009), duties are placed on Marine Scotland relation to marine licence decision making and the consideration of MCZs.

As part of the current marine licence decision-making process Marine Scotland must advise on developments where:

“... the act is capable of affecting (other than insignificantly)—

- (i) the protected features of an MCZ;*
- (ii) any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent.”*

Marine Scotland will use a risk-based approach when determining the ‘nearness’ of an activity with respect to MCZs. This will include applying an appropriate buffer zone to the MCZ features under consideration as well as a consideration of risks which lie in activities further removed from features.

¹⁵ <https://www.legislation.gov.uk/uksi/2017/588/contents/made>

The MCZ Risk Assessment (MCZ RA) process considers the impacts on MCZs. This process has three sequential stages, detailed below.

2.2.1.1. Screening

It is determined that s.126 of MCAA (2009) applies if:

- a. The licensable activity is taking place within or near an area being put forward or already designated as an MCZ; and
- b. The activity is capable of affecting (other than insignificantly) either;
 - i. The protected features of an MCZ; or
 - ii. Any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependant.

Where it has been determined through screening that s.126 should apply to the licence or application, Marine Scotland will assess the application further to determine which subsections of s.126 should apply to the application. This will be done in two stages; Stage 1 assessment and Stage 2 assessment.

2.2.1.2. Stage 1 Assessment

The Stage 1 assessment considers the extent of the potential impact of the plan or project on the MCZ in more detail. The Stage 1 assessment looks at whether the plan or project could potentially affect the conservation objectives for the site i.e. impact the site so that the features are no longer in favourable condition or prevent the features from recovering to favourable condition. If mitigation to reduce identified impacts cannot be secured, and there are no other alternative locations, then the project will proceed to be considered under Stage 2 of the assessment process.

2.2.1.3. Stage 2 Assessment

The Stage 2 assessment considers the socio-economic impact of the plan or project together with the risk of environmental damage. There are two parts to the Stage 2 assessment process:

- Does the public benefit in proceeding with the project clearly outweigh the risk of damage to the environment that will be created by proceeding with it? If so,
- Can the applicant satisfy that they can secure, or undertake arrangements to secure, measures of equivalent environmental benefit for the damage the project will have on the MCZ features?

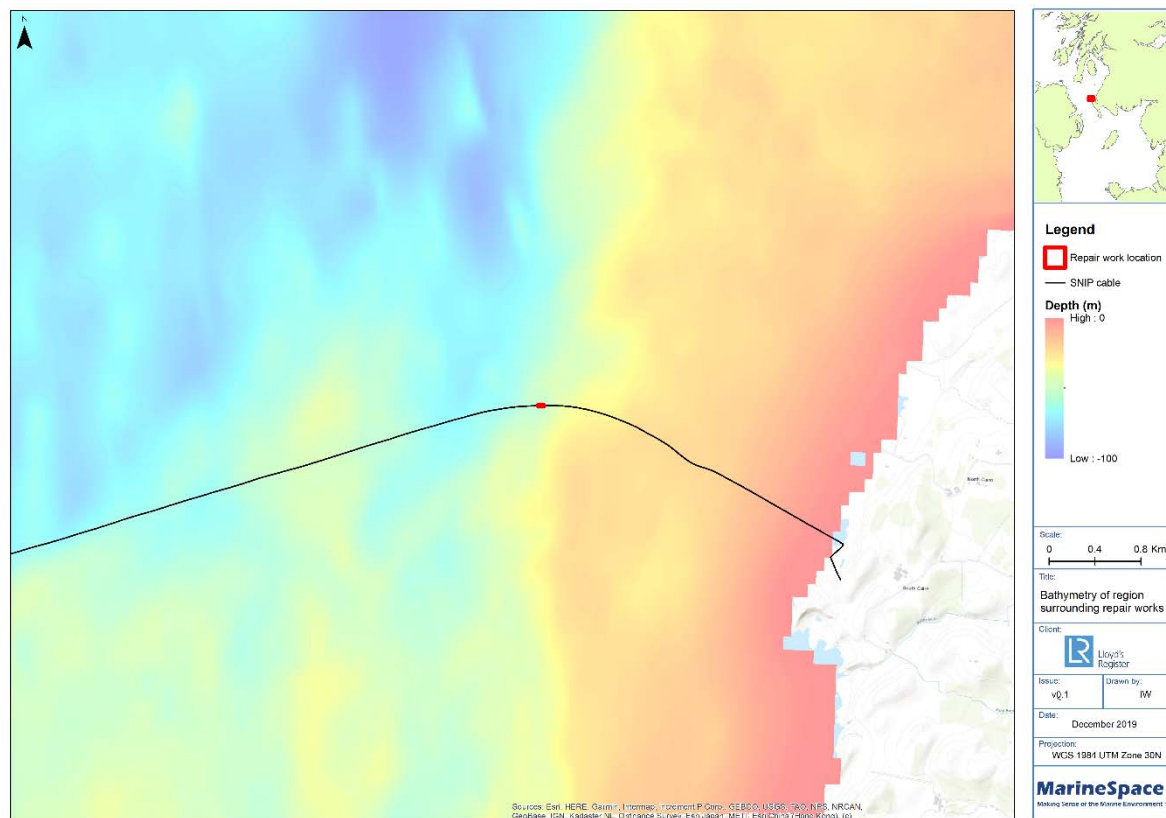
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3. Baseline Conditions

3.1. Physical Environment

Regional seabed substrates local to the proposed works are primarily offshore circalittoral sand, with areas of offshore circalittoral coarse sediment, and offshore circalittoral mud (EMODnet, 2019). Wider areas of sandy sediment extend to the north and coarse is the more predominant sediment to the south. Areas of muddy substrate are found to the northwest of the proposed works. The site is situated at the edge of the coastal shelf where depths increase offshore (Figure 3.1)

Figure 3.1: Bathymetry at site of proposed pipeline repair works (Source: EDC, 2018)



Scotland's tides are controlled by the tidal regime in the North Atlantic and are classified as strongly semi-diurnal (the two high tides and the two low tides are about the same height). Mean spring tidal range in Scotland is typically 3-4 m; this is in line with the tidal range at Stranraer (the closest monitoring station to the proposed works), but tidal height exceeds 7 m in the Solway Firth, to the southeast (Neil *et al.*, 2017). The North Channel which separates southwest Scotland from Northern Ireland is characterised by high tidal flows. Typical speeds in Scottish waters are under 1 m/s, but currents in this region exceed 2.5 m/s (Hashemi *et al.*, 2015).

Wave regime in Scottish coastal waters is affected by conditions in the North Atlantic; fetch for the predominantly southwesterly winds ensure that the west coast experiences an energetic wave

climate. However, mean wave power in the vicinity of the proposed works (0.1-6 kW/m; Marine Scotland, 2019) is at the lower range of conditions experienced across Scotland.

3.2. Biological Environment

As described in 3.1, 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. UK benthic characterisation surveys have supported this conclusion, recognising annelid worms as the dominant taxa in the region terms of both abundance and biomass (Barrio Frojan *et al.*, 2012). 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, 2019b)

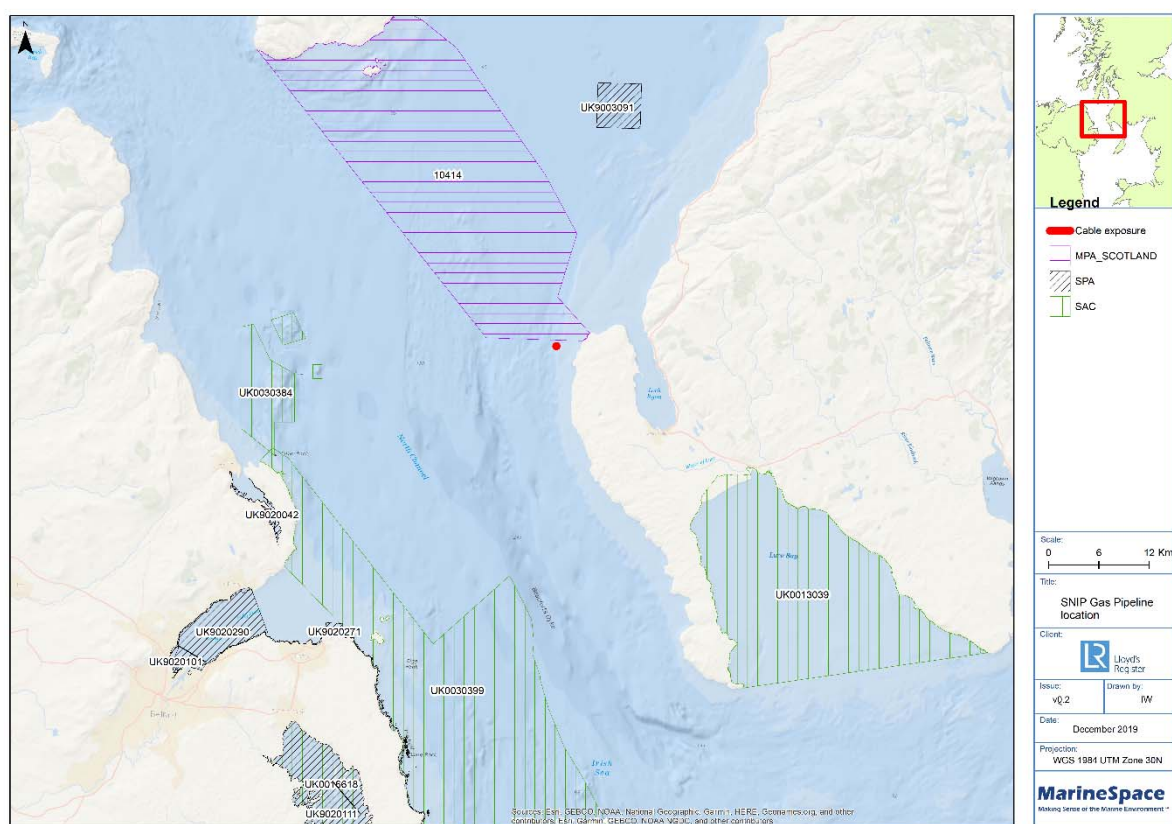
The Clyde Sea Sill Nature Conservation Marine Protection Area (NCMPA) is located less than 1 km north of the proposed works site. This area contains a 'sill' which leads cooler, saline waters from the North Channel to mix with warmer, less saline waters from the Clyde. This creates a front, which concentrates 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. Habitat Regulations Assessment and Marine Conservation Zone Risk Assessment

4.1. Marine Protected Areas - Baseline

There are several designated and proposed marine protected areas and coastal nature conservation sites within the region (Figure 4.1).

Figure 4.1: Marine Protected Areas and nature conservation sites in proximity to the Scotland-Northern Ireland Pipeline exposure (Source: Open Gov, 2019)



4.1.1. European Sites - Special Areas of Conservation and Sites of Community Importance

4.1.1.1. Annex I habitats

The nearest UK SAC (with a marine Annex I component) to the site of the proposed works is The Maidens SAC. This site is situated approximately 28 km west (at its nearest point). It covers an area of approximately 75 km² and has been designated as one of the UK's best examples of both 'sandbanks which are slightly covered by seawater all of the time' and 'reef'. The site is also designated for grey seal *Halichoerus grypus* (see following section on Annex II species). Directly south of The Maidens is North Channel SAC, however this is not designated for any Annex I habitats.

Luce Bay and Sands SAC covers the extent of Luce Bay, approximately 24.5 km southeast of the proposed works site. This 488 km² bay has been designated for the presence of the following Annex I listed habitats: large shallow inlets and bays; embryonic shifting dunes; shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes"); fixed coastal dunes with herbaceous vegetation ("grey dunes"); Atlantic decalcified fixed dunes (*Calluno-Ulicetea*).

4.1.1.2. Annex II species

The Annex II species for which SACs may be designated include harbour seal *Phoca vitulina*, grey seal *Halichoerus grypus*, harbour porpoise *Phocoena phocoena*, and common bottlenose dolphin *Tursiops truncatus*. They may also be designated for migratory (diadromous) fish, which occur in the marine environment for parts of their lifecycle: Atlantic salmon *Salmo salar*, twaite shad *Alosa fallas*, allis shad *Alosa alosa*, sea lamprey *Petromyzon marinus*, and river lamprey *Lampetra fluviatilis*.

Diadromous fish species such as sea lamprey, Atlantic salmon and European eel *Anguilla anguilla* are found in Scottish coastal waters and may be present at the site of the proposed repair works. However, the only SACs in southwest Scotland designated for migratory fish 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). There are no UK SACs in the area (southwest Scotland) for allis shad or twaite shad.

SACs (and SCIs) for harbour seal and grey seal are, typically, screened in based on their known foraging range from haul out sites. For grey seal, the foraging range has been determined to be 135 km, and for harbour seal it is 120 km (Special Committee on Seals (SCOS), 2018). Table 4.1 provides details of all SACs for grey seal or harbour seal situated within 135 km or 120 km of the proposed pipeline burial works, respectively.

Cetaceans are highly mobile species and can move across great distances. Biogeographic populations of these species have been delineated into Marine Mammal Management Units (MMMUs) (IAMMWG, 2013). Whilst based on best available evidence, MUs represent artificial delineations of populations, particularly for very wide-ranging species about which little information on population structure is available. The spatial extent of MMMUs are used to inform the spatial scale at which protected sites for cetaceans can be screened. A series of UK SACs are designated within the MMMUs for a suite of Annex II cetaceans, most notably harbour porpoise and bottlenose dolphin.

The proposed pipeline protection works are situated approximately on the borders between MMMUs for both harbour porpoise ('West Scotland' and 'Celtic and Irish Sea') and bottlenose dolphin ('Coastal West Scotland and Hebrides' and 'Irish Sea'). In recognition of this, both MMMUs are considered for each of these species. The UK SACs designated for common bottlenose dolphin and harbour porpoise within these MMMUs are detailed in Table 4.2.

It is not anticipated that any in-combination effects will arise from the presence or transits of vessels associated with the proposed pipeline repair works. However, context of vessels movements is provided within the accompanying Environmental Assessment, and the HRA and may require additional assessment once transit routes are known.

Table 4.1: Special Areas of Conservation designated for harbour seal *Phoca vitulina* or grey seal *Halichoerus grypus* populations that are located within the species' maximum foraging range

Site Name	Designation	Country	Annex II Feature	Distance (km)
Murlough	SAC	Northern Ireland inshore	Harbour seal	88
South-East Islay Skerries	SAC	Scotland inshore	Harbour seal	89
North Channel	SAC	Northern Ireland inshore and Northern Ireland offshore	Harbour seal	28
Inner Hebrides and the Minches	SAC	Scotland inshore	Harbour seal	84
Skerries and Causeway	SAC	Northern Ireland inshore	Harbour seal	83
The Maidens	SAC	Northern Ireland inshore	Grey seal	28

Table 4.2: Special Areas of Conservation designated for harbour porpoise *Phocoena phocoena* or common bottlenose dolphin *Tursiops truncatus* located within the same Management Unit as the proposed works*

Site Name	Designation	Country	Annex II Feature	Distance (km)
Bristol Channel Approaches/Dynesfeydd Môr Hafren	SAC	Wales	Harbour porpoise	385
North Anglesey Marine/Gogledd Môn Forol	SAC	Wales	Harbour porpoise	124
North Channel	SAC	Northern Ireland	Harbour porpoise	28
West Wales Marine/Gorllewin Cymru Forol	SAC	Wales	Harbour porpoise	229

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Blasket Islands	SAC	Ireland	Harbour porpoise	471**
Rockabill to Dalkey Island	SAC	Ireland	Harbour porpoise	163
Roaringwater Bay and Islands	SAC	Ireland	Harbour porpoise	477**
Mers Celtiques - Talus du golfe de Gascogne	SAC	France	Harbour porpoise	660
Nord Bretagne DO	SAC	France	Harbour porpoise	617
Côte de Granit rose-Sept-Iles	SAC	France	Harbour porpoise	670
Tregor Goëlo	SAC	France	Harbour porpoise	670
Nord Bretagne DH	SAC	France	Harbour porpoise	617
Chaussée de Sein	SAC	France	Harbour porpoise	758
Baie de Morlaix	SAC	France	Harbour porpoise	760
Ouessant-Molène	SAC	France	Harbour porpoise	717
Abers - Côte des légendes	SAC	France	Harbour porpoise	708
Inner Hebrides and the Minches	SAC	Scotland	Harbour porpoise	85
Skerries and Causeway	SAC	Northern Ireland	Harbour porpoise	84
Cardigan Bay/Bae Ceredigion	SAC	Wales	Common bottlenose	291

			dolphin	
Pen Llyn a'r Sarnau/Lleyn Peninsula and the Sarnau	SAC	Wales	Common bottlenose dolphin	229

* Due to the location of the proposed works on the boundary between MUs, both 'West Scotland' and 'Celtic and Irish Sea' MUs are included for harbour porpoise and both 'Coastal West Scotland and Hebrides' and 'Irish Sea' MUs for common bottlenose dolphin.

** Designation is located on the western coast of Ireland and therefore actual swimming distance is greater than the straight-line measurement specified herein.

4.1.2. Special Protection Areas

SPAs are designated under the Birds Directive to protect important populations of bird species. SPAs are most commonly designated to protect breeding colonies, and over-wintering populations; and have also been designated as important feeding areas for coastal SPA populations. Table 4.3 details SPAs designated for bird species with foraging ranges that overlap with the proposed works site. Foraging ranges are based on the mean maximum distances as determined by Thaxter *et al.* (2012). Where present, the mean maximum plus one standard deviation has been used.

Table 4.3: Special Protection Areas Designated for Bird Species with Foraging Ranges that Overlap with the Proposed Works Site (foraging ranges sourced from Thaxter *et al.*, 2012)

Site Name	Designation	Country	Relevant Designated Feature Bird Species with Foraging Ranges that Overlap with the Proposed Works	Distance (km)
Ailsa Craig	SPA	Scotland inshore	Herring Gull; common guillemot; lesser black-backed gull; northern gannet	26
Flannan Isles	SPA	Scotland inshore	Northern fulmar	393
Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island	SPA	Wales inshore	Manx shearwater	239
Handa	SPA	Scotland inshore	Northern fulmar	376
Larne Lough	SPA	Northern Ireland inshore	Sandwich tern	40
Mingulay and Berneray	SPA	Scotland inshore	Northern fulmar	249
Morecambe Bay and Duddon Estuary	SPA	England inshore	Lesser black-backed gull	135
Rathlin Island	SPA	Northern Ireland inshore	Common guillemot; lesser black-backed gull; northern fulmar	68

Rum	SPA	Scotland inshore	Manx shearwater	228
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4.1.3. Ramsar Sites

Ramsar sites are designated for important wetlands and their associated fauna. These fauna can include marine species such as seabirds and marine mammals.

Loch of Inch and Torrs Warren Ramsar site is a 21 km² area, located approximately 19 km southeast of the proposed works site. The site is composed of an area of foreshore and sand dunes and a large nutrient-rich freshwater loch, that support well-developed fen communities. During the winter months the site supports internationally important numbers of Greenland white-fronted geese *Anser frontalis flavirostris*. The temporal separation between the proposed pipeline repair works (planned for late March 2020) and the wintering Greenland white-fronted geese populations avoids overlap between presence of this feature and the project effects envelope.

Belfast Lough Ramsar site is a 4 km² site located 46 km from the proposed works and made up of intertidal mudflats and lagoons, and reclaimed land. These areas support important feeding/roosting sites for significant numbers of wintering waders and wildfowl. The outer lough is primarily formed of rocky shores with some small sandy bays and beach-head saltmarsh. It regularly supports internationally important numbers of overwintering redshank *Tringa totanus*.

Outer Ards Ramsar site is a 12 km² coastline site, including reefs and islands, located 41 km from the proposed pipeline repair works. The site includes sand- and mud-dominated shores, cobble and boulder beaches and rocky shores. Adjoining habitats include areas of dune and maritime grassland, maritime heath and cliff ledge vegetation, saltmarsh, tidal and non-tidal fens and wet flushes. The Outer Ards Ramsar site is especially important for the breeding colony of Arctic tern *Sterna paradisaea*, together with the wintering populations of light-bellied Brent goose *Branta bernicla hrota*, European golden plover *Pluvialis apricaria*, ruddy turnstone *Arenaria interpres* and ringed plover *Charadrius hiaticula*.

The Killough Bay Ramsar site is an area of mudflat and sand dominated beech habitat with areas of gravel, cobble and rocky shore. The site is located 87 km from the proposed works. The principal interest is the wintering population of light-bellied Brent goose, which feeds on the rich mats of the green alga *Enteromorpha* spp. during late winter and spring.

Strangford Lough Ramsar site is located 54 km from the works site and covers an area of approximately 16 km². It is a wetland site that supports one of the most extensive saltmarsh areas in Northern Ireland. The area contains vulnerable and endangered plants and animals such as eelgrass, and marine sponges, marine mollusc, and breeding and wintering populations of well over 70,200 waterfowl.

Larne Lough Ramsar site is a shallow estuary containing mudflat and saltmarsh habitat partially contained within a peninsula, located 38 km from the proposed works. Vegetation is dominated by halophytic communities and includes reedbeds and saltmarsh pans. The site regularly supports nationally important numbers of breeding terns and internationally important numbers of wintering light-bellied Brent goose *Branta bernicla hrota*.

There are no other Ramsar sites within 100 km of the proposed works. It is MarineSpace's initial analysis that more distant MCZs are all too far away from the proposed works for any adverse risks to occur to any of the designated features.

4.1.4. Annex IV species

Annex IV species are defined under the Habitats Directive as “... *animal and plant species of community interest in need of strict protection.*” Although these will not be protected under species spatial designations, it is important to consider the potential impacts on these Annex IV species as a whole.

Annex IV species that may be present in the marine environment include: harbour porpoise, common bottlenose dolphin, common dolphin *Delphinus delphis*, killer whale *Orcinus orca*, long-finned pilot whale *Globicephala melas*, Risso's dolphin *Grampus griseus*, Atlantic white-sided dolphin *Lagenorhynchus actus*, Atlantic white-beaked dolphin *L. albirostris*, minke whale *Balaenoptera acutorostrata*, fin whale *B. physalus*, and sperm whale *Physeter macrocephalus*. All cetaceans in UK waters are recognized as Annex IV species. Although 15 species have been recorded within the northern Irish Sea (Evans and Shepherd, 2001), of these only 3 are sighted with any frequency; the northern minke whale, common bottlenose dolphin and harbour porpoise (Reid *et al.*, 2003).

4.1.5. Marine Conservation Zones

The Outer Belfast Lough Marine Conservation Zone (MCZ) is the closest MCZ to the proposed works, approximately 38 km southwest. This site is an exposed area and is located within Northern Ireland's busiest sea-lough and encompasses a wide range of habitats such as subtidal sand and subtidal mixed sediments, sediment dominated bays and rocky shores. The site was designated due to the presence of a well-established population of ocean quahog *Arctica islandica* and subtidal (sublittoral) sand habitat.

The Waterfoot MCZ is located approximately 53 km from the site of the proposed works, within a small embayment in the Red Bay area, County Antrim, Northern Ireland. This area is predominantly sand and gravel sediments which support extensive high-quality seagrass *Zostera marina* bed on subtidal sand.

The Rathlin MCZ is a 91 km² site situated approximately 66 km from the pipeline repair works site. It is situated on an island which marks the northernmost point of Northern Ireland. The site was designated for deep-sea bed (>200 m), nesting populations of black guillemot *Cepphus grylle* and geological/geomorphological features including a submerged coastline, underwater caves, sea arches and lagoons. Black guillemot distribution is limited to within 2 km of their colonies (SNH, 2019). As such there is no pathway for interaction between the populations located in the Rathlin MCZ and the proposed works activities.

The South Rigg MCZ is located 59 km from the proposed works site. This offshore site includes a variety of habitats from finer sediments to rocky habitats and has been designated for the presence of moderate energy circalittoral rock; sea-pen and burrowing megafauna communities; subtidal coarse sediment; subtidal mixed sediments; subtidal mud; and subtidal sand.

There are no other MCZs within 100 km of the proposed works. It is MarineSpace's initial analysis that more distant MCZs are all too far away from the proposed works for any adverse risks to occur to any of the designated features. The qualifying features of the designations listed above are highly localised and include no far-ranging taxa. As such there is no pathway for interaction with the works effect envelope and all MCZs are not taken on for further assessment.

As per the recent '*People Over Wind & Sweetman* (Case C-323/17)' ruling by the CJEU, mitigation measures can only be considered for Natura 2000 sites after screening for likely significant effects has been conducted.

4.1.6. Nature Conservation Marine Protected Areas (Scotland)

Nature conservation Marine Protected Areas (NCMPAs) have been designated in 31 locations within Scotland. These sites are in place for the conservation of nature, protection of biodiversity and protecting of Scottish heritage. The Clyde Sea Sill NCMPA is situated 740 m from the proposed works at its nearest point. This site 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.

The Clyde Sea Sill site is characterised by coarse and mixed substrates in tide-swept conditions off Kintyre, rippled fine-medium sands in the centre of the sill, and sandy-mud habitats on the Galloway side. It was designated for black guillemot; circalittoral and offshore sand and coarse sediment communities; fronts; and for the marine geomorphology of the Scottish shelf seabed.

Conservation advice for this NCMPA notes that:

"Black guillemot have medium sensitivity to underwater noise associated with seismic and geophysical surveys. Black guillemots generally forage within about 2km of their colonies. Underwater noise should be reduced or limited in the areas of most importance for foraging black guillemots from colonies on Sanda and Sheep Islands, in order to achieve the conservation objectives for this species"

and that:

"Management should therefore be focussed around these locations and does not need to be put in place across the whole MPA" (Scottish Natural Heritage, 2019).

Sanda and Sheep Islands are at the northern extent of the Clyde Sea Sill NCMPA and, as such, there is no overlap between their expected foraging range and the effects envelope for the proposed works.

4.2. Pressures/Effects

The proposed pipeline protection works have the potential to directly interact with nature conservation features through the following pressure pathways:

- Permanent loss (removal) of seabed habitats and change in seabed character associated with presence of a rock berm (incl. prey species habitat);
- Visual disturbance; and
- Death or permanent or temporary injury caused by risk of collision with installation vessels.

The overall condition of the nature conservation sites may also be indirectly affected through the following pathways:

- Changes in suspended solids (water clarity);
- Underwater noise changes; and
- Visual disturbance.

4.3. Screening for Likely Significant Effects/Risks

The established HRA and MCZ RA processes are detailed in Section 2 of this report. The screening stage examines the likely effects of a project, either alone, or in combination with other projects and plans, on a Natura 2000 site. It seeks to answer the question “*Can it be concluded that no likely significant effect will occur?*”

The structure of the assessment is focussed on the exposure of Natura 2000 sites and MCZs and receptors (designated/qualifying features/sub-features) to relevant pressure footprints associated with the proposed pipeline protection works. The structure of the screening exercise relates ‘source – pressure pathways – receptor’ and makes assessment of significance in relation to magnitude of effect (pressure) and the sensitivity of a receptor (to that pressure).

The screening for likely significant effect is made within the context of the worst-case scenarios, noting that management/avoidance/mitigation measures are not considered at this stage, and using the information provided in each site’s advice on marine operations workbook.

The same rationale is applied when screening for likely significant risk for designated features of MCZs.

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5. Activities to be Assessed and Associated Pressures (Effects)

The following pressures (environmental effects) associated with rock placement and presence of a rock berm are screened and assessed where required:

- Permanent loss (removal) of seabed habitats and change in seabed character associated with presence of a rock berm;
- Creation of sediment plume; impact from rocks upon seabed causing mobilisation of seabed sediments;
- Creation of sediment plume by release of fine sediments present on the surface of imported rock material;
- Noise created during rock placement (disturbance/displacement);
- Noise from vessel movements and operations;
- Visual impact of vessels; and
- Death or permanent/temporary injury caused by risk of collision with installation vessels

Assessment is set within the context of the scope of works parameters presented in Section 1.1 of this report. Table 5.1 below provides an overview of the key parameters and assumptions used to develop the 'worst case scenario' used in the assessment.

Table 5.1: Assessment envelope - key parameters and assumptions

Environmental Envelope

Footprint of direct seabed disturbance from rock placement is < 1,000 m²

Seabed habitat loss/alteration is assessed as being permanent in nature

Sediment plumes created by rock deposition are assessed as 50 m cross-tide and up to 10 km tide parallel spring tide

Pipeline protection works are expected to take 8 hours and be completed in a single day

Transit routes are unknown but given the short works duration, vessel traffic is not expected to be detectable above background vessel movements

The proposed works are scheduled to commence in late March 2020

5.1. Screening

5.1.1. Screening for Direct Effects

For direct effects to occur, the pressure must spatially overlap with the site features (including far-ranging/foraging species) or with the boundary of the site. Therefore, all sites with no direct spatial interaction with the proposed decommissioning activities can be screened out of assessment in relation to the pressures associated with direct effects.

5.1.2. Habitat loss and loss of foraging

There is no direct spatial overlap between the proposed works site and any designated site of nature conservation importance. However, there is a direct spatial overlap with habitat that may support prey species for far-ranging designated populations from the following designated sites of nature conservation importance:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (harbour seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin);
- Ailsa Craig SPA (herring gull; common guillemot; lesser black-backed gull; northern gannet);
- Flannan Isles SPA (northern fulmar);
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA (Manx shearwater);
- Handa SPA (northern fulmar);

- Larne Lough SPA (Sandwich tern);
- Mingulay and Berneray SPA (northern fulmar);
- Morecambe Bay and Duddon Estuary SPA (lesser black-backed gull);
- Rathlin Island SPA (guillemot; lesser black-backed gull; northern fulmar); and
- Rum SPA (Manx shearwater).

These sites are screened into Stage 2 AA and all other designated sites of nature conservation importance are screened out of assessment for this pressure.

5.1.2.1. Visual disturbance

The proposed operations have the potential to affect marine ornithology and marine mammal receptors through disturbance and displacement due to visual disturbance from vessels associated with the proposed decommissioning works.

Any impacts resulting from this pathway would be spatially restricted to the immediate area around the vessel, and temporally restricted to the duration of the operations. It is assumed that only one vessel will be present at a time, and that operations and presence at the site will be completed in a single day.

5.1.2.2. Death or permanent or temporary injury caused by risk of collision with installation vessels

Bird collisions with vessels are known to occur, however these are more frequent at night on lighted ships (Merkel and Johansen, 2011). Furthermore, below water collisions may occur when aquatic animals collide with the propeller or other parts of the hull causing collision injury or death. Any impacts from these pressures will increase with the spatial or temporal scale or intensity of the activity.

The accompanying Environmental Assessment report provides details of vessel traffic in the vicinity of the proposed works. Typical commercial marine traffic in this region includes ferry routes to and from Scotland and Northern Ireland. 6 ferries leave Loch Ryan Port and sail to Belfast daily, while up to 16 scheduled daily ferries, both passenger and freight, sail from the Port of Cairnryan to Larne in Northern Ireland. Estimated annual average vessel density, within the specific region where works will take place is low, however vessel density to the north and to the west is high. Given that the proposed works will be completed by 1 vessel in a single day, the likelihood of these collision events occurring is minimal. This impact is screened out of the following assessment.

5.1.3. Screening for Indirect Effects

For secondary or indirect effects to occur a halo of effect must be considered that may extend some distance from the point source of the sub-activity. These distances are variable dependent upon the sub-activity and the pressure.

5.1.3.1. Changes in suspended solids (water clarity)

For the pressure changes in suspended solids (water clarity) the area of effect is likely to be highly localised. However, to maintain a precautionary approach the extent of any tidal plume is predicted in line with the range of sediment plumes from trailing suction hopper dredger (TSHD) activities (Figure 5.1). It should be noted that the area of effect associated with the deposition of rock berm materials is not expected to generate increased suspended sediment loads or plumes to the same extent as those generated by TSHDs.

The footprint of sediment plume and potential altered seabed bedforms (resulting from the deposition of any suspended sediment) may interact with the following designated sites or habitat supporting prey items of far-ranging designated populations of species from:

- Ailsa Craig SPA (herring gull; common guillemot; lesser black-backed gull; northern gannet);
- Flannan Isles SPA (northern fulmar);
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA (Manx shearwater);
- Handa SPA (northern fulmar);
- Larne Lough SPA (Sandwich tern);
- Mingulay and Berneray SPA (northern fulmar);
- Morecambe Bay and Duddon Estuary SPA (lesser black-backed gull);
- Rathlin Island SPA (guillemot; lesser black-backed gull; northern fulmar); and
- Rum SPA (Manx shearwater).

These sites are screened into Stage 2 AA.

All other designated sites of nature conservation importance are screened out of assessment for the indirect pressures of: 'changes in suspended solids (water clarity)' and 'smothering and siltation rate changes (light)' as there are no pressures pathways present.

Figure 5.1: Maximum potential plume extent from activities at the proposed pipeline repair works site. Tidal plume prediction is based on a worst-case assessment based on tidal prism data



5.1.3.2. Underwater noise changes

Rock placement on the seabed is achieved as rocks are transferred from the cargo hold/hopper to the flexible fall pipe. Rocks will then fall down through the fall pipe towards the seabed. This process creates a degree of underwater noise and has the potential to impact designated populations of foraging seabirds, marine mammals and migratory fishes.

Although the noise levels associated with rock placement are not expected to be high, the effects may be detectable to some foraging seabirds and marine mammals, and may induce localised avoidance behaviour in sensitive species. In a precautionary manner all sites with far-ranging designated populations that may be foraging in the vicinity whilst the proposed works take place have been screened into Stage 2 AA.

The marine mammal species considered within this HRA include two native species of cetacean (common bottlenose dolphin and harbour porpoise) and two native species of seal (grey seal and harbour seal).

SACs (and SCIs) for harbour seal and grey seal are typically screened in based on their known foraging range from haul out sites. For grey seal, the foraging range has been determined to be

135 km, and for harbour seals it is 120 km (Special Committee on Seals (SCOS), 2018). Within this HRA, the approach to cetaceans is based on advice from Scottish Natural Heritage (2016a), which incorporates all sites within the project areas relative mammal MUs for each mammal species (IAMMWG, 2015; JNCC, 2013). Proposed works will be conducted within the following marine mammal MUs. For each of these MUs, their related SACs are presented within Table 4.2.

- Harbour porpoise: 'West Scotland' and 'Celtic and Irish Sea';
- Common bottlenose dolphin: 'Coastal West Scotland and Hebrides' and 'Irish Sea'.

Through these assessments, the following conservation designations are screened in for indirect effects from underwater noise:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (harbour seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin); and
- Pen Llŷn a'r Sarnau / Lleyn Peninsula and the Sarnau SAC (common bottlenose dolphin);

5.1.3.3. Migratory Fish

Diadromous fish species such as sea lamprey *Petromyzon marinus*, Atlantic salmon *Salmo salar* and European eel *Anguilla anguilla* are present in Scottish coastal waters and may be present at the site of the proposed repair works.

Atlantic salmon smolts move down rivers in April and May to reach the sea and head northwards and westwards in prolonged migrations of up to many thousands of kilometres that last for one or more years. Some Scottish fish travel as far as the Davis Strait between the western coast of

Greenland and Baffin Island in the Canadian Arctic (Scottish Government, 2017; MarineSpace, 2018). After 2 or 3 years at sea, Atlantic salmon return to the Scottish coastline in the autumn or early winter before migrating back up their natal rivers to spawn.

Sea lamprey larvae metamorphose to adults during the summer and then migrate to sea during the late autumn and early winter, distributing to coastal and offshore waters (Maitland, 2003). After up to 6 years at sea the adults return to their natal rivers between March and June (but can start as early as September), with spawning taking place between May and June.

Adult European eel appear to migrate out to sea during the summer and autumn months. The migration tends to be reliant upon increased freshwater discharge events. Juvenile elvers (glass eels) arrive at rivers during the early to late winter period and into April and May. However, there are no European eel qualifying features in any of the SACs screened for likely significant effects.

The only SACs in southwest Scotland designated for migratory fish 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).

5.1.3.4. Visual disturbance

Currently the exact vessel transit routes to and from the proposed works are unknown. However, works will be carried out by a single vessel that will make a single trip to and from the works site. Interaction with designated sites of nature conservation importance, should be considered in relation to the known existing background vessels movements and density and frequency of such traffic for this area (detailed in the accompanying Environmental Assessment report).

Current advice states that non-physical (visual) disturbance of sensitive species such as red-throated diver from surface vessels may be expected up to 2 km from point source and may be up to 4 km distant (Reach *et al.*, 2013; Furness *et al.* 2013; Garthe and Hüppopd, 2004). Therefore, in a precautionary manner, a 4 km distance from potential and likely vessel transit routes has been considered as part of the AA. This is not only for SPAs with red-throated diver classified populations, but also in a precautionary manner for all of the following screened in SPAs:

- Ailsa Craig SPA (herring gull; common guillemot; lesser black-backed gull; northern gannet);
- Flannan Isles SPA (northern fulmar);
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA (Manx shearwater);
- Handa SPA (northern fulmar);
- Larne Lough SPA (Sandwich tern);
- Mingulay and Berneray SPA (northern fulmar);
- Morecambe Bay and Duddon Estuary SPA (lesser black-backed gull);
- Rathlin Island SPA (guillemot; lesser black-backed gull; northern fulmar); and
- Rum SPA (Manx shearwater).

5.1.4. Results of the Screening for Likely Significant Effects/Risks

With respect to the proposed pipeline protection works, the screening exercise concluded that **no likely significant effects/risks** could not be determined for:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (harbour seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin);
- Ailsa Craig SPA (herring gull; common guillemot; lesser black-backed gull; northern gannet);
- Flannan Isles SPA (northern fulmar);
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA (Manx shearwater);
- Handa SPA (northern fulmar);
- Larne Lough SPA (Sandwich tern);
- Mingulay and Berneray SPA (northern fulmar);
- Morecambe Bay and Duddon Estuary SPA (lesser black-backed gull);
- Rathlin Island SPA (guillemot; lesser black-backed gull; northern fulmar); and
- Rum SPA (Manx shearwater).

These sites are screened in to requiring Appropriate Assessment regarding the proposed pipeline protection works. No MCZs or NCMPAs have been screened in for further assessment and will not be considered further in this report.

6. Assessment of Adverse Effects on Integrity of Sites

6.1. Ornithological Qualifying Features

6.1.1. Prey Species Habitat Loss and Loss of Foraging Habitat

Seabed disturbance associated with rock placement will be limited in extent to an area less than 1,000 m². The works are also short in duration (8 h of work to be completed in a single day). The proposed works do not occur directly within any conservation designation and any effects that do occur will occur through the loss of suitable foraging habitat.

Although the works will result in a permanent change in seabed habitat type, the small extent of this change ensures that only a small fraction of overall foraging area is affected. The effect of this change is expected to be of a very low magnitude and overall residual effects on fish, including prey species, from disturbance of the seabed during the additional rock emplacement activity are considered to be minor and temporary.

The significance of effects on prey species and foraging habitat availability are not of a magnitude sufficient to result in any adverse effects on qualifying species and their classified populations.

6.1.2. Determination of Impacts on Prey Species and Loss of Foraging Habitat

Considering the temporary temporal nature of the rock installation activity, the small seabed footprint in the context of the extensive foraging area available to the species assessed, and the small magnitude of habitat alteration it is determined that **no adverse effects on site integrity will result for the SPAs and Ramsar sites** screened into assessment:

- Ailsa Craig SPA;
- Flannan Isles SPA;
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA;
- Handa SPA;
- Larne Lough SPA;
- Mingulay and Berneray SPA;
- Morecambe Bay and Duddon Estuary SPA;
- Rathlin Island SPA; and
- Rum SPA.

6.1.3. Underwater Sound Emissions on Prey Species

The increase in underwater sound emissions associated with the emplacement of additional rock will cause disturbance to foraging bird species and reduce the amount of available foraging grounds. Seabirds can be impacted by underwater noise whilst they are diving and foraging for food. The level of impact received by the individual will depend on a variety of factors such as the distance to the sound source, the time spent underwater (dive duration), and the hearing sensitivity of the species.

Dive duration has been assessed for a range of seabirds by the Welsh Assembly Government (2011). Gull species and northern fulmar, being shallow divers (<4 m), are unlikely to spend any considerable time underwater; for example, lesser black-backed gull have a dive duration of 2 seconds. The dive duration of divers and terns is unknown. The species with the longest dive durations are great cormorant (up to 152 s), guillemot (up to 43 s), and gannet (up to 38 s).

The underwater hearing sensitivity of seabirds is not well known. Diving ducks have an auditory sensitivity range from 1.0 -3.0 kHz (USGS, 2019). Great cormorant has been shown to have more sensitive hearing at higher frequencies underwater (compared to in-air) and are able to detect noise at 5 kHz frequency above a threshold of 120 dB re 1 μ Pa RMS (Johansen *et al.*, 2015). Auks (specifically Atlantic puffin) have peak underwater hearing sensitivity centred around 2 kHz, with ability to hear up to 6 kHz (at SPLs of \sim 80 dB re. 20 μ Pa). It appears that specialised divers that dive for longer durations have greater hearing sensitivities in higher frequency ranges.

The seabirds that may encounter underwater noise in potentially impactful levels are the diving species that are sensitive to higher frequencies produced by the proposed works. Seabirds have previously been assessed as having a neutral impact from other underwater acoustic operations that produce considerably higher source levels (specifically seismic surveys; DCCAE, 2019).

It can be broadly stated that underwater noise dissipates with increasing distance from the source. Therefore, the level of sound received by the individual will decrease with increasing distance from the source. It is the level of received sound that will determine the level of impact experienced by the individual.

It is thought that the primary pathway through which disturbance occurs is underwater noise produced by the vessel. In an assessment of subsea noise impacts on marine species from installation and protection of export cables, Nedwell *et al.* (2012) noted that the noise of rock armour deposition formed a smaller component of underwater noise than vessels. Vessels do not produce sufficient noise to cause injury to marine mammals (Richardson *et al.*, 1995); only disturbance effects may occur.

However, the 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 (for any species). This potential area of effect is very small compared with nearby areas where seabirds are known to feed. Furthermore, the source of noise associated with, and effects of, rock emplacement will be temporary and localised, and fish populations are not determined to be adversely affect.

Migratory fish species which are qualifying features of SACs or Ramsar sites are assessed separately below. No adverse effects on those populations were determined.

6.1.4. Determination of Impacts from Underwater Sound Emissions on Prey Species

Considering the temporary temporal nature of the rock installation activity, the small seabed footprint in the context of the all bird foraging ranges assessed, and the small magnitude of habitat alteration it is determined that **no adverse effects on site integrity will result for the SPAs and Ramsar sites** screened into assessment:

- Ailsa Craig SPA;
- Flannan Isles SPA;
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA;
- Handa SPA;
- Larne Lough SPA;
- Mingulay and Berneray SPA;
- Morecambe Bay and Duddon Estuary SPA;
- Rathlin Island SPA; and
- Rum SPA.

6.1.5. Increases to Suspended Sediment and Turbidity

Rock placement activities will result in a small increase in suspended sediment due to impact from rocks upon seabed causing mobilisation of seabed sediments and release of fine sediments present on the surface of imported rock material. Increased turbidity can affect foraging ability of some seabirds (Schreiber and Burger, 2001). However, the scale of this increase will be low due to the small area of seabed upon which rocks will be deposited (< 1,000 m²) and the small volume of fine sediment that is likely to be present on the surface of imported rock. In addition, the effects of any suspended sediment increase will be temporary; rock placement works will be completed within approximately 8 hours, and the sediment plume is expected to disperse within a single tidal cycle. Assessment of sediment plume caused during sandbank clearance works for the Hornsea One cable burial works determined that associated plume would reduce to undetectable levels within 24 hours (HR Wallingford, 2013). Given the comparatively small increase in suspended sediment associated with the proposed rock placement activities, it should be concluded that the residence period for any increase in turbidity will be less. Increases in turbidity occur naturally during and after storm events. It is expected that this small level of increased sediment will be undetectable above natural variation. The overall spatio-temporal effects of the sediment plume will therefore be extremely limited and **no adverse effects on site integrity will result for the SPAs and Ramsar sites** screened into assessment:

- Ailsa Craig SPA;
- Flannan Isles SPA;
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA;
- Handa SPA;
- Larne Lough SPA;
- Mingulay and Berneray SPA;
- Morecambe Bay and Duddon Estuary SPA;
- Rathlin Island SPA; and
- Rum SPA.

6.2. Annex II Marine Mammal Features

6.2.1. Prey Species Habitat Loss, Loss of Foraging Habitat Space and Impacts from Underwater Sound Emissions and Foraging Success

The determinations made in Section 6.1 are also directly applicable to marine mammal prey species. All qualifying marine mammal features have sufficient range and foraging habitat space to make the determinations comparable.

6.2.2. Determination of Impacts on Prey Species Habitat Loss, Foraging Area and from Underwater Sound Emissions on Prey Species

Considering the temporary temporal nature of the rock installation activity, the small seabed footprint in the context of the extensive foraging area available to the species assessed, and the small magnitude of habitat alteration it is determined that **no adverse effects on site integrity will result for the SACs and Ramsar sites** screened into assessment:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal; harbour porpoise);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (grey seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin); and
- Annex IV listed cetacean species within affected waters

6.2.3. Impacts from Damage and Disturbance

The emplacement of rock onto the seabed or the use of acoustic survey and vessel positioning/navigation equipment associated with the rock emplacement have the potential to result in secondary effects that can affect marine mammal features and/or their prey species (death or permanent or temporary injury caused by propagation of underwater sound to the individual or to prey species; and disturbance/displacement caused by propagation of underwater sound to the individual or to a prey species). There may also be effects associated with an increase in underwater sound emissions from the vessels associated with the works. Finally, the risk of collision with vessels must be considered.

To determine if there may be any adverse effects associated with emitted underwater sound waves two criteria have to be considered:

- Sensitivity of the species to the underwater sound waves produced by the source activity; and
- Potential for the species to be exposed to the underwater sound waves pathway.

6.2.3.1. Marine Mammal Hearing Sensitivities and Thresholds

Sensitivity to underwater noise is dependent upon the specific hearing abilities of the species. The potential effects are:

- Lethal effects and physical injury;
- Auditory injury (permanent threshold shift (PTS) and temporary threshold shift (TTS)); and
- Behavioural response.

The thresholds used in this screening exercise are taken from the Caithness-Moray Firth export cable project-specific European Protected Species (EPS) Assessment report (Natural Power, 2017). This is used as the pressure thresholds and receptor sensitivities are directly comparable to those associated with the proposed works assessed in this report.

6.2.3.2. Lethal Effects and Physical Injury

Rock Emplacement

Rock emplacement was given an estimated unweighted source level of 172 dB re 1 μ Pa @ 1 m (Natural Power, 2017). There is, therefore, no potential for lethal effects or physical injury (for which the thresholds are 240 dB re 1 μ Pa and 220 dB re 1 μ Pa respectively) from the emplacement of rock.

Increased Vessel Noise

The estimated unweighted source level for noise from a large vessel is 168 dB re 1 μ Pa @ 1 m (Natural Power, 2017). There is, therefore, no potential for lethal effects or physical injury, for which the thresholds are 240 dB re 1 μ Pa @ 1 m and 220 dB re 1 μ Pa @ 1 m respectively.

Determination

No adverse effects on site integrity are predicted for:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal; harbour porpoise);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (grey seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin); and
- Annex IV listed cetacean species within affected waters

6.2.3.3. Auditory Injury

Rock Emplacement

It is assumed that marine mammals will flee from the noise source, rather than remain stationary. Therefore, exposure to a level of noise at which auditory injury is expected to occur from the rock emplacement work is extremely unlikely to occur. This is because the M-weighted sound exposure level (SEL) ranges out to which auditory injury is predicted show that auditory injury is only likely to occur at ranges of less than one metre (Natural Power, 2017).

Increased Vessel Noise

The M-weighted SEL range out to which auditory injury is expected to occur for noise from large vessels is predicted to be less than one metre (Natural Power, 2017).

Determination

No adverse effects on site integrity are predicted (so long as mitigation measures are implemented) for:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal; harbour porpoise);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (grey seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin); and
- Annex IV listed cetacean species within affected waters

6.2.3.4. Behavioural Response – Disturbance

Rock Emplacement

Natural Power (2017) predicted that the potential for a behavioural response due to increased anthropogenic noise from rock emplacement was 31 m for bottlenose dolphin (and 99 m for harbour porpoise) (based on predicted 90 dBht (species) impact ranges). These ranges (<1 km) do not interact with any of the SACs with Annex II marine mammal features. Therefore, only foraging individuals have the potential to interact with the effect footprint.

Increased Vessel Noise

The number of individuals which have the potential to be affected by increased vessel noise was not estimated by Natural Power (2017), because the ranges of potential impact were determined to be so small. It is considered that sound from vessel activity associated with the proposed rock

emplacement work will not significantly add to the background noise levels from vessels already present in the region (SSE, 2011; Natural Power, 2017).

Determination

No adverse effects on site integrity are predicted for:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal; harbour porpoise);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (grey seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin); and
- Annex IV listed cetacean species within affected waters

6.2.3.5. Vessel Collision

Vessel collisions are known to cause mortality in marine mammals. These events are usually associated with large cetaceans and tend to be lethal (Natural Power, 2017). Non-lethal collisions are documented with injuries represented by blunt trauma (collision with the bow) or lacerations (collision with propellers). Injured cetaceans may have an increased susceptibility to predation or succumbing to secondary infections (Natural Power, 2017).

The rock emplacement works will be undertaken by large vessels following the cable route (a pre-defined linear route) when working. Nearshore works conducted by small to medium-sized vessels will either be stationary or travelling at low working speeds. Considering these factors, it will be easy for marine mammals to predict vessel movements and to demonstrate avoidance. The

potential for collision with the vessels undertaking the rock emplacement work is therefore considered to be negligible.

Determination

No adverse effects on site integrity are predicted for:

- Murlough SAC (harbour seal);
- South-East Islay Skerries SAC (harbour seal);
- North Channel SAC (harbour seal; harbour porpoise);
- Inner Hebrides and the Minches SAC (harbour seal; harbour porpoise);
- Skerries and Causeway SAC (harbour seal; harbour porpoise);
- The Maidens SAC (grey seal);
- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC (harbour porpoise);
- North Anglesey Marine / Gogledd Môn Forol SAC (harbour porpoise);
- West Wales Marine / Gorllewin Cymru Forol SAC (harbour porpoise);
- Blasket Islands SAC (harbour porpoise);
- Rockabill to Dalkey Island SAC (harbour porpoise);
- Roaringwater Bay and Islands SAC (harbour porpoise);
- Nord Bretagne DO SAC (harbour porpoise);
- Mers Celtiques - Talus du golfe de Gascogne SAC (harbour porpoise);
- Côte de Granit rose-Sept-Iles SAC (harbour porpoise);
- Tregor Goëlo SAC (harbour porpoise);
- Nord Bretagne DH SAC (harbour porpoise);
- Chaussée de Sein SAC (harbour porpoise);
- Baie de Morlaix SAC (harbour porpoise);
- Ouessant-Molène SAC (harbour porpoise);
- Abers - Côte des légendes SAC (harbour porpoise);
- Cardigan Bay / Bae Ceredigion SAC (common bottlenose dolphin);
- Pen Llŷn a'r Sarnau / Llyn Peninsula and the Sarnau SAC (common bottlenose dolphin);
- Annex IV listed cetacean species within affected waters

6.2.4. Visual Disturbance

Visual disturbance of sensitive species such as red-throated diver may be expected up to 2 km from point source and may be up to 4 km distant (Reach *et al.*, 2013; Furness *et al.* 2013; Garthe and Hüppopd, 2004). Therefore, in a precautionary manner, a 4 km distance from potential and likely vessel transit routes have been considered as part of the AA.

The accompanying Environmental Assessment report provides details of vessel traffic in the vicinity of the proposed works. 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. Estimated annual average vessel density within the specific region where works will take place is low, however vessel density to the north and to the west is high.

A review was undertaken of the sensitivity to disturbance and displacement effects by different species as part of an EIA for a tidal array project (assessment based on the following sources: and Garthe and Hüppop, 2004; Furness and Wade, 2012; Furness, 2013; Furness *et al.*, 2013). The results of the review for the species present in the working area and surrounding region are presented in Table 6.1.

Table 6.1: Sensitivity of seabird species in the region to disturbance and displacement associated with vessel presence and airborne noise (Adapted from: Furness, 2013; Furness and Wade, 2012; Furness *et al.*, 2013; and Garthe and Hüppop, 2004)

Common Name	Species	Sites Screened into Assessment	Sensitivity to Disturbance and Displacement
Northern fulmar	<i>Fulmaris glacialis</i>	Flannan Isles SPA; Handa SPA; Mingulay and Berneray SPA; Rathlin Island SPA	Low
Lesser black-backed gull	<i>Larus fuscus</i>	Ailsa Craig SPA; Morecambe Bay and Duddon Estuary SPA; Rathlin Island SPA	Low
Herring gull	<i>Larus argentatus</i>	Ailsa Craig SPA	Low
Northern gannet	<i>Morus bassanus</i>	Ailsa Craig SPA	Low
Sandwich tern	<i>Thalasseus sandvicensis</i>	Larne Lough SPA; Larne Lough SPA	Low
Guillemot	<i>Uria aalge</i>	Ailsa Craig SPA; Rathlin Island SPA	Medium
Manx shearwater	<i>Puffinus puffinus</i>	Glannau Aberdaron ac Ynys Enlli/ Aberdaron Coast and Bardsey Island SPA; Rum SPA	Low

It can be inferred that all seabird species in the region have a low or medium sensitivity to displacement and disturbance from vessel presence and airborne noise. The proposed works will be completed using a single vessel which will make a single trip to site.

6.2.5. Determination from Visual Disturbance

Considering this short works duration and the minimal number of transits set within in regional levels of shipping that transit through the area, then any additional potential disturbance effect is expected to be negligible. It is determined that **no adverse effects on site integrity will result for the SPAs and Ramsar sites** screened into assessment:

- Ailsa Craig SPA;
- Flannan Isles SPA;
- Glannau Aberdaron ac Ynys Enlli / Aberdaron Coast and Bardsey Island SPA;
- Handa SPA;
- Larne Lough SPA;
- Mingulay and Berneray SPA;
- Morecambe Bay and Duddon Estuary SPA;
- Rathlin Island SPA; and
- Rum SPA.

6.3. Migratory fish

6.3.1. Migratory fish

There is potential for temporal overlap between the proposed works and migratory movements for these species. However, based on the small spatial (<1,000 m²) and temporal (8 hours) scale of the proposed works, there is negligible pathway for impacts to these wide-ranging species.

No adverse effects to on site integrity are predicted for:

- The River Bladnoch SAC (designated for Atlantic salmon); and
- The Solway Firth SAC, over 120 km away (designated for river lamprey).

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7. In-combination Effects

The Habitats Regulations requires the consideration of in-combination effects from proposed activities on European Sites. The in-combination assessment should consider effects, which may or may not interact with each other, but which could affect a given receptor (i.e. a habitat or species for which a European site is designated).

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

The in-combination 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/or
- 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
- Various subsea telecommunication cable lease options.

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 to surrounding features of SACs and SPAs. The potential for in-combination effects will be assessed as part of the environmental assessment (associated with each of those projects) if, and when, those projects proceed to licence application stage. This determination will not affect the proposed pipeline repair works assessed in this HRA as any adverse effects will be associated with the subsequent projects and addressed by those projects at the time of their assessment.

In consideration of this and due to the scale, duration of the proposed repair works, it has been concluded that there is expected to be **no Likely Significant Effect** on any of the SACs or cSACs considered within this HRA.

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8. Water Framework Directive

The Water Framework Directive (WFD) commits EU member states to achieve good quantitative and qualitative status of all water bodies. In the UK, an integrated approach to the management of all freshwater bodies, groundwaters, transitional (estuarine) and coastal waters at the river basin level has been adopted.

The overall requirement of the WFD is that all waterbodies must achieve 'Good Ecological Status'; by 2027, with interim targets in 2015 and 2021. It also requires that environmental objectives be set for all waterbodies to either maintain 'Good Status', or to move towards 'Good Status' if a waterbody is currently failing its target. Under all conditions, it requires that there should be no deterioration in status.

There are two separate classifications for surface water bodies (including rivers, lakes, transitional and coastal waters); ecological and chemical characteristics. The WFD follows the 'one out all out principle' which stipulates that waterbodies are classified in accordance with the lowest scoring quality element. For a water body to be in overall 'good' status, both ecological and chemical status must be at least 'good'.

The ecological status of a surface water body is assessed through the consideration of both biological elements (e.g. fish, benthic organisms and other aquatic flora), physico-chemical elements (e.g. dissolved oxygen, salinity and concentrations of nutrients), concentrations of specific pollutants, and the condition of the hydromorphological quality elements (e.g. wave regime).

Ecological status is assessed against a scale of 'high', 'good', 'moderate', 'poor' or 'bad', with 'high' denoting largely undisturbed conditions and the other classes representing a deterioration from the undisturbed condition. The ecological status classification for the water body, and the confidence in this, is determined from the worst scoring quality element.

Chemical status is assessed by according to compliance with environmental standards for chemicals that are listed in the EC Environmental Quality Standards Directive (2008/105/EC). Chemical status is recorded as 'good' or 'fail'. In accordance with the 'one out, all out principle', chemical status for a water body is determined by the worst scoring chemical.

River Basin Management Plans (RBMPs) developed for each River Basin District (RBD) set out the current status classification of all waterbodies, as well as the objectives and actions required to maintain or improve the current Status of each waterbody.

The objectives of this WFD assessment are as follows:

- Identify any waterbodies that could potentially be affected by the proposed works;
- Identify any activities that could affect those waterbodies; and
- Assess the potential for activities associated with the proposed works to result in a deterioration of waterbody status, or prevent status objectives being achieved in the future.

8.1. Details of proposed works

Details of the proposed works methodology is provided in Section 1.1. The Project is located within the Solway Tweed RBD. Due to the transboundary extent of the Solway Tweed river catchment extent, this RBD is managed jointly by the Scottish Environmental Protection Agency (SEPA) and the Environment Agency (EA) in England.

The Solway Tweed RBD (classified as 'good' status) is sub-divided into distinct water bodies. The proposed works are situated in the Mull of Galloway to Corsewall Point coastal water body (ID: 200012) (classified as 'good' status) which is 333.5 km² in extent. Immediately to the northwest, this water body adjoins the Firth of Clyde Outer (offshore) water body (ID: 200295) (classified as 'good' status), which lies within the Scotland river basin district (classified as 'good status'). The Firth of Clyde Outer (offshore) covers 1,414.3 km² in area.

The Solway Tweed RBMP notes that:

"The two most widespread pressures on the water environment [within the Solway Tweed RBD], rural diffuse pollution and modifications to the physical condition of water bodies."

The RBMP subsequently proposes a series of actions to address the primary challenges to improvement of the water body.

8.2. Potential Impacts from the proposed pipeline protection works

The proposed rock placement works have the potential to impact the status of surrounding water bodies through:

- Habitat loss, and associated impacts on biological communities; and
- Water quality, through an increase in suspended sediment.

8.2.1. Habitat loss

The EA 'Clearing the Waters for All' (2016) guidance specifies that impacts to habitats within a waterbody should be considered if an activity is:

- 0.5km² or larger;
- 1% or more of the water body's area;
- Within 500 m of any higher sensitivity habitat; and/or
- 1% or more of any lower sensitivity habitat.

The proposed pipeline repair works area is <0.001 km², which constitutes <0.0003% of the Mull of Galloway to Corsewall Point coastal water body. The closest sensitive habitat is the Clyde Sea Sill Nature Conservation MPA, situated 740 m from the site of the proposed works. The proposed works footprint also does not cover 1% or more of any lower sensitivity habitat. Based on these factors it is concluded that the proposed pipeline protection works do not require assessment for potential risk to biological habitats under the WFD.

8.2.2. Water quality

EA (2016) states that a WFD impact assessment of water quality must be carried out if an activity:

- Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days);
- Is in a water body with a phytoplankton status of moderate, poor or bad; and/or
- Is in a water body with a history of harmful algae.

The proposed works may result in an increase in turbidity, but any increase will be small. In addition, the works are taking place in open tidal waters and any increase in suspended sediment is expected to be dispersed within a single tidal cycle. Assessment of sediment plume caused during sandbank clearance works for the Hornsea One cable burial works determined that associated plumes would reduce to undetectable levels within 24 hours (HR Wallingford, 2013). Given the comparatively small increase in suspended sediment associated with the proposed rock placement activities, it should be concluded that the residence period for any increase in turbidity will be less.

The Galloway to Corsewall Point coastal water body has a phytoplankton status of 'high' and there is no history of harmful algae. Based on these factors, it is concluded that the proposed pipeline protection works do not require assessment for potential risk to biological habitats under the WFD.

8.3. WFD Assessment Conclusion

Based on the scoping criteria outlined in the EA '*Clearing the Waters for All*' WFD guidance, 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.**

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9. Conclusions

9.1. Habitat Regulations Assessment

The assessment presented in this report concludes that the proposed pipeline protection works will have no adverse effects on the integrity of any designated site within the Natura 2000 network.

The proposed works will lead to a permanent change in seabed characteristics over a small area (<1,000 m²) and will be associated with a small temporary increase in suspended sediment and a degree of underwater sound and pressure emissions. However, due to the small spatial and temporal nature of these impacts, they are not considered to pose a risk to any conservation designation.

No adverse effects on the integrity all sites screened into assessment is determined.

9.2. MCZ Risk Assessment

All MCZs were screened out of assessment at the screening stage. No impact pathway was identified from the proposed activities to the designated features of these sites. As such the proposed works was determined to pose no threat to the integrity of these sites.

No likely significant risks to any MCZ or NCMPS screened for assessment was determined.

9.3. Water Framework Directive

An assessment of the proposed works was carried out in accordance with EA '*Clearing the Waters for All*' (2016) guidance. This 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.**

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10. References

- DCCAE (Department of Communications, Climate Action & Environment), 2019. Irish Offshore Environmental Assessment (IOSEA) 5. Available online at [https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/environment/strategic-environmental-assessment/Pages/Irish-Offshore-Environmental-Assessment-\(IOSEA\)-5.aspx](https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/environment/strategic-environmental-assessment/Pages/Irish-Offshore-Environmental-Assessment-(IOSEA)-5.aspx) [Accessed December 2019].
- EA (Environment Agency), 2016. Clearing the Waters for All. Available at <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters#screening-exclude-activities-from-scoping> [Accessed December 2019].
- EC (European Commission), 2007. Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC. EC
- EDC (EMODnet Bathymetry Consortium), 2018. EMODnet Digital Bathymetry (DTM). <http://doi.org/10.12770/18ff0d48-b203-4a65-94a9-5fd8b0ec35f6>
- EMODnet Seabed Habitats, 2019. Available at: <https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/?zoom=5¢er=-5.749,56.543&layerIds=500,501,502&baseLayerId=-3> [Accessed December 2019]
- Evans PGH, and Shepherd B, 2001. Cetaceans in Liverpool Bay and Northern Irish Sea. Seawatch Foundation
- Froján CRB, Bolam SG, Eggleton JD, & Mason C, 2012. Large-scale faunal characterisation of marine benthic sedimentary habitats around the UK. *Journal of sea research*, 69, 53-65.
- Furness B, 2013. Extent of displacement, and mortality implications of displacement of seabirds by offshore wind farms. Draft Environmental Statement Chapter 11 Appendix B Seabird Displacement Review. 22 pp.
- Furness B, and Wade H, 2012. Vulnerability of Scottish seabirds to offshore wind turbines. MacArthur Green Ltd. Glasgow, Scotland.
- Furness RW, Wade HM, and Masden EA, 2013. Assessing vulnerability of marine bird populations to offshore windfarms. *Journal of Environmental Management*, 119, 56-66.
- Garthe S, and Hüppop O, 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology*, 41, 724–734.
- Hashemi MR, Neill SP, and Davies AG, 2015. A coupled tide-wave model for the NW European shelf seas. *Geophysical and Astrophysical Fluid Dynamics*, 109, 234-253.
- HR Wallingford on behalf of Smart Wind Limited, 2013. Hornsea Offshore Wind Farm Project One Environmental Statement Volume 5 – Offshore Annexes. Annex 5.1.6, Cable Burial Plume Assessment. PINS Document Reference: 7.5.1.6 APFP Regulation 5(2)(a). Report UK04-050200-REP-0033.
- IAMMWG (Inter-Agency Marine Mammal Working Group), 2013. Management Units for marine

mammals in UK waters. A note prepared by the UK Statutory Nature Conservation Bodies.

JNCC (Joint Nature Conservation Committee), 2010. Marine Conservation Zones. Available online at <http://archive.jncc.gov.uk/default.aspx?page=5545> [Accessed December 2019].

JNCC (Joint Nature Conservation Committee), 2019a. Marine Protected Area network completed. Available online at <https://jncc.gov.uk/news/tranche-3-mcz-designation-announcement/> [Accessed December 2019].

JNCC (Joint Nature Conservation Committee) 2019b. Marine Habitat Classification for Britain and Ireland. Available at <https://mhc.jncc.gov.uk/> [Accessed December 2019]

Johansen S, Larsen ON, Christensen-Dalsgaard J, Seidelin L, Huulvej T, Gensen K, Lunneryd S-G, Bostrom M, and Wahlberg M, 2015. In-Air and Underwater Hearing in the Great Cormorant (*Phalacrocorax carbo sinensis*). Advances in Experimental Medicine and Biology.

Marine Scotland, 2019. Annual mean wave power interactive map based on data provided by ABP Marine Environmental Research (ABPmer). Available at <https://marinescotland.atkinsgeospatial.com/nmpi/default.aspx?layers=425> [Accessed December 2019]

MarineSpace Ltd, 2018. *Caithness-Moray HVDC Link Cable Repair & Rock Placement: Environmental Assessment Report*. Version 1.0.

Merkel FR, and Johansen KL, 2011. Light-induced bird strikes on vessels in Southwest Greenland. Marine Pollution Bulletin, 62, 2330-2336.

Natural Power, 2017. EPS Risk Assessment for Work Proposed in 2018 Caithness to Moray HVDC Project. Document No. 1156585. Issue A [In prep.].

Nedwell JR, Brooker AG, and Barham RJ, 2012. Assessment of underwater noise during the installation of export power cables at the Beatrice Offshore Wind Farm. Subacoustech Environmental Report, (E318R0106).

Neill SP, Vögler A, Goward-Brown AJ, Baston S, Lewis MJ, Gillibrand PA, Waldman S, and Woolf DK, 2017. The wave and tidal resource of Scotland. Renewable Energy, 114, 3-17.

Open Gov, 2019. Open Government Licence v3.0. JNCC © copyright 2018; ©NIEA, 2019

PINS (The Planning Inspectorate), 2017. Advice note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects. Available at <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/06/Advice-note-10v4.pdf> [Accessed December 2019]

Reach IS, Henson K, Golding TJ, Murphy KJ, Langman RJ, Coates AS, Warner IC, Hatton L, Wright S, and Leake S, 2013. Marine Aggregate Licence, Renewal and Application Areas: Anglian and Outer Thames Estuary Region: A Report to Inform an Appropriate Assessment (in combination), with regard to disturbance, and any displacement effects, on the classified Red-throated Diver *Gavia stellata* population of the Outer Thames Estuary Special Protection Area -Version 1.0. A Report

produced for British Marine Aggregate Producers Association to inform the Marine Management Organisation.

Reid J.B., Evans P.G.H., and Northridge S.P., 2003. *Atlas of Cetacean Distribution in North-West European Waters*. Joint Nature Conservation Committee.

Richardson J, Greene CR, Malme CI, and Thomson DH, 1995. *Marine Mammals and Noise*. San Diego California: Academic Press.

Schreiber EA, and Burger J, (Eds.), 2001. *Biology of marine birds*. CRC Press.

SCOS (Special Committee on Seals), 2018. *Scientific Advice on Matters Related to the Management of Seal Populations: 2018*. 144pp.

Scottish Government, 2017. Salmon. Available at: <http://www.gov.scot/Topics/marine/marine-environment/species/fish/freshwater/salmon> [Accessed December 2019].

SNH (Scottish Natural Heritage), 2019. Scottish MPA Project Management options. Available at <https://www.nature.scot/sites/default/files/2017-11/Marine%20Protected%20Area%20-%20management%20options%20paper%20-%20Clyde%20Sea%20Sill%20possible%20MPA.pdf> [Accessed December 2019]

SSE, 2011. Moray Firth Hub & Caithness HVDC Connection Hub & Subsea Cables Volume 1: Environmental Statement. Rev 0.0. Report produced by Aquatera Ltd.

Thaxter CB, Lascelles B, Sugar K, Cook ASCP, Roos S, Bolton M, Langston RHW, and Burton NHK, 2012. Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* Early Online DOI: 10.1016/j.biocon.2011.12.009.

USGS, 2019. In-air and underwater hearing abilities of seabirds. Available online at https://www.usgs.gov/centers/pwrc/science/air-and-underwater-hearing-abilities-seabirds?qt-science_center_objects=0#qt-science_center_objects [Accessed December 2019].

Welsh Assembly Government, 2011. *Assessment of Risk to Diving Birds from Underwater Marine Renewable Devices in Welsh Waters*. A report produced by RPS Energy for the Welsh Assembly Government.

Xodus Assure, 2016. Consultancy Support Framework - Marine Services - WP1 Additional Works. Freespan Fatigue Assessment. Document Number: L-300267-S02-REPT-001

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