November 2025

Holistic Network Design Implementation Plan

Marine Conservation Zone (MCZ) Assessment

Project number: 60705615

NESO
National Energy System Operator

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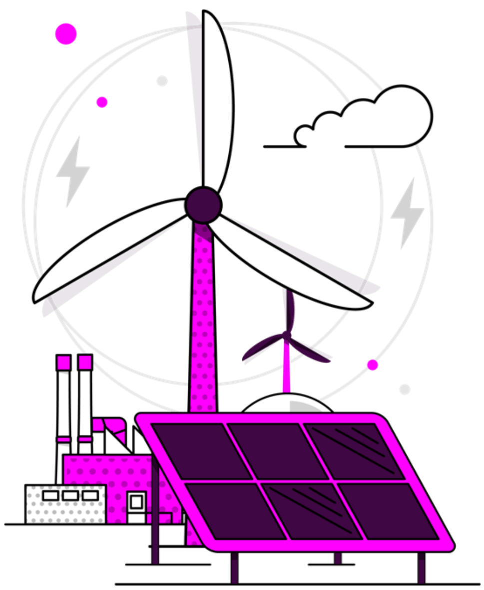

Executive Summary

Executive Summary

Overview of NESO

The UK's 2023 Energy Act set the legislative framework for an independent system planner and operator to help accelerate Great Britain's energy transition. This led to the establishment of the National Energy System Operator (NESO).

An independent, public corporation at the centre of the energy system, NESO takes a whole system view to secure our vision for reliable, clean and affordable energy. NESO's work will be the catalyst for change across the global community, forging the path to a sustainable future for everyone.

Tackling climate change is truly the challenge of our generation, addressing energy security, sustainability and affordability for everyone is at the forefront of the global agenda and drive to meet net zero. NESO will look across the whole energy system to meet these challenges and transition to a low-carbon future, embracing new technologies and cleaner generation sources, always with the cost to the consumer in mind.

NESO's three primary duties are:

- Net zero - enable the government to deliver on its legally binding greenhouse emissions targets
- Efficiency and economy - promoting efficient, coordinated, and economic electricity and gas networks
- Security and supply - ensuring security of supply for current and future consumers of electricity and gas.

Overview of Offshore Coordination

The Offshore Coordination Team was set up by NESO (previously National Grid Electricity System Operator) with the support from Ofgem and the Department for Energy Security and Net Zero (DESNZ). Offshore Coordination contributes to the Offshore Transmission Network Review (OTNR) which was set up in July 2020. Its purpose is to enable the vital role of offshore wind in meeting the UK Government's targets for net zero. The Terms of Reference (ToR) for Offshore Coordination set out the ambition for NESO to design coordinated offshore wind recommendations for a variety of different offshore wind leasing rounds. These included ScotWind, Innovation Targeted Oil and Gas (INTOG) and Celtic Sea. The completion of these design recommendations totals over 53GW across 34 different projects of offshore wind across Holistic Network Design (HND), HND Follow Up Exercise (HNDFUE), Celtic Sea and INTOG.

The Marine Conservation Zone Assessment for Offshore Coordination

A Marine Conservation Zone (MCZ) assessment is being undertaken on the HND Implementation Plan which covers all the latest GB network designs captured within HND, HNDFUE (as of the end of August 2024), INTOG and Celtic Sea. Whilst it is not mandated that Offshore Coordination carry out a MCZ assessment, due to the size and scope of the design exercises, carrying out these assessments will ensure our recommendations have given the appropriate level of consideration to environmental concerns.

In summary, MCZ assessments are undertaken to determine whether possible impacts of a proposed activity have the potential to hinder the conservation objectives of sites designated under the Marine and Coastal Access Act 2009 (MCAA). This process encompasses a variety of sites designated (collectively referred to herein as MCZs, unless otherwise stated) within the UK's territorial and offshore waters:

- MCZs in English, Welsh, and Northern Irish waters;
- Highly Protected Marine Areas (HPMA) in English waters; and
- Nature Conservation Marine Protected Areas (NCMPAs (herein referred to as MPAs)) in Scottish waters.

The MCZ assessment for Offshore Coordination follows legislation under Section 126 of the MCAA 2009[1]. The process follows the Marine Management Organisation's (MMO) guidance for English MCZ assessments (2013)[2] and has been applied to Welsh and Scottish waters in the absence of guidance from the respective regional authorities.

NESO has commissioned AECOM to undertake an independent and objective MCZ assessment. This MCZ Assessment Report has therefore been prepared for Offshore Coordination by AECOM on behalf of NESO.

This Marine Conservation Zone Assessment Report

This document sets out the initial screening and MCZ Stage 1 assessment process (a summary of these processes is provided below).

Screening

The objective of this stage is to determine whether the potential activities associated with a plan / project taking place within or near a proposed or already designated MCZ could affect (other than insignificantly) either:

[1] For the application of the MCAA 2009, the public authority or equivalent role is held by NESO.
[2] Marine Management Organisation (MMO). (2013). Marine conservation zones and marine licensing. Marine Management Organisation. [Online] Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010080-001344-Marine%20Management%20Organisation%20-%20Annex%20A%20-Guidance%20on%20MCZ%20assessments.pdf

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

Where either of the above criteria are triggered, the associated study corridor (scheme) has been taken forward to Stage 1 assessment.

This stage of the process has been treated as a high-level appraisal intended primarily to focus the rest of the assessment on the study corridors which pose a credible pathway for effect, or where reasonable scientific doubt remains as to whether a scheme could potentially hinder the conservation objectives of an MCZ.

Stage 1 Assessment

The Stage 1 Assessment attempts to identify whether there is a significant risk of activities associated with the screened-in study corridors hindering the conservation objectives of an MCZ and whether the MCZ can exercise its functions to further the conservation objectives of the site.

This appraisal involves consideration of greater detail whereby the methodology is tailored to the specific impacts requiring investigation and the designated features of the relevant MCZs. At Stage 1 there is also consideration of mitigation measures. As a plan level assessment there are no detailed design elements to base specific mitigation on. As such, the mitigation included as part of the assessment is considered standard practice in the industry.

Where the assessment identifies that there is potential for conservation objectives to be significantly hindered, it subsequently considers whether there are other means of proceeding (OMP) with the scheme which would create a substantially lower risk of hindering the achieving objectives.

This MCZ assessment has identified eight Study Corridors as having potential to significantly hinder the conservation objectives of an English MCZ, Highly Protected Marine Area (HPMA), or Scottish Marine Protected Area (MPA), despite the implementation of best practice mitigation measures. As such, these Study Corridors have been recommended for Stage 2 Assessment.

1. Introduction

Overview

Project Description

Report Scope

A Marine Conservation Zone (MCZ) assessment is being undertaken on the HND Implementation Plan which covers all the latest GB network designs captured within HND, HNDFUE (as of the end of August 2024), INTOG and Celtic Sea. Whilst it is not mandated that Offshore Coordination carry out a MCZ assessment, due to the size and scope of the design exercises, carrying out these assessments will ensure our recommendations have given the appropriate level of consideration to environmental concerns.

In summary, MCZ assessments are undertaken to determine whether possible impacts of a proposed activity have the potential to hinder the conservation objectives of sites designated under the Marine and Coastal Access Act 2009 (MCAA). This process encompasses a variety of sites designated (collectively referred to herein as MCZs, unless otherwise stated) within the UK's territorial and offshore waters:

- MCZs in English, Welsh, and Northern Irish waters;
- Highly Protected Marine Areas (HPMA) in English waters; and
- Nature Conservation Marine Protected Areas (NCMPAs (herein referred to as MPAs)) in Scottish waters.

The MCZ assessment for Offshore Coordination follows legislation under Section 126 of the MCAA 2009[3]. The process follows the Marine Management Organisation's (MMO) guidance for English MCZ assessments (2013) and has been applied to Welsh and Scottish waters in the absence of guidance from the respective regional authorities.

NESO has commissioned AECOM to undertake an independent and objective MCZ assessment. This MCZ Assessment Report has therefore been prepared for Offshore Coordination by AECOM on behalf of NESO.

Report Scope

Specific consideration of the potential for effects to occur on MCZs in English, Welsh, and Northern Irish waters; and Marine Protected Areas (MPAs) in Scottish waters[4,5] is required as part of marine licence applications, as set out in Section 126 of the Marine and Coastal Access Act 2009 (MCAA).

The purpose of this report is to inform the MCZ assessment process in determining whether the proposed cable routes are capable of affecting (other than insignificantly):

- Protected features of an MCZ; and / or
- Any ecological or geomorphological process on which the conservation of any protected features of an MCZ is (wholly or in part) dependant.

[3] For the application of the MCAA 2009, the public authority or equivalent role is held by NESO.
[4] Scottish MPAs in this context comprise Nature Conservation MPAs (NCMPAs)
[5] The term 'MCZ' may be used here within to refer collectively to the assessment of English, Welsh, and Northern Irish MCZs, as well as Scottish MPAs

This report considers the construction, operation, maintenance, and decommissioning phases of the cable routes in as much detail as possible in the absence of detailed design.

Since July 2023, three Highly Protected Marine Areas (HPMA) have been designated in English waters as part of a pilot phase; Allonby Bay, North East of Farnes Deep, and Dolphin Head. These pilot HPMAs have been designated as MCZs under the Marine and Coastal Access Act 2009 (HM Government, 2023). As such, they are included within the scope of this assessment. They will be collectively referred to as MCZs, or HPMAs when discussed in isolation. The methodology followed for this plan level MCZ assessment follows guidance from the Marine Management Organisation (MMO, 2013), noting that no guidance specific to plan level MCZ assessments is currently available.

This version (v2) of the MCZ assessment builds upon the previous MCZ assessment for the proposed HND and HNDFUE (ScotWind) marine study corridors within English and Welsh waters, adding in Scottish MPAs and Northern Irish MCZs relevant to the HND Implementation Plan study corridors within English, Welsh, and Scottish waters (also referred to as 'cable routes' or 'marine schemes' (**Table 1**)). The relevant MCZ locations, are presented in **Figure 1** - **4**.

Table 1: Study corridors in English, Scottish and Welsh Waters

Scheme	Study corridor
Study corridors in English waters	
HND	Ballantrae_to_Pentir
	PA_1_to_Birkhill_Wood
	PA_2_to_Berwick_Bank
	R4_1_to_Birkhill_Wood
	R4_2_to_Birkhill_Wood
	R4_3_to_Weston_Marsh
	R4_4_to_Bodelwyddan
	R4_5_to_Penwortham
	R4_6_to_Penwortham
	SW_E1a_to_Hawthorn_Pit
	SW_E1a_to_Lincolnshire_Connection_Node
HNDFUE	SW_E1a_to_Branxton
	SW_E1c_1_to_Lincolnshire_Connection_Node
	SW_E1c_2_to_Weston_Marsh
	SW_E2a_2_to_Near_Richborough
INTOG	Cedar_to_Branxton

Scheme	Study corridor
Celtic Sea	PDA1_to_Llandyfaelog
	PDA2_to_South_Wales_Connection_Node
	PDA3_to_Pyworthy
Study corridors in Scottish waters	
HND	Ballantrae_to_Pentir
	Kilmarnock_South_to_Ballantrae
	PA_2_to_Berwick_Bank
	SW_E1a_to_Hawthorn_Pit
	SW_E1a_to_SW_e1b
	SW_E1a_to_Fiddes
	SW_E1a_to_Lincolnshire_Connection_Node
	SW_N1_to_Spittal
	SW_N4_to_Arnish_(Lewis)
	SW_NE4_to_New_Deer_(ES26)
	SW_NE7_to_Peterhead
	SW_W1_to_Ballantrae
HNDFUE	Shetland_to_Blackhillock
	SW_E1a_to_Branxton
	SW_E1c_1_to_Lincolnshire_Connection_Node
	SW_E1c_1_to_SW_E1c_2
	SW_E1c_2_to_Weston_Marsh
	SW_E2a_1_to_SW_E2a_2
	SW_E2a_2_to_Near_Richborough
	SW_E2a_2_to_SW_E1c_1
	SW_E2b_to_Peterhead_2
	SW_E2b_to_SW_E2a_1
	SW_E3_to_Fiddes
	SW_N2_to_Near_Dounreay
	SW_N3_to_Arnish
	SW_NE1a_to_Shetland
	SW_NE1b_to_Shetland
	SW_NE1c_to_Shetland

Scheme	Study corridor
	SW_NE2_to_Spittal
	SW_NE3_to_New_Deer_2
	SW_NE4_to_New_Deer
	SW_NE6_to_Peterhead_2
	SW_NE7_to_Peterhead_DCSS
	SW_NE8_to_Peterhead_1
INTOG	Aspen_to_Beech
	Aspen_to_Fetteresso
	Beech_to_Beech_MPI
	Beech_to_Cedar
	Cedar_to_Aspen
	Cedar_to_Branxton
	North_Connect_to_Cenos
	Peterhead_to_Cenos
	Scaraben_to_Peterhead_2
	Scaraben_to_Sinclair
Study corridors in Welsh Waters	
HND	Ballantrae_to_Pentir
	R4_4_to_Bodelwyddan
Celtic Sea	PDA1_to_Llandyfaelog
	PDA2_to_South_Wales_Connection_Node

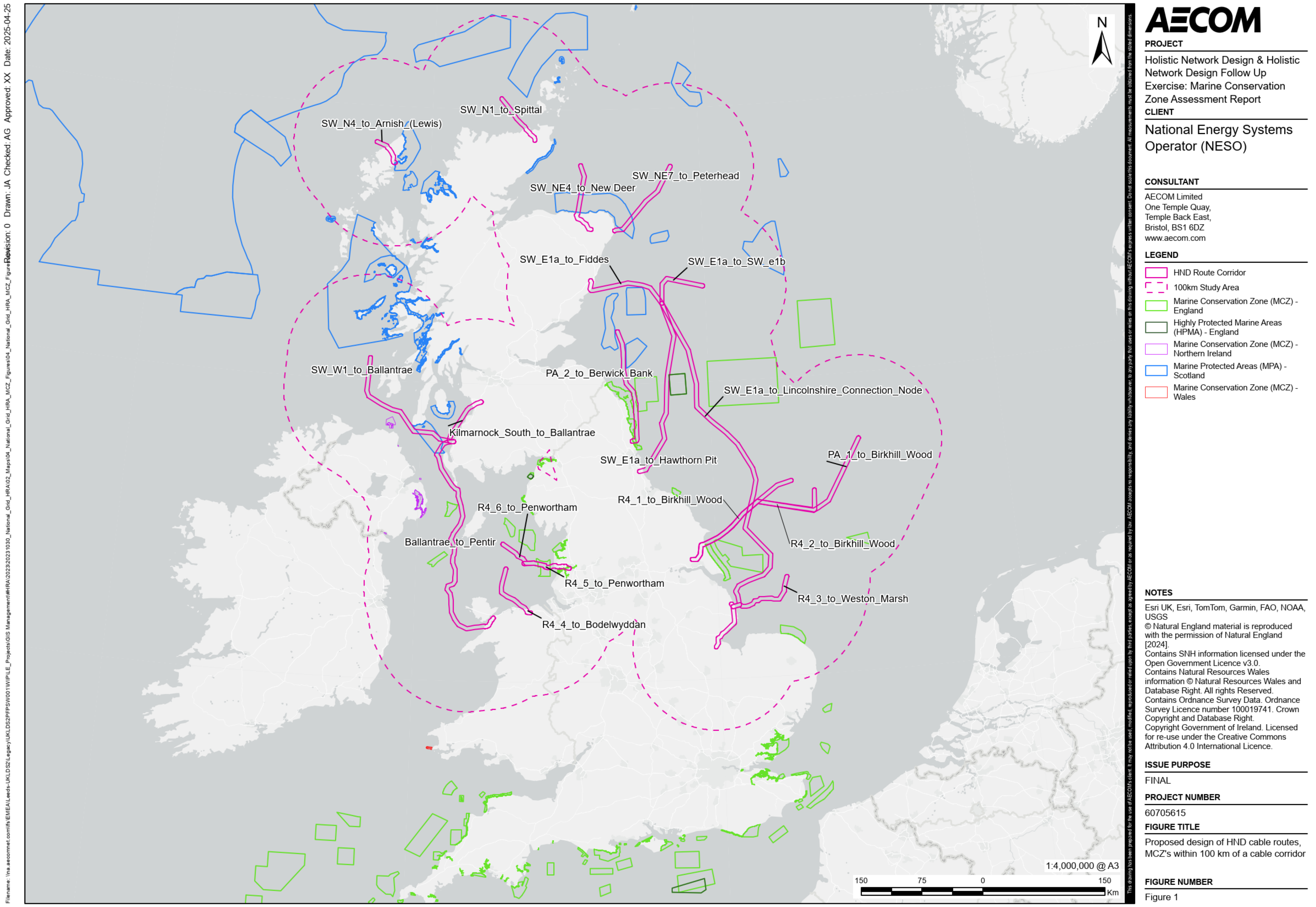

Figure 1: The plan level study corridors included in the proposed design of HND, and MCZs within 100 km of a study corridor

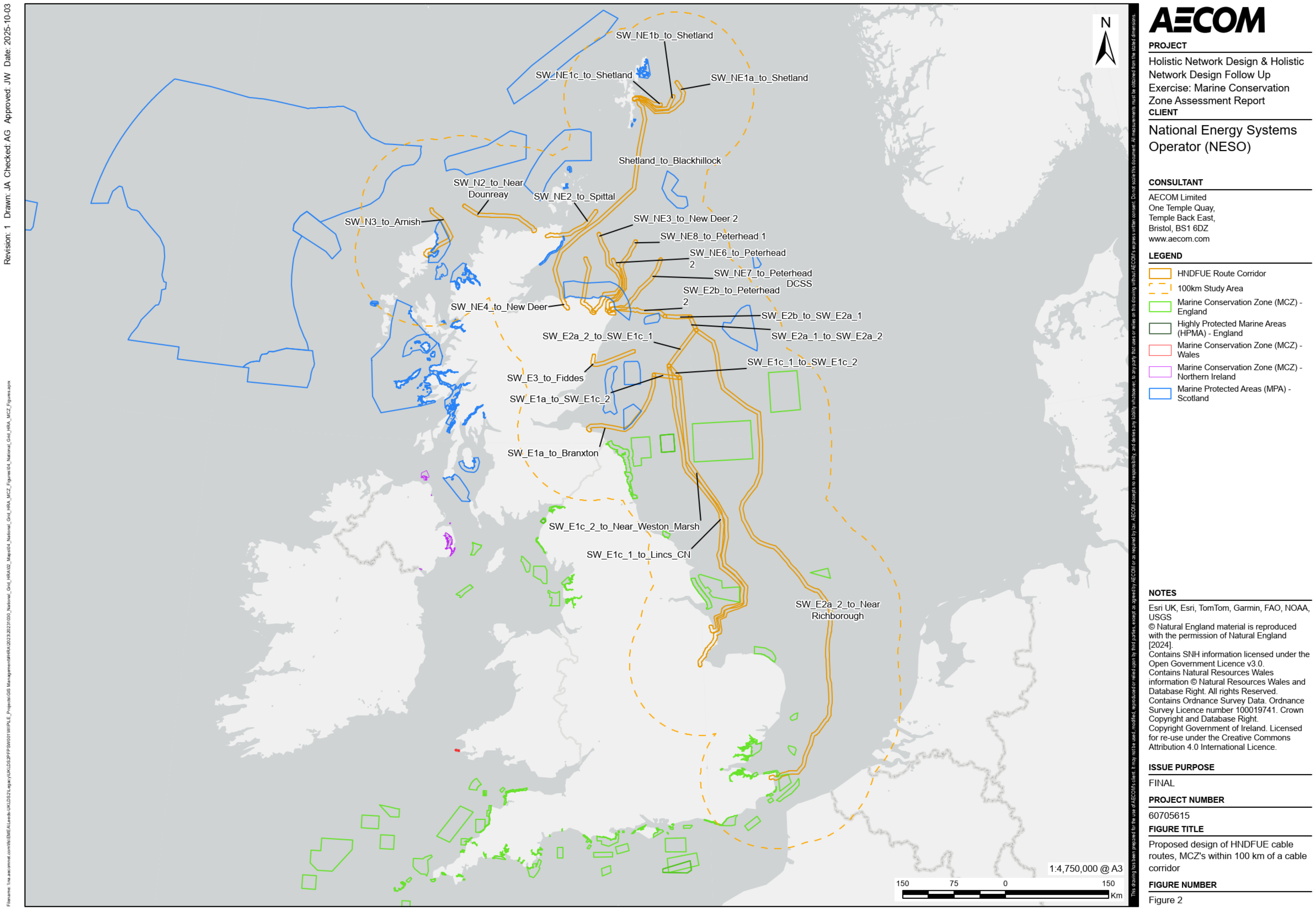

Figure 2: The plan level study corridors included in the proposed design of HNDFUE, and MCZs within 100 km of a study corridor

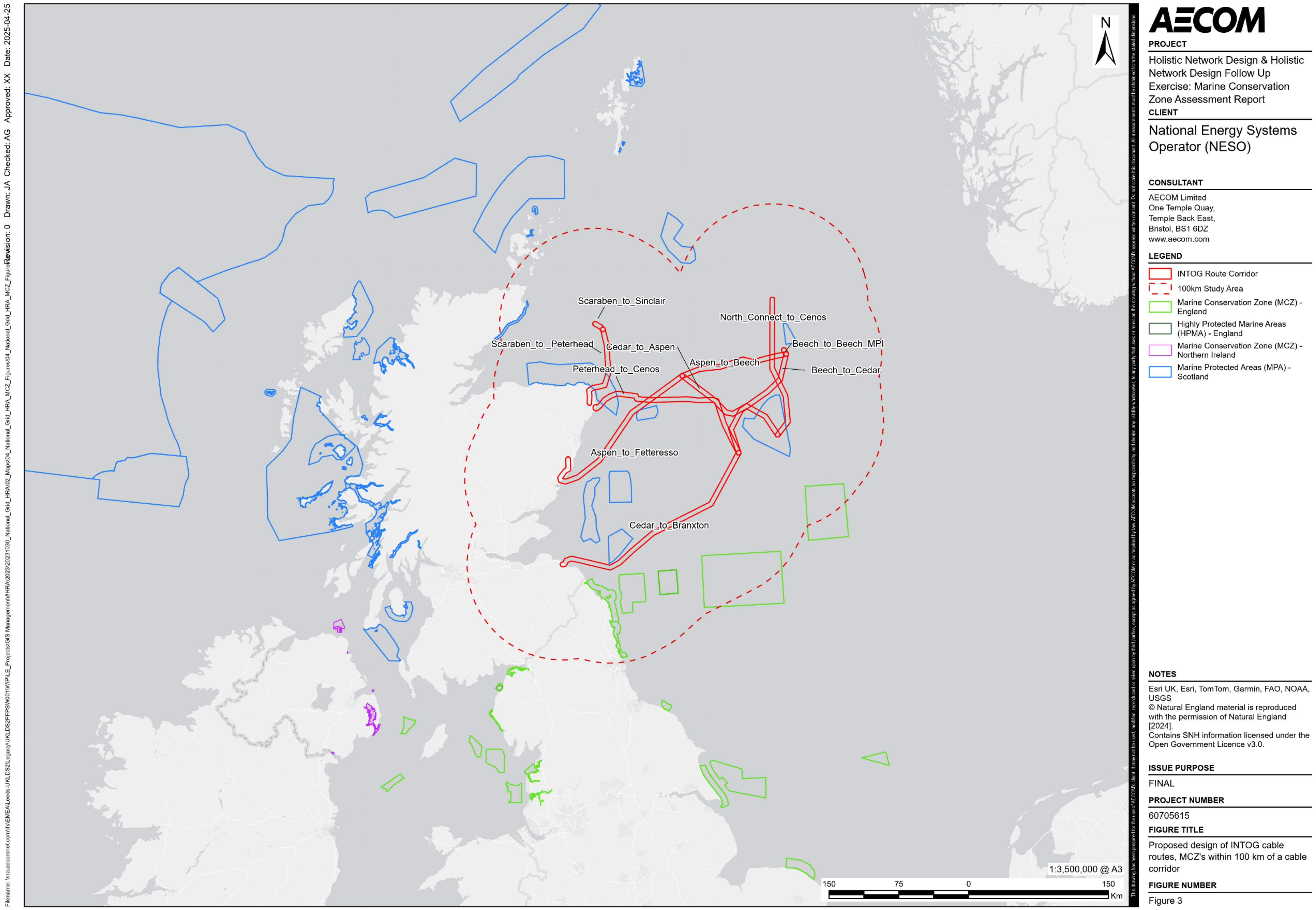

Figure 3: The plan level study corridors included in the proposed design of INTOG, and MCZs within 100 km of a study corridor

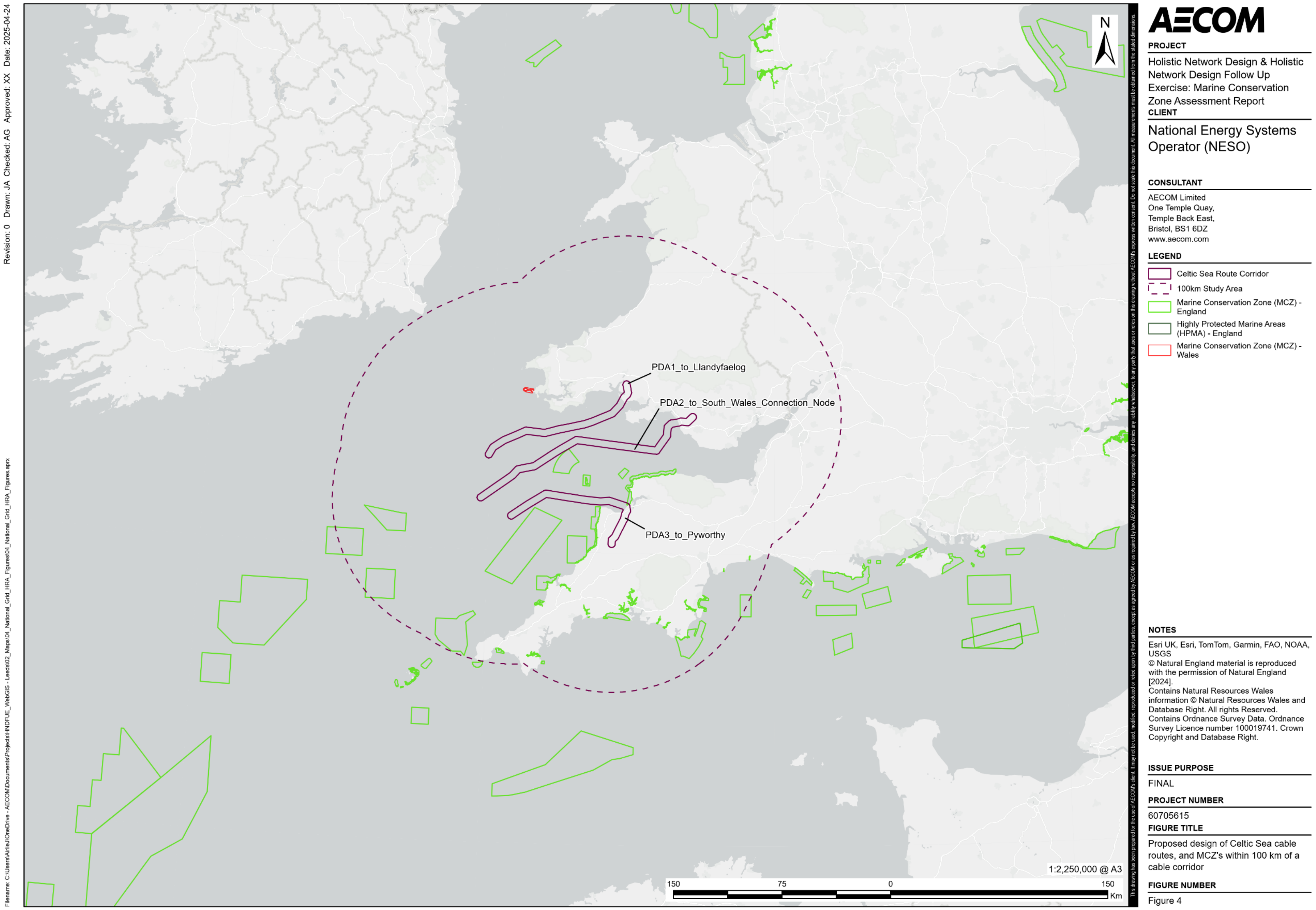

Figure 4: The plan level study corridors included in the proposed design of Celtic Sea, and MCZs within 100 km of a study corridor

2. Legislative Framework

Marine and Coastal Act (MCAA) 2009

MCZs in English, Welsh, and Northern Irish territorial and offshore waters[6], are designated under the MCAA 2009; they provide protection for a range of important marine habitats, species and geological formations. In conjunction with other existing international and national designations, these sites contribute to an ecologically coherent network of MPAs in the North East Atlantic and North Sea.

MCZs in English, Welsh, and Northern Irish waters have been identified through the MCZ project which was set up in 2008 and led by the Joint Nature Conservation Committee (JNCC) and Natural England (NE). The purpose of the MCZ project was to identify and recommend MCZs to Government for designation.

HPMAs have also been designated under the Marine and Coastal Access Act 2009 (HM Government, 2023). These sites provide ecosystem-wide protection and recovery of all species and habitats and processes within their boundaries. In particular, these sites intend to prevent all activities considered damaging, depositional, or extractive.

MPAs in Scottish territorial waters are designated under Section 1 of the Marine (Scotland) Act 2010 and under the MCAA 2009. The development of the Scottish MPA network has involved work between the Marine Directorate for the Scottish Government, the JNCC, NE, Historic Environment Scotland, the Scottish Environment Protection Agency and NatureScot (formerly Scottish Natural Heritage). The approach for identifying MPAs followed a science-based process as set out in the Scottish MPA Selection Guidelines.

At the time of this assessment, a total 138 sites have been identified, comprising 91 English MCZs, one Welsh MCZ, five Northern Irish MCZs, 36 Scottish MPAs, and three HPMAs.

Under Section 126 of the MCAA, the Marine Management Organisation (MMO) have a duty to consider MCZs in English waters during marine licence decision making; where projects are determined to be a Nationally Significant Infrastructure Project (NSIP) this duty falls to DESNZ. In Welsh waters the duty to consider MCZs is placed on the Natural Resources Wales (NRW) Marine Licensing Team; in Northern Irish waters this duty is placed on the Department of Agriculture, Environment and Rural Affairs (DAERA), and in Scotland this duty is placed on Marine Directorate - Licensing Operations Team (MD-LOT); these duties apply where:

- A public authority has the function of determining an application (whenever made) for authorisation of the doing of an act; and

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[6] Northern Irish waters (and therefore MCZs) are not directly within the scope of the HND Implementation plan but have been screened for precaution and considered in terms of potential transboundary effects (see **Section 8**).

- The act is capable of affecting (other than insignificantly):
    - The protected features of an MCZ; and
    - Any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or part) dependent.

Section 83 of the Marine (Scotland) Act 2010 places specific duties on the Marine Directorate of the Scottish Government relating to MPAs within Scottish territorial waters, and marine licence decision making. Section 83 applies in the Scottish marine area where:

- A public authority has the function of determining an application (whenever made) for authorisation of the doing of any act;
- The act is capable of affecting (other than insignificantly):
    - A protected feature in a Nature Conservation MPA;
    - A stated purpose for a Demonstration and Research MPA;
    - A marine historic asset in a Historic MPA; and
    - Any ecological or geomorphological process on which the conservation of any protected feature in a Nature Conservation MPA, or on which the stated purpose for a Demonstration and Research MPA, is (wholly or in part) dependent.
- The proposal results in a significant risk of hindering the achievement of the conservation objectives of the MPA.

Through consultations with the Department for Energy Security and Net Zero (DESNZ) it has been clarified that for the HND Implementation Plan the public authority or equivalent role is held by NESO.

3. Assessment Methodology

Introduction

The assessment process for MCZs considered during the licensing process is outlined by the MMO in its guidance document 'Marine Conservation Zones and Marine Licensing' (MMO, 2013).

In the absence of formal guidance from MD-LOT in relation to the assessment of Scottish MPAs during the licence decision making process, the MMO guidance (2013) for English MCZ assessments has been applied to Scottish MPAs in this appraisal to ensure adequate information is provided to enable the Marine Directorate of the Scottish Government to appropriately consider MPAs, thereby remaining compliant with the Marine (Scotland) Act 2010.

The MMO Guidance (2013) describes how MCZ Assessments should be undertaken during the process of marine license decision making. These MMO guidelines recommend a staged approach to assessment, involving three sequential stages: screening, stage 1 assessment and stage 2 assessment.

In the absence of formal guidance from NRW on the assessment of MCZs in Welsh waters, the MMO guidance (2013)[7] for English MCZ assessments will be applied to Skomer Marine Conservation Zone (the only designated MCZ in Welsh waters) to ensure adequate information is provided to enable NRW to appropriately consider the MCZ, thereby remaining compliant with the MCAA (2009). The stages of MCZ assessment are:

- Screening – Determine whether the licensable activity is taking place within of near an area being put forward or already designated as an MCZ and whether the activity is capable of affecting (other than insignificantly) either (I) the protected features on 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. If the answer is yes, then proceed to Stage 1.
- Stage 1 Assessment – Is the authority satisfied that there is no significant risk of the activity hindering the conservation objectives stated for the MCZ and can the authority exercise its functions to further the conservation objectives of the site. If the answer is no to either of these questions, then the authority must consider whether there are other means of proceeding with the act which would create a substantially lower risk of hindering the achieving objectives. If the answer is still no, then proceed to Stage 2.
- Stage 2 Assessment – This stage looks at whether the benefit to the public clearly outweighs the risk of damage to the environment and seeks to satisfy the authority that the applicant can make arrangements to undertake measure of equivalent environmental benefit to the damage which the act will have of the MCZ.

[7] MMO. (2013). Marine conservation zones and marine licensing. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file

To determine whether section 126 applies, it is necessary to consider the geographical proximity of HND Implementation Plan study corridors to the MCZ, and the potential for activities within those study corridors to affect the designated features of an MCZ or the ecological/ geomorphological processes upon which designated features are reliant.

Screening

A geographic information system (GIS) was used to map boundaries of MCZ sites in relation to study corridors. To determine whether a sensitive receptor has the potential to interact with a study corridor, it is necessary to understand the nature and existing baseline for the designated biodiversity features. This information is used to inform the examination of designated biodiversity features of the MCZs against potential impacts to determine if there is a pathway for effect.

A risk-based approach is recommended by the MMO or NRW when determining the proximity of an activity to an MCZ. The application of appropriate buffer zones to the protected features of an MCZ under consideration, as well as consideration of the potential risk of impacts from activities at greater distances from the MCZ is necessary.

Most MCZs are designated for benthic features and thus the most impactful pathways relate to direct disturbance to the seabed ecology, such as cable installation, or indirect disturbance to seabed communities from suspended sediments disturbed by installation activities and their subsequent dispersion and deposition on the seabed. Therefore, for the most part, a buffer zone was determined using an estimate of distance travelled by suspended sediments. Where MCZs are protected for other features, such as marine mammals or migratory fish, a different buffer distance is applied.

The MCZ assessment guidelines (MMO, 2013) indicate that following the identification of MCZs to be considered, section 126 would apply if it is determined through the course of screening that “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.”

Stage 1 Assessment

The Stage 1 Assessment considers the ‘likelihood of an activity causing an effect, the magnitude of the effect should it occur, and the potential risk any such effect may cause on either the protected features of an MCZ or any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependant’ (MMO, 2013). This should be considered in terms of whether they hinder the achievement of conservation objectives or maintenance or achievement of favourable status. 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.

Stage 2 Assessment

The Stage 2 Assessment (reported separately) considers the socio-economic impact and benefit to the public of the proposed Project outweighs the risk of damage to the environment. 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?

Guidance from Natural England and JNCC on nature conservation considerations and environmental best practice for subsea cables (Natural England & JNCC, 2022a) has been considered as part of this assessment.

4. Potential Impacts, Effects and Zones of Influence

Summary of Impact Pathways

Summary of Impact Pathways

As this MCZ Assessment deals with study corridors at plan-level, detailed project descriptions and methodologies are not available at this time. Therefore, the precautionary principle has been applied to common industry practice to ascertain the potential impact pathways for cable installation, operation and maintenance, and decommissioning.

In order to inform the screening process the anticipated effect of the identified impact pathways have been based on conservative Zones of Influence (ZoI). An overview of each impact pathway is provided below; however, the magnitudes of effect and ZoIs that result from cable installation, operation and maintenance, and decommissioning can vary. Therefore, it is strongly recommended that the impact pathways for each cable corridor are re-assessed on a case-by-case basis at project-level, once a project description and installation methodologies have been confirmed; informed by detailed, localised environmental data.

Table 2: Summary of impact pathways and typical ZoIs used to inform the plan level MCZ assessment

Pathway	Typical ZoI	Phases of Development	Pressure-activities database (PAD) (JNCC, 2022)	Feature Activity Sensitivity Tool (FeAST, 2025)
Temporary physical disturbance – subtidal benthic habitats and species	The footprint and immediate vicinity of the works	Construction Maintenance Decommissioning	• Abrasion / disturbance of the substrate on the surface of the seabed; • Habitat structure changes - removal of substratum (extraction); and • Penetration and / or disturbance of the substrate below the surface of the seabed,	• Physical removal (extraction of substratum)[8]; and • Subsurface abrasion / penetration.

[8] This relates to seabed preparation and / or dredging that will be back filled and / or will recover by natural process (temporary disturbance), not physical removal of substratum (permanent).

Pathway	Typical ZoI	Phases of Development	Pressure-activities database (PAD) (JNCC, 2022)	Feature Activity Sensitivity Tool (FeAST, 2025)
			including abrasion	
Permanent loss – subtidal benthic habitats and species	The footprint of any cable protection	Construction Maintenance Decommissioning	• Physical change (to another seabed type); and • Physical change (to another sediment type).	• Physical change (to another seabed type).
Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species	The footprint and immediate vicinity of any works and any cable protection	Construction Maintenance Decommissioning	• Introduction or spread of invasive non-indigenous species.	• Introduction or spread on non-indigenous species and translocations.
Changes in prey availability	The footprint and immediate vicinity of any works and any cable protection. Overall screening distance dictated by overlap with individual species' foraging range	Construction Maintenance Decommissioning	• *No equivalent pressure listed in the PAD.*	•
Collision risk – marine mammals	The immediate vicinity of project vessels Screening distance also considers the Marine Mammal Management Units (MMMU) or Seal Management Units (SMU)[9] for individual species	Construction Maintenance Decommissioning	• Collision BELOW water with static or moving objects not naturally found in the marine environment (e.g., boats, machinery, and structures).	• Death or injury by collision above water; and • Death or injury by collision below water

[9] As identified by the Special Committee on Seals (SCOS), 2020

Pathway	Typical ZoI	Phases of Development	Pressure-activities database (PAD) (JNCC, 2022)	Feature Activity Sensitivity Tool (FeAST, 2025)
Thermal emissions – subtidal benthic habitats and species	The immediate vicinity of the cable	Operation	• Temperature increase.	• Temperature change.
Electro-magnetic fields (EMF) – subtidal benthic habitats and species, marine mammals, fish, and invertebrates	The immediate vicinity of the cable	Operation	• Electromagnetic changes.	• Electromagnetic changes.
Airborne sound and visual disturbance – marine mammals and birds	≤1.5 km seals ≤4 km birds	Construction Maintenance Decommissioning	• Above water noise; • Introduction of light; and • Visual disturbance.	• Visual disturbance (behaviour)
Underwater sound – marine mammals, fish, and shellfish	<5 km	Construction Maintenance Decommissioning	• Underwater noise changes; and • Vibration.	• Underwater noise.
Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	<17 km	Construction Maintenance Decommissioning	• Changes in suspended solids (water clarity); • Smothering and siltation rate changes (Heavy); • Smothering and siltation rate changes (Light); and • Water flow (tidal current) changes, including sediment transport considerations.	• Siltation rate changes (heavy); • Siltation rate changes (light); and • Water clarity changes.
Water quality - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	<17 km	Construction Maintenance Decommissioning	• Hydrocarbon & PAH contamination; • Litter; • Nutrient enrichment;	• Hydrocarbon & PAH contamination; and • Transition elements &

Pathway	Typical ZoI	Phases of Development	Pressure-activities database (PAD) (JNCC, 2022)	Feature Activity Sensitivity Tool (FeAST, 2025)
			• Synthetic compound contamination; and • Transition elements & organo-metal contamination.	organo-metal contamination.
Barriers to migration – migratory fish	100 km	Construction Operation	• Barrier to species movement	• Barrier to species movement.

Temporary physical disturbance – subtidal benthic habitats and species

Installation activities associated with route preparation and cable installation can lead to direct physical disturbance of substrate, which may lead to temporary disturbance and / or loss of benthic habitats and species both within the footprint and in the immediate vicinity of the works. Sensitivity to physical disturbance varies between receptor: for mobile receptors displacement, physiological or morphological damage may occur; whilst for sedentary or less mobile receptors, the likely impacts are physiological or morphological damage and mortality.

Permanent loss - subtidal benthic habitats and species

The permanent placement of cable protection such as rock placement, concrete mattressing or other methods on the seabed could lead to loss of benthic habitats and species within the footprint of these measures.

Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species

There is potential for INNS to be introduced via the hull or ballast water of ships used for the installation, maintenance, and decommissioning of each cable.

Additionally, the installation of cables is expected to require protection at some locations, which will likely introduce hard substrates in the form of rock protection or mattresses, to benthic habitats. It has been suggested that these structures can act as either a stepping stone, or as a direct vector for the dispersal and spread of INNS (Mineur *et al.*, 2012), allowing for localised spreading.

Changes in prey availability – birds and marine mammals

The availability and provision of food items is essential to support the seabird colonies with the most relevant prey items being sandeel, European sprat, goby, saithe, and whiting. Similarly, many marine mammal species rely on a variety of demersal fish and shellfish species as prey, supporting their diet. Common species of relevance include sandeel, flatfish, and gadoids (e.g. cod and hake).

Construction activities will cause physical disturbance of the seabed during the route preparation and cable installation, potentially affecting spawning and nursery habitats of prey species, and / or temporarily increasing turbidity, resulting in sediment deposition and smothering of prey species. This has the potential to affect seabird and marine mammal food resources within their foraging ranges.

Collision risk – marine mammals

The installation, maintenance, and decommissioning of the subsea cables will require the deployment of multiple vessels for relevant activities. This increases the risk of collision between marine mammals and project vessels, which can result in severe injury and possible death.

This risk is most likely to affect larger marine mammals, such as whales, but has the potential to also put smaller marine mammals at risk. Collisions are likely to result in serious injury during contact with propeller blades or the bow, hull, skeg, and rudder (Schoeman *et al.*, 2020). The severity of the impact is highly dependent on impact location and seriousness of injuries.

Thermal emissions – subtidal benthic habitats and species

The operation of trenched submarine high voltage cables generates heat due to resistance in the conductor components which can warm the cable surface and the immediately adjacent environment (i.e., sediments).

The rate of heat loss, and magnitude of environmental heating, is dependent on several factors: most notably the amount of power passing through the cables; the design of the cables; and the thermal properties of the surrounding seabed, which is influenced by sediment grain size in particular.

Thermal emissions from trenched submarine cables can result in physical and chemical changes to the benthic environment, including changes in bacterial activity and interference with the make-up of microorganism communities (Taormina, *et al.*, 2018). Benthic organisms have varying tolerance to increases in temperature, for example *Nephrops spp.* have a 'very low' sensitivity to increases in temperature (Sabatini & Hill, 2008), whereas the slender sea pen Virgularia mirabilis has a 'moderate' sensitivity (Hill & Wilson, 2000).

EMF – Subtidal benthic habitats and species, marine mammals, fish, and invertebrates

During cable operation, high voltage cables emit Electromagnetic Fields (EMF), which have the potential to affect benthic receptors, and sensitive fish species (e.g. elasmobranchs, eels, and salmonids) in the immediate vicinity (typically tens of metres (Orpwood *et al*., 2015; NIRAS, 2006)) of the cables. Some cable designs include a metallic outer sheath so the cables will produce no external electrical field, though there is still potential for induced electrical fields via the movement of the sea through the cable's magnetic field.

How the cables are laid will also influence the extent of EMF effects. Cables can often be laid singularly. Where multiple cables are required, these can be laid in two separate parallel trenches (unbundled), or in a single trench with the cables bundled together. In the bundled configuration, the interactions between the magnetic fields associated with the opposing poles results in cancellation, and a reduced overall field strength. Where the cables are separately laid, the distance between the two poles reduced the degree of field cancellation, and as such the resulting field are of greater strength.

Airborne sound and visual disturbance – marine mammals and birds

Cetaceans (whales and dolphins) are not considered to be particularly sensitive to changes in visual stimuli as their primary sense relates to sound. However, pinnipeds (seals) spend time hauled out on land and at the sea-surface, making them more susceptible to these airborne sound and visual stimuli. These can lead to avoidance behaviour disturbance effects, with possible long-term effects of repeated disturbance.

In general, shipping traffic more than 1,500 m away from a haul-out site is not thought to evoke any reaction. However, between 900 m and 1,500 m, grey seals could be expected to detect the presence of vessels; and at closer than 900 m, a flight reaction may occur (Scottish Executive, 2007). Studies of harbour seals have shown a flight response to boats occurs at a distance of around 500 m (Anderson *et al*., 2012).

For most seabirds, construction activities can displace birds at up to 2 km from the development, with divers and seaduck more sensitive, with displacement reported at up to 4 km (Furness & Wade, 2012; Bradbury *et al*., 2014, JNCC *et al*., 2022).

Underwater sound – marine mammals, fish, and shellfish

Project activities which produce impulsive sound underwater (e.g. piling and seismic geophysical surveys) have the greatest potential to impact marine mammals, fish, and / or shellfish species. However, these activities are not commonly associated with subsea cable installation. Most activities associated with the installation of subsea cables produce continuous, low intensity sound that is outside of the hearing range of marine mammals and fish. Continuous sound is often masked by the sound of vessel movements and therefore undetectable.

Activities that may result in disturbance to marine mammals, fish, and / or shellfish from underwater sound are the operation of a sub-bottom profiler (SBP) the acoustic positioning system (USBL) during geophysical surveys, and the presence of project vessels, which will be required prior to cable installation. SBPs can cause injury or behavioural disturbance to fish within hundreds of metres (Popper *et al.*, 2014). While injury to marine mammals can also occur within hundreds of metres, behavioural disturbance can occur within ~5 km (JNCC, 2020a). Additionally, USBL has potential to harm or disturb marine mammals within tens of metres.

The increase in vessel movements during the installation works generally involves a small number of vessels, which are generally transient along the marine installation corridor, and will not result in a significant increase in vessel movements. Therefore, this will not result in a significant increase in ambient vessel sound or a significant impact on marine mammals or fish. Vessel sound has, therefore, been screened out of the consideration of underwater sound.

There has been little research into the impact of underwater sound on marine invertebrates (including shellfish) which are believed to be sensitive to particle motion rather than to sound pressure (Popper & Hawkins, 2018). At present there are no published sensitivity thresholds for this receptor group, however particle motion is likely to have a negligible magnitude of effect, within tens of metres.

Increased SSC - subtidal benthic habitats and species, marine mammals, fish, and invertebrates

Installation activities have the potential to increase Suspended Sediment Concentrations (SSCs), disturbing the seabed and creating a sediment plume within the water column. This in turn can lead to increased deposition as suspended sediments settle out of the water column. Increased SSC can also lead to elevated turbidity levels which may affect rates of photosynthesis and an increase in sediment load can reduce the feeding efficiency and subsequent growth rates of filter feeders.

Increased deposition can smother the seabed, potentially resulting in changes to seabed geomorphology, sediment structure and habitats. This would have an impact on species that currently rely on these habitats for food and refuge, leading to potential indirect effects on survival, growth, reproduction and displacement of individuals.

The effects of increased SSC typically occur within one tidal excursion ellipse (Hewageegana & Canestrelli, 2021)[10].

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[10] 17 km has been implemented by this assessment to represent the mean maximum tidal excursion ellipse, as opposed to the maximum reported for specific locations. Any similar, but uncommon occurrences of tidal excursion ellipses beyond 15 km will be picked up at the project level, when benthic survey data and physical process are considered for each cable route.

Water quality - subtidal benthic habitats and species, marine mammals, fish, and invertebrates

Changes to marine water quality arising from the use of Horizontal Directional Drilling (HDD) drilling fluids and additives, accidental leaks and spills from vessels, and the mobilisation of sediment bound contaminants (such as heavy metals and toxins) has the potential to indirectly affect benthic habitats and species, fish, and marine mammals through toxicity and contamination. These effects typically occur within one tidal excursion ellipse (<17 km mean maximum). Moreover, any change to water quality in the nearshore could affect intertidal areas during high tide, in addition to subtidal and surrounding waters, depending on the scale of the spill.

Barriers to migration – Diadromous fish

Increased SSC during installation and decommissioning, and EMF present during the operational lifespan of the cable can create a migration barrier between freshwater and marine habitats. Depending on the orientation and location of the cable in relation to the spawning habitat, this can potentially prevent or delay migration and subsequently affect adults accessing spawning grounds, or juvenile navigation post spawning.

As a conservative approach, 100 km is considered an appropriate screening distance for cables potentially creating barrier effects. For example, smelt Osmerus eperlanus migrations can range between 2-3 km up to 1,000 km, averaging between 50 km and 200 km as they move from freshwater to coastal waters close to estuaries (Belyanina, 1969; Klimley *et al.*, 2021).

5. Screening

Screening for MCZs – arranged by region

Sites Carried forward to Stage 1 Assessment

Screening Summary

The MCZ Assessment Guidelines (MMO, 2013) indicate that following the identification of MCZs to be considered, Section 126 would apply if it is determined through the course of screening that:

> *"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."*

A total of 56 MCZs, 31 MPAs, and two HPMA sites were identified for screening, as summarised in **Table 3** - **Table 10**. For comprehensiveness, these sites comprise all MCZs within 100 km of the HND Implementation Plan study corridors and is considered a sufficiently precautionary buffer[11].

[11] Where appropriate marine mammal management units (MMMU) (IAMMWG, 2023), seal management units (SMU) (SCOS, 2020) and foraging ranges (Carter *et al.,* 2022), and the foraging range of sea birds (Woodward *et al*., 2019) have been considered. Where relevant to these extents for protected features of a site, cable routes beyond 100 km from a site with may be included in the screening process.

Screening for MCZs – Arranged by Region

Table 3: Screening for MCZs – HND Implementation Plan – East Scotland

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
Firth of Forth Banks Complex MPA	• Ocean quahog aggregations (*Arctica islandica*) • Offshore subtidal sands and gravels • Shelf banks and mounds • Wee Bankie Key Geodiversity Area	HND		a. Temporary physical disturbance – subtidal benthic habitats b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species	
		SW_E1a_to_Fiddes	0.28		Possible: Screened into Stage 1 Assessment for pathways e and f relating to ocean quahog and subtidal sands and gravel
		PA_2_to_Berwick Bank	0.70		
		SW_E1a_to_Lincolnshire_Connection_Node	17.64		Unlikely: Located beyond the
		SW_E1a_to_Hawthorn Pit	17.64		
		SW_E1a_to_SW_e1b	17.53		

[12] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_E1a_to_Lincolnshire_Connection_Node	17.53	d. Thermal emissions – subtidal benthic habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	ZoI for potential impact pathways
		SW_NE4_to_New_Deer (ES26)	80.78		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE7_to_Peterhead	69.31		
		HNDFUE			
		SW_E1a_to_Branxton	0		Likely: Screened into Stage 1 Assessment for pathways a-f relating to all MPA protected features
		SW_E3_to_Fiddes	6.76		Possible: Screened into Stage 1 Assessment for pathways e

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					and f relating to ocean quahog and subtidal sands and gravel
		SW_E1a_to_SW_E1c_2	17.53		Unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_1_to_SW_E1c_2	39.82		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E2a_2_to_SW_E1c_1	39.82		
		SW_E1c_2_to_Weston_Marsh	54.70		
		SW_E2a_1_to_SW_E2a_2	94.32		
		SW_E1c_1_to_Lincolnshire_Connection_Node	39.82		
		SW_E2a_2_to_Near_Richborough	94.32		
		SW_E2b_to_Peterhead_2	70.31		
		SW_E2b_to_SW_E2a_1	74.35		
		SW_NE3_to_New_Deer_2	83.54		
		SW_NE4_to_New_Deer	80.78		
		SW_NE6_to_Peterhead_2	74.19		
		SW_NE7_to_Peterhead_DCSS	74.19		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_NE8_to_Peterhead_1	69.31		
		INTOG			
		Cedar_to_Branxton	1.37		Possible: Screened into Stage 1 Assessment for pathways e and f relating to ocean quahog and subtidal sands and gravel
		Aspen_to_Fetteresso	7.60		
		Peterhead_to_Cenos	66.56		Highly unlikely: Located beyond the ZoI for potential impact pathways
Southern Trench MPA	• Burrowed mud • Fronts • Minke whale (*Balaenoptera acutorostrata*)	HND		a. Temporary physical disturbance – subtidal benthic	
		SW_NE4_to_New_Deer (ES26)	0		Likely: Screened into Stage 1 Assessment
		SW_NE7_to_Peterhead	0		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
	• Quaternary of Scotland • Shelf deeps • Submarine Mass Movement			habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Changes in prey availability e. Thermal emissions – subtidal benthic habitats and species f. Electro-magnetic fields (EMF) – subtidal benthic habitats and	for pathways a-c and e-h relating to burrowed mud; pathways d, and g-i relating to minke whales; and pathways a-b for quaternary of Scotland
		SW_E1a_to_Lincolnshire_Connection_Node	85.03		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Hawthorn Pit	84.96		
		SW_E1a_to_SW_e1b	62.33		
		SW_E1a_to_Fiddes	54.45		
		SW_N1_to_Spittal	67.69		
		SW_E1a_to_Lincolnshire_Connection_Node	84.96		
		HNDFUE			
		SW_E1a_to_Branxton	84.95		Highly unlikely: Located beyond the
		SW_E1a_to_SW_E1c_2	84.96		
		SW_E1c_1_to_SW_E1c_2	85.67		
		SW_E1c_1_to_Lincolnshire_Connection_Node	85.67		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_E2a_2_to_Near_Richborough	96.37	species Airborne sound and visual disturbance – birds g. Underwater sound h. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species i. Water quality - subtidal benthic habitats and species	ZoI for potential impact pathways
		SW_E2a_1_to_SW_E2a_2	84.16		
		SW_E2a_2_to_SW_E1c_1	83.35		
		SW_E2b_to_SW_E2a_1	47.55		
		SW_E3_to_Fiddes	43.13		
		SW_NE2_to_Spittal	65.54		
		SW_N2_to_Near_Dounreay	83.66		
		SW_E2b_to_Peterhead_2	0		Likely: Screened into Stage 1 Assessment for pathways a-c and e-h relating to burrowed mud; pathways d, and g-i relating to minke whales; and pathways a-b for quaternary of Scotland
		SW_NE3_to_New_Deer_2	0		
		SW_NE4_to_New_Deer	0		
		SW_NE6_to_Peterhead_2	0		
		SW_NE7_to_Peterhead_DCSS	0		
		SW_NE8_to_Peterhead_1	0		
		Shetland_to_Blackhillock	1.5		Possible:

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					Screened into Stage 1 Assessment for pathways h and i relating to burrowed mud and minke whale
		INTOG			
		Aspen_to_Fetteresso	9.97		Possible: Screened into Stage 1 Assessment for pathways h and i relating to burrowed mud and minke whale
		Peterhead_to_Cenos	0		Likely: Screened into Stage 1 Assessment for
		Scaraben_to_Peterhead_2	0		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					pathways a-c and e-h relating to burrowed mud; pathways d, and g-i relating to minke whales; and pathways a-b for quaternary of Scotland
		Aspen_to_Beech	78.98		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Cedar_to_Aspen	70.99		
		Scaraben_to_Sinclair	36.09		
Turbot Bank MPA	• Sandeels (*Ammodytes marinus* / *Ammodytes tobianus*)	HND		a. Temporary physical disturbance – subtidal benthic habitats	
		SW_E1a_to_Lincolnshire_Connection_Node	72.50		Highly unlikely: Located beyond the ZoI for
		SW_E1a_to_Hawthorn Pit	72.50		
		SW_NE4_to_New_Deer (ES26)	71.02		
		SW_NE7_to_Peterhead	29.40		
		SW_E1a_to_SW_e1b	43.41		

Site Name	Protected Features	Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
	SW_E1a_to_Fiddes	49.97	b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	potential impact pathways
	HNDFUE			
	SW_E2b_to_Peterhead_2	0		Likely: Screened into Stage 1 Assessment for pathways a-f relating to sandeels
	SW_E2b_to_SW_E2a_1	4.97		Possible: Screened into Stage 1 Assessment for pathways e and f relating to sandeels
	SW_E1a_to_Branxton	72.59		Highly unlikely: Located beyond the ZoI for potential impact pathways
	SW_E1a_to_SW_E1c_2	72.5		
	SW_E1c_1_to_Lincolnshire_Connection_Node	63.34		
	SW_E1c_1_to_SW_E1c_2	63.34		
	SW_E1c_2_to_Weston_Marsh	84.79		
	SW_E2a_1_to_SW_E2a_2	41.41		
	SW_E2a_2_to_Near_Richborough	53.23		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_E2a_2_to_SW_E1c_1	48.34		
		SW_E3_to_Fiddes	40.20		
		SW_NE3_to_New_Deer_2	52.99		
		SW_NE4_to_New_Deer	70.02		
		SW_NE6_to_Peterhead_2	48.46		
		SW_NE7_to_Peterhead_DCSS	27.87		
		SW_NE8_to_Peterhead_1	42.01		
		INTOG			
		Aspen_to_Fetteresso	0		Likely: Screened into Stage 1 Assessment for pathways a-f relating to sandeels
		Peterhead_to_Cenos	3.57		Possible: Screened into Stage 1 Assessment for pathways e and f relating to sandeels
		Aspen_to_Beech	39.84		Highly unlikely:
		Cedar_to_Aspen	39.84		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		Scaraben_to_Peterhead_2	42.86		Located beyond the ZoI for potential impact pathways
		Beech_to_Cedar	78.01		
		Scaraben_to_Sinclair	92.58		
		Cedar_to_Branxton	94.22		
East of Gannet and Montrose Fields MPA	• Ocean quahog aggregations (*Arctica islandica*) • Offshore deep sea muds	HND		a. Temporary physical disturbance – subtidal benthic habitats b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic	
		SW_E1a_to_SW_e1b	64.67		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE4_to_New_Deer (ES26)	36.49		
		HNDFUE			
		SW_E1c_1_to_SW_E1c_2	91.62		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2_to_Weston_Marsh	91.68		
		SW_E2b_to_Peterhead_2	83.09		
		SW_E2b_to_SW_E2a_1	47.01		
		SW_E2a_1_to_SW_E2a_2	35.35		
		SW_E2a_2_to_SW_E1c_1	35.35		
		SW_E2a_2_to_Near_Richborough	20.24		
		SW_E1a_to_SW_E1c_2	91.68		
		SW_E1c_1_to_Lincolnshire_Connection_Node	92.32		
		INTOG			

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		Peterhead_to_Cenos	0	habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	Likely: Screened into Stage 1 Assessment for pathways a-f relating to ocean quahog and deep sea muds
		North_Connect_to_Cenos	0		
		Beech_to_Cedar	4.21		Possible: Screened into Stage 1 Assessment for pathways e and f relating to ocean quahog and deep sea muds
		Cedar_to_Aspen	13.99		
		Cedar_to_Branxton	19.47		Unlikely: Located beyond the ZoI for potential impact

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					pathways
		Aspen_to_Beech	37.98		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Beech_to_Beech_MPI	42.12		
		Aspen_to_Fetteresso	78.01		
Norwegian Boundary Sediment Plain MPA	• Ocean quahog aggregations (*Arctica islandica*) (*including sands and gravels as their supporting habitat*)	INTOG		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		Beech_to_Beech_MPI	4.11		Possible: Screened into Stage 1 Assessment for pathways a and b relating to ocean quahog
		Aspen_to_Beech	8.11		
		Beech_to_Cedar	8.12		
		North_Connect_to_Cenos	9.20		
		Peterhead_to_Cenos	76.02		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Cedar_to_Aspen	94.14		
Central		INTOG		• None apply	

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
Fladen MPA	• Burrowed mud (sea-pens and burrowing megafauna and tall sea-pen components) • Sub-glacial tunnel valley representative of the Fladen Deeps Key Geodiversity Area	North_Connect_to_Cenos	90.63		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HND			
		SW_NE7_to_Peterhead	75.64		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_NE1a_to_Shetland	84.53		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE1b_to_Shetland	88.10		
		SW_NE1c_to_Shetland	94.36		
		Shetland_to_Blackhillock	38.03		
		SW_NE2_to_Spittal	99.47		
		SW_NE8_to_Peterhead_1	74.87		
		SW_NE7_to_Peterhead_DCSS	76.59		
		INTOG			
		NorthConnect_to_Centos	90.16		Highly

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					unlikely: Located beyond the ZoI for potential impact pathways
East Caithness Cliffs MPA	• Black guillemot (*Cepphus grylle*)	HND		a. Changes in prey availability b. Airborne sound and visual disturbance	
		SW_N1_to_Spittal	19.85		Unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		Shetland_to_Blackhillock	1.93		Possible: Screened into Stage 1 Assessment for pathways a-b relating to black guillemot
		SW_NE2_to_Spittal	5.86		
		SW_NE4_to_New_Deer	36.49		Highly unlikely: Located
		SW_NE3_to_New_Deer_2	50.61		
		SW_NE6_to_Peterhead_2	74.95		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_NE8_to_Peterhead_1	88.34		beyond the ZoI for potential impact pathways
		SW_N2_to_Near_Dounreay	36.70		
		INTOG			
		Scaraben_to_Sinclair	72.97		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Scaraben_to_Peterhead_2	82.60		
Noss Head MPA	• Horse mussel beds	HND		a. Temporary physical disturbance – subtidal benthic habitats b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) –	
		SW_N1_to_Spittal	21.25		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE4_to_New_Deer (ES26)	38.04		
		HNDFUE			
		SW_NE2_to_Spittal	0		Likely: Screened into Stage 1 Assessment

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
				subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	for pathways a-f relating to horse mussel beds
		Shetland_to_Blackhillock	6.57		Possible: Screened into Stage 1 Assessment for pathways e and f relating to horse mussel beds
		SW_N2_to_Near_Dounreay	39.61		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE4_to_New_Deer	38.04		
		SW_NE3_to_New_Deer_2	48.02		
		SW_NE6_to_Peterhead_2	74.05		
		SW_NE8_to_Peterhead_1	87.64		
		INTOG			
		Scaraben_to_Sinclair	71.55		Highly unlikely: Located
		Scaraben_to_Peterhead_2	81.29		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					beyond the ZoI for potential impact pathways
Mousa to Boddam MPA	• Marine Geomorphology of the Scottish Shelf Seabed • Sandeels (*Ammodytes marinus* / *Ammodytes tobianus*)	HNDFUE		g. Increased SSC - subtidal benthic habitats and species h. Water quality - subtidal benthic habitats and species	
		Shetland_to_Blackhillock	10.50		Possible: Screened into Stage 1 Assessment for pathways a and b relating to sandeels
		SW_NE1a_to_Shetland	25.03		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_NE1b_to_Shetland	26.54		
		SW_NE1c_to_Shetland	26.54		
Fetlar to Haroldswick MPA	• Black guillemot (*Cepphus grylle*) • Circalittoral sand and coarse	HNDFUE		• None apply	
		Shetland_to_Blackhillock	28.82		Highly unlikely: Located beyond the ZoI for
		SW_NE1a_to_Shetland	28.11		
		SW_NE1b_to_Shetland	27.75		
		SW_NE1c_to_Shetland	26.95		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
	sediment communities • Horse mussel beds • Kelp and seaweed communities on sublittoral sediment • Shallow tide-swept coarse sands with burrowing bivalves				potential impact pathways
North-west Orkney MPA	• Marine Geomorphology of the Scottish Shelf Seabed • Sandeels (*Ammodytes marinus / Ammodytes tobianus*)	HND			
		SW_N1_to_Spittal	20.73	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		Shetland_to_Blackhillock	64.49	• None apply	Highly unlikely: Located beyond the
		SW_N2_to_Near_Dounreay	35.72		
		SW_NE1a_to_Shetland	77.09		
		SW_NE1b_to_Shetland	77.10		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
		SW_NE1c_to_Shetland	77.10		ZoI for potential impact pathways
		SW_NE2_to_Spittal	49.25		
		SW_NE3_to_New_Deer_2	96.17		
Faroe-Shetland Sponge Belt MPA	• Continental slope • Deep sea sponge aggregations • Marine Geomorphology of the Scottish Deep Ocean Seabed • Ocean quahog aggregations (*Arctica islandica*) • Offshore subtidal sands and gravels	HNDFUE		• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
		Shetland_to_Blackhillock	98.19		
		SW_NE1a_to_Shetland	98.19		
		SW_NE1b_to_Shetland	98.18		
		SW_NE1c_to_Shetland	98.06		
		Shetland_to_Blackhillock	98.19		
Papa Westray MPA	• Black guillemot (*Cepphus grylle*) • Marine Geomorphology of the Scottish Shelf Seabed	HND		• None apply	Highly unlikely: Located beyond the ZoI for potential impact
		SW_N1_to_Spittal	82.06		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
					pathways
		HNDFUE			
		Shetland_to_Blackhillock	77.43	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N2_to_Near_Dounreay	94.36		
		SW_NE2_to_Spittal	65.25		
		SW_NE3_to_New_Deer_2	96.76		
Wyre and Rousay Sounds MPA	• Kelp and seaweed communities on sublittoral sediment • Maerl beds • Marine Geomorphology of the Scottish Shelf Seabed	HND		• None apply	
		SW_N1_to_Spittal	61.01		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		Shetland_to_Blackhillock	62.71		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N2_to_Near_Dounreay	94.37		
		SW_NE2_to_Spittal	50.50		
		SW_NE3_to_New_Deer_2	78.51		

Site Name	Protected Features		Distance from Study Corridors (km)	Potential Impact Pathways of Relevance[12]	Likelihood of Interaction
West Shetland Shelf MPA	• Offshore subtidal sands and gravels	HND		• None apply	
		SW_N1_to_Spittal	55.60		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_N2_to_Near_Dounreay	42.87		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N3_to_Arnish	57.60		

Table 4: Screening for MCZs – HND Implementation Plan – West Scotland

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[13]	Likelihood of Interaction
Clyde Sea Sill MPA	• Black guillemot (*Cepphus grylle*) • Circalittoral and offshore sand and coarse sediment communities • Fronts • Marine Geomorphology of the Scottish Shelf Seabed	HND		a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Changes in prey availability e. Thermal emissions – subtidal benthic habitats and species f. Electro-magnetic fields (EMF) – subtidal benthic habitats and species Airborne sound and visual disturbance –birds g. Airborne sound and visual disturbances h. Increased Suspended Sediment Concentrations	
		SW_W1_to_Ballantrae	0		Likely: Screened into Stage 1 Assessment for pathways a-i relating to black guillemot, pathways a-c and e-i for sediment communities and fronts, and b for marine geomorphology
		Ballantrae_to_Pentir	0		
		Kilmarnock South_to_Ballantrae	6.07		Possible: Screened into Stage 1 Assessment for pathways d-h relating to black guillemot, and pathways e-h for sediment communities and fronts

[13] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

				(SSC) - subtidal benthic habitats and species i. Water quality - subtidal benthic habitats and species	
South Arran MPA	• Burrowed mud • Kelp and seaweed communities on sublittoral sediment • Maerl beds • Maerl or coarse shell gravel with burrowing sea cucumbers • Shallow tide-swept coarse sands with burrowing bivalves	HND		a. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		SW_W1_to_Ballantrae	18.07		Unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	25.96		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Kilmarnock South_to_Ballantrae	9.05		Possible: Screened into Stage 1 Assessment for pathways a and b on all protected features
Loch Sween MPA	• Burrowed mud • Maerl beds • Native oysters • Sublittoral mud and mixed sediment communities	HND		• None apply	
		Ballantrae_to_Pentir	90.27		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Kilmarnock South_to_Ballantrae	72.10		
		SW_W1_to_Ballantrae	51.83		
Loch Sunart to the Sound of Jura MPA	• Flapper skate (*Dipturus intermedius*) • Quaternary of Scotland	HND		• None apply	
		SW_W1_to_Ballantrae	52.80		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Kilmarnock South_to_Ballantrae	79.32		
Loch Sunart MPA	• Flapper skate (*Dipturus intermedius*) • Quaternary of Scotland	HND		• None apply	
		SW_W1_to_Ballantrae	78.81		Highly unlikely: Located beyond the ZoI for potential impact pathways
Upper Loch Fyne and	• Burrowed mud • Flame shell beds	HND		• None apply	
		Kilmarnock	60.24		Highly unlikely:

Loch Goil MPA	• Horse mussel beds • Ocean quahog aggregations (*Arctica islandica*)	South_to_Ballantrae			Located beyond the ZoI for potential impact pathways
		SW_W1_to_Ballantrae	71.57		
		Ballantrae_to_Pentir	96.07		
North-east Lewis MPA	• Marine Geomorphology of the Scottish Shelf Seabed • Quaternary of Scotland • Risso's dolphin (*Grampus griseus*) • Sandeels (*Ammodytes marinus / Ammodytes tobianus*)	HND		a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Changes in prey availability e. Thermal emissions – subtidal benthic habitats and species f. Electro-magnetic fields (EMF) – subtidal benthic habitats and species Airborne sound and visual disturbance –birds g. Underwater sound – marine mammals and fish h. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species i. Water quality - subtidal benthic habitats and species	
		SW_N4_to_Arnish (Lewis)	0		Likely: Screened into Stage 1 Assessment for pathways a-b for marine geomorphology and quaternary of Scotland, pathway d relating Risso's dolphin, and pathways a-c and e-i relating to sandeels
		HNDFUE			
		SW_N2_to_Near_Dounreay	39.04		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N3_to_Arnish	0		Likely: Screened into Stage 1 Assessment for pathways a-b for marine geomorphology and quaternary of Scotland, pathway d relating Risso's dolphin, and pathways a-c and e-i relating to sandeels

Shiant East Bank MPA	• Circalittoral sand and mixed sediment communities • Northern sea fan and sponge communities • Quaternary of Scotland • Shelf banks and mounds	HND		a. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		SW_N4_to_Arnish (Lewis)	16.95		Possible: Screened into Stage 1 Assessment for pathways a and b relating to circalittoral sand and mixed sediment communities, Northern sea fan and sponge communities, quaternary of Scotland, Shelf banks and mounds
		HNDFUE			
		SW_N2_to_Near_Dounreay	84.42		Unlikely: Located beyond the ZoI for potential impact pathways
		SW_N3_to_Arnish	17.81		
Wester Ross MPA	• Burrowed mud • Circalittoral muddy sand communities • Flame shell beds • Kelp and seaweed communities on sublittoral sediment	HND		• None apply	
		SW_N4_to_Arnish (Lewis)	39.98		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_N2_to_Near_Dounreay	71.28		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N3_to_Arnish	36.63		
Monach Isles MPA	• Black guillemot (*Cepphus grylle*) • Marine Geomorphology of the Scottish Shelf Seabed • Quaternary of Scotland	HND		• None apply	
		SW_N4_to_Arnish (Lewis)	96.54		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_N3_to_Arnish	95.89		Highly unlikely: Located beyond the ZoI for potential impact pathways
Red Rocks and Longay	• Flapper skate	HND		• None apply	
		SW_N4_to_Arnish (Lewis)	93.91		Highly unlikely:

MPA	• Quaternary of Scotland - moraines, crag and tails, rock drumlin				Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_N3_to_Arnish	94.42		Highly unlikely: Located beyond the ZoI for potential impact pathways
Loch Carron MPA	• Flame shell beds • Maerl beds	HNDFUE		• None apply	
		SW_N4_to_Arnish (Lewis)	97.65		Highly unlikely: Located beyond the ZoI for potential impact pathways
Sea of the Hebrides MPA	• Basking shark (*Cetorhinus maximus*) • Fronts • Marine Geomorphology of the Scottish Shelf Seabed • Minke whale (*Balaenoptera acutorostrata*)	HND		a. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		SW_N4_to_Arnish (Lewis)	74.36		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_W1_to_Ballantrae	15.67		Possible: Screened into Stage 1 Assessment for pathways a-b relating to basking sharks and minke whales
		HNDFUE			
		SW_N3_to_Arnish	74.65		Highly unlikely: Located beyond the ZoI for potential impact pathways
West of Scotland MPA	• Burrowed mud (including Sea-pens) • Coral gardens • Cold-water coral reefs (including *Lophelia pertusa* reefs) • Deep-sea sponge aggregations • Offshore deep-sea muds	HNDFUE		• None apply	
		SW_N2_to_Near_Dounreay	92.25		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_N3_to_Arnish	68.20		
		SW_N4_to_Arnish (Lewis)	74.63		

	• Offshore sands and gravels • Seamount communities • Seamount • Blue Ling (*Molva dypterygia*) • Leafscale gulper shark (*Centrophorus squamosus*) / Gulper shark (*Centrophorus granulosus*) • Orange roughy (*Hoplostethus atlanticus*) • Portuguese dogfish (*Centroscymnus coelolepis*) • Round-nose grenadier (*Coryphaenoides rupestris*)				
Loch Creran MPA	• Flame shell beds • Quaternary of Scotland	HND SW_W1_to_Ballantrae	93.56	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
Small Isles MPA	• Black guillemot (*Cepphus grylle*) • Burrowed mud • Circalittoral sand and mud communities • Fan mussel aggregations (*Atrina fragilis*)	HND SW_W1_to_Ballantrae	90.92	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways

Note: conservation objectives are provided for sites screened in, below.

Table 5: Screening for MCZs – HND Implementation Plan – Northern Ireland

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[14]	Likelihood of Interaction
Rathlin MCZ	• Black guillemot (*Cepphus grylle*) • Deep-sea bed • Geological / Geomorphological features	HND		a. Changes in Prey availability b. Increased Suspended Sediment Concentrations (SSC) - subtidal benthic habitats and species c. Water quality - subtidal benthic habitats and species	
		SW_W1_to_Ballantrae	5.94		Possible: Screened into Stage 1 Assessment for pathways a-b relating to deep sea bed, and pathway a relating to black guillemot
		Kilmarnock South_to_Ballantrae	66.51		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	60.06		
Waterfoot MCZ	• Subtidal (sublittoral) sand • Seagrass bed (Zostera marina)	HND		None apply	
		Kilmarnock South_to_Ballantrae	60.25		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_W1_to_Ballantrae	22.94		
		Ballantrae_to_Pentir	45.34		
Outer Belfast Lough MCZ	• Ocean quahog • Subtidal (sublittoral) sand	HND		None apply	
		Kilmarnock South_to_Ballantrae	55.69		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_W1_to_Ballantrae	50.81		
		Ballantrae_to_Pentir	25.03		
Strangford Lough MCZ	No protected features detailed in publicly available information.	HND		None apply	
		Ballantrae_to_Pentir	71.10		Highly unlikely: Located beyond the ZoI for
		SW_W1_to_Ballantrae	66.50		

[14] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

	Please see HRA for the Stangford Lough SAC and SPA	Ballantrae_to_Pentir	35.11		potential impact pathways
Carlingford Lough MCZ	• Subtidal (sublittoral) mud • *Philine aperta* and Virgularia *mirabilis* in soft stable infralittoral mud	HND		None apply	
		Ballantrae_to_Pentir	76.89		Highly unlikely: Located beyond the ZoI for potential impact pathways

Note: conservation objectives are provided for sites screened in, below.

Table 6: Screening for MCZs – HND Implementation Plan – Wales

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[15]	Likelihood of Interaction
Skomer MCZ	• Grey seal (*Halichoerus grypus*) • Pink seafan (*Eunicella verrucose*) • Sponge communities • Eelgrass (*Zostera marina*) • Algal communities.	HND		a. Changes in prey availability – marine mammals	
		R4_4_to_Bodelwyddan	231.90		Possible: Grey seal migrations have been evidenced within the Seal Management Unit, between Skomer MCZ and areas overlapping the study corridor. Screened into Stage 1 Assessment for pathway a related to grey seal
		Ballantrae_to_Pentir	153.11		
		Celtic Sea			
		PDA3_to_Pyworthy	67.72		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA2_to_South_Wales_Connection_Node	41.00		
		PDA1_to_Llandyfaelog	23.86		

[15] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

Table 7: Screening for MCZs – HND Implementation Plan – North East England

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
Holderness Offshore MCZ (UKMCZ0078)	• North Sea glacial tunnel valleys • Ocean quahog (*Arctica islandica*) • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand	HND		b. Temporary physical disturbance – subtidal benthic habitats and species c. Permanent loss - subtidal benthic habitats and species d. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species e. Thermal emissions – subtidal benthic habitats and species f. EMF – Subtidal benthic habitats and species g. Increased SSC - subtidal benthic	
		R4_3_to_Weston_Marsh	27.34		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PA_1_to_Birkhill_Wood	0		Likely: Screened into Stage 1 Assessment for pathways a-g related to subtidal benthic habitats and ocean quahog
		R4_1_to_Birkhill_Wood	0		
		R4_2_to_Birkhill_Wood	0		
		SW_E1a_to_Lincolnshire_Connection_Node	0		
		HNDFUE			
		SW_E1c_1: Lincolnshire Connection Node	0.57		Possible: Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats and ocean quahog
		SW_E1c_2 to Weston_Marsh	2.99		
		SW_E2a_2_to_Near_Richborough	69.26		Highly unlikely: Located beyond the ZoI for potential impact pathways

[16] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
				habitats and species h. Water quality - subtidal benthic habitats and species	
Holderness Inshore MCZ (UKMCZ0035)	• High energy circalittoral rock • Intertidal sand and muddy sand • Moderate energy circalittoral rock • Spurn Head (subtidal) • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal mud • Subtidal sand	HND		a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. EMF – Subtidal benthic habitats and species f. Increased SSC - subtidal benthic	
		PA_1_to_Birkhill_Wood	0		Likely: Screened into Stage 1 Assessment for pathways a-g related to subtidal benthic habitats
		R4_1_to_Birkhill_Wood	0		
		R4_2_to_Birkhill_Wood	0		
		SW_E1a_to_Lincolnshire_Connection_Node	10.96		Possible: Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats
		R4_3_to_Weston_Marsh	30.81		Highly unlikely: Located beyond the ZoI for potential impact pathways
		HNDFUE			
		SW_E1c_1: Lincolnshire Connection Node	13.45		Possible: Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats
		SW_E1c_2 to Weston_Marsh	16.40		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
				habitats and species g. Water quality - subtidal benthic habitats and species	
Markham's Triangle MCZ (UKMCZ0084)	• Subtidal coarse sediment • Subtidal mud • Subtidal sand • Subtidal mixed sediments	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		R4_3_to_Weston_Marsh	85.23		Unlikely: Located beyond the ZoI for potential impact pathways
		PA_1_to_Birkhill_Wood	47.62		
		R4_1_to_Birkhill_Wood	95.47		
		R4_2_to_Birkhill_Wood	49.74		
		SW_E1a_to_Lincolnshire_Connection_Node	93.06		
		HNDFUE			
		SW_E2a_2_to_Near_Richborough	12.43		Possible: Screened into Stage 1 Assessment for pathways a and b related to all protected features
		SW_E1c_1_to_Lincolnshire_Connection_Node	98.45		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2_to_Weston_Marsh	93.06		
Farnes East MCZ (UKMCZ0043)	• Moderate energy circalittoral rock • Subtidal coarse sediment	HND		a. Temporary physical disturbance – subtidal benthic habitats and species	
		SW_E1a_to_Lincolnshire_Connection_Node	43.03		Unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_SW_e1b	87.98		
		SW_E1a_to_Fiddes	87.98		
		SW_E1a_to_Hawthorn Pit	7.42		Possible:

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
	• Subtidal mixed sediments • Subtidal sand • Subtidal mud • Sea-pen and burrowing megafauna communities • Ocean quahog (*Arctica islandica*)			b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. EMF – Subtidal benthic habitats and species f. Increased SSC - subtidal benthic habitats and species g. Water quality - subtidal benthic habitats and species	Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats, sea pen and burrowing mega fauna communities, and ocean quahog
		PA_2_to_Berwick Bank	0		Likely: Screened into Stage 1 Assessment for pathways a-g related to subtidal benthic habitats, sea pen and burrowing mega fauna communities, and ocean quahog
		HNDFUE			
		SW_E1a_to_Branxton	12.43		Possible: Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats, sea pen and burrowing mega fauna communities, and ocean quahog
		SW_E1c_1: Lincolnshire Connection Node	41.90		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2 to Weston_Marsh	49.44		
		SW_E1a_to_SW_E1c_2	87.87		
		SW_E1c_1_to_SW_E1c_2	93.89		
		INTOG			Possible:

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
		Cedar_to_Branxton	8.74		Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats, sea pen and burrowing mega fauna communities, and ocean quahog
North East of Farnes Deep MCZ and HPMA (UKEHPMA003)	• HPMA • Entire marine ecosystem	HND		a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Changes in prey availability e. Collision risk – marine mammals f. Thermal emissions – subtidal benthic habitats and species	
		SW_E1a_to_Lincolnshire_Connection_Node	8.13		Possible: Screened into Stage 1 Assessment for pathways i-k related to the entire ecosystem of the HPMA
		SW_E1a_to_Hawthorn Pit	0		Likely: Screened into Stage 1 Assessment for pathways a-k related to the entire ecosystem of the HPMA
		PA_2_to_Berwick Bank	41.70		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_SW_e1b	85.96		
		SW_E1a_to_Fiddes	85.96		
		HNDFUE			
		SW_E1c_1_to_Lincolnshire_Connection_Node	6.83		Possible: Screened into Stage 1 Assessment for pathways i-k related to the entire ecosystem of the HPMA
		SW_E1c_2_to_Weston_Marsh	14.24		
		SW_E1a_to_Branxton	39.52		Highly unlikely:
		SW_E1a_to_SW_E1c_2	80.03		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
		SW_E1c_1_to_SW_E1c_2	80.03	g. EMF – Subtidal benthic habitats and species h. Airborne sound and visual disturbance – marine mammals and birds i. Underwater sound – marine mammals, fish, and Shellfish j. Increased SSC - subtidal benthic habitats and species k. Water quality - subtidal benthic habitats and species	Located beyond the ZoI for potential impact pathways
		SW_E2a_2_to_Near_Richborough	96.21		
		SW_E2a_2_to_SW_E1c_1	97.27		
		INTOG			
		Cedar_to_Branxton	32.29		Highly unlikely: Located beyond the ZoI for potential impact pathways
Swallow Sand MCZ (UKMCZ0026)	• Subtidal coarse sediment • Subtidal sand • North Sea glacial tunnel valley (Swallow Hole)	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		SW_E1a_to_Lincolnshire_Connection_Node	8.55		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		SW_E1a_to_Hawthorn Pit: SW_E1a– Hawthorn Pit	42.84		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PA_2_to_Berwick Bank	87.67		
		SW_E1a_to_SW_e1b	88.01		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
		SW_E1a_to_Fiddes	88.01		
		R4_1_to_Birkhill_Wood	94.51		
		HNDFUE			
		SW_E1c_1: Lincolnshire Connection Node	12.03		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		SW_E1c_2_to_Weston_Marsh	4.40		
		SW_E2a_2_to_Near_Richborough	9.24		
		SW_E1a_to_Branxton	69.61		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_SW_E1c_2	66.93		
		SW_E1c_1_to_SW_E1c_2	66.93		
		SW_E2a_2_to_SW_E1c_1	88.55		
		INTOG			
		Cedar_to_Branxton	42.58		Highly unlikely: Located beyond the ZoI for potential impact pathways
Berwick to St Mary's MCZ (UKMCZ0055)	• Common eider (*Somateria mollissima*)	HND		a. Changes in prey availability b. Airborne sound and visual disturbance – marine mammals and birds	
		SW_E1a_to_Lincolnshire_Connection_Node	74.88		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Hawthorn Pit	14.51		Possible: Screened into Stage 1 Assessment for pathways a related to common eider.
		PA_2_to_Berwick Bank	0		Likely:

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
					Screened into Stage 1 Assessment for pathways a and b related to common eider
		HNDFUE			
		SW_E1a_to_Branxton	16.91		Possible: Screened into Stage 1 Assessment for pathways a related to common eider.
		SW_E1c_1_to_Lincolnshire_Connection_Node	75.04		Unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2_to_Weston_Marsh	81.16		
		INTOG			
		Cedar_to_Branxton	13.52		Possible: Screened into Stage 1 Assessment for pathways a related to common eider.
Coquet to St Mary's MCZ (UKMCZ0030)	• High energy infralittoral rock • High energy intertidal rock • Intertidal coarse sediment • Intertidal mixed sediments • Intertidal mud	HND		a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native	
		SW_E1a_to_Branxton	59.41		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Lincolnshire_Connection_Node	74.88		
		SW_E1a_to_Hawthorn Pit	14.51		Possible: Screened into Stage 1 Assessment for pathways f and g related to subtidal benthic habitats
		PA_2_to_Berwick Bank	0		Likely:

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
	• Intertidal sand and muddy sand • Intertidal underboulder communities • Low energy intertidal rock • Moderate energy circalittoral rock • Moderate energy infralittoral rock • Moderate energy intertidal rock • Peat and clay exposures • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal mud • Subtidal sand			Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. EMF – Subtidal benthic habitats and species f. Increased SSC - subtidal benthic habitats and species g. Water quality - subtidal benthic habitats and species	Screened into Stage 1 Assessment for pathways a-g related to subtidal benthic habitats
		HNDFUE			
		SW_E1c_1_to_Lincolnshire_Connection_Node	75.04		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2_to_Weston_Marsh	81.16		
		INTOG			
		Cedar_to_Branxton	54.54		Highly unlikely: Located beyond the ZoI for potential impact pathways
Runswick Bay MCZ (UKMCZ0039)	• High energy intertidal rock • Intertidal sand and muddy sand • Low energy intertidal rock • Moderate energy circalittoral rock	HND		• None apply	
		PA_2_to_Berwick Bank	70.32		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Hawthorn Pit	36.76		
		PA_1_to_Birkhill_Wood	63.08		
		R4_1_to_Birkhill_Wood	63.08		
		R4_2_to_Birkhill_Wood	63.08		
		HNDFUE			

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
	• Moderate energy infralittoral rock • Moderate energy intertidal rock • Ocean quahog (*Arctica islandica*) • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal mud • Subtidal sand	SW_E1c_1: Lincolnshire Connection Node	72.18		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2_to_Weston_Marsh	79.04		
Fulmar MCZ (UKMCZ0046)	• Subtidal mixed sediments • Subtidal sand • Subtidal mud • Ocean quahog (*Arctica islandica*)	HNDFUE		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		SW_E2a_2_to_Near_Richborough	14.98		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats and ocean quahog
		INTOG			
		Beech_to_Cedar	77.44		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Beech_to_Aspen	77.44		
		Cedar_to_Branxton	54.54		
		NorthConnect_to_Centos	60.09		
		Peterhead_to_Cenos	60.09		
Aln Estuary MCZ		HND		a. Increased SSC - subtidal benthic	
		PA_2_to_Berwick Bank	7.93		Possible:

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[16]	Likelihood of Interaction
	• Coastal saltmarshes and saline reedbeds • Intertidal mud • Estuarine rocky habitats • Sheltered muddy gravels			habitats and species b. Water quality - subtidal benthic habitats and species	Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats, and intertidal habitats
		SW_E1a_to_Hawthorn Pit	39.74		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Lincolnshire_Connection_Node	83.78		
		HNDFUE			
		SW_E1a_to_Branxton	38.75		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_1_to_Lincolnshire_Connection_Node	84.30		
		SW_E1c_2_to_Weston_Marsh	89.99		
		INTOG			
		Cedar_to_Branxton	54.54		Highly unlikely: Located beyond the ZoI for potential impact pathways

Note: conservation objectives are provided for sites screened in, below.

Table 8: Screening for MCZs – HND Implementation Plan – South East England

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[17]	Likelihood of Interaction
Cromer Shoal Chalk Beds MCZ (UKMCZ0031)	• High energy circalittoral rock • High energy infralittoral rock • Moderate energy circalittoral rock • Moderate energy infralittoral rock • North Norfolk Coast assemblage of subtidal sediment features and habitats • Peat and clay exposures • Subtidal chalk • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand	HND		• None apply	
		R4_3_to_Weston_Marsh	29.26		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1a_to_Lincolnshire_Connection_Node	53.80		
		HNDFUE			
		SW_E1c_1: Lincolnshire Connection Node	56.85		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E1c_2 to Weston_Marsh	52.37		
		SW_E2a_2_to_Near_Richborough	73.09		
Thanet Coast MCZ (UKMCZ0017)	• Blue mussel (*Mytilus edulis*) beds • Moderate energy circalittoral rock	HND		a. Temporary physical disturbance – subtidal benthic	
		SW_E2a_2_to_Near_Richborough	0		Likely: Screened into Stage 1 Assessment for pathways

[17] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

	• Moderate energy infralittoral rock • Peat and clay exposures • Ross worm (*Sabellaria spinulosa*) reefs • Stalked jellyfish (*Calvadosia cruxmelitensis*) • Stalked jellyfish (*Haliclystus* spp) • Subtidal chalk • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand			habitats and species b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. EMF – Subtidal benthic habitats and species f. Increased SSC - subtidal benthic habitats and species g. Water quality - subtidal benthic habitats and species	a-g related to all protected features
Goodwin Sands MCZ (UKMCZ0061)	• Blue mussel (*Mytilus edulis*) beds • English Channel outburst flood features • Moderate energy circalittoral rock	HNDFUE SW_E2a_2_to_Near_Richborough	0	a. Temporary physical disturbance – subtidal benthic habitats and species b. Permanent loss - subtidal benthic	Likely: Screened into Stage 1 Assessment for pathways a-g related to all protected features

	• Ross worm (*Sabellaria spinulosa*) reefs • Subtidal coarse sediment • Subtidal sand			habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic habitats and species e. EMF – Subtidal benthic habitats and species f. Increased SSC - subtidal benthic habitats and species g. Water quality - subtidal benthic habitats and species	
Orford Inshore MCZ (UKMCZ0081)	• Subtidal mixed sediments	HNDFUE		• None apply	
		SW_E1c_2 to Weston_Marsh	30.70		Highly unlikely: Located beyond the ZoI for potential impact pathways
		SW_E2a_2_to_Near_Richborough	30.71		Highly unlikely: Located beyond the ZoI for potential impact pathways
Kentish Knock East MCZ	• Subtidal coarse sediment	HNDFUE		a. Increased SSC - subtidal benthic	
		SW_E2a_2_to_Near_Richborough	13.18		Possible:

(UKMCZ0080)	• Subtidal mixed sediments • Subtidal sand			habitats and species b. Water quality - subtidal benthic habitats and species	Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
The Swale Estuary MCZ (UKMCZ0041)	• Estuarine rocky habitats • Intertidal coarse sediment • Intertidal mixed sediments • Intertidal sand and muddy sand • Low energy intertidal rock • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal mud • Subtidal sand	HNDFUE SW_E2a_2_to_Near_Richborough	16.26	a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	Possible: Screened into Stage 1 Assessment for pathways a and b relating to estuarine rocky habitats, intertidal habitats, and subtidal benthic habitats
Dover to Deal MCZ (UKMCZ0032)	• Blue mussel (*Mytilus edulis*) beds • High energy circalittoral rock • High energy intertidal rock • Intertidal coarse sediment • Intertidal sand and muddy sand	HNDFUE SW_E2a_2_to_Near_Richborough	9.35	a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats, blue mussel, native oyster, and ross worm

	• Intertidal underboulder communities • Littoral chalk communities • Low energy intertidal rock • Moderate energy circalittoral rock • Moderate energy infralittoral rock • Moderate energy intertidal rock • Native oyster (*Ostrea edulis*) • Ross worm (*Sabellaria spinulosa*) reefs • Subtidal chalk • Subtidal mixed sediments • Subtidal sand				
		HNDFUE			
Dover to Folkestone MCZ (UKMCZ0033)	• Folkestone Warren (Gault Formation) • High energy intertidal rock • Intertidal coarse sediment • Intertidal sand and muddy sand • Intertidal underboulder communities	SW_E2a_2_to_Near_Richborough	20.09	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways

	• Littoral chalk communities • Low energy intertidal rock • Moderate energy infralittoral rock • Moderate energy intertidal rock • Native oyster (*Ostrea edulis*) • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal mud • Subtidal sand				
Folkestone Pomerania MCZ (UKMCZ0006)	• Fragile sponge and anthozoan communities on subtidal rocky habitats • High energy circalittoral rock • Honeycomb worm (*Sabellari alveolata*) reefs • Ross worm (*Sabellaria spinulosa*) reefs • Subtidal coarse sediment • Subtidal sand	HNDFUE			
		SW_E2a_2_to_Near_Richborough	26.35	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
Foreland MCZ		HNDFUE			

(UKMCZ0060)	• English Channel outburst flood features • High energy circalittoral rock • Moderate energy circalittoral rock • Subtidal coarse sediment • Subtidal sand	SW_E2a_2_to_Near_Richborough	6.10	a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
Blackwater, Crouch, Roach and Colne Estuaries MCZ (UKMCZ0003)	• Clacton Cliffs and Foreshore Intertidal mixed sediments Native oyster (*Ostrea edulis*) Native oyster (*Ostrea edulis*) beds	HNDFUE			
		SW_E2a_2_to_Near_Richborough	38.68	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
Swanscombe MCZ (UKMCZ0073)	• Intertidal mud • Tentacled lagoon worm (*Alkmaria romijni*)	HNDFUE			
		SW_E2a_2_to_Near_Richborough	68.59	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
Medway Estuary - Zone 1 MCZ (UKMCZ0011-01)	• Estuarine rocky habitats • Intertidal mixed sediments • Intertidal sand and muddy sand • Low energy intertidal rock • Peat and clay exposures	HNDFUE			
		SW_E2a_2_to_Near_Richborough	36.35	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways

	• Smelt (*Osmerus eperlanus*) • Subtidal coarse sediment • Subtidal mud • Subtidal sand • Tentacled lagoon worm (*Alkmaria romijni*)				
Beachy Head East MCZ (UKMCZ0053)	• High energy circalittoral rock • Littoral chalk communities • Moderate energy circalittoral rock • Peat and clay exposures • Ross worm (*Sabellaria spinulosa*) reefs • Short snouted seahorse (*Hippocampus hippocampus*) • Subtidal chalk • Subtidal coarse sediment • Subtidal sand	HNDFUE SW_E2a_2_to_Near_Richborough	70.69	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
Beachy Head West MCZ (UKMCZ0002)	• Blue mussel (*Mytilus edulis*) beds • High energy circalittoral rock • Infralittoral muddy sand	HNDFUE SW_E2a_2_to_Near_Richborough	96.64	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways

	• Infralittoral sandy mud • Intertidal coarse sediment • Littoral chalk communities • Low energy infralittoral rock and thin sandy sediment • Moderate energy circalittoral rock • Native oyster (*Ostrea edulis*) • Short snouted seahorse (*Hippocampus hippocampus*) • Subtidal chalk • Subtidal mixed sediments • Subtidal mud • Subtidal sand				
Inner Bank MCZ (UKMCZ0079)	• Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand	HNDFUE			
		SW_E2a_2_to_Near_Richborough	56.99	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways

Note: conservation objectives are provided for sites screened in, below.

Table 9: Screening for MCZs – HND Implementation Plan – North West England

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
South Rigg MCZ (UKMCZ0088)	• Moderate energy circalittoral rock • Subtidal mixed sediments • Sea-pen & burrowing megafauna communities • Subtidal coarse sediment • Subtidal mud • Subtidal sand	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality– - subtidal benthic habitats and specie s	
		Ballantrae_to_Pentir	1.03		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats, and sea pen and burrowing megafauna communities
		R4_6_to_Penwortham	69.93		Highly unlikely: Located beyond the ZoI for potential impact pathways
		R4_4_to_Bodelwyddan	92.80		
		Kilmarnock South_to_Ballantrae	71.57		
		SW_W1_to_Ballantrae	71.57		
Queenie Corner MCZ (UKMCZ0086)	• Sea-pen & burrowing megafauna communities • Subtidal mud	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality– - subtidal benthic habitats and species	
		Ballantrae_to_Pentir	4.45		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats, and sea pen and burrowing megafauna communities
		R4_5_to_Penwortham	92.47		Highly unlikely: Located beyond the ZoI for
		R4_6_to_Penwortham	66.96		

[18] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
		R4_4_to_Bodelwyddan	71.59		potential impact pathways
Solway Firth MCZ (UKMCZ0069)	• Smelt (Osmerus eperlanus)	HND		a. Barrier to migration – diadromous fish	
		PA_2_to_Berwick Bank	94.00		Highly unlikely to cause a barrier to migration due to the large distance from the MCZ, the complex topography of the coast and multiple other water bodies in-between, and the cable routes not extending across the entrance to Solway Firth Screened out from assessment
		Kilmarnock South_to_Ballantrae	98.85		
		Ballantrae_to_Pentir	100.38		Unlikely: Smelt would have to cross Ballantrae_to_Pentir to gain access to the Celtic Sea from Solway Firth MCZ. Although, however smelt are known to migrate to coastal environments close to estuaries, they are unlikely to migrate through open ocean as they are relatively weak swimmers (Lyle and Maitland, 1997), and have access to multiple estuaries east of the cable. Therefore, any

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
					potential barrier to migration would likely be insignificant Screened out from assessment
Allonby Bay HPMA (UKEHPMA001)	• Entire marine ecosystem	HND		• None apply	
		R4_6_to_Penwortham	84.41		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	84.44		
		Kilmarnock South_to_Ballantrae	98.14		
		SW_W1_to_Ballantrae	98.14		
Allonby Bay MCZ (UKMCZ0028)	• Blue mussel (*Mytilus edulis*) beds • High energy intertidal rock • Honeycomb worm (*Sabellari alveolata*) reefs • Intertidal biogenic reefs • Intertidal coarse sediment • Intertidal sand and muddy sand • Low energy intertidal rock • Moderate energy infralittoral rock	HND		• None apply	
		R4_6_to_Penwortham	84.41		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	84.44		
		Kilmarnock South_to_Ballantrae	98.14		
		SW_W1_to_Ballantrae	98.14		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
	• Moderate energy intertidal rock • Peat and clay exposures • Subtidal biogenic reefs • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand				
West of Copeland MCZ (UKMCZ0090)	• Subtidal sand • Subtidal coarse sediment • Subtidal mixed sediments	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		R4_6_to_Penwortham	10.67		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		R4_5_to_Penwortham	33.31		Highly unlikely: Located beyond the ZoI for potential impact pathways
		R4_4_to_Bodelwyddan	37.71		
		Ballantrae_to_Pentir	49.17		
West of Walney MCZ (UKMCZ0045)	• Sea-pen and burrowing megafauna communities • Subtidal mud • Subtidal sand	HND		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		R4_5_to_Penwortham	13.16		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		R4_6_to_Penwortham	11.24		
		R4_4_to_Bodelwyddan	34.96		Highly unlikely: Located beyond the ZoI for
		Ballantrae_to_Pentir	68.87		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
					potential impact pathways
Wyre-Lune MCZ (UKMCZ0074)	• Smelt (*Osmerus eperlanus*)	HND		a. EMF – fish b. Increased SSC - fish c. Water quality - fish d. Barriers to migration – diadromous fish	
		R4_5_to_Penwortham	7.11		Possible: Screened into Stage 1 Assessment for pathways a-d related to smelt
		R4_6_to_Penwortham	7.09		
		R4_4_to_Bodelwyddan	59.40		Highly unlikely: Located beyond the ZoI for potential impact pathways
Fylde MCZ (UKMCZ0007)	• Subtidal mud • Subtidal sand	HND		a. Temporary physical disturbance – subtidal benthic habitats b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species d. Thermal emissions – subtidal benthic	
		R4_5_to_Penwortham	0		Likely: Screened into Stage 1 Assessment for pathways a-f related to subtidal benthic habitats
		R4_6_to_Penwortham	0		
		R4_4_to_Bodelwyddan	35.84		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	72.94		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
				habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	
Ribble Estuary MCZ (UKMCZ0067)	• Smelt (*Osmerus eperlanus*)	HND		a. EMF - fish b. Underwater sound – fish c. Increased SSC - subtidal benthic habitats and species d. Water quality - subtidal benthic habitats and species e. Barrier to migration - fish	
		R4_5_to_Penwortham	0		Likely: Screened into Stage 1 Assessment for pathways a-e related to smelt
		R4_6_to_Penwortham	0		
		R4_4_to_Bodelwyddan	56.49		Highly unlikely: Located beyond the ZoI for potential impact pathways
		Ballantrae_to_Pentir	94.25		Highly unlikely: Located beyond the ZoI for potential impact pathways
Cumbria Coast MCZ– - Zone 1 (UKMCZ0005-01)	• High energy intertidal rock • Honeycomb worm (*Sabellari alveolata*) reefs	HND		a. Changes in prey availability - razorbill	
		R4_5_to_Penwortham	57.50		Possible: The cable routes are within the mean maximum foraging range of razorbill
		R4_6_to_Penwortham	48.76		
		R4_4_to_Bodelwyddan	72.44		
		Ballantrae_to_Pentir	72.76		

Site Name	Protected Features	Distance from Study Corridors (km)		Potential Impact Pathways of Relevance[18]	Likelihood of Interaction
	• Intertidal biogenic reefs • Intertidal sand and muddy sand • Intertidal underboulder communities • Moderate energy infralittoral rock • Peat and clay exposures • Razorbill (*Alca torda*)	SW_W1_to_Ballantrae	108.62		(164.6 km)
		Kilmarnock South_to_Ballantrae	108.62		
Cumbria Coast MCZ– - Zone 2 (UKMCZ0005-02)		HND			
		R4_5_to_Penwortham	57.50		Possible: The cable routes are within the mean maximum foraging range of razorbill (164.6 km)
		R4_6_to_Penwortham	48.76		
		R4_4_to_Bodelwyddan	72.44		
		Ballantrae_to_Pentir	72.61		
		SW_W1_to_Ballantrae	108.62		
		Kilmarnock South_to_Ballantrae	108.62		

Note: conservation objectives are provided for sites screened in, below.

Table 10: Screening for MCZs – HND Implementation Plan – South West England

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
North West of Lundy MCZ (UKMCZ0064)	• Subtidal coarse sediment	Celtic Sea		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		PDA2_to_South_Wales_Connection_Node	0.20		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal coarse sediment habitats
		PDA3_to_Pyworthy	13.10		
		PDA1_to_Llandyfaelog	12.12		
South-West Approaches to Bristol Channel MCZ (UKMCZ0083)	• Subtidal coarse sediment • Subtidal sand	Celtic Sea		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		PDA3_to_Pyworthy	1.76		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		PDA2_to_South_Wales_Connection_Node	24.48		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA1_to_Llandyfaelog	45.99		
Lundy MCZ (UKMCZ0010)	• Spiny lobster (*Palinurus elephas*)	Celtic Sea		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic	
		PDA3_to_Pyworthy	6.99		Possible: Screened into Stage 1 Assessment for pathways a and b related to spiny lobster
		PDA2_to_South_Wales_Connection_Node	20.31		

[19] The impact pathways listed are of key concern relating to cable routes listed. Each will be considered where a route has been carried forward to Stage 1 assessment.

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
		PDA1_to_Llandyfaelog	31.62	habitats and species	Highly unlikely: Located beyond the ZoI for potential impact pathways
Hartland Point to Tintagel MCZ (UKMCZ0034)	• Coastal saltmarshes and saline reedbeds • Fragile sponge and anthozoan communities on subtidal rocky habitats • High energy circalittoral rock • High energy infralittoral rock • High energy intertidal rock • Honeycomb worm (*Sabellari alveolata*) reefs • Intertidal coarse sediment • Intertidal sand and muddy sand • Low energy intertidal rock • Moderate energy circalittoral rock • Moderate energy infralittoral rock	Celtic Sea		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		PDA3_to_Pyworthy	1.19		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats, intertidal habitats, sponge communities, and pink sea fans
		PDA2_to_South_Wales_Connection_Node	40.99		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA1_to_Llandyfaelog	54.80		

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
	• Moderate energy intertidal rock • Pink sea-fan (*Eunicella verrucosa*) • Subtidal coarse sediment • Subtidal sand				
Padstow Bay and Surrounds MCZ (UKMCZ0012)	• High energy circalittoral rock • High energy infralittoral rock • High energy intertidal rock • Intertidal coarse sediment • Intertidal sand and muddy sand • Moderate energy infralittoral rock • Moderate energy intertidal rock • Pink sea-fan (*Eunicella verrucosa*) • Spiny lobster (*Palinurus elephas*)	Celtic Sea		• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA3_to_Pyworthy	38.67		
		PDA2_to_South_Wales_Connection_Node	64.10		
		PDA1_to_Llandyfaelog	87.71		
Newquay and the Gannel MCZ		Celtic Sea		• None apply	
		PDA3_to_Pyworthy	58.83		Highly unlikely:

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
(UKMCZ0037)	• Coastal saltmarshes and saline reedbeds • Estuarine rocky habitats • Giant goby (*Gobius cobitis*) • High energy circalittoral rock • High energy infralittoral rock • High energy intertidal rock • Intertidal coarse sediment • Intertidal mixed sediments • Intertidal mud • Intertidal sand and muddy sand • Low energy intertidal rock • Moderate energy infralittoral rock • Moderate energy intertidal rock • Subtidal coarse sediment • Subtidal sand	PDA2_to_South_Wales_Connection_Node	79.01		Located beyond the ZoI for potential impact pathways

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
Cape Bank MCZ (UKMCZ0076)	• Moderate energy circalittoral rock • Subtidal coarse sediment	Celtic Sea		• None apply	
		PDA3_to_Pyworthy	68.33		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA2_to_South_Wales_Connection_Node	75.96		
Morte Platform MCZ (UKMCZ0063)	• High energy circalittoral rock • Moderate energy circalittoral rock • Subtidal coarse sediment	Celtic Sea		a. Increased SSC - subtidal benthic habitats and species b. Water quality - subtidal benthic habitats and species	
		PDA3_to_Pyworthy	14.77		Possible: Screened into Stage 1 Assessment for pathways a and b related to subtidal benthic habitats
		PDA2_to_South_Wales_Connection_Node	12.29		
		PDA1_to_Llandyfaelog	35.72		Highly unlikely: Located beyond the ZoI for potential impact pathways
Bideford to Foreland Point MCZ (UKMCZ0029)	• Fragile sponge and anthozoan communities on subtidal rocky habitats • High energy circalittoral rock • High energy infralittoral rock • High energy intertidal rock • Honeycomb worm (*Sabellaria alveolata*) reefs • Intertidal coarse sediment	Celtic Sea		a. Temporary physical disturbance – subtidal benthic habitats b. Permanent loss - subtidal benthic habitats and species c. Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species	
		PDA3_to_Pyworthy	0		Likely:: Screened into Stage 1 Assessment for pathways a-f related to subtidal benthic habitats and communities
		PDA2_to_South_Wales_Connection_Node	12.09		Possible: Screened into Stage 1 Assessment for pathways e and f related to subtidal benthic habitats
		PDA1_to_Llandyfaelog	42.84		Highly unlikely: Located beyond the ZoI for potential impact pathways

Site Name	Protected Features	Distance from Study corridors (km)	Potential Impact Pathways of relevance[19]	Likelihood of Interaction
	• Intertidal mixed sediments • Intertidal sand and muddy sand • Intertidal underboulder communities • Littoral chalk communities • Low energy infralittoral rock • Low energy intertidal rock • Moderate energy circalittoral rock • Moderate energy infralittoral rock • Moderate energy intertidal rock • Pink sea-fan (*Eunicella verrucosa*) • Spiny lobster (*Palinurus elephas*) • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand		d. Thermal emissions – subtidal benthic habitats and species e. Increased SSC - subtidal benthic habitats and species f. Water quality - subtidal benthic habitats and species	
		Celtic Sea	• None apply	

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
Camel Estuary MCZ (UKMCZ0056)	• Coastal saltmarshes and saline reedbeds • Estuarine rocky habitats • Intertidal coarse sediment • Intertidal mud • Low energy intertidal rock	PDA3_to_Pyworthy	39.53		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA2_to_South_Wales_Connection_Node	78.48		
		Celtic Sea			
East of Haig Fras MCZ (UKMCZ0023)	• Fan mussel (*Atrina fragilis*) • High energy circalittoral rock • Moderate energy circalittoral rock • Sea-pen and burrowing megafauna • communities • Subtidal coarse sediment and mixed • sediments mosaic • Subtidal mud • Subtidal sand	PDA3_to_Pyworthy	85.79	• None apply	Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA2_to_South_Wales_Connection_Node	74.73		
		Celtic Sea			
North-East of Haig Fras MCZ (UKMCZ0085)	• Subtidal coarse sediment • Subtidal mud	PDA3_to_Pyworthy	99.98	• None apply	Highly unlikely:
		PDA2_to_South_Wales_Connection_Node	81.36		

Site Name	Protected Features	Distance from Study corridors (km)		Potential Impact Pathways of relevance[19]	Likelihood of Interaction
	• Subtidal sand	PDA1_to_Llandyfaelog	98.21		Located beyond the ZoI for potential impact pathways
South of Celtic Deep MCZ (UKMCZ0087)	• Moderate energy circalittoral rock • Subtidal coarse sediment • Subtidal mixed sediments • Subtidal sand	Celtic Sea		• None apply	
		PDA3_to_Pyworthy	69.93		Highly unlikely: Located beyond the ZoI for potential impact pathways
		PDA2_to_South_Wales_Connection_Node	50.00		
		PDA1_to_Llandyfaelog	67.48		

Note: conservation objectives are provided for sites screened in, below.

Sites Carried forward to Stage 1 Assessment

In order to inform Stage 1 assessment, the following sections detail the conservation objectives and general management approach (including feature condition, where possible) for each site screened in for Stage 1 assessment; in addition to summaries of the specific study corridor and associated impact pathways these sites have been carried forward for.

Scottish Sites

Clyde Sea Sill MPA

Conservation Objectives and General Management Approach

The conservation objectives of the Clyde Sea Sill MPA are that the protected features (**Table 11**)—

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a marine habitat, means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

The reference to the composition of the characteristic biological communities of a marine habitat includes a reference to the diversity and abundance of species forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

"Favourable condition", with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
- the extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and

- the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

"Favourable condition", with respect to a large scale feature, means that—

- the extent, distribution and structure of that feature is maintained;
- the function of the feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including, but not restricted to, feeding, spawning, courtship or use as nursery grounds; and
- the processes supporting the feature are maintained.

The reference to the characteristic biological communities of a large scale feature includes a reference to the diversity of species associated with the large scale feature.

"Favourable condition", with respect to a feature of geomorphological interest, means that:

- its extent, component elements and integrity are maintained;
- its structure and functioning are unimpaired; and
- its surface remains sufficiently unobscured for the purposes of determining whether the criteria in the above paragraphs are satisfied.

For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

For the purpose of determining whether a protected feature is in favourable condition within the meanings detailed above, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 11: General management approach – Clyde Sea Sill MPA

Protected features	General management approach
Black guillemot (*Cepphus grylle*)	Recover from 'unfavourable condition'
Circalittoral and offshore sand and coarse sediment communities	Maintain in 'favourable' condition'
Fronts	
Marine Geomorphology of the Scottish Shelf Seabed	

Screening Assessment

HND

SW_W1_to_Ballantrae and Ballantrae_to_Pentir

The offshore schemes for SW_W1_to_Ballantrae and Ballantrae_to_Pentir run directly through the Clyde Sea Sill MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, black guillemot are potentially at risk from airborne sound and visual disturbances and changes in prey availability. Additionally, circalittoral and offshore sand and coarse sediment communities, and fronts are potentially at risk from temporary physical disturbance, permanent loss of habitat, introduction of INNS, thermal emissions, EMF, increased SSC and changes in water quality. Marine Geomorphology of the Scottish Shelf Seabed is also potentially at risk from permanent loss of habitat. Therefore, the **Clyde Sea Sill MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Kilmarnock South_to_Ballantrae

The offshore scheme for Kilmarnock South_to_Ballantrae is located 6.07 km from the Clyde Sea Sill MPA, respectively. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, black guillemot are potentially at risk from changes in prey availability. Additionally, circalittoral and offshore sand and coarse sediment communities and fronts are potentially at risk increased SSC and changes in water quality. Therefore, the **Clyde Sea Sill MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

East Caithness Cliffs MPA

Conservation Objectives and General Management Approach

The conservation objectives of the East Caithness Cliffs MPA are that the protected features (**Table 12**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
- the extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and
- the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 12: General management approach – East Caithness Cliffs MPA

Protected features	General management approach
Black guillemot (*Cepphus grylle*)	Conserve – feature condition uncertain

Screening Assessment

HNDFUE

Shetland_to_Blackhillock and SW_NE2_to_Spittal

The offshore scheme for Shetland_to_Blackhillock and SW_NE2_to_Spittal are located 1.93 km and 5.86 km from the East Caithness Cliffs MPA, respectively. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of black guillemot are potentially at risk from changes in prey availability, and airborne sound and visual disturbances. Therefore, the **East Caithness Cliffs MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

East of Gannet and Montrose Fields MPA

Conservation Objectives and General Management Approach

The conservation objectives of the East of Gannet and Montrose Fields MPA are that the protected features (**Table 13**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a marine habitat, means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

The composition of the characteristic biological communities of a marine habitat includes a reference to the diversity and abundance of species of marine flora and fauna forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

"Favourable condition", with respect to a low or limited mobility species of marine fauna, means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction in numbers of a low or limited mobility species of marine fauna is to be disregarded if the population of that species is thriving and sufficiently resilient to enable its recovery from such reduction.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 13: General management approach – East of Gannet and Montrose Fields MPA

Protected features	General management approach
Ocean quahog aggregations (*Arctica islandica*)	Conserve – feature condition uncertain
Offshore deep sea muds	

Screening Assessment

INTOG

Peterhead_to_Cenos, and North_Connect_to_Cenos

The offshore schemes for Peterhead_to_Cenos, and North_Connect_to_Cenos run directly through the East of Gannet and Montrose Fields MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of ocean quahog and offshore deep sea muds are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, EMF increased SSC, and changes in water quality that may occur inside the MPA. Therefore, the **East of Gannet and Montrose Fields MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Beech_to_Cedar, and Cedar_to_Aspen

The offshore schemes for Beech_to_Cedar, and Cedar_to_Aspen are located 4.21 km and 13.99 km from the East of Gannet and Montrose Fields MPA, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of ocean quahog and offshore deep sea muds are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, the East of Gannet and Montrose Fields MPA is carried forward to the Stage 1 Assessment of these impact pathways.

Firth of Forth Banks Complex MPA

Conservation Objectives and General Management Approach

The conservation objectives for the Firth of Forth Banks Complex MPA are that the protected features (**Table 14**):

- so far as already in favourable condition, remain in such condition; and

- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable Condition”, with respect to the Offshore subtidal sands and gravels within the MPA, this means that:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or living within the habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary reduction of numbers is to be disregarded if the population of ocean quahog aggregations is sufficiently thriving and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

“Favourable Condition”, with respect to the Ocean quahog aggregations within the MPA, this means that:

- the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction of numbers is to be disregarded if the population of ocean quahog aggregations is sufficiently thriving and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

“Favourable Condition”, with respect to the Shelf banks and mounds large-scale feature within the MPA, this means that:

- the extent, distribution and structure is maintained;
- the function is maintained so as to ensure that it continues to support its characteristic biological communities (which includes a reference to the diversity of any species associated with the large-scale feature) and their use of the site for, but not restricted to, feeding, courtship, spawning, or use as nursery grounds; and
- the processes supporting that feature are maintained.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

“Favourable Condition”, with respect to the Wee Bankie key geodiversity area within the MPA, this means that:

- its extent, component elements and integrity are maintained;
- its structure and functioning are unimpaired; and

- its surface remains sufficiently unobscured for the purposes of determining whether the above criteria are satisfied.

Any obscuring of that feature entirely by natural processes is to be disregarded.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 14: General management approach – Firth of Forth Banks Complex MPA

Protected features	General management approach
Offshore subtidal sands and gravels	Recover to favourable condition
Ocean quahog aggregations	
Shelf banks and mounds large-scale feature	Maintain in favourable condition
Wee Bankie Key Geodiversity Area	

Screening Assessment

HND

SW_E1a_to_Fiddes and PA_2_to_Berwick Bank

The offshore schemes for SW_E1a_to_Fiddes and PA_2_to_Berwick Bank are located 0.28 km and 0.70 km from the Firth of Forth Banks Complex MPA, respectively. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of subtidal benthic sands and gravels and ocean quahog are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Firth of Forth Banks Complex MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1a_to_Branxton

The offshore scheme for SW_E1a_to_Branxton passes directly through the Firth of Forth Banks Complex MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of ocean quahog aggregations, offshore subtidal sands and gravels, shelf banks and mounds, and moraines are at risk from temporary physical disturbance and permanent habitat loss. Additionally, ocean quahog aggregations, and offshore subtidal sands and gravels are at risk from the introduction of INNS, thermal emissions, EMF, increased SSC, and changes in water quality. Therefore, the **Firth of Forth Banks Complex MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E3_to_Fiddes

The offshore scheme for SW_E3_to_Fiddes is located 6.76 km from the Firth of Forth Banks Complex MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of subtidal benthic sands and gravels and ocean quahog are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Firth of Forth Banks Complex MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

INTOG

Cedar_to_Branxton and Aspen_to_Fetteresso

The offshore schemes for Cedar_to_Branxton and Aspen_to_Fetteresso are located 1.37 km and 7.60 km from Firth of Forth Banks Complex MPA, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic sands and gravels and ocean quahog are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Firth of Forth Banks Complex MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Mousa to Boddam MPA

Conservation Objectives and General Management Approach

The conservation objectives of the Mousa to Boddam MPA are that the protected features (**Table 15**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable condition”, with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds;
- the extent and distribution of any supporting feature upon which the species is dependent is conserved or, where relevant, recovered; and
- the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

“Favourable condition”, with respect to a feature of geomorphological interest, means that:

- its extent, component elements and integrity are maintained;

- its structure and functioning are unimpaired; and
- its surface remains sufficiently unobscured for the purposes of determining whether the above criteria in are satisfied.

For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 15: General management approach – Mousa to Boddam MPA

Protected features	General management approach
Marine Geomorphology of the Scottish Shelf Seabed	Conserve – feature condition unknown
Sandeels (*Ammodytes marinus* / *Ammodytes tobianus*)	Conserve – feature in good condition

Screening Assessment

HNDFUE

Shetland_to_Blackhillock

The offshore scheme for Shetland_to_Blackhillock is located 10.50 km from the Mousa to Boddam MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of sandeels is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Mousa to Boddam MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

North-east Lewis MPA

Conservation Objectives and General Management Approach

The conservation objectives of the North-east Lewis MPA are that the protected features (**Table 16**):

- so far as already in favourable condition, remain in such condition,
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable condition”, with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the North-east Lewis MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds,

- the extent and distribution of any supporting feature upon which the species is dependent is conserved or, where relevant, recovered, and
- the structure and function of any supporting feature, including any associated processes supporting the species within the North-east Lewis MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

"Favourable condition", with respect to a feature of geomorphological interest, means that:

- its extent, component elements and integrity are maintained,
- its structure and functioning are unimpaired, and
- its surface remains sufficiently unobscured for the purposes of determining whether the criteria in the above points are satisfied.

For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 16: General management approach – North-east Lewis MPA

Protected features	General management approach
Marine Geomorphology of the Scottish Shelf Seabed	Maintain in favourable condition
Quaternary of Scotland	
Risso's dolphin (*Grampus griseus*)	
Sandeels (*Ammodytes marinus* / *Ammodytes tobianus*)	

Screening Assessment

HND

SW_N4_to_Arnish (Lewis)

The offshore scheme for SW_N4_to_Arnish (Lewis) runs directly through the North-east Lewis MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from temporary physical disturbance, permanent habitat loss. Sandeels are potentially at risk from temporary physical disturbance, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; Underwater sound; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Additionally, Risso's dolphin are potentially at risk from changes in prey availability, vessel collision, and underwater sound. Therefore, **North-east Lewis MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_N3_to_Arnish

The offshore scheme for SW_N3_to_Arnish runs directly through the North-east Lewis MPA to St Marys MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from temporary physical disturbance, permanent habitat loss. Sandeels are potentially at risk from temporary physical disturbance, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; Underwater sound; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Additionally, Risso's dolphin are potentially at risk from changes in prey availability, vessel collision, and underwater sound. Therefore, North-east Lewis MPA is carried forward to the Stage 1 Assessment of these impact pathways.

Norwegian Boundary Sediment Plain MPA

Conservation Objectives and General Management Approach

The conservation objectives of the Norwegian Boundary Sediment Plain MPA are that the protected features (**Table 17**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a marine habitat, means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

The composition of the characteristic biological communities of a marine habitat includes a reference to the diversity and abundance of species of marine flora and fauna forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

"Favourable condition", with respect to a low or limited mobility species of marine fauna, means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction in numbers of a low or limited mobility species of marine fauna is to be disregarded if the population of that species is thriving and sufficiently resilient to enable its recovery from such reduction.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 17: General management approach – Norwegian Boundary Sediment Plain MPA

Protected features	General management approach
Ocean quahog aggregations (including sands and gravels as their supporting habitat)	Reduce / limit pressure from mobile fishing gear

Screening Assessment

INTOG

Beech_to_Beech_MPI, Aspen_to_Beech, Beech_to_Cedar, and North_Connect_to_Cenos

The offshore schemes for Beech_to_Beech_MPI, Aspen_to_Beech, Beech_to_Cedar, and North_Connect_to_Cenos are located 4.11 km, 8.11 km, 8.12 km and 9.20 km from the Norwegian Boundary Sediment Plain MPA, respectively. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of ocean quahog and their supporting sand and gravel habitat are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, the **Norwegian Boundary Sediment Plain MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Noss Head MPA

Conservation Objectives and General Management Approach

The conservation objectives of the Noss Head MPA are that the protected features (**Table 18**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable condition”, with respect to a marine habitat, means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

The reference to the composition of the characteristic biological communities of a marine habitat includes a reference to the diversity and abundance of species of marine flora and fauna forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregard.

Table 18: General management approach – Noss Head MPA

Protected features	General management approach
Horse mussel beds	Conserve – feature in good condition

Screening Assessment

HNDFUE

SW_NE2_to_Spittal

The offshore scheme for SW_NE2_to_Spittal runs directly through Noss Head MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of horse mussel beds is potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MPA; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MPA. Therefore, **Noss Head MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Shetland_to_Blackhillock

The offshore scheme for Shetland_to_Blackhillock is located 6.57 km from Noss Head MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of horse mussel beds is potentially at risk from increased SSC, and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, **Noss Head MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Sea of the Hebrides MPA

Conservation Objectives and General Management Approach

The conservation objectives of the Sea of the Hebrides MPA are that the protected features (**Table 19**):

- so far as already in favourable condition, remain in such condition,
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable condition”, with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the Sea of the Hebrides MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds,

- the extent and distribution of any supporting feature upon which the species is dependent is conserved or, where relevant, recovered, and
- the structure and function of any supporting feature, including any associated processes supporting the species within the Sea of the Hebrides MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

"Favourable condition", with respect to a large scale feature, means that—

- the extent, distribution and structure of that feature is maintained,
- the function of that feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including for, but not restricted to, feeding, courtship, spawning or use as nursery grounds, and
- the processes supporting that feature are maintained.

The reference to the characteristic biological communities of a large scale feature includes a reference to the diversity of any species associated with the large scale feature.

"Favourable condition", with respect to a feature of geomorphological interest, means that:

- its extent, component elements and integrity are maintained,
- its structure and functioning are unimpaired, and
- its surface remains sufficiently unobscured for the purposes of determining whether the criteria in the above points are satisfied.

For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 19: General management approach – Sea of the Hebrides MPA

Protected features	General management approach
Basking shark (*Cetorhinus maximus*)	Maintain in favourable condition
Fronts	
Marine Geomorphology of the Scottish Shelf Seabed	
Minke whale (*Balaenoptera acutorostrata*)	

Screening Assessment

HND

SW_W1_to_Ballantrae

The offshore scheme for SW_W1_to_Ballantrae is located 15.67 km from the Sea of the Hebrides MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of basking sharks and minke whales are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, the **Sea of the Hebrides MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Shaint East Bank MPA

Conservation Objectives and General Management Approach

The Conservation Objectives of the Shiant East Bank MPA, are that the protected features (**Table 20**)

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a marine habitat, means that

- its extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or living within the habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

""Favourable condition", with respect to a feature of geomorphological interest, means that:

- its extent, component elements and integrity are maintained,
- its structure and functioning are unimpaired, and
- its surface remains sufficiently unobscured for the purposes of determining whether the criteria in the above points are satisfied.

For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

"Favourable condition", with respect to a large scale feature, means that:

- the extent, distribution and structure of that feature is maintained,

- the function of that feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including for, but not restricted to, feeding, courtship, spawning or use as nursery grounds, and
- the processes supporting that feature are maintained.

The characteristic biological communities of a large scale feature includes a reference to the diversity of any species associated with the large scale feature.

Table 20: General management approach – Shaint East MPA

Protected features	General management approach
Circalittoral sands and mixed sediment communities	Favourable Condition - Conserve
Northern sea fan and sponge communities	
Shelf banks and mounds	
Geomorphological features – Quaternary of Scotland (drumlinoid features, glacial lineations, iceberg plough marks, streamlined bedrock)	

Screening Assessment

HND

SW_N4_to_Arnish (Lewis)

The offshore scheme for SW_N4_to_Arnish (Lewis) is located 16.95 km from the Shaint East Bank MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats and species are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Shaint East Bank MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Southern Trench MPA

Conservation Objectives and General Management Approach

The conservation objectives for the Southern Trench MPA are that the protected features (**Table 21**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable Condition", with respect to marine habitat within the MPA, this means that:

- extent is stable or increasing; and

- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or living within the habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary reduction of numbers is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

"Favourable Condition", with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds,
- the extent and distribution of any supporting feature upon which the species is dependent is conserved or, where relevant, recovered, and
- the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

"Favourable condition", with respect to a large scale feature, means that:

- the extent, distribution and structure of that feature is maintained,
- the function of that feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including for, but not restricted to, feeding, courtship, spawning or use as nursery grounds, and
- the processes supporting that feature are maintained.

The characteristic biological communities of a large scale feature includes a reference to the diversity of any species associated with the large scale feature.

"Favourable condition", with respect to a feature of geomorphological interest, means that—

- its extent, component elements and integrity are maintained,
- its structure and functioning are unimpaired, and
- its surface remains sufficiently unobscured for the purposes of determining whether the criteria in the paragraphs above are satisfied.

For the purpose of determining whether a feature of geological or geomorphological interest is sufficiently unobscured, any obscuring of that feature entirely by natural processes is to be disregarded.

For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 21: General management approach – Southern Trench MPA

Protected features	General management approach
Burrowed mud	Maintain in favourable condition
Fronts	
Minke whale (*Balaenoptera acutorostrata*)	
Geomorphological features – Subglacial tunnel valleys and moraines, slide scars	
Large-scale features – Fronts and shelf deeps	

Screening Assessment

HND

SW_NE4_to_New_Deer (ES26) and SW_NE7_to_Peterhead

The offshore schemes for SW_NE4_to_New_Deer (ES26) and SW_NE7_to_Peterhead pass directly through the Southern Trench MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of burrowed mud, geomorphological features, and shelf deeps are at risk from temporary physical disturbance and permanent habitat loss. Additionally, burrowed mud habitats are at risk from the introduction of INNS, thermal emissions, EMF, increased SSC, and changes in water quality. Fronts are also at risk from increased SSC, and changes in water quality. Therefore, the **Southern Trench MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E2b_to_Peterhead_2, SW_NE3_to_New_Deer_2, SW_NE4_to_New_Deer, SW_NE6_to_Peterhead_2, SW_NE7_to_Peterhead_DCSS, and SW_NE8_to_Peterhead_1

The offshore schemes for SW_E2b_to_Peterhead_2, SW_NE3_to_New_Deer_2, SW_NE4_to_New_Deer, SW_NE6_to_Peterhead_2, SW_NE7_to_Peterhead_DCSS, and SW_NE8_to_Peterhead_1 pass directly through the Southern Trench MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of burrowed mud, geomorphological features, and shelf deeps are at risk from temporary physical disturbance and permanent habitat loss. Additionally, burrowed mud habitats are at risk from the introduction of INNS, thermal emissions, EMF, increased SSC, and changes in water quality. Fronts are also at risk from increased SSC, and changes in water quality. Therefore, the **Southern Trench MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

Shetland_to_Blackhillock

The offshore scheme for Shetland_to_Blackhillock is located 1.5 km from Southern Trench MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of burrowed mud, and fronts, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Southern Trench MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

INTOG

Peterhead_to_Cenos and Scaraben_to_Peterhead_2

The offshore scheme for Peterhead_to_Cenos and Scaraben_to_Peterhead_2 pass directly through the Southern Trench MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of burrowed mud, geomorphological features, and shelf deeps are at risk from temporary physical disturbance and permanent habitat loss. Additionally, burrowed mud habitats are at risk from the introduction of INNS, thermal emissions, EMF, increased SSC, and changes in water quality. Fronts are also at risk from increased SSC, and changes in water quality. Therefore, the **Southern Trench MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Aspen_to_Fetteresso

The offshore scheme for Aspen_to_Fetteresso is located 9.97 km from Southern Trench MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of burrowed mud, and fronts, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **Southern Trench MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

South Arran MPA

Conservation Objectives and General Management Approach

The conservation objectives of the South Arran MPA are that the protected features (**Table 22**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a marine habitat, means that:

- its extent is stable or increasing; and

- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.

Reference to the composition of the characteristic biological communities of a marine habitat includes a reference to the diversity and abundance of species of marine flora and fauna forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

“Favourable condition”, with respect to a low or limited mobility species of marine fauna, means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction in numbers of a low or limited mobility species of marine fauna is to be disregarded if the population of that species is thriving and sufficiently resilient to enable its recovery from such reduction.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 22: General management approach – South Arran MPA

Protected features	General management approach
Burrowed mud	Condition unknown - Conserve
Kelp and seaweed communities on sublittoral sediment	
Maerl or coarse shell gravel with burrowing sea cucumbers	
Shallow tide-swept coarse sands with burrowing bivalves	
Maerl beds	Condition unknown - Recover

Screening Assessment

HND

Kilmarnock South_to_Ballantrae

The offshore scheme for Kilmarnock South_to_Ballantrae is located 9.05 km from South Arran MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of benthic habitats and communities are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, the **South Arran MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

English Sites

Aln Estuary MCZ

Conservation Objectives and General Management Approach

The conservation objectives of the Aln Estuary MCZ are that the habitats (**Table 23**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a habitat within the Zone, means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

Reference to the composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For the purpose of determining whether a habitat is in favourable condition, any alteration to that habitat brought about entirely by natural processes is to be disregarded.

Table 23: General management approach – Aln Estuary MCZ

Protected features	General management approach
Coastal saltmarshes and saline reedbeds	Maintain in favourable condition
Intertidal mud	
Estuarine rocky habitats	
Sheltered muddy gravels	

Screening Assessment

HND

PA_2_to_Berwick Bank

The offshore scheme for PA_2_to_Berwick Bank is located 7.93 km from the Aln Estuary MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Aln Estuary MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Berwick to St Mary's MCZ

Conservation Objectives and General Management Approach

The Conservation Objectives for the Berwick to St Mary's MCZ are that the protected features (**Table 24**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

Table 24: General management approach – Berwick to St Mary's MCZ

Protected features	General management approach
Common eider (*Somateria mollissima*)	Recover to favourable condition

Screening Assessment

HND

PA_2_to_Berwick Bank

The offshore scheme for PA_2_to_Berwick Bank runs directly through the Berwick to St Mary's MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of common eider are potentially at risk from changes in prey availability, and airborne sound and visual disturbance. Therefore, the **Berwick to St Mary's MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E1a_to_Hawthorn Pit

The offshore scheme for SW_E1a_to_Hawthorn Pit is located 14.51 km from the Berwick to St Mary's MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of common eider are potentially at risk from changes in prey availability. Therefore, the **Berwick to St Mary's MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1a_to_Branxton

The offshore scheme for SW_E1a_to_Branxton is located 16.91 km from the Berwick to St Mary's MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of common eider are potentially at risk from changes in prey availability. Therefore, the **Berwick to St Mary's MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

INTOG

Cedar_to_Branxton

The offshore scheme for Cedar_to_Branxton is located 13.52 km from the Berwick to St Mary's MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of common eider are potentially at risk from changes in prey availability. Therefore, the **Berwick to St Mary's MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Bideford to Foreland Point MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Zone is that the protected features (**Table 25**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"favourable condition":

- with respect to a habitat within the Zone, means that:
  - its extent is stable or increasing; and
  - its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.
- with respect to a species of marine fauna within the Zone, means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

The composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 25: General management approach – Bideford to Foreland Point MCZ

Protected features	General management approach
Low energy intertidal rock	Maintain in favourable condition
Moderate energy intertidal rock	
High energy intertidal rock	
Intertidal coarse sediment	
Intertidal mixed sediments	
Intertidal sand and muddy sand	
Intertidal underboulder communities	
Littoral chalk communities	
Low energy infralittoral rock	
Moderate energy infralittoral rock	
High energy infralittoral rock	
Moderate energy circalittoral rock	
High energy circalittoral rock	
Subtidal coarse sediment	
Subtidal mixed sediments	
Honeycomb worm (*Sabellaria alveolata*) reefs	
Pink sea-fan (*Eunicella verrucosa*)	
Subtidal sand	Recover to favourable condition
Spiny lobster (*Palinurus elephas*)	

Screening Assessment

Celtic Sea

PDA3_to_Pyworthy

The offshore scheme for PDA3_to_Pyworthy runs directly through the Bideford to Foreland Point MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, intertidal habitats, sponge and anthozoan communities, Sabellaria, pink seafan, and spiny lobster are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Bideford to Foreland Point MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

PDA2_to_South_Wales_Connection_Node

The offshore scheme for PDA2_to_South_Wales_Connection_Node is located 12.09 km from the Bideford to Foreland Point MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, intertidal habitats, sponge and anthozoan communities, Sabellaria, pink seafan, and spiny lobster are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Bideford to Foreland Point MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Coquet to St Marys MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Coquet to St Mary's MCZ is that the protected habitats (**Table 26**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 26: General management approach – Coquet to St Marys MCZ

Protected features	General management approach
Low energy intertidal rock	Maintain in favourable condition
Moderate energy intertidal rock	
High energy intertidal rock	
Intertidal mixed sediments	
Intertidal coarse sediment	
Intertidal sand and muddy sand	
Intertidal mud	
Intertidal underboulder communities	
Peat and clay exposures	
Moderate energy infralittoral rock	
High energy infralittoral rock	
Moderate energy circalittoral rock	
Subtidal coarse sediment	
Subtidal sand	
Subtidal mixed sediments	
Subtidal mud	

Screening Assessment

HND

PA_2_to_Berwick Bank

The offshore scheme for PA_2_to_Berwick Bank runs directly through the Coquet to St Marys MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Coquet to St Marys MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E1a_to_Hawthorn Pit

The offshore scheme for SW_E1a_to_Hawthorn Pit is located 14.51 km from the Coquet to St Marys MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Coquet to St Marys MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Cumbria Coast MCZ (Zone 1 and 2)

Conservation Objectives and General Management Approach

The conservation objective in relation to razorbill in the Cumbria Coast MCZ - Zone 2 is that (**Table 27**):

- the habitat used by members of that species ("supporting habitat"):
  - so far as in favourable condition, remain in such condition, and
  - so far as not already in favourable condition, be brought into such condition and remain in such condition;
- the population of breeding razorbill:
  - so far as in favourable condition, remain in such condition, and
  - so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition" with respect to supporting habitat within Zone 2, means that:

- its extent and distribution is stable or increasing;
- its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

"Favourable condition" with respect to the population of breeding razorbill occurring within Zone 2 (whether temporary or otherwise), means that the distribution, size, age and sex ratios of the population are such as to ensure that it is maintained in numbers which enable it to thrive.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 27: General management approach – Cumbria Coast MCZ

Protected features	General management approach
Razorbill (*Alca torda*)	Recover to favourable condition

Screening Assessment

HND

R4_5_to_Penwortham, R4_6_to_Penwortham, R4_4_to_Bodelwyddan, Ballantrae_to_Pentir, and Kilmarnock South_to_Ballantrae

The offshore schemes for R4_5_to_Penwortham, R4_6_to_Penwortham, R4_4_to_Bodelwyddan, Ballantrae_to_Pentir, Kilmarnock South_to_Ballantrae and Kilmarnock South_to_Ballantrae are located less than 164.6 km from the Cumbria Coast MCZ - Zones 1 and 2. Therefore, there is potential for the protected ornithological feature of the MCZs to be affected by the project activities.

Notably, the conservation status of razorbill is potentially at risk from changes in prey availability that may occur within their mean max foraging range. Therefore, the **Cumbria Coast MCZs are carried forward to the Stage 1 Assessment** of these impact pathways.

Dover to Deal MCZ

Conservation Objectives and General Management Approach

The conservation objective of Dover to Deal MCZ is that the protected habitats (**Table 28**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

Any temporary deterioration in condition of a habitat feature is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 28: General management approach – Dover to Deal MCZ

Protected features	General management approach
High energy intertidal rock	Maintain in favourable condition
Intertidal coarse sediment	
Intertidal sand and muddy sand	
Intertidal underboulder communities	
Littoral chalk communities	
Low energy intertidal rock	
Moderate energy infralittoral rock	
Moderate energy intertidal rock	

Protected features	General management approach
Native oyster (*Ostrea edulis*)	
Subtidal chalk	
Subtidal mixed sediments	
Subtidal sand	
Blue mussel beds	
High energy circalittoral rock	Recover to favourable condition
Moderate energy circalittoral rock	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2 is located 9.35 km from the SW_E2a_2_to_Near_Richborough. Therefore, there is potential for the protected features of the Dover to Deal MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, blue mussel, native oyster, and ross worm are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Dover to Deal MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Farnes East MCZ

Conservation Objectives and General Management Approach

The Conservation Objectives for the protected features (**Table 29**) of the Farnes East MCZ are:

Subject to natural change, the moderate energy circalittoral rock, subtidal coarse sediment, subtidal sand, subtidal mud, subtidal mixed sediments and sea-pen and burrowing megafauna communities features are to remain in or be brought into favourable condition, such that their:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of their characteristic biological communities are such as to ensure that they are in a condition which is healthy and not deteriorating.

Subject to natural change, the ocean quahog feature is to remain in or be brought into favourable condition, such that:

- the quality and extent of its habitat is stable or increasing; and
- the population structure allows numbers to be maintained or increased.

Table 29: General management approach – Farnes East MCZ

Protected features	General management approach
Moderate energy circalittoral rock	Maintain in favourable condition
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	
Subtidal mud	
Sea-pen and burrowing megafauna communities	
Ocean quahog (*Arctica islandica*)	

Screening Assessment

HND

PA_2_to_Berwick Bank

The offshore scheme for PA_2_to_Berwick Bank runs directly through the Farnes East MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen and burrowing megafauna communities, and the bivalve, ocean quahog, are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, and thermal emissions that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Farnes East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E1a_to_Hawthorn Pit

The offshore scheme for SW_E1a_to_Hawthorn Pit is located 7.42 km from the Farnes East MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen and burrowing megafauna communities, and the bivalve, ocean quahog, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Farnes East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1a_to_Branxton

The offshore scheme for SW_E1a_to_Branxton is located 12.43 km from the Farnes East MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen and burrowing megafauna communities, and the bivalve, ocean quahog, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Farnes East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

INTOG

Cedar_to_Branxton

The offshore scheme for Cedar_to_Branxton is located 12.43 km from the Farnes East MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen and burrowing megafauna communities, and the bivalve, ocean quahog, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Farnes East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Foreland MCZ

Conservation Objectives and General Management Approach

The conservation objective of Foreland MCZ is that the protected habitats (**Table 30**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For each species of marine fauna, favourable condition means that the population within a Zone is supported in numbers which enable it to thrive, by maintaining:

- the quality and quantity of its habitat; and
- the number, age and sex ratio of its population.

Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 30: General management approach – Foreland MCZ

Protected features	General management approach
English Channel outburst flood feature	Maintain in favourable condition
Subtidal sand	
High energy circalittoral rock	Recover to favourable condition
Moderate energy circalittoral rock	
Subtidal coarse sediment	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough is located 6.10 km from the Foreland MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Foreland MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Fulmar MCZ

Conservation Objectives and General Management Approach

The conservation objectives for the Fulmar MCZ are that the protected features **(Table 31):**

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to subtidal mixed sediments, subtidal mud and subtidal sand within the Zone, this means that:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or living within the habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded.

With respect to the ocean quahog within the Zone, this means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 31: General management approach – Fulmar MCZ

Protected features	General management approach
Subtidal mixed sediments	Maintain in favourable condition
Subtidal sand	
Subtidal mud	
Ocean quahog (*Arctica islandica*)	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough is located 14.98 km from the Fulmar MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats and the bivalve, ocean quahog, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Fulmar MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Fylde MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Fylde MCZ is that the protected habitats (**Table 32**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- extent is stable increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities (including the diversity and abundance of species forming

part or inhabiting the habitat) are sufficient to ensure that it remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 32: General management approach – Fylde MCZ

Protected features	General management approach
Subtidal sand	Maintain in favourable condition
Subtidal mud	

Screening Assessment

HND

R4_5_to_Penwortham and R4_6_to_Penwortham

The offshore schemes for R4_5_to_Penwortham and R4_6_to_Penwortham both run directly through the Fylde MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, increased SSC; and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the Fylde MCZ is carried forward to the Stage 1 Assessment of these impact pathways.

Goodwin Sands MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Goodwin Sands MCZ is that the protected habitats (**Table 33**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including the diversity and abundance of species forming part of or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition of a habitat feature is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 33: General management approach – Goodwin Sands MCZ

Protected features	General management approach
English Channel outburst flood features	Maintain in favourable condition
Subtidal coarse sediment	
Subtidal sand	
Blue mussel beds	Recover to a favourable condition
Moderate energy circalittoral rock	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough runs directly through the Goodwin Sands MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, and blue mussels are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Goodwin Sands MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Hartland Point to Tintagel MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Hartland Point to Tintagel MCZ is that the protected features (**Table 34**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition":

- with respect to a habitat within the Zone, means that:
  - its extent is stable or increasing; and

    - (its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating;

- with respect to the species of marine fauna within the Zone, means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

The composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 34: General management approach – Hartland Point to Tintagel MCZ

Protected features	General management approach
Coastal saltmarshes and saline reedbeds	Maintain in favourable condition
Low energy intertidal rock	
Moderate energy intertidal rock	
High energy intertidal rock	
Intertidal coarse sediment	
Intertidal sand and muddy sand	
Moderate energy infralittoral rock	
High energy infralittoral rock	
Honeycomb worm (*Sabellaria alveolata*) reefs	
Moderate energy circalittoral rock	Recover to favourable condition
High energy circalittoral rock	
Subtidal coarse sediment	
Subtidal sand	
Fragile sponge & anthozoan communities on subtidal rocky habitats	
Pink sea-fan (*Eunicella verrucosa*)	

Screening Assessment

Celtic Sea

PDA3_to_Pyworthy

The offshore scheme for PDA3_to_Pyworthy is located 1.19 km from Hartland Point to Tintagel MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, intertidal habitats, sponge communities, and pink sea fans are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Kentish Knock East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Holderness Inshore MCZ

Conservation Objectives and General Management Approach

The conservation objective of each of the Holderness Inshore MCZ is that the protected habitats (**Table 35**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery. For the geological feature within the Zone (Spurn, subtidal) favourable condition means:

- its extent, component element and overall integrity are maintained;
- its structure and functioning are unimpeded; and
- The feature remains unobscured so its condition may be determined.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 35: General management approach – Holderness Inshore MCZ

Protected features	General management approach
Intertidal sand and muddy sand	Maintain in favourable condition
Moderate energy circalittoral rock	
High energy circalittoral rock	
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	
Subtidal mud	
Spurn head (subtidal)	

Screening Assessment

HND

PA_1_to_Birkhill_Wood, R4_1_to_Birkhill_Wood, and R4_2_to_Birkhill_Wood

The offshore schemes PA_1_to_Birkhill_Wood, R4_1_to_Birkhill_Wood, R4_2_to_Birkhill_Wood, and SW_E1a_to_Lincolnshire_Connection_Node run directly through the Holderness Inshore MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Holderness Inshore MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E1a_to_Lincolnshire_Connection_Node

The offshore scheme for SW_E1a_to_Lincolnshire_Connection_Node is located 10.96 km from the Holderness Inshore MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Holderness Inshore MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1c_1: Lincolnshire Connection Node, and SW_E1c_2 to Weston_Marsh

The offshore schemes for SW_E1c_1: Lincolnshire Connection Node and SW_E1c_2 to Weston_Marsh are located 13.45 km and 16.40 km, respectively, from the Holderness

Inshore MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Holderness Inshore MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Holderness Offshore MCZ

Conservation Objectives and General Management Approach

The Conservation Objective for the Holderness Offshore MCZ is that the protected features (**Table 36**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to subtidal coarse sediment, subtidal sand and subtidal mixed sediments within the Zone, this means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat) are such as to ensure that it remains in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

With respect to the ocean quahog within the Zone, this means that the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

With respect to the North Sea glacial tunnel valleys within the Zone, this means that:

- its extent, component elements and integrity are maintained;
- its structure and functioning are unimpaired; and

- its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (i) and (ii) are satisfied.

Any obscurement of that feature brought about entirely by natural processes is to be disregarded.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 36: General management approach – Holderness Offshore MCZ

Protected features	General management approach
North Sea glacial tunnel valleys	Maintain in favourable condition
Ocean quahog (*Arctica islandica*)	Recover to favourable condition
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	

Screening Assessment

HND

PA_1_to_Birkhill_Wood, R4_1_to_Birkhill_Wood, R4_2_to_Birkhill_Wood, and SW_E1a_to_Lincolnshire_Connection_Node

The offshore scheme for PA_1_to_Birkhill_Wood, R4_1_to_Birkhill_Wood, R4_2_to_Birkhill_Wood, and SW_E1a_to_Lincolnshire_Connection_Node all run directly through the Holderness Offshore MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats and the bivalve, ocean quahog, are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore, the **Holderness Offshore MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1c_1: Lincolnshire Connection Node, and SW_E1c_2 to Weston_Marsh

The offshore scheme for SW_E1c_1: Lincolnshire Connection Node, and SW_E1c_2 to Weston_Marsh are located 0.57 km and 2.99 km from the Holderness Offshore MCZ, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats and the bivalve, ocean quahog, are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Holderness Offshore MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Lundy MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Lundy MCZ is that the protected feature (**Table 37**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to the protected feature, means that the quality and quantity of its habitat within the Zone and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.

Any temporary reduction of numbers is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

For the purpose of determining whether the protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 37: General management approach – Lundy MCZ

Protected features	General management approach
Spiny lobster (*Palinurus elephas*)	Recover to favourable condition

Screening Assessment

Celtic Sea

PDA3_to_Pyworthy

The offshore scheme for PDA3_to_Pyworthy is located 6.99 km from Lundy MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of spiny lobster is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, **Lundy MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Kentish Knock East MCZ

Conservation Objectives and General Management Approach

The conservation objective of Kentish Knock East MCZ is that the protected features (**Table 38**):

- so far as already in favourable condition, remain in such condition, and

- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable Condition", with respect to a habitat within this MCZ, means that:

- its extent is stable or increasing, and
- its structure and functions, its quality, and the composition of its characteristic biological communities are such to ensure that it remains in a condition which is healthy and not deteriorating.

The reference to the composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of, or inhabiting, that habitat.

For the purposes of this MCZ, any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery, and for the purpose of determining whether a protected feature is in favourable condition within the meaning of this designation, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 38: General management approach – Kentish Knock East MCZ

Protected features	General management approach
Subtidal sand	Maintain in favourable condition
Subtidal coarse sediments	Recover to favourable condition
Subtidal mixed sediments	

Screening Assessment

HND

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough is located 13.18 km from the Kentish Knock East MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Kentish Knock East MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Markham's Triangle MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Zone is that the protected features (**Table 39**):

- so far as already in favourable condition, remain in such condition, and

- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a habitat within the Zone, means that:

- its extent is stable or increasing, and
- its structure and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

The reference to the composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 39: General management approach – Markham's Triangle MCZ

Protected features	General management approach
Subtidal coarse sediments	Recover to favourable condition
Subtidal mud	
Subtidal sand	
Subtidal mixed sediments	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough is located 12.43 km from Markham's Triangle MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, **Markham's Triangle MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Morte Platform MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Zone is that the protected features (**Table 40**):

- so far as already in favourable condition, remain in such condition, and

- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

"Favourable condition", with respect to a habitat within the Zone, means that:

- its extent is stable or increasing, and
- its structure and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

The composition of the characteristic biological communities of a habitat includes a reference to the diversity and abundance of species forming part of, or inhabiting, that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 40: General management approach – Morte Platform MCZ

Protected features	General management approach
High energy circalittoral rock	Recover to favourable condition
Moderate energy circalittoral rock	
Subtidal coarse sediment	

Screening Assessment

Celtic Sea

PDA2_to_South_Wales_Connection_Node and PDA3_to_Pyworthy

The offshore schemes for PDA2_to_South_Wales_Connection_Node and PDA3_to_Pyworthy are located 12.29 km and 14.77 km from Morte Platform MCZ. Therefore, there is potential for the protected features of the Morte Platform MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, **Morte Platform MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

North East of Farnes Deep MCZ and HPMA

The North East of Farnes Deep MCZ and HPMA overlap one another, with the MCZ being designated in 2013, and the HPMA being designated in 2023 extending protection to the entire marine ecosystem.

It should be noted that the HPMAs became a material consideration from the point of consultation in July 2022. This was post HND and HNDFUE recommended design (March 2022, and May 2022, respectively) and therefore would not have been considered a constraint when the initial plan for HND was being designed.

Conservation Objectives

The conservation objective of the North East of Farnes Deep HPMA is to:

- achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the North East of Farnes Deep Highly Protected Marine Area, to a natural state; and
- prevent further degradation and damage to the protected feature, subject to natural change.

Such that within the site:

- The ecosystem is allowed to fully recover in the absence of damaging activities such that:
  - The ecosystem structure consists of a diverse range of benthic and pelagic communities, habitats and species, including biotic and abiotic components of the ecosystem. These fulfil a variety of functional roles, including supporting key life cycle stages and / or behaviours of marine species.
  - The physical, biological and chemical ecosystem processes and functions proceed unhindered, so that the site realises its full ecological potential to deliver goods and services, including habitats and species considered important to the long-term storage of carbon.
  - The ecosystem is resilient to change and stressors.
  - Any ecosystem changes brought about by the process of removing anthropogenic pressures should be considered in the context of a naturally recovering ecosystem.
- The HPMA supports our understanding of how marine ecosystems change and recover in the absence of impacting activities. Note that this does not prevent human intervention to enable or facilitate recovery or the prevention of degradation or damage.

General Management Approach

A more precautionary approach to the management of activities is advised for HPMAs than is the case for existing MCZs. The government's vision for HPMAs is that these will be areas of the sea that allow the protection and recovery of marine ecosystems by prohibiting extractive, destructive and depositional uses and allowing only non-damaging levels of other activities to the extent permitted by international law.

Regulators, including the MMO and Inshore Fisheries and Conservation Authorities (IFCAs), will aim to introduce necessary management measures in due course (HM Government, 2023b).

High-level conservation advice for Public Authorities has been published (Natural England and JNCC, 2022a) which include further detail on the management of risk posed by activities.

Screening Assessment

HND

SW_E1a_to_Hawthorn Pit

The current offshore scheme design for SW_E1a_to_Hawthorn Pit overlaps the north west corner of the North East of Farnes Deep HPMA. Therefore, there is potential for the protected features of the HPMA to be affected by the project activities.

Notably, as the HPMA provides ecosystem wide protection, all species and habitats within its borders are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, collisions with marine mammals, and thermal emissions, EMF, airborne sound and visual disturbance, underwater sound, increased SSC, and changes in water quality.

The conservation advice for all HPMAs (Natural England & JNCC, 2022a) state that cable installation, operation and maintenance, and decommissioning (and their associated activities) should be avoided within HPMA boundaries; as should any activity that could potentially cause degradation or damage to any part of the ecosystem within the HPMA.

Therefore, the **North East of Farnes Deep HPMA is carried forward to the Stage 1 Assessment** of these impact pathways.

HNDFUE

SW_E1c_1_to_Lincolnshire_Connection_Node, and SW_E1c_2_to_Weston_Marsh

The offshore schemes for SW_E1c_1_to_Lincolnshire_Connection_Node, and SW_E1c_2_to_Weston_Marsh are located 6.83 km and 14.24 km from the North East of Farnes Deep HPMA, respectively. Therefore, there is potential for the protected features of the HPMA to be affected by the project activities.

Notably, as the HPMA provides ecosystem wide protection, all species and habitats within its borders are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the HPMA.

The conservation advice for all HPMAs (Natural England & JNCC, 2022a) state that any activity that could potentially cause degradation or damage to any part of the ecosystem within the HPMA. Therefore, the **North East of Farnes Deep HPMA is carried forward to the Stage 1 Assessment** of these impact pathways.

North West of Lundy MCZ

Conservation Objectives and General Management Approach

The conservation objective of the Zone is that the protected feature (**Table 41**):

- so far as already in favourable condition, remains in such condition, and
- so far as not already in favourable condition, be brought into such condition and remain in such condition.

"Favourable condition", with respect to the protected feature within the Zone, means that:

- its extent is stable or increasing, and
- its structure and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

The reference to the composition of the characteristic biological communities of the protected feature includes a reference to the diversity and abundance of species forming part of, or inhabiting, the protected feature.

Any temporary deterioration in condition is to be disregarded if the protected feature is sufficiently healthy and resilient to enable its recovery.

For the purpose of determining whether a protected feature is in favourable condition, any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 41: General management approach – North West of Lundy MCZ

Protected features	General management approach
Subtidal coarse sediment	Recover to favourable condition

Screening Assessment

Celtic Sea

PDA2_to_South_Wales_Connection_Node, PDA1_to_Llandyfaelog, and PDA3_to_Pyworthy

The offshore schemes for PDA2_to_South_Wales_Connection_Node, PDA1_to_Llandyfaelog, and PDA3_to_Pyworthy are located 0.20 km, 12.12 km, and 13.10 km from the North West of Lundy MCZ, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal coarse sediment is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, the **North West of Lundy MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Queenie Corner MCZ

Conservation Objectives and General Management Approach

The Conservation Objective for the Queenie Corner MCZ is that the protected features (**Table 42**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to subtidal mud and sea-pen and burrowing megafauna communities within the Zone, means that:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable their recovery.

Any alteration to the features brought about entirely by natural processes is to be disregarded.

Table 42: General management approach – Queenie Corner MCZ

Protected features	General management approach
Sea-pen & burrowing megafauna communities	Recover to favourable condition
Subtidal mud	

Screening Assessment

HND

Ballantrae_to_Pentir

The offshore scheme for Ballantrae_to_Pentir is located 4.45 km from the Queenie Corner MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen, and burrowing megafauna communities are potentially at risk from increased SSC, and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Queenie Corner MCZ** is carried forward to the Stage 1 Assessment of these impact pathways.

Rathlin MCZ

Conservation Objectives and General Management Approach

The protected features and conservation objectives are as follows (**Table 43**):

"Favourable condition", in relation to marine habitats or geological features, means that the habitat's or geological features' extent is stable or increasing and its structures, functions, quality and the composition of its characteristic biological communities (including diversity and abundance) are such that it remains in a healthy condition, which is not deteriorating.

"Favourable condition", in relation to marine species, means that the quality and quantity of the species, habitat, and the composition of its population in terms of number, age, and sex ratio ensures that the population is maintained in numbers that enable it to thrive.

For the purposes of determining whether a protected feature is in favourable condition, any temporary deterioration in condition or reduction in numbers shall be disregarded if the habitat or population is sufficiently healthy, thriving and resilient to enable its recovery.

For the same purposes, any alteration to that feature brought about entirely by natural processes shall be disregarded.

Table 43: General management approach – Rathlin MCZ

Protected features	General management approach
Black guillemot (*Cepphus grylle*)	Restore to favourable condition
Deep-sea bed	
Geological / Geomorphological features	Maintain in favourable condition

Screening Assessment

HND

SW_W1_to_Ballantrae

The offshore scheme for SW_W1_to_Ballantrae is located 5.94 km from the Sea of Rathlin MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of deep-sea beds is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Additionally, the conservation status of black guillemot are potentially at risk from changes in prey availability. Therefore, **Rathlin MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Ribble Estuary MCZ

Conservation Objectives and General Management Approach

The Conservation Objectives for the Wyre-Lune MCZ are that the protected feature (**Table 44**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

Table 44: General management approach – Ribble Estuary MCZ

Protected features	General management approach
Smelt (*Osmerus eperlanus*)	Recover to favourable condition

Screening Assessment

HND

R4_5_to_Penwortham and R4_6_to_Penwortham

The offshore scheme for R4_5_to_Penwortham and R4_6_to_Penwortham both run directly through the Ribble Estuary MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of smelt is potentially at risk from increased SSC and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Additionally, underwater sound and the presence of EMF may affect individuals within the MCZ, and / or create a barrier to migration for individuals traveling into or out of the MCZ. Therefore, the **Ribble Estuary MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

South Rigg MCZ

Conservation Objectives and General Management Approach

The Conservation Objective for the South Rigg MCZ is that the protected features (**Table 45):**

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to moderate energy circalittoral rock, subtidal coarse sediment, subtidal sand, subtidal mud, subtidal mixed sediments and sea-pen and burrowing megafauna communities within the Zone, means that:

- its extent is stable or increasing; and

- its structures and functions, its quality, and the composition of its characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat) are such as to ensure that it remains in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Table 45: General management approach – South Rigg MCZ

Protected features	General management approach
Moderate energy circalittoral rock	Maintain in favourable condition
Subtidal mixed sediments	
Sea-pen & burrowing megafauna communities	Recover to favourable condition
Subtidal coarse sediment	
Subtidal mud	

Screening Assessment

HND

Ballantrae_to_Pentir

The offshore scheme for Ballantrae_to_Pentir is located 1.03 km from the South Rigg MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen, and burrowing megafauna communities are at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **South Rigg MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

South-West Approaches to Bristol Channel MCZ

Conservation Objectives and General Management Approach

The overarching Conservation Objectives for the South-West Approaches to Bristol Channel MCZ is for its protected features to either to remain in or reach favourable condition. The ability of a protected feature to remain in or reach favourable condition can be affected by its sensitivity to pressures associated with activities taking place within or in close proximity to a protected site.

Formal conservation advice is not currently available for this MCZ. As such, the Conservation Objectives commonly stated by other MCZs with comparable protected features have been taken into consideration:

The protected features (**Table 46**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to subtidal coarse sediment, subtidal sand within the Zone, this means that:

- its extent is stable or increasing; and
- its structures and functions, its quality, and the composition of its characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting that habitat) are such as to ensure that it remains in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 46: General management approach – South-West Approaches to Bristol Channel MCZ

Protected features	General management approach
Subtidal coarse sediment	Recover to favourable condition
Subtidal sand	

Screening Assessment

Celtic Sea

PDA3_to_Pyworthy

The offshore schemes for PDA3_to_Pyworthy is located 1.76 km from the South-West Approaches to Bristol Channel MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **South-West Approaches to Bristol Channel MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Swale Estuary MCZ

Conservation Objectives and General Management Approach

The Conservation Objective for the Swale Estuary MCZ is that the protected features (**Table 47**):

- so far as already in favourable condition, remain in such condition; and

- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to a habitat within the Zone, means that:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable its recovery.

Any alteration to the features brought about entirely by natural processes is to be disregarded.

Table 47 General management approach – Swale Estuary MCZ

Protected features	General management approach
Estuarine rocky habitats	
Low energy intertidal rock	
Intertidal mixed sediment	
Intertidal coarse sediment	
Intertidal sand and muddy sand	Maintain in favourable condition
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	
Subtidal mud	

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore schemes for SW_Ea2_2_to_Near_Richborough is located 16.26 km. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, estuarine habitats, and intertidal habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Swale Estuary MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Swallow Sand MCZ

Conservation Objectives and General Management Approach

The Conservation Objective for the Swallow Sand MCZ is that the protected features (**Table 48**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

With respect to subtidal coarse sediment and subtidal sand within the Zone, means that:

- extent is stable or increasing; and
- structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or inhabiting each habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating.

Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable its recovery.

Any alteration to the features brought about entirely by natural processes is to be disregarded.

With respect to the North Sea glacial tunnel valley (Swallow Hole) within the Zone, means that:

- Its extent, component elements and integrity are maintained;
- Its structure and functioning are unimpaired; and
- Its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (i) and (ii) are satisfied.

Any obscurement of that feature brought about entirely by natural processes is to be disregarded.

Any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 48: General management approach – Swallow Sand MCZ

Protected features	General management approach
Subtidal coarse sediment	Maintain in favourable condition
North Sea glacial tunnel valleys (Swallow Hole)	
Subtidal sand	Recover to favourable condition

Screening Assessment

HNDFUE

SW_E1c_2_to_Weston_Marsh, and SW_E1c_1: Lincolnshire Connection Node

The offshore schemes for SW_E1c_2_to_Weston_Marsh, and SW_E1c_1: Lincolnshire Connection Node are located 4.40 km and 12.03 km from the Swallow Sand MCZ, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Therefore, the **Swallow Sand MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Thanet Coast MCZ

Conservation Objectives and General Management Approach

The conservation objective of Thanet Coast MCZ is that the protected habitats (**Table 49**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For each species of marine fauna, favourable condition means that the population within a Zone is supported in numbers that enable it to thrive, by maintaining:

- the quality and quantity of its habitat; and
- the number, age and sex ratio of its population.

Any temporary reduction of numbers of a species is to be disregarded if the population is sufficiently thriving and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 49: General management approach – Thanet Coast MCZ

Protected features	General management approach
Blue mussel (*Mytilus edulis*)	Maintain in favourable condition
Moderate energy circalittoral rock	
Moderate energy infralittoral rock	
Peat and clay exposures	
Stalked jellyfish (*Haliclystus* sp.)	
Stalked jellyfish (*Calvadosia cruxmelitensis*)	
Subtidal chalk	
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	
Ross worm (*Saballeria spinulosa*) reefs	Recover to favourable condition

Screening Assessment

HNDFUE

SW_E2a_2_to_Near_Richborough

The offshore scheme for SW_E2a_2_to_Near_Richborough runs directly through the Thanet Coast MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, blue mussels, and jellyfish species are potentially at risk from temporary physical disturbance, permanent habitat loss, introduction of INNS, thermal emissions, and EMF that may occur inside the MCZ; and increased SSC, and changes in water quality that may occur inside, and within one tidal excursion ellipse of the MCZ. Therefore**, the Thanet Coast MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Turbot Bank MPA

Conservation Objectives and General Management Approach

The conservation objectives for the Turbot Bank MPA are that the protected features (**Table 50**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

“Favourable Condition”, with respect to a mobile species of marine fauna, means that:

- the species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds,
- the extent and distribution of any supporting feature upon which the species is dependent is conserved or, where relevant, recovered, and
- the structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.

For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.

Table 50: General management approach – Turbot Bank MPA

Protected features	General management approach
Sandeels (*Ammodytes marinus* / *Ammodytes tobianus*)	• Ecological condition has not been verified • Maintain potential to act as a source of young sandeels for surrounding areas

Screening Assessment

HNDFUE

SW_E2b_to_Peterhead_2

The offshore scheme for SW_E2b_to_Peterhead_2 passes directly through the Turbot Bank MPA. Therefore, there is potential for the protected features of the MPA to be affected by the project activities.

Notably, the conservation status of sandeels is at risk from temporary physical disturbance and permanent habitat loss, the introduction of INNS, thermal emissions, increased SSC, and changes in water quality. Therefore, **the Turbot Bank MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

SW_E2b_to_SW_E2a_1

The offshore scheme for SW_E2b_to_SW_E2a_1 is located 4.97 km from Turbot Bank MPA. Therefore, there is potential for the protected feature of the MPA to be affected by the project activities.

Notably, the conservation status sandeels is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, **Turbot Bank MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

INTOG

Aspen_to_Fetteresso

The offshore scheme for Aspen_to_Fetteresso passes directly through the Turbot Bank MPA. Therefore, there is potential for the protected feature of the MPA to be affected by the project activities.

Notably, the conservation status of sandeels is at risk from temporary physical disturbance and permanent habitat loss, the introduction of INNS, thermal emissions, increased SSC, and changes in water quality. Therefore, **the Turbot Bank MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

Peterhead_to_Cenos

The offshore scheme for Peterhead_to_Cenos is located 3.57 km from Turbot Bank MPA. Therefore, there is potential for the protected feature of the MPA to be affected by the project activities.

Notably, the conservation status of sandeels is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MPA. Therefore, **the Turbot Bank MPA is carried forward to the Stage 1 Assessment** of these impact pathways.

West of Copeland MCZ

Conservation Objectives and General Management Approach

The conservation objective of the West of Copeland MCZ is that the protected features (**Table 51**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

Favourable condition, with respect to a habitat within the MCZ, means that:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it remains in a condition which is healthy and not deteriorating.

The composition of the characteristic biological communities of a habitat includes the diversity and abundance of species forming part of or inhabiting that habitat.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

For the purpose of determining whether a protected habitat is in favourable condition any alteration to that habitat brought about entirely by natural processes is to be disregarded.

Table 51: General management approach – West of Copeland MCZ

Protected features	General management approach
Subtidal sand	Maintain in favourable condition
Subtidal coarse sediment	Recover to favourable condition
Subtidal mixed sediment	

Screening Assessment

HND

R4_6_to_Penwortham

The offshore scheme for R4_6_to_Penwortham is located 10.67 km from the West of Copeland MCZ. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, **the West of Copeland MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

West of Walney MCZ

Conservation Objectives and General Management Approach

The conservation objective of the West of Walney MCZ's is that the protected habitats (**Table 52**):

- are maintained in favourable condition if they are already in favourable condition; and
- be brought into favourable condition if they are not already in favourable condition.

For each protected feature, favourable condition means that, within a Zone:

- its extent is stable or increasing; and
- its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate.

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition.

Table 52: General management approach – West of Walney MCZ

Protected features	General management approach
Subtidal sand	Recover to favourable condition
Subtidal mud	
Sea-pen and burrowing megafauna communities	

Screening Assessment

HND

R4_6_to_Penwortham and R4_5_to_Penwortham

The offshore scheme for R4_6_to_Penwortham and R4_5_to_Penwortham are located 11.24 km and 13.16 km from the West of Walney MCZ, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of subtidal benthic habitats, sea-pen, and burrowing megafauna communities are potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse. Therefore, **the West of Walney MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Wyre-Lune MCZ

Conservation Objectives and General Management Approach

The Conservation Objectives for the Wyre-Lune MCZ are that the protected features (**Table 53**):

- so far as already in favourable condition, remain in such condition; and
- so far as not already in favourable condition, be brought into such condition, and remain in such condition.

Table 53: General management approach – Wyre-Lune MCZ

Protected features	General management approach
Smelt (*Osmerus eperlanus*)	Recover to favourable condition

Screening Assessment

HND

R4_6_to_Penwortham and R4_5_to_Penwortham

The offshore scheme for R4_6_to_Penwortham and R4_5_to_Penwortham are located 7.09 km and 7.11 km from the West of Walney MCZ, respectively. Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of smelt is potentially at risk from increased SSC and changes in water quality that may occur within one tidal excursion ellipse of the MCZ. Additionally, the presence of EMF may create a barrier to migration for individuals traveling into or out of the MCZ. Therefore, **the Wyre-Lune MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Welsh Sites

Skomer MCZ

Conservation Objectives and General Management Approach

Conservation objectives are yet to be defined for the Skomer MCZ (NRW, 2023). Natural Resources Wales (NRW) has committed to continue to manage and monitor Skomer MCZ until conservation objectives have been defined and agreed with the Welsh Government. However, the Department for Environment, Food and Rural Affairs' (Defra) Marine Conservation Zones Designation Explanatory Note (2013) states that *"Generally, each MCZ has one conservation objective. The objective applies to all of the features being protected. The objective is that each of the features being protected be in favourable condition…"*. As such, the following screening assessment proceeds on the basis that this conservation objective should be met.

Table 54: General management approach – Skomer MCZ

Protected features	General management approach
European storm petrel (*Hydrobates pelagicus*)	Maintain or enhance condition
Red-billed chough (*Pyrrhocorax pyrrhocorax*)	
Short-eared owl (*Asio flammeus*)	
Manx shearwater (*Puffinus puffinus*)	
Atlantic puffin (*Fratercula arctica*)	
Lesser black-backed gull (*Larus fuscus*)	
Seabird assemblage	

Screening Assessment

HND

Ballantrae_to_Pentir and R4_4_to_Bodelwyddan

The offshore schemes for Ballantrae_to_Pentir, R4_4_to_Bodelwyddan, and the Skomer MCZ are located within the Wales Seal Management Unit (SMU) for grey seal. There is evidence of grey seal migrations overlapping the MCZ and the two offshore schemes (Carter, *et al*., 2022). Therefore, there is potential for the protected features of the MCZ to be affected by the project activities.

Notably, the conservation status of grey seals is potentially at risk from changes in prey availability. Therefore, the **Skomer MCZ is carried forward to the Stage 1 Assessment** of these impact pathways.

Screening Summary

The screening stage of this assessment has identified the need for the impact pathways presented in **Table 55** to be carried forward to Stage 1 Assessment:

Table 55: Screening summary

Pathways	MCZs that could have their Conservation objectives hindered	Associated Study corridors	
Temporary physical disturbance – subtidal benthic habitats and species	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
	Clyde Sea Sill MPA	HND	SW_W1_to_Ballantrae
			Ballantrae_to_Pentir
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos
			Peterhead_to_Cenos
	Farnes East MCZ	HND	PA_2_to_Berwick Bank
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2

			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
		INTOG	Peterhead_to_Cenos
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
		INTOG	Aspen_to_Fetteresso
Permanent loss - subtidal benthic habitats and species	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy
	Clyde Sea Sill MPA	HND	SW_W1_to_Ballantrae
			Ballantrae_to_Pentir
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos
			Peterhead_to_Cenos
	Farnes East MCZ	HND	PA_2_TO_BERWICK BANK
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
		INTOG	Peterhead_to_Cenos
			Scaraben_to_Peterhead_2
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2

		INTOG	Aspen_to_Fetteresso
Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
		HND	SW_E1a_to_Hawthorn Pit
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos
			North_Connect_to_Cenos
	Farnes East MCZ	HND	PA_2_to_Berwick Bank
	Firth of Forth Banks Complex	HNDFUE	SW_E1a_to_Branxton
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Holderness Inshore MCZ	HND	PA _1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	Holderness Offshore MCZ	HND	PA _1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal
	South Rigg MCZ	HND	Ballantrae_to_Pentir
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
		HND	SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
		INTOG	Peterhead_to_Cenos
			Scaraben_to_Peterhead_2
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
		INTOG	Aspen_to_Fetteresso
Changes in prey	Berwick to St Mary's MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit

availability – birds and marine mammals		HNDFUE	SW_E1a_to_Branxton
		INTOG	Cedar_to_Branxton
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
			Kilmarnock South_to_Ballantrae
	Cumbria Coast MCZ - Zone 1 and Zone 2	HND	R4_5_to_Penwortham
			R4_6_to_Penwortham
			R4_4_to_Bodelwyddan
			Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
			Kilmarnock South_to_Ballantrae
	East Caithness Cliffs MPA	HNDFUE	Shetland_to_Blackhillock
			SW_NE2_to_Spittal
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	Rathlin MCZ	HND	SW_W1_to_Ballantrae
	Skomer MCZ	HND	Ballantrae_to_Pentir
			R4_4_to_Bodelwyddan
Collision risk – marine mammals	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Skomer MCZ	HND	Ballantrae_to_Pentir
			R4_4_to_Bodelwyddan
Thermal emissions – subtidal benthic habitats and species	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos
			North_Connect_to_Cenos
	Farnes East MCZ	HND	PA_2_to_Berwick Bank
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Holderness Inshore MCZ	HND	PA _1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	Holderness Offshore MCZ	HND	PA _1_to_Birkhill_Wood

			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
		INTOG	Peterhead_to_Cenos
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
		INTOG	Aspen_to_Fetteresso
EMF – Subtidal benthic habitats and species, marine mammals, and fish	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos
			North_Connect_to_Cenos
	Farnes East MCZ	HND	PA_2_to_Berwick Bank
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Holderness Inshore MCZ	HND	PA _1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	Holderness Offshore MCZ	HND	PA _1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)

		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
		INTOG	Peterhead_to_Cenos
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
		INTOG	Aspen_to_Fetteresso
Airborne sound and visual disturbance – marine mammals and birds	Berwick to St Mary's MCZ	HND	PA_2_to_Berwick Bank
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
	East Caithness Cliffs MPA	HNDFUE	Shetland_to_Blackhillock
			SW_NE2_to_Spittal
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
Underwater sound – marine mammals, fish, and Shellfish	Ribble Estuary MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
Increased SSC - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	Aln Estuary MCZ	HND	PA_2_to_Berwick Bank
	Bideford to Foreland Point MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node
			PDA3_to_Pyworthy
	Clyde Sea Sill MPA	HND	SW_W1_to_Ballantrae and Ballantrae
			Kilmarnock South_to_Ballantrae
			Ballantrae_to_Pentir
			SW_W1_to_Ballantrae
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
	Dover to Deal MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos
			Peterhead_to_Cenos
			Beech_to_Cedar
	Farnes East MCZ	HND	PA_2_to_Berwick Bank

		SW_E1a_to_Hawthorn Pit
	HNDFUE	SW_E1a_to_Branxton
	INTOG	Cedar_to_Branxton
Firth of Forth Banks Complex MPA	HND	PA_2_to_Berwick Bank
		SW_E1a_to_Fiddes
	HNDFUE	SW_E1a_to_Branxton
		SW_E3_to_Fiddes
	INTOG	Aspen_to_Fetteresso
		Cedar_to_Branxton
Foreland MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
Fulmar MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
Fylde MCZ	HND	R4_6_to_Penwortham
		R4_5_to_Penwortham
Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
Hartland Point to Tintagel MCZ	Celtic Sea	PDA3_to_Pyworthy
Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood
		R4_1_to_Birkhill_Wood
		R4_2_to_Birkhill_Wood
		SW_E1a_to_Lincolnshire_Connection_Node
	HNDFUE	SW_E1c_1: Lincolnshire Connection Node
		SW_E1c_2 to Weston_Marsh
Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood
		R4_1_to_Birkhill_Wood
		R4_2_to_Birkhill_Wood
		SW_E1a_to_Lincolnshire_Connection_Node
	HNDFUE	SW_E1c_1: Lincolnshire Connection Node
		SW_E1c_2 to Weston_Marsh
Kentish Knock East MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
Lundy MCZ	Celtic Sea	PDA3_to_Pyworthy
Markham's Triangle MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
Morte Platform MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node
		PDA3_to_Pyworthy
Mousa to Boddam MPA	HNDFUE	Shetland_to_Blackhillock
North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
	HNDFUE	SW_N3_to_Arnish
North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
		SW_E1a_to_Lincolnshire_Connection_Node
	HNDFUE	SW_E1c_2 to Weston_Marsh
North West of Lundy MCZ	Celtic Sea	PDA1_to_Llandyfaelog
		PDA2_to_South_Wales_Connection_Node
		PDA3_to_Pyworthy
	INTOG	Aspen_to_Beech

	Norwegian Boundary Sediment Plain MPA		Beech_to_Beech_MPI
			Beech_to_Cedar
			North_Connect_to_Cenos
	Noss Head MPA	HNDFUE	Shetland_to_Blackhillock
			SW_NE2_to_Spittal
	South Arran MPA	HND	Kilmarnock South_to_Ballantrae
	Rathlin MCZ	HND	SW_W1_to_Ballantrae
	Ribble Estuary MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Sea of the Hebrides MPA	HND	SW_W1_to_Ballantrae
	Shaint East Bank MPA	HND	SW_N4_to_Arnish (Lewis)
	South Rigg MCZ	HND	Ballantrae_to_Pentir
	South-West Approaches to Bristol Channel MCZ	Celtic Sea	PDA3_to_Pyworthy
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
			Shetland_to_Blackhillock
		INTOG	Aspen_to_Fetteresso
			Peterhead_to_Cenos
			Scaraben_to_Peterhead_2
	Swale Estuary MCZ	HND	SW_Ea2_2_to_Near_Richborough
	Swallow Sand MCZ	HND	SW_E1a_to_Lincolnshire_Connection_Node
		HNDFUE	SW_E1a_to_Lincolnshire_Connection_Node
			SW_E1c_2_to_Weston_Marsh
			SW_E2a_2_to_Near_Richborough
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
			SW_E2b_to_SW_E2a_1
		INTOG	Aspen_to_Fetteresso
			Peterhead_to_Cenos
	West of Copeland MCZ	HND	R4_6_to_Penwortham
	West of Walney MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Wyre-Lune MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Aln Estuary MCZ	HND	PA_2_to_Berwick Bank

Water quality - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	Bideford to Foreland Point MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node
			PDA3_to_Pyworthy
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
	Dover to Deal MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos
			Peterhead_to_Cenos
			Beech_to_Cedar
	Farnes East MCZ	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Hawthorn Pit
		HNDFUE	SW_E1a_to_Branxton
		INTOG	Cedar_to_Branxton
	Firth of Forth Banks Complex MPA	HND	PA_2_to_Berwick Bank
			SW_E1a_to_Fiddes
		HNDFUE	SW_E1a_to_Branxton
			SW_E3_to_Fiddes
		INTOG	Aspen_to_Fetteresso
			Cedar_to_Branxton
	Foreland MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Fulmar MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Fylde MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Hartland Point to Tintagel MCZ	Celtic Sea	PDA3_to_Pyworthy
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
		HNDFUE	SW_E1c_1: Lincolnshire Connection Node
			SW_E1c_2 to Weston_Marsh
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood
			R4_1_to_Birkhill_Wood
			R4_2_to_Birkhill_Wood
			SW_E1a_to_Lincolnshire_Connection_Node
		HNDFUE	SW_E1c_1: Lincolnshire Connection Node
			SW_E1c_2 to Weston_Marsh
	Kentish Knock East MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Lundy MCZ	Celtic Sea	PDA3_to_Pyworthy
	Markham's Triangle MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Morte Platform MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node
			PDA3_to_Pyworthy
	Mousa to Boddam MPA	Celtic Sea	Shetland_to_Blackhillock

	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)
		HNDFUE	SW_N3_to_Arnish
	North East of Farnes Deep MCZ and HPMA	HND	SW_E1a_to_Hawthorn Pit
			SW_E1a_to_Lincolnshire_Connection_Node
		HNDFUE	SW_E1c_2 to Weston_Marsh
	North West of Lundy MCZ	Celtic Sea	PDA1_to_Llandyfaelog
			PDA2_to_South_Wales_Connection_Node
			PDA3_to_Pyworthy
	Norwegian Boundary Sediment Plain MPA	INTOG	Aspen_to_Beech
			Beech_to_Beech_MPI
			Beech_to_Cedar
			North_Connect_to_Cenos
	Noss Head MPA	HNDFUE	Shetland_to_Blackhillock
			SW_NE2_to_Spittal
	Rathlin MCZ	HND	SW_W1_to_Ballantrae
	Ribble Estuary MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Sea of the Hebrides MPA	HND	SW_W1_to_Ballantrae
	South Rigg MCZ	HND	Ballantrae_to_Pentir
	South-West Approaches to Bristol Channel MCZ	Celtic Sea	PDA3_to_Pyworthy
	Southern Trench MPA	HND	SW_NE7_to_Peterhead
			SW_NE4_to_New_Deer (ES26)
		HNDFUE	SW_E2b_to_Peterhead_2
			SW_NE3_to_New_Deer_2
			SW_NE4_to_New_Deer
			SW_NE6_to_Peterhead_2
			SW_NE7_to_Peterhead_DCSS
			SW_NE8_to_Peterhead_1
			Shetland_to_Blackhillock
		INTOG	Aspen_to_Fetteresso
			Peterhead_to_Cenos
	Swale Estuary MCZ	HND	SW_Ea2_2_to_Near_Richborough
	Swallow Sand MCZ	HNDFUE	SW_E1a_to_Lincolnshire_Connection_Node
			SW_E1c_2_to_Weston_Marsh
			SW_E2a_2_to_Near_Richborough
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2
			SW_E2b_to_SW_E2a_1
		INTOG	Aspen_to_Fetteresso
			Peterhead_to_Cenos
	West of Copeland MCZ	HND	R4_6_to_Penwortham

	West of Walney MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Wyre-Lune MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
Barriers to migration – diadromous fish	Ribble Estuary MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham
	Wyre-Lune MCZ	HND	R4_6_to_Penwortham
			R4_5_to_Penwortham

6. Stage 1 Assessment

Temporary physical disturbance
Permanent loss
Introduction of Invasive Non-Native Species (INNS)
Changes in prey availability
Thermal emissions
Electromagnetic fields (EMF)
Airborne sound and visual disturbance
Underwater sound
Increased Suspended Sediment Concentrations (SSC)
Water quality
Barriers to migration

This section assesses the potential for the identified impacts associated with the HND and HNDFUE study corridors to hinder the site conservation objectives of the MCZs carried forward from screening. For those MCZs which are at risk of significant effects, a further Stage 2 MCZ Assessment will be required.

Following the initial screening in **Section 5**, potential effects to 45 MCZs were identified. To avoid excessive repetition these are assessed by impact pathway.

Temporary physical disturbance – subtidal benthic habitats and species

There are a number of activities associated with the installation phase of subsea cables that will temporarily disturb seabed habitats, resulting in short term physical disturbance to, and temporary loss of seabed habitats. In some instances, physical damage to less mobile benthic species such as bivalves and other molluscs may also occur. Temporary disturbance, as a result of cable installation activities, will occur along the entire route for each cable.

Sensitivity to physical disturbance varies between habitats and species; it depends upon the stability of the habitat and its resilience to disturbance, and the vulnerability of an individual species to mechanical disturbance. For example, mobile sands, or habitats in shallow water where there is significant wave and tidal energy, are considered to have greater capacity to accommodate physical disturbance, greater recoverability, and their associated communities are expected to be relatively tolerant of disturbance.

The magnitude of disturbance caused to marine habitats by the installation of subsea cables is dependent on the methods used, which for HND and HNDFUE are unknown at this time. In spite of this, mobile species, such as crabs, can avoid installation activities. However, most animals will be sediment dwelling and will be disturbed as those sediments are typically ploughed or jetted aside to an adjacent location. As sediments are displaced and backfilled there will be some mortality of larger and less mobile species. However, for many animals, displacement will have only a temporary impact, and fauna will be able to redistribute within the sediment once the installation spread has moved away. Ultimately, the recovery of habitats is site and installation method specific but is expected to be relatively rapid in the majority of circumstances (RPS, 2019); particularly in shallower at shallower depths and areas with mobile sediments / higher sediment supply (Kraus and Carter, 2018).

The potential effects of temporary physical disturbance resulting from cable maintenance and decommissioning phases are likely to be the same or of lesser magnitude than those related to the installation phase.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of temporary physical disturbance on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, following best practice guidance (JNCC and Natural England, 2022), and informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints; including minimising the footprint as much as possible, and targeting seabed habitats that are known for quicker recovery times, where practicable;
- Consideration of the cable trenching method with the smallest ZoI; and
- Consideration of the requirement and extent of for pre-lay grapnel runs and sand wave lowering.

[20] For example, financial and engineering considerations.

Assessment Conclusion

Table 56: Assessment of the potential for MCZ conservation objectives to be hindered by temporary physical disturbance associated with the HND Implementation Plan Sea study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Temporary physical disturbance – subtidal benthic habitats and species	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	Conservation objectives are highly unlikely to be hindered. These sites were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that "Any temporary deterioration in condition is to be disregarded if the habitats are sufficiently healthy and resilient to enable their recovery". The general management approach indicates that the protected features are considered to be in favourable or good condition and should be maintained as such. The magnitude of disturbance to soft sediment protected features within these sites will be temporary and localised and will return to baseline conditions within a short period of time, and the protected communities are considered able to recover from any effects of this impact pathway; this assessment assumes impacts to hard substrate protected features are avoided.
			SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	Fylde MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DCSS	
			SW_NE8_to_Peterhead_1	
		INTOG	Peterhead_to_Cenos	
			Scaraben_to_Peterhead_2	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	Conservation objectives are highly unlikely to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for this MCZ states that the protected features must "…remain in or be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating", and in the case of ocean quahog that their numbers be maintained or increased. The general management approach indicates that the protected features are considered to be in favourable condition and should be maintained as such.
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Turbot Bank MPA	INTOG	Aspen_to_Fetteresso	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
				The magnitude of disturbance to the protected features within this MCZ will be temporary and localised and will return to baseline conditions within a short period of time. Additionally, the protected communities are considered able to recover from any effects of this impact pathway, without population level impacts that would undermine community stability, or efforts to increase numbers of individuals.
	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	There is potential for conservation objectives to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The general management approach indicates that specific protected features susceptible to this impact pathway are considered to be in unfavourable condition and recovery to favourable condition is required. Clear mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, the assessment of the feasibility and effectiveness of any mitigation measures must be informed by more detailed information than presently available.
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos North_Connect_to_Cenos	There is potential for conservation objectives to be hindered.

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	These MCZs were screened in due to the associated study corridors running directly through their boundaries. The general management approach indicates that the condition of specific protected features susceptible to this impact pathway has not been assessed and / or is unknown. Therefore, these protected features may be in unfavourable condition and require recovery to favourable condition. Clear mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, to determine the feasibility and effectiveness of any mitigation measures more detailed information than presently available is required.
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	The hinderance of conservation objectives cannot be ruled out. This HPMA was screened in due to the associated study corridor overlapping it's boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). As such, the subsequent refinement of the current study corridor at project level will require careful consideration to avoid challenge from

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
				regulatory bodies with regard to licencing and consent.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width. Careful consideration will be required during this process to ensure this results in an updated study corridor that avoids or significantly minimises the risk of affecting the HPMA's protected features. As the hinderance of HPMA conservation objectives cannot be ruled out with the current level of information, **this study corridor will be taken forward to Stage 2 plan-level Assessment**.

HNDFUE

- Study corridor **SW_E1a_to_Branxton** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**;
- Study corridor **SW_E2a_2_to_Near_Richborough** may hinder the conservation objectives of **Goodwin Sands** and **Thanet Coast MCZs**; and
- Study corridor **SW_E2b_to_Peterhead_2** could potentially hinder the conservation objectives of **Turbot Bank MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it may be possible to use surveys to identify the location of protected features where the study corridor and MCZ overlaps, informing micro routing around them.

INTOG

- Study corridor **Peterhead_to_Cenos** and **North_Connect_to_Cenos** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA**.

It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it may be possible to use surveys to identify the location of protected features where the study corridor and MCZ overlaps, informing micro routing around them.

Celtic Sea

- Study corridor **PDA3_to_Pyworthy** could potentially hinder the conservation objectives of **Bideford to Foreland Point MCZ**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it may be possible to use surveys to identify the location of protected features where the study corridor and MCZ overlaps, informing micro routing around them.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZ as a result of this impact pathway.

Permanent loss - subtidal benthic habitats and species

As part of the activities associated with the installation phase of subsea cables, there may be a requirement to use subtidal rock protection and / or concrete mattressing at points along the study corridor. Protection may be used to protect Horizontal Directional Drilling (HDD) breakouts, crossings with third-party assets, cable joints, and in locations where the minimum depth of lowering (DoL) cannot be achieved.

The installation methods and the exact location and extent of any required cable protection is not currently known for each cable route. Therefore, with the application of the precautionary principle, it must be assumed that a moderate amount of cable protection will be required for each cable route. This will result in permanent habitat loss below the footprint of any hard cable protection measures that are introduced.

The permanent loss of sensitive features, such as the protected benthic features of MCZs, will likely result in at least minor overall impacts, with the potential for significant impacts to occur. Either outcome may result in the conservation objectives of MCZs being hindered. Therefore, this requires further analysis once methods and design have been confirmed at the individual project level for each cable route.

Mitigation

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, following best practice guidance (JNCC and Natural England, 2022), and informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, including minimising the footprint as much as possible; and
- Where possible, cable protection materials could be selected to match the environment (e.g. when cables are installed in areas of cobbles or other natural rock features, rock of similar diameter and material as the receiving environment should be used could be used as an alternative to materials such as concrete mattressing).

Assessment Conclusion

Table 57: Assessment of the potential for conservation objectives to be hindered by permanent habitat loss associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Permanent loss - subtidal benthic habitats and species+	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	There is potential for conservation objectives to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features must remain in or recover to favourable condition. Clear mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, to determine the feasibility and effectiveness of any mitigation measures more detailed information is required.
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
		HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
	Holderness Inshore MCZ		R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE8_to_Peterhead_1	
		INTOG	Scaraben_to_Peterhead_2	
			Peterhead_to_Cenos	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	INTOG Aspen_to_Fetteresso	
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	The hinderance of conservation objectives cannot be ruled out. These sites were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features must remain in or recover to favourable condition. As there is potential for protected benthic features within the boundaries of these MCZs to be permanently lost, the current study corridor designs have the potential to hinder the conservation objectives of these MCZs. Further consideration of the final project design, installation and mitigation measures will be required.
			SW_W1_to_Ballantrae	
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos	
	Fylde MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
		HNDFUE	SW_NE7_to_Peterhead_DCSS	
		INTOG	Peterhead_to_Cenos	

HND

- Study corridors **Ballantrae_to_Pentir** and **SW_W1_to_Ballantrae** could potentially hinder the conservation objectives of the **Clyde Sea Sill MPA**;
- Study corridor **R4_6_to_Penwortham** and **R4_5_to_Penwortham** could potentially hinder the conservation objectives of the **Fylde MCZ**; and
- Study corridor **SW_NE7_to_Peterhead** could potentially hinder the conservation objectives of the **Southern Trench MPA**.

  With the current designs it is not possible for the above study corridors to avoid the associated MCZs. Additionally, where the study corridors overlap the MCZ it is anticipated that cable protection will be required where cable crossings are required, resulting in the permanent loss of habitat within the MCZ. Careful consideration of mitigation measures will be required at project level as the identified mitigation measures may not be sufficient to prevent MCZ conservation objectives from being hindered. As the hinderance of MCZ conservation objectives cannot be ruled out with the current level of information, **these study corridors will be taken forward to Stage 2 plan-level Assessment**.

Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby removing the risk of affecting the HPMA's protected features directly through permanent habitat loss.

- Study corridor **PA_2_to_Berwick Bank** could potentially hinder the conservation objectives of the **Coquet to St Marys** and **Farnes East MCZ**;
- Study corridors **PA_1_to_Birkhill_Wood**, **R4_1_to_Birkhill_Wood** **R4_2_to_Birkhill_Wood**, and **SW_E1a_to_Lincolnshire_Connection_Node** could potentially hinder the conservation objectives of the **Holderness Inshore** and **Holderness Offshore MCZs**.
- Study corridor **SW_NE4_to_New_Deer (ES26)** could potentially hinder the conservation objectives of the **Southern Trench MPA**.

It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it should be possible to use micro routing to avoid locations where cable protection would be required; and / or use surveys to identify the location of protected features within the MCZ, informing micro routing around them.

HNDFUE

- Study corridor **SW_NE7_to_Peterhead_DCSS** could potentially hinder the conservation objectives of the **Southern Trench MPA**.
- With the current design it is not possible for the above study corridors to avoid the associated MCZs. Additionally, where the study corridors overlap the MCZ it is anticipated that cable protection will be required where cable crossings are required, resulting in the permanent loss of habitat within the MCZ. Careful consideration of mitigation measures will be required at project level as the identified mitigation measures may not be sufficient to prevent MCZ conservation objectives from being hindered. As the hinderance of MCZ conservation objectives cannot be ruled out with the current level of information, **the study corridors will be taken forward to Stage 2 plan-level Assessment**.

- Study corridor **SW_E1a_to_Branxton** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**.
- Study corridor **SW_E2a_2_to_Near_Richborough** could potentially hinder the conservation objectives of the **Goodwin Sands** and **Thanet Coast MCZs**.
- Study corridor **SW_E2b_to_Peterhead_2** could potentially hinder the conservation objectives of the **Turbot Bank MPA**.
- Study corridor **SW_NE2_to_Spittal** could potentially hinder the conservation objectives of the **Noss Head MPA**.
- Study corridors **SW_E2b_to_Peterhead_2**, **SW_NE3_to_New_Deer_2**, **SW_NE4_to_New_Deer**, **SW_NE6_to_Peterhead_2**, and **SW_NE8_to_Peterhead_1** could potentially hinder the conservation objectives of the **Southern Trench MPA**.

It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it should be possible to use micro routing to avoid locations where cable protection would be required; and / or use surveys to identify the location of protected features within the MCZ, informing micro routing around them.

INTOG

- Study corridor **Peterhead_to_Cenos** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA** and **Southern Trench MPA**

  With the current design it is not possible for the above study corridor to avoid the associated MCZs. Additionally, where the study corridors overlap the MCZ it is anticipated that cable protection will be required where cable crossings are required, resulting in the permanent loss of habitat within the MCZ. Careful consideration of mitigation measures will be required at project level as the identified mitigation measures may not be sufficient to prevent MCZ conservation objectives from being hindered. As the hinderance of MCZ conservation objectives cannot be ruled out with the current level of information, **this study corridor will be taken forward to Stage 2 plan-level Assessment**.

- Study corridor **North_Connect_to_Cenos** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA**.
- Study corridor **Scaraben_to_Peterhead_2** could potentially hinder the conservation objectives of the **Southern Trench MPA**; and
- Study corridor **Aspen_to_Fetteresso** could potentially hinder the conservation objectives of the **Turbot Bank MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it should be possible to use micro routing to avoid locations where cable protection would be required; and / or use surveys to identify the location of protected features within the MCZ, informing micro routing around them.

Celtic Sea

- Study corridor **PDA3_to_Pyworthy** could potentially hinder the conservation objectives of the **Bideford to Foreland Point MCZ**.
- It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from

occurring. Alternatively, the same outcome may be attainable by micro routing the cable within the study corridor so that it avoids the MCZ. Where this cannot be achieved it should be possible to use micro routing to avoid locations where cable protection would be required; and / or use surveys to identify the location of protected features within the MCZ, informing micro routing around them.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZ as a result of this impact pathway.

Introduction of Invasive Non-Native Species (INNS) – subtidal benthic habitats and species

INNS can be introduced through multiple sources, particularly via the hulls of, and discharge of ballast water from international vessels. INNS can also be introduced and / or spread by the addition of substrates, such as rock placement and concrete mattresses, used for cable protection (Adams *et al.*, 2014; Coolen *et al.*, 2020).

The accidental introduction of INNS has the potential to cause detrimental changes to benthic habitats. Whilst most non-native species are unlikely to become invasive, those that do can out-compete native species and introduce diseases which could result in significant changes to community composition and mortality. The introduction of INNS could occur from the different vessels that may be required during the installation, maintenance, or decommissioning phases of each individual cable; and / or the introduction of untreated substrates at crossings with other infrastructure along each cable route. If INNS were to be introduced, the effect on benthic habitats could be significant and long-term.

The methods, and therefore relative precautions of the installation, maintenance, and decommissioning activities for each cable route are not currently established. Similarly, the exact location, extent, and source materials used for any required cable protection is not currently known. Therefore, it is not possible to accurately assess the impact of INNS at plan level; this will be required at project level. Thus, with the application of the precautionary principle, it must be assumed that there is potential for INNS to be introduced; pertinently, within the study corridors which run directly through MCZs.

Mitigation

A number of industry best practice mitigations would lower the probability of INNS transmission to benthic habitats, and thus reduce the risk of significantly affecting a Habitats site:

- All project vessels should adhere to the International Maritime Organisation (IMO) Guidelines for the control and management of ship'' biofouling, and the

International Convention for the Control and Management of Ships' Ballast Water and Sediments, to minimise the transfer of invasive aquatic species.

- Where possible, the number of locations where cable protection is required (i.e. the number of cable crossings) should be minimised.
- Any material introduced into the marine environment, such as rock protection material, should be from a suitable source to ensure no INNS can be introduced.

Ultimately, it is considered industry best practice to produce a marine biosecurity plan / INNS management plan at project-level (Cook *et al.*, 2014a, and 2014b), following the latest guidance on INNS from the GB non-native species secretariat. This is increasingly becoming considered a requirement for offshore developments at project-level[21].

With the adherence to these guidelines and measures, INNS introductions would be considered unlikely, with any impacts limited to individual cable route corridors. Thus, significantly reducing the likelihood of significantly adverse effects on a Habitats site.

[21] particularly in Scotland and Wales

Assessment Conclusion

Table 58: Assessment of the potential for conservation objectives to be hindered by the introduction of INNS associated with the HND Implementation Plan Sea study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Introduction of INNS – subtidal benthic habitats and species	Queenie Corner MCZ	HND	Ballantrae_to_Pentir	Conservation objectives are unlikely to be hindered. These sites were screened in due to the associated study corridors running near to their boundaries. At plan level there is insufficient detail to indicate that INNS could be remotely introduced to this site from within the study corridor. However, the close proximity of these study corridors mean INNS should be a consideration when greater design details are available at project level.
	South Rigg MCZ	HND	Ballantrae_to_Pentir	
	Southern Trench MPA	HNDFUE	Shetland_to_Blackhillock	
	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	There is potential for conservation objectives to be hindered. These MCZs were screened in due to the associated study corridors running directly through (or in close proximity to) their boundaries. The conservation objectives for these sites state that protected features must remain in or recover to favourable condition.
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	East of Gannet and Montrose Fields MPA	INTOG	Peterhead_to_Cenos North_Connect_to_Cenos	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
	Firth of Forth Banks Complex	HNDFUE	SW_E1a_to_Branxton	
	Fylde MCZ	HND	R4_6_to_Penwortham	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
			R4_5_to_Penwortham	With the current study corridor designs there is potential for protected benthic features within the boundaries of these sites to be altered by the introduction of INNS. However, should industry best practice mitigation measures be implemented, including the production of a biosecurity plan, the risk of INNS being introduced would be significantly lowered. However, the opportunities for INNS to spread will differ on a case-by-case basis, relating to the ecological context of each cable's location and chosen cable design. Further consideration of the final project design, installation and mitigation measures will be required.
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DCSS	
			SW_NE8_to_Peterhead_1	
		INTOG	Scaraben_to_Peterhead_2	
			Peterhead_to_Cenos	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	Aspen_to_Fetteresso	

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby removing the risk of affecting the HPMA's protected features directly. Careful consideration will need to be given to the design and extent of cable protection, installation methodology, and INNS specific mitigation measures as part of an INNS management plan, and / or marine biosecurity plan in order to avoid or significantly minimise the risk of INNS affecting the HPMA's designated features.

- Study corridor **Ballantrae_to_Pentir** and **SW_W1_to_Ballantrae** could potentially hinder the conservation objectives of the **Clyde Sea Sill MPA;**

- Study corridor **PA_2_to_Berwick Bank** could potentially hinder the conservation objectives of the **Coquet to St Marys MCZ** and **Farnes East MCZ**;

- Study corridors **R4_6_to_Penwortham** and **R4_5_to_Penwortham** could potentially hinder the conservation objectives of the **Fylde MCZ**;

- Study corridors **PA_1_to_Birkhill_Wood**, **R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood**, and **SW_E1a_to_Lincolnshire_Connection_Node** could potentially hinder the conservation objectives of the **Holderness Inshore MCZ**;

- Study corridors **PA_1_to_Birkhill_Wood**, **R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood**, and **SW_E1a_to_Lincolnshire_Connection_Node** could potentially hinder the conservation objectives of the **Holderness Offshore MCZ**; and

- Study corridor **Ballantrae_to_Pentir** could potentially hinder the conservation objectives of the **South Rigg MCZ**.

- Study corridors **SW_NE4_to_New_Deer (ES26)**, and **SW_NE7_to_Peterhead**, could potentially hinder the conservation objectives of the **Southern Trench MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in revised design avoiding the MCZs entirely, greatly reducing the potential for this impact pathway to occur. However, consideration will need to be given to the proximity of the refined study corridors and corridors which cannot avoid MCZs. This includes the design and extent of cable protection, and the installation methodology as at plan level there is insufficient detail to indicate whether INNS could be remotely introduced. It is industry best practice to cover these considerations as part of an INNS management plan, and / or marine biosecurity plan.

HNDFUE

- Study corridor **SW_E1a_to_Branxton** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**;
- Study corridor **SW_E2a_2_to_Near_Richborough** could potentially hinder the conservation objectives of the **Goodwin Sands** and **Thanet Coast MCZs**;
- Study corridor **SW_NE2_to_Spittal** could potentially hinder the conservation objectives of the **Noss Head MPA**;
- Study corridors **SW_E2b_to_Peterhead_2**, **SW_NE3_to_New_Deer_2**, **SW_NE4_to_New_Deer**, **SW_NE6_to_Peterhead_2**, **SW_NE7_to_Peterhead_DCSS**, and **SW_NE8_to_Peterhead_1** could potentially hinder the conservation objectives of the **Southern Trench MPA**; and
- Study corridor **SW_E2b_to_Peterhead_2** could potentially hinder the conservation objectives of the **Turbot Bank MPA**.

It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in revised design avoiding the MCZs entirely, greatly reducing the potential for this impact pathway to occur. However, consideration will need to be given to the proximity of the refined study corridors and corridors which cannot avoid MCZs. This includes the design and extent of cable protection, and the installation methodology as at plan level there is insufficient detail to indicate whether INNS could be remotely introduced. It is industry best practice to cover these considerations as part of an INNS management plan, and / or marine biosecurity plan.

INTOG

- Study corridors **North_Connect_to_Cenos**, and **Peterhead_to_Cenos** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA**;
- Study corridors **Scaraben_to_Peterhead_2**, and **Peterhead_to_Cenos** could potentially hinder the conservation objectives of the **Southern Trench MPA**; and
- Study corridor **Aspen_to_Feteresso** could potentially hinder the conservation objectives of the **Turbot Bank MPA**.

It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in revised design avoiding the MCZs entirely, greatly reducing the potential for this impact pathway to occur. However, consideration will need to be given to the proximity of the refined study corridors and corridors which cannot avoid MCZs. This includes the design and extent of cable protection, and the installation methodology as at plan level there is insufficient detail to indicate whether INNS could be remotely introduced. It is industry best practice to cover these considerations as part of an INNS management plan, and / or marine biosecurity plan.

Celtic Sea

- Study corridor **PDA3_to_Pyworthy** could potentially hinder the conservation objectives of the **Bideford to Foreland Point MCZ**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in revised design avoiding the MCZs entirely, greatly reducing the potential for this impact pathway to occur. However, consideration will need to be given to the proximity of the refined study corridors and corridors which cannot avoid MCZs. This includes the design and extent of cable protection, and the installation methodology as at plan level there is insufficient detail to indicate whether INNS could be remotely introduced. It is industry best practice to cover these considerations as part of an INNS management plan, and / or marine biosecurity plan.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZ as a result of this impact pathway.

Changes in prey availability – birds and marine mammals

The availability and provision of food items is essential to support the marine mammals and seabird colonies with the most relevant prey items being sandeels, European sprat, goby, saithe and whiting.

Cable installation will disturb a small proportion of the total prey species in the area of cable installation and the loss of prey will result in a low level of change for a short period of time. Physical disturbance of the seabed during the route preparation and cable installation activities such as route clearance, ploughing, trenching, or excavating will temporarily increase turbidity and may subsequently result in sediment deposition and smothering of prey species.

Overall, it is expected that the magnitude of change in available prey species for any cable route will be low. Although seabirds and marine mammals associated with designated sites are likely to be present within the study corridors, the loss of prey will account for only a small area of the available marine habitats. Therefore, in most cases marine mammal and seabird species are unlikely to be sensitive to it and will have high recoverability. It is therefore considered that conservation objectives will not be hindered as a result of changes in prey availability for marine mammal and seabird species.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of changes in prey availability:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, including minimising the footprint as much as possible;
- Consideration of habitat and / or prey mapping to inform mitigation needs and / or micro routing as appropriate; and
- Consideration of timing to avoid key biological periods / locations to reduce impact on prey species as appropriate.

Assessment Conclusion

Table 59: Assessment of the potential for conservation objectives to be hindered by changes in prey availability associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Changes in prey availability – birds and marine mammals	Berwick to St Mary's MCZ	HND	PA_2_to_Berwick Bank	Conservation objectives are unlikely to be hindered. These MCZs were screened in due to the associated study corridors running either directly through their boundaries, or within the foraging rages of its protected features. Although the protected features of these sites are likely to be present within the study corridors, the loss of prey will account for only a small area of the available marine habitats. Therefore the protected features are unlikely to be sensitive to any changes and will have high recoverability.
			SW_E1a_to_Hawthorn Pit	
		HNDFUE	SW_E1a_to_Branxton	
		INTOG	Cedar_to_Branxton	
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	
			SW_W1_to_Ballantrae	
			Kilmarnock South_to_Ballantrae	
	Cumbria Coast MCZs	HND	R4_5_to_Penwortham	
			R4_6_to_Penwortham	
			R4_4_to_Bodelwyddan	
			Ballantrae_to_Pentir	
			SW_W1_to_Ballantrae	
			Kilmarnock South_to_Ballantrae	
	East Caithness Cliffs MPA	HNDFUE	Shetland_to_Blackhillock	
			SW_NE2_to_Spittal	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Rathlin MCZ	HND	SW_W1_to_Ballantrae	
	Skomer MCZ	HND	Ballantrae_to_Pentir	
			R4_4_to_Bodelwyddan	

All study corridors associated with the HND Implementation Plan Sea are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway.

Collision risk – marine mammals

The presence of vessels has the potential to increase the risk of vessel collision with marine mammals. As part of the activities associated with the installation phase of subsea cables, each cable route will involve the deployment of a number of vessels during their respective installation, operation and maintenance, and decommissioning phases. These vessels will typically include all or a selection of the following:

- Survey vessels;
- Cable laying vessels;
- Guard vessels;
- Rock placement vessels;
- Jack up barges; and
- Dive support vessels for the works at the HDD breakout point.

Marine vessels which collide with marine megafauna, result in the most serious injuries if they are 80 m and longer and travelling faster than 14 knots (25 km/hr) (Laist *et al*., 2001). There has been concern of high-speed ferry traffic, which are comparable in size and travel at similar speeds and have been proven to be particularly lethal (Carrillo & Ritter, 2010). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact, and lacerations from propellers.

Marine mammals, possess a thick subdermal layer of blubber or fat deposits which provides a level of protection to their vital organs, meaning they are reasonably resilient to minor strikes and collisions (Wilson *et al*., 2007). Most are also considered to be fast swimming, agile species, with fast reflexes and good sensory capabilities (Hoelzel, 2002).

Avoidance behaviour exhibited by cetaceans is often associated with fast, unpredictable vessels such as speedboats and jet-skis (Bristow & Reeves, 2001; Gregory & Rowden, 2001), while neutral or positive reactions, particularly in dolphins have been observed with larger, slower moving vessels such as cargo ships (Ng and Leung, 2003; Sini *et al*., 2005). Although there have been reports of vessel strikes with marine mammals, evidence of risk is limited (Deaville, 2015). Mortality and injury of cetaceans resulting from vessel strikes have been mostly reported in large baleen whales which are slow swimming (IAMMWG, 2015). There are few reports of vessel strikes with harbour porpoise and other small cetaceans, likely due to the avoidance behaviour of these species (particularly porpoises (Wisniewska *et al*., 2018; Roberts *et al*., 2019)).

The risk to pinnipeds is generally considered lower than that for cetaceans (Jones *et al*., 2017). Although there have been reports of vessel strikes to pinnipeds, including several cases of injuries caused by propellers and thrusters (for dynamic positioning of vessels), evidence of risk is limited (Bexton *et al*., 2012). For example, individual seals have been seen to easily avoid vessels involved in slow-moving dredging operations (Todd *et al*., 2015). Furthermore, evidence suggests that a large proportion of supposed vessel strike injuries in seals can be attributed to grey seal infanticide and cannibalism, which causes 'spiral / corkscrew' lacerations comparable to those produced by ship propellors (Thompson *et al*., 2013; Brownlow *et al*., 2016).

The number of vessels required for each cable route is not yet known. However, the numbers typically involved in such operations usually do not pose a significant increase in marine traffic and commonly operate at low speeds for the majority of the installation process. Therefore, with industry standard embedded mitigation measures in place, vessels provide a negligible increase in collision risk to marine mammals. Despite this, there is potential, albeit low, for collisions to occur and therefore hinder the conservation objectives of the North East of Farnes Deep HPMA. It is highly likely complete avoidance of the HPMA will be necessary.

Mitigation

The following measures have the potential to avoid and / or reduce the risk of collision vessels and marine mammals:

- Asherance to standard best practice, including but not limited to:
    - Design of study corridors which optimise the balance of environmental, technical, commercial, and financial considerations, such as avoiding designated sites, as far as possible;
    - Deploy marine mammal observers on vessels to help prevent collisions with marine animals;
    - Consider the number of vessels required relative to the existing marine trafic;
    - Project vessels to comply with the International Regulations for Preventing Collisions at Sea 1972
    - Reducing the speeds undertaken by vessels; and
    - Reduce the number and frequency of vessels transiting between port and the installation/ maintenance site.

Assessment Conclusion

Table 60: Assessment of the potential for MCZ conservation objectives to be hindered by collision risks associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Collision risk – marine mammals	Skomer MCZ	HND	Ballantrae_to_Pentir	Conservation objectives are unlikely to be hindered. This MCZ was screened in due to the associated study corridors being located within the designated site's boundaries or within the foraging range of its designated features. The number of vessels typically required for each cable installation do not pose a significant increase in marine traffic and commonly operate at low speeds for the majority of the installation process. Industry standard embedded mitigation measures are considered sufficient to substantially reduce any risk to the MCZ's protected features.
			R4_4_to_Bodelwyddan	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	There is potential for conservation objectives to be hindered. This HPMA was screened in due to the associated study corridor running directly through its boundaries. The conservation objectives of the HPMA state that degradation and damage to protected features must be prevented (HM Government, 2023b). The proposed study corridor runs through the north west corner of the HPMA, where five species of marine mammal have been recorded (HM Government, 2023b). As such, there is potential, for collisions to occur, and thus a protected feature to be 'damaged' within the HPMA boundaries. As such, the subsequent refinement of the current study corridor at project level will require careful consideration to ensure there is no overlap between the cable corridor and the HPMA, and to avoid challenge from regulatory bodies with regard to licencing and consent.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. While marine mammal movements are not influenced by site boundaries, the HPMA has been established with the knowledge that marine mammals are likely to be present within its confines. Thus, there is potentially a higher risk of collisions within its boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby avoiding the HPMA, and removing any potential of affecting protected features directly within the HPMA boundaries, and thus substantially reducing the risk of hindering the conservation objectives of the HPMA.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

Thermal emissions – subtidal benthic habitats and species

Submarine power cables have been shown to generate and dissipate heat when active, reaching cable surface temperatures of up to 70°C (Emeana, *et al*., 2016). Generally, heat dissipation is considered more significant for AC cables, as opposed to HVDC cables (OSPAR Commission, 2009). The duration of cable heat emissions will be long-term, occurring throughout the operational lifetime of the cable. Effects will also occur along the full length of the cable; however, these would be localised to a few metres from the cable, dependent upon the heat carrying capacity of the particular sediments surrounding each cable.

Sediment particle size composition has been found to influence heat transfer. Coarse silts experienced the greatest temperature change, a shorter distance from the source. Meanwhile, fine and coarse sands had a lower temperature change but a greater affected distance (Emeana, *et al*., 2016).

Temperature increases have the potential to cause sediment dwelling and demersal mobile organisms to move away from the affected area. Increased heat may also alter physio-chemical conditions and bacterial activity in surrounding sediments, contributing to altered faunal composition and localised ecological shifts (Meissner *et al*., 2008). While the full effect of temperature changes on sediment composition and related biogeochemical cycling are unknown, preliminary studies have indicated shifts in bacterial community composition with increased temperatures, with corresponding changes in ammonium concentration and nitrogen cycling (Hicks *et al.*, 2018).

Increased sediment temperature has the potential to affect infaunal species and assemblages directly. However, whilst the sediment surrounding the cable may be heated there is negligible capability to heat the overlying water column because of the very high heat capacity of water (OSPAR, 2008), meaning there would be no effects on epibenthic communities.

The overall ZoI is therefore considered to be moderate in size due to the relatively discrete area over which this impact pathway will affect benthic ecology. Protected features such as ocean quahog, and sea pens are found near or at the surface where thermal effects are negligible. Furthermore, species inhabiting this part of the sediment experience natural variations greater than that produced by the cables and are therefore likely to be habituated to temperature changes.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of EMF on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, following best practice guidance (JNCC and Natural England, 2022), and informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, including minimising the footprint as much as possible; and
- Consideration of the need for thermal modelling, to inform design.

Assessment Conclusion

Table 61: Assessment of the potential for MCZ conservation objectives to be hindered by thermal emissions associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk –	Group	Associated Study corridors	Assessment
Thermal emissions – subtidal benthic habitats and species	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	Conservation objectives are highly unlikely to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for the MCZs state that the protected features "...must remain in or be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating", and in the case of ocean quahog that their numbers be maintained or increased. The thermal effects of the proposed cables are expected to be of a low magnitude and the protected features are considered likely to be habituated to greater natural variations of temperature than typically produced by an HDVC cable. Therefore, it is highly unlikely for the presence of a subsea power cable to hinder the current favourable condition, or efforts to achieve favourable condition for the protected features.
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	
			SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos	
			Peterhead_to_Cenos	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	
	Fylde MCZ	HND	R4_5_to_Penwortham	
			R4_6_to_Penwortham	
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
		HND	PA_1_to_Birkhill_Wood	

Impact Pathway	MCZs at risk -	Group	Associated Study corridors	Assessment
	Holderness Offshore MCZ		R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DCSS	
			SW_NE8_to_Peterhead_1	
		INTOG	Peterhead_to_Cenos	
			Scaraben_to_Peterhead_2	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	Aspen_to_Fetteresso	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	Conservation objectives are highly unlikely to be hindered.. This HPMA was screened in due to the associated study corridor overlapping its boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a).

Impact Pathway	MCZs at risk -	Group	Associated Study corridors	Assessment
				It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby avoiding the HPMA, and removing any potential of affecting protected features directly

All study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

EMF – subtidal benthic habitats and species, marine mammals, and fish

An operational HVDC cable produces electromagnetic field (EMF) emissions. EMF has potential to disrupt sensory mechanisms in magnetosensitive and electrosensitive marine species. Burial of subsea cables helps to reduce the strength of induced electrical fields in comparison to surface laid cables (CMACS 2003) with EMF typically attenuating to background levels within 50 m of cables (NIRAS 2016). However, animals in the vicinity of a study corridor will still be exposed to variable EMFs. The levels of EMF and attenuation distances vary by the level of shielding the cable has, burial depth, burial configuration, and transmission power. Furthermore, the tidal movement of seawater over the cables will result in the generation of localised induced electric (iE) fields. As such, EMF modelling for each cable route would provide the data to assess the impacts of EMF on a case-by-case basis. However, in the absence of cable design and modelling data, this plan level MCZ assessment assumes the EMF output by HND and HNDFUE HVDC cables will be comparable to that of other interconnector cables associated with National Grid, such as Eastern Link 1 and 2.

Marine mammals are highly migratory and may be capable of detecting the earth's magnetic field (CMACS, 2003), likely using it for navigation (Walker *et al.*, 2003). Therefore, cetaceans may be able to detect EMF from cables (Normandeau, *et al.*, 2011). However, the observed effects from EMF emissions to marine mammals vary by emission magnitude and are largely constrained to behavioural responses, such as a temporary change in swim direction (Russel *et al.*, 2016). Given that any emissions will be localised to the water column immediately surrounding the cable, and that marine mammal species are generally highly mobile, and thus capable of avoiding the area, any effect of EMF from HVDC cables on marine mammals is likely to be minimal.

Fish derive their direction, and even geographic position, from features using magnetic fields and so cable EMF has the potential to disrupt fish behaviour, including migration (Klimley *et al.*, 2021). The electrosensitive fish species most pertinent to this plan level MCZ assessment are salmonids, eels, and lamprey; all of which are migratory. However, a field study of behavioural responses found no significant difference to migration success (Wyman *et al.*, 2018) in juvenile salmon *Salmo salar*, nor strong avoidance actions by European eel *Anguilla anguilla* (Westerberg & Begout-Anras, 2000). The ability for smelt *Osmerus eperlanus* (a protected feature of relevant MCZs) to be influenced by EMF is understudied within the literature. However, smelt are not believed to be particularly electrosensitive, as evidence for other physiologically comparable demersal bony fish, such as cod *Gadus morhua*, suggests their behaviour is not affected by EMF (Bochert & Zettler, 2004, Bergström *et al.*, 2013; Hammar *et al.*, 2014).

Elasmobranchs (sharks and rays) also include some highly electrosensitive species, however these are not named as a protected feature in any MCZ carried forward to Stage 1 assessment. As such, elasmobranchs are not considered with regard to hindering the conservation objectives of the relevant MCZs. HPMAs on the other hand provide the highest level of protection in English waters, ecosystem wide. Therefore, including elasmobranchs within the HPMA boundaries.

There is very little information about the sensitivity of benthic species to EMF, however, there have been a small number of investigations in laboratory experiments (Boles & Lohmann, 2003; Bochert & Zettler, 2004; Jakubowska *et al.*, 2019). These studies suggest some detection in benthic invertebrates may be possible although there have been no direct impacts observed at EMF levels typical of a HVDC subsea cable (ORJIP, 2022). Thus, whilst EMF will be emitted whenever the cable is active, and is therefore a permanent effect during cable operation, the spatial extent is very small, and effects are restricted to small short-term behavioural responses. Consequently, the magnitude of the impact to all benthic habitats and species is considered negligible.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of EMF on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, following best practice guidance (JNCC and Natural England, 2022), and informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, including minimising the footprint as much as possible;
- Consideration of the need for EMF modelling, to inform design;
- Consideration of the configuration of multiple cables (e.g. bundled); and
- Consideration of the required depth of lowering to minimise EMF emissions.

Assessment Conclusion

Table 62: Assessment of the potential for MCZ conservation objectives to be hindered by EMF associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
EMF – Subtidal benthic habitats and species, marine mammals, and fish	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	Conservation objectives are highly unlikely to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for the MCZs state that the protected features "…must remain in or be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating", and in the case of ocean quahog that their numbers be maintained or increased. The level of EMF produced by a buried (or protected) HVDC cable is expected to be of a negligible to low magnitude and low intensity. Electrosensitive protected features are not expected substantially affected by the presence of a subsea cable. Therefore, it is highly unlikely for the presence of a subsea power cable to hinder the current favourable condition, or efforts to achieve favourable condition for the protected features.
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	
			SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos	
			Peterhead_to_Cenos	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	
	Fylde MCZ	HND	R4_5_to_Penwortham	
			R4_6_to_Penwortham	
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
			SW_E1a_to_Lincolnshire_Connection_Node	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DCSS	
			SW_NE8_to_Peterhead_1	
		INTOG	Peterhead_to_Cenos	
			Scaraben_to_Peterhead_2	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	Aspen_to_Fetteresso	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	Conservation objectives are highly unlikely to be hindered. This HPMA was screened in due to the associated study corridor overlapping its boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a).

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
				It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby avoiding the HPMA; removing any potential of affecting protected features directly, and significantly reducing the potential of indirect affects to designated features outside the HPMA boundaries.

All study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

Airborne sound and visual disturbance – marine mammals and birds

The operations of cable lay and supporting vessels could result in changes in visual stimuli (including artificial light) and an increase in airborne sound.

Cetaceans are not considered to be particularly sensitive to changes in visual stimuli as their primary sense relates to sound. However, pinnipeds spend time hauled out on land and at the sea-surface, making them more susceptible to airborne sound and visual stimuli. These can lead to avoidance behaviour disturbance effects which could cause individuals to stop resting, feeding, travelling and / or socialising, with possible long-term effects of repeated disturbance resulting in permanent displacement and / or a decline in fitness and productivity.

In general, shipping traffic more than 1,500 m away from a haul-out site is not thought to evoke any reaction. However, between 900 m and 1,500 m, grey seals could be expected to detect the presence of vessels; and at closer than 900 m, a flight reaction may occur (Scottish Executive, 2007). Studies of harbour seals have shown a flight response to boats occurs at a distance of around 500 m (Anderson *et al.*, 2012). Therefore, the number of animals likely to be at risk of disturbance is extremely small. Any disturbance effects would also be limited to minor avoidance behaviour and as highly mobile animals that forage over extensive ranges, such movements are not considered likely to have any meaningful effect on the availability of prey or the energetic expenditure required for foraging. As any disturbance would be short-term, temporary, and very limited in extent, it is considered of negligible magnitude.

Disturbance can lead to a number of physiological and behavioural responses which can affect demographic characters of the bird population. Responses to disturbance can result in loss of energy, impaired breeding, unrest through increased vigilance, disruption to incubation, and increased nest failures due to predation and nest abandonment (Valente & Fisher, 2011).

The extent to which seabirds respond to disturbance is dependent upon a number of factors including: period of life cycle during which disturbance occurs; duration, type and intensity of the disturbance (e.g., onshore works are likely to be more disruptive to seabirds than the offshore works due to the generation of loud noises and use of machinery); presence of opportunistic predators; and the degree of habituation with the disturbance (Showler *et al.*, 2010). Some seabirds are more resilient to disturbance and / or displacement than others with varying responses depending upon marine activity (MMO, 2018).

The construction and operation of an OWF can displace seaduck, a more sensitive species than most sea birds, up to 4 km (Furness and Wade, 2012; Bradbury, 2014; Joint Natural

England & JNCC, 2022a) through visual and audible cues. However, disturbance from cable installation vessels will be less than those from offshore wind farms, and a 1 km ZoI therefore represents a worst-case scenario for disturbance from the study corridor during the installation phase.

The effect of the vessel's presence would be disturbance of potential foraging or resting habitat on the sea, causing the birds to have to move elsewhere, which may result in birds having less time to forage, cause them to expend additional energy, or potentially disturb breeding and / or wintering. With the time of year that cable installation will take place not known, there is potential disturbances to coincide with sensitive times of the year for bird species.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of airborne sound and visual disturbance on marine receptors, and are considered standard best practice:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Implementing seasonal restrictions on certain installation, maintenance, and decommission activities, which avoid important breeding and wintering periods for certain bird species, and / or pupping and moulting periods for seal species;
- Micro-routing to avoid seal haul outs overlapping with the ZoI; and
- Lighting on-board the vessels can be kept to the minimum level required to ensure safe operations and directed towards working areas.

Assessment Conclusion

Table 63: Assessment of the potential for MCZ conservation objectives to be hindered by airborne sound and visual disturbance associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Airborne sound and visual disturbance – marine mammals and birds	Berwick to St Mary's MCZ	HND	PA_2_to_Berwick Bank	There is potential for conservation objectives to be hindered. This MCZ was screened in due to the associated study corridors running directly through its boundaries, or within the ZoI for this impact pathway. The conservation objectives for this MCZ states that protected features must remain in or be brought into favourable condition. Clear mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, to determine the feasibility and effectiveness of any mitigation measures more detailed information is required.
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	
			SW_W1_to_Ballantrae	
	East Caithness Cliffs MPA	HNDFUE	Shetland_to_Blackhillock	
			SW_NE2_to_Spittal	
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	There is potential for conservation objectives to be hindered. This HPMA was screened in due to the associated study corridor overlapping its boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). Pertinently, seabird and seal species are known to

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
				occur within the HPMA in greater densities than some surrounding locations.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained, with specific mention to mitigating potential impacts to bird species (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. NESO also intend for the subsequent refinement of the 5 km wide study corridor at project-level to adhere to conservation advice and be a minimum of 2 km from the HPMA boundary. These refinements will avoid or significantly minimises the risk of affecting the HPMA's protected features.

- Study corridor **PA_2_to_Berwick Bank** could potentially hinder the conservation objectives of the **Berwick to St Mary's MCZ**.

- Study corridors **Ballantrae_to_Pentir** and **SW_W1_to_Ballantrae** could potentially hinder the conservation objectives of the **Clyde Sea Sill MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design reducing the risk of this impact pathway affecting protected features. For all of the above study corridors, consideration of the population numbers and distribution of common eider or black guillemot throughout the year and timing of installation activities to avoid sensitive times of year may reduce the risk of hindering the MCZs conservation objectives will likely be required.

HNDFUE

- Study corridor **Cedar_to_Branxton** could potentially hinder the conservation objectives of the **Berwick to St Mary's MCZ**.

- Study corridors **Shetland_to_Blackhillock** and **SW_NE2_to_Spittal** could potentially hinder the conservation objectives of the **East Caithness Cliffs MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design reducing the risk of this impact pathway affecting protected features. For all of the above study corridors, consideration of the population numbers and distribution of common eider or black guillemot throughout the year and timing of installation activities to avoid sensitive times of year may reduce the risk of hindering the MCZs conservation objectives will likely be required.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

Underwater sound – marine mammals, fish, and Shellfish

As summarised in **Section 2**, there are a number of activities associated with subsea cable Installation that will generate underwater sound (UWS). Most activities typically produce sound at frequencies outside of the hearing range of marine mammals and fish, or in most circumstances do not substantially increase the level of sound beyond what these receptors are expected to be habituated to. Therefore, it is unlikely for most cable installation activities to pose a risk of injury or significant disturbance to these receptors.

However, as the installation methodology is not yet defined, there are potential activities that are within the hearing range of marine mammals and fish and therefore have the potential to have adverse effects on these receptors. These activities comprise the operation of sub-bottom profilers (SBP) the acoustic positioning systems (USBL) (**Table 64**).

Table 64: Characteristics of underwater sound sources potentially generated by the project cable route Installation Phase

Survey or cable installation activity	Operating Frequency (kHz)	Sound Pressure Level (dB re 1µP a@1m)	Sound Source Data Reference
Sub-bottom profiling (SBP) (e.g., Innomar SES-2000, Edgetech Chirp & Applied Acoustics 201 boomer)	0.5 – 12	238 (peak)	Equipment specification sheets
USBL (e.g., Kongsberg HiPAP 502)	21 - 31	207 (peak)	Equipment specification sheet

Marine Mammals

Marine mammals use sound for communication, to locate mates, to search for prey, to avoid predators and hazards, and in the case of cetaceans, for short- and long-range navigation (Tyack, 1998; OSPAR, 2009). Man made sound sources have the potential to affect marine mammals where the frequency of the sound generated is within a species auditory range.

To reflect the different hearing sensitivities of marine mammals they have been classified into different functional hearing groups (Southall *et al.*, 2007; Southall *et al.*, 2019; NMFS, 2024).

Five marine mammal species have been recorded within the North East of Farnes Deep HPMA, comprising grey seal *Halichoerus grypus*, minke whale *Balaenoptera acutorostrata*, short-beaked common dolphin *Delphinus delphis*, Risso's dolphin *Grampus griseus*, and harbour porpoise *Phocoena phocoena* (JNCC, 2023; HM Government, 2023b).

Table 65: Hearing sensitivity of marine mammals

Marine mammal hearing group	Relevant key species	Estimated auditory bandwidth
Low frequency cetacean	Minke whale	7 Hz to 36 kHz
High frequency cetacean	Short-beaked common dolphin and Risso's dolphin	150 Hz to 160 kHz
Very high frequency cetacean	Harbour porpoise	200 Hz to 165 kHz
Phocid pinnipeds in water	Grey seal	40 Hz to 90 kHz

The impact of underwater sound in marine mammals is generally split into impacts on hearing and behavioural responses. Auditory effects from underwater sound exposure are either a permanent or temporary change in hearing sensitivity, or threshold shift (Permanent Threshold Shift (PTS) and Temporary Threshold Shift (TTS)), respectively), as a consequence of damage to the inner ear of marine mammals.

The most up to date sound exposure criteria for auditory injury in marine mammals have been published by the US National Marine Fisheries Service (NMFS), often referred to as the NOAA criteria (NMFS, 2024).

The threshold criteria for impulsive sound sources are Sound Pressure Level (SPL) which is a means of characterizing the peak amplitude of a sound. The threshold criteria for continuous sound sources are for Sound Exposure Level (SEL) (**Table 66**), which is a measure of energy that considers both received level and the duration of exposure. This implies that sounds received at lower levels for a longer duration may have similar effects as sounds received at higher levels for a shorter duration.

Table 66: Marine mammal sensitivity thresholds for impulsive and continuous sound sources

	Impulsive Sound Sources				**Continuous Sound Sources**	
	PTS		TTS		PTS	TTS
Marine Mammal Hearing Group	SPLpeak	SELcum	SPLpeak	SELcum	SELcum	SELcum
Low Frequency Cetaceans	219	183	213	168	199	179
High Frequency Cetaceans	230	185	224	170	198	178
Very High Frequency Cetaceans	202	155	196	140	173	153
Phocids in Water	218	185	212	170	201	181

Source: Southall *et al.*, 2019

Notes:

SPL thresholds are unweighted and SEL are weighted for marine mammal hearing range. SEL thresholds are in dB re 1 µPa2s and peak SPL thresholds are in dB re 1 µPa.

Marine mammal hearing groups are written as used in Southall et al., 2021, and NMFS, 2024.

As summarised in **Section 2**, the operation of the SBP and the acoustic positioning system USBL are impulsive sound sources with the potential to cause injury or behavioural disturbance to marine mammals.

The sub-bottom profiler is the source most likely to be audible to marine mammals. It is generally accepted the auditory injury (PTS) is only likely to occur if marine mammals remain within close proximity, probably in the range of several metres, of an impulsive sound source. However, sound exposure over a period of time can accumulate to cause auditory injury (as expressed in the 24-hour cumulative thresholds for the SEL metric). Nevertheless, it is unlikely for highly mobile marine mammals to remain in close proximity to the sound source for a period long enough to result in auditory injury.

Some behavioural disturbance may occur during the operation of the USBL and SBP. There are no widely agreed quantitative thresholds for behavioural disturbance despite major progress being made in this field (Southall *et al.*, 2021). This reflects both a lack of empirical evidence and a high level of variability in behavioural responses which are often unrelated to the sound level received (Gomez *et al.*, 2016). For example, where there is a strong motivation to remain in an area, or there is a high level of habituation to man-made underwater sound, such as shipping lanes, animals may not demonstrate observable avoidance behaviour.

The harbour porpoise is the species with the highest sensitivity to underwater sound, with peak hearing range at higher frequency. Several field studies which include geophysical and seismic surveys, have shown that porpoise density and vocalisations are reduced temporarily for several kilometres around the sound source with gradually less of an effect the further away the observations are made (e.g., Lucke *et al*., 2009; Dahne, 2013; Stone & Tasker, 2006). Other investigations into impact to cetaceans suggest a disturbance range of 5 km for geophysical sound sources (JNCC, 2020a; Thompson *et al*., 2013). These sources are generally highly directional sources with expected low levels of horizontal sound propagation; many operating at high frequencies and therefore subject to high transmission loss (e.g., Crocker & Fratantonio 2016, Crocker *et al*. 2018). However, several of these systems also produce medium frequencies likely to propagate longer distances and therefore have the potential to cause disturbance to harbour porpoise and other marine mammals. Due to a lack of data for avoidance behaviour for geophysical sound sources, 5 km is a conservative disturbance zone for all marine mammals, in line with Effective Deterrent Ranges (EDR) for SBP published by JNCC (2020).

To accurately conclude that any disturbances may or may not hinder HPMA conservation objectives, further methodological detail and technical consideration will be necessary for each cable route at project level design.

Fish

Sound plays a major role in the lives of fish including for communication, locating prey, and avoiding predators (Fay & Popper, 2000). Sound is perceived by fish through the ears and the lateral line which is also sensitive to vibration. Some species of teleost or bony fish have a gas filled sack called a swim bladder that can also be used for sound detection (Hawkins, 1993). These morphological features have been used to group fish into three categories of hearing sensitivity to underwater sound (Popper *et al*., 2014):

- Low hearing sensitivity fish – species with no swim bladder or other gas chamber, including flatfish and elasmobranchs (sharks and rays), are less susceptible to barotrauma;
- Medium hearing sensitivity fish – species with a swim bladder but the structure is not involved in hearing. Includes Atlantic salmon, sea trout and European eel; and
- High hearing sensitivity fish – includes herring and Atlantic cod, species in which hearing involves a swim bladder or other gas volume.

The potential impact of underwater sound in fish ranges from physical and auditory injury to the masking of other sounds and behavioural disturbance (Popper *et al*., 2014).

There are fish species from all hearing groups found within the HPMA which will be included in the ecosystem wide protection provided by all HPMAs. More specifically, smelt are a protected feature of three MCZs which HND and HNDFUE study corridors run directly through. Smelt are Osmeriformes, as such, their physiology is related to that of salmonids, and therefore they are considered medium hearing sensitivity fish.

For most fish, sensitivity to sound occurs from below 100 Hz to several hundred hertz, or in a very few species, including herring, up to several thousand hertz (Mann *et al*., 2001;

Popper, *et al.*, 2014). Those species with a swim bladder are sound pressure sensitive at the higher frequencies, and some species of herring-like fishes (but not Atlantic herring) can detect sounds above 20 kHz (ultrasound) (Popper, *et al.*, 2014).

Sub bottom profilers (SBP) operate at frequencies <1 kHz and so are within the hearing range of fish. However, based on Popper *et al.*'s (2014), threshold criteria for mid-frequency sonar (a proxy for SBP), and standard geometric spreading calculations, the distance at which injury and behavioural disturbance could occur for medium and high sensitivity fish is within tens of metres. This is considered a conservative estimate as no injury or effect to the ear or non-auditory tissues has been observed at the sound pressures comparable to SBPs, with the observed effects beginning at higher sound levels than tested to date (Halvorsen & Zeddies, 2011). Thus, any impact would be localised, temporary and reversible and resulting in a negligible magnitude of effect; unlikely to undermine MCZ conservation objectives.

Unexploded ordnance

In addition to the above appraisal, the lack of defined methodologies for each cable route means there is no clear approach to the possible presence of Unexploded Ordnance (UXO). Typically, the risk of UXO explosion, and surveys to locate potential UXO are addressed in a separate assessment. It is assumed that this is the case for HND and HNDFUE, and therefore UXO are not considered as part of this plan level MCZ assessment.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of underwater sound on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Consideration of best practice guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017);
- Consideration of the need for underwater sound modelling, to inform design;
- Implementing seasonal restrictions on certain installation, maintenance, and decommission activities; and
- Consideration of the need for Marine Mammal Observation.

As detailed in Natural England's best practice guidance (Parker *et al.*, 2022) it is advised that a Marine Mammal Management Plan (MMMP) is submitted alongside Development Consent Order (DCO) applications; detailing the mitigation measures implemented as part of any project where marine mammals may be affected.

Assessment Conclusion

Table 67: Assessment of the likelihood for MCZ conservation objectives to be hindered by underwater sound associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
Underwater sound – marine mammals and fish	Ribble Estuary MCZ	HND	R4_6_to_Penwortham R4_5_to_Penwortham	Conservation objectives are unlikely to be hindered. These MCZs and HPMA were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for the MCZs state that the protected features "…must be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating". USBL operates at frequencies beyond the hearing of smelt; and the level of sound produced by SBP would be of a negligible magnitude, highly unlikely to have a significant effect on smelt. Therefore, it is highly unlikely for the implementation of SBPs to undermine current favourable condition, or efforts to achieve favourable condition for the protected features.
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	There is potential for conservation objectives to be hindered. This MCZ was screened in due to the associated study corridors running directly through its boundaries. The conservation objectives for this MCZ states that protected features must remain in or be brought into favourable condition. As there is potential for protected features within the boundaries of this MCZ to be disturbed within 5 km of the study corridor, this could have adverse consequences to marine mammals protected within the MCZ's boundaries.
		HNDFUE	SW_N3_to_Arnish	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment
				Clear mitigation and / or design commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, to determine the feasibility and effectiveness of any mitigation measures more detailed information is required.
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	There is potential for conservation objectives to be hindered. This HPMA was screened in due to the associated study corridors running directly through its boundaries. The conservation objectives for this HPMA states that protected features must remain in or be brought into favourable condition. As there is potential for protected features within the boundaries of this HPMA to be disturbed within 5 km of the study corridor, this could have adverse consequences to marine mammals protected within the HPMA's boundaries. Clear mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. However, to determine the feasibility and effectiveness of any mitigation measures more detailed information is required.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained, with specific mention to mitigating potential impacts to bird species (Natural England & JNCC, 2022b)[22]. Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. NESO also intend for the subsequent refinement of the 5 km wide study corridor at project-level to adhere to conservation advice and be a minimum of 2 km from the HPMA boundary. These refinements will avoid or significantly minimise the risk of affecting the HPMA's protected features. Underwater sound modelling, to inform design should be a key consideration for developers. Additional mitigation measures that should be considered include adherence to JNCC guidelines, where appropriate, regarding the minimisation of impacts from underwater sound generated from known project activities (JNCC, 2017).

- Study corridor **SW_N4_to_Arnish (Lewis)** could potentially hinder the conservation objectives of the **North-east Lewis MPA**.

  It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Where this is not possible, additional mitigation measures such as adhering to JNCC guidelines to minimise impacts from underwater sound generated from known project activities (JNCC, 2017) may be sufficient to avoid hindering the conservation objectives relating to the protected features.

HNDFUE

- Study corridor **SW_N3_to_Arnish** could potentially hinder the conservation objectives of the **North-east Lewis MPA**.

[22] the effects of underwater sound sources located beyond the HPMA boundaries is not a specific consideration within the conservation advice. However, it does state that any activities likely to hinder the conservation objective of an HPMA should be avoided, unless the Public Authorities' MCZ Assessment Process determines otherwise.

> It is the intention of NESO to avoid any overlap between cable installation and MCZ boundaries where possible. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, which could result in subsequent design avoiding the MCZs entirely, thereby preventing this impact pathway from occurring. Where this is not possible, additional mitigation measures such as adhering to JNCC guidelines to minimise impacts from underwater sound generated from known project activities (JNCC, 2017) may be sufficient to avoid hindering the conservation objectives relating to the protected features.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

This determination is based on the potential for SBP and USBL to be used as a part of the installation methodology. These methods are not always used in the installation of HVDC cable, but their omission cannot be confirmed at this stage. Additionally, accurately assessing their likely effects on marine mammal behaviour requires further information and assessment. Should these activities be excluded from the methods for any of the cable routes, the remaining activities would be unlikely to hinder the conservation objectives of any MCZs.

Increased SSC - subtidal benthic habitats and species, marine mammals, fish, and invertebrates

Installation phase activities will disturb seabed sediments which is likely to contribute to temporary increases in SSC and sediment deposition.

Large increases in SSC and sediment deposition can have significant impacts on marine organisms, with the potential to smother benthic life (Pineda, *et al.*, 2017). Sessile benthic organisms are particularly at risk as many are filter feeders and increased sediment loads can clog their feeding apparatus (Pineda, *et al.*, 2017). Disturbance to seabed sediments can also resuspend any contaminants that have settled in the environment, which can be ingested by organisms, or contaminate adjacent areas when they resettle (Bancon-Montigny, *et al.*, 2019).

The largest sediment plumes and highest levels of SSC will be associated with disturbance of sediments with a high proportion of fine particulate material, such as muds and clays, that will remain in suspension longest and settle to the seabed more slowly.

The magnitude of disturbance caused to marine habitats by the installation of subsea cables is dependent on the methods used, which for the study corridors are unknown at this time. Any measurable change in SSC will typically be temporary and localised, particularly regarding coarser sediments, with finer fractions that are transported further also be rapidly diluted. However, without confirmed installation methodologies, and more in-depth analysis of benthic habitats within each individual study corridor, this appraisal has applied the precautionary principle. As such, there is potential for large volumes of sediment to be transported within one tidal ellipse (10 – 17 km) of the study corridor, and with some study corridors located within the boundaries of MCZs, there is potential for conservation objectives to be hindered. The impact of sediment deposition and turbidity will decrease with distance from the source of disturbance. The greatest impact is expected within a few hundred metres from any of the proposed cables. Calculations specific to each cable route will need to be undertaken to estimate the extent of sediment dispersion before deposition as a result of trenching activities. The results of which, will be used to inform the project specific MCZ assessment.

Sensitivity to the impact of habitat disturbance varies between habitats and species; it depends upon the stability of the habitat and its resilience to disturbance, and the vulnerability of an individual species to mechanical disturbance. For example, mobile sands, or habitats in shallow water where there is significant wave and tidal energy, are considered to have greater capacity to accommodate physical disturbance, and their associated communities are expected to be relatively tolerant of disturbance.

Salmonids can be sensitive to increased SSC through reduced vision of prey (Abbotsford, 2021). However, effects to migratory fish from increased SSC and turbidity are thought to occur in response to long-term changes. Due to the short-term nature of any increase in SSC and the associated deposition and smothering risks occurring during installation of the cable, it is also unlikely to act as a barrier to migrating fish between marine and freshwater environments. In addition, as effects to migratory fish are not considered likely, impacts to the freshwater pearl mussel are also considered unlikely as this species is dependent on migratory fish part of its life cycle (Skinner *et al*., 2003). The application of seasonal restrictions during construction can also avoid the impact entirely, should the migratory fish be designated features of a traversed MCZ.

Many crustacean species, including the edible crab and Nephrops are known to be tolerant of, and have low sensitivity to, short-term increases in turbidity and SSC. Increased turbidity can affect shellfish, for example crabs spend more time searching for prey due to decreased visual acuity (Wang N., 2021). This can lead to them exhibiting avoidance behaviour when conditions become unfavourable to increase feeding success (Neal & Wilson, 2008). Buried crustacean species including the edible crab and European lobster remain sedentary during egg-bearing, meaning they may be more sensitive to increased SSC and turbidity. During egg-bearing, avoidance of sediment disturbance may be more difficult. The eggs that are laid also require sufficient regular aeration, meaning a high level of deposition and smothering may have implications, making them likely to be highly sensitive to substantial levels of sediment deposition.

Mobile species, such as crabs, scallops and lobsters are thought to tolerate a smothering depth of 5 cm over a month (Neal & Wilson, 2008). They can exhibit avoidance behaviour when conditions become unfavourable by moving away from the affected area. Due to their mobility, adults are considered to have low sensitivity to increased SSC and its associated impacts. However, most animals will be sediment dwelling and will be disturbed as those sediments are ploughed or jetted aside to an adjacent location. As sediments are displaced and backfilled there will be some mortality of larger and less mobile species but for many animals, displacement will have only a temporary impact, and fauna will be able to redistribute within the sediment once the installation spread has moved away. Recovery of habitats is expected to be relatively rapid.

Furthermore, an increase in SSC may lead to impacts on marine mammal populations. However, marine mammals are frequent inhabitants of turbid environments with low visibility, and studies have indicated that they do not typically experience severe impact from increased SSC (Marubini *et al*., 2009; Hastie *et al*., 2016). For most marine mammals, hearing rather than sight is their primary sensory modality. Further, seals can detect water movement with their vibrissae (Murphy *et al*., 2017), while odontocetes (toothed whales) primarily use echolocation to navigate and forage (Madsen *et al*., 2023). Therefore, direct impacts to marine mammals via a temporary increase in SSC are considered negligible. Indirect impacts to marine mammals such as effects on prey species have been included in the later section on Prey Species.

Installation activities may also have impacts on seabirds as there is potential for disturbance of key prey species via temporary increases in SSC. Therefore, as impacts are limited to those indirect effect, it is not considered that a temporary increase in SSC will have an effect on seabird features. The potential effects of such activities on prey species are assessed in the later section on Prey Species.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of SSC and sediment deposition on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, following best practice guidance (JNCC and Natural England, 2022), and informed by pre-installation evaluation of site-specific survey data, and physical processes modelling to avoid or minimise localised engineering and environmental constraints; including minimising the footprint as much as possible, and installation that avoids fine sediments where possible;
- Consideration of the cable trenching method with the smallest ZoI; and
- Consideration of the requirement and extent of for pre-lay grapnel runs and sand wave lowering

Assessment Conclusion

Table 68: Assessment of the potential for MCZ conservation objectives to be hindered by increased SSC associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
Increased SSC - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	Aln Estuary MCZ	HND	PA_2_TO_BERWICK BANK	Conservation objectives are unlikely to be hindered. These sites were screened in due to the associated study corridors being located within one tidal ellipse of their boundaries. The conservation objectives for these sites state that protected features must remain in favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is therefore a risk that increased SSC and sediment deposition could affect protected features. However, any effect is likely to be temporary and localised; and the management advice for these sites has appraised their protected features to be in favourable or good condition.
	Clyde Sea Sill MPA	HND	Kilmarnock South_to_Ballantrae	
	Coquet to St Marys MCZ	HND	SW_E1a_to_Hawthorn Pit	
			PA_2_to_Berwick Bank	
	Farnes East MCZ	HND	SW_E1a_to_Hawthorn Pit	
	Fulmar MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Inshore MCZ	HNDFUE	SW_E1c_1: Lincolnshire Connection Node	
	Norwegian Boundary Sediment Plain MPA	INTOG	Aspen_to_Beech	
			Beech_to_Cedar	
			Beech_to_Beech_MPI	
			North_Connect_to_Cenos	
	Noss Head MPA	HNDFUE	Shetland_to_Blackhillock	
	Sea of the Hebrides MPA	HND	SW_W1_to_Ballantrae	
	Shaint East Bank MPA	HND	SW_N4_to_Arnish (Lewis)	
	Southern Trench MPA	HNDFUE	Shetland_to_Blackhillock	
		INTOG	Aspen_to_Fetteresso	
	Swale Estuary MCZ	HND	SW_Ea2_2_to_Near_Richborough	
	West of Copeland MCZ	HND	R4_6_to_Penwortham	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				Risk of impact can be reduced through application of appropriate best practice mitigation as outlined above.
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	Conservation objectives are unlikely to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features must remain in favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is therefore a risk that increased SSC and sediment deposition could affect protected features. However, any effect is likely to be temporary and localised; and the management advice for these sites has appraised their protected features to be in favourable or good condition. Risk of impact can be
			SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
		HNDFUE	SW_E1a_to_Branxton	
		INTOG	Cedar_to_Branxton	
	Fylde MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
	Mousa to Boddam MPA	HNDFUE	Shetland_to_Blackhillock	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DC	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
			SS	reduced through application of appropriate best practice mitigation as outlined above.
			SW_NE8_to_Peterhead_1	
		INTOG	Peterhead_to_Cenos	
			Scaraben_to_Peterhead_2	
	Bideford to Foreland Point MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node	There is potential for conservation objectives to be hindered. These sites were screened in due to the associated study corridors being located within one tidal ellipse of their boundaries. The conservation objectives for these sites state that protected features must remain in or be brought into favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. Additionally, the conservation objectives for the sites state that any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery. As there is potential for
	Dover to Deal MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	East of Gannet and Montrose Fields MPA	INTOG	Beech_to_Cedar	
			Cedar_to_Aspen	
	Firth of Forth Banks Complex MPA	HND	PA_2_to_Berwick Bank	
			SW_E1a_to_Fiddes	
		HNDFUE	SW_E3_to_Fiddes	
		INTOG	Aspen_to_Fetteresso	
			Cedar_to_Branxton	
	Foreland MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Hartland Point to Tintagel MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Holderness Offshore MCZ	HNDFUE	SW_E1c_1: Lincolnshire Connection Node	
			SW_E1c_2 to Weston_Marsh	
	Lundy MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Kentish Knock East MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Markham's Triangle MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Morte Platform MCZ	Celtic Sea	PDA2_to_South_Wales_Con	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
			nection_Node	protected features in unfavourable (or unconfirmed) condition to be affected by increased SSC and sediment deposition, the current study corridor designs have the potential to hinder the conservation objectives of these sites. Mitigation commitments may be sufficient to avoid significantly hindering the conservation objectives relating to these protected features. However, the assessment of the feasibility and effectiveness of any mitigation measures must be informed by more detailed information than presently available. Alternatively, the distance between the study corridor and the MCZ may mean transported SSC is likely to reduce to levels lower than or comparable to natural variation if they reach the MCZ. Additional, modelling at project-level may be required to confirm this.
			PDA3_to_Pyworthy	
	North West of Lundy MCZ	Celtic Sea	PDA1_to_Llandyfaelog	
			PDA2_to_South_Wales_Connection_Node	
			PDA3_to_Pyworthy	
	Rathlin MCZ	HND	SW_W1_to_Ballantrae	
	Ribble Estuary MCZ	HND	R4_5_to_Penwortham	
			R4_6_to_Penwortham	
	South Arran MPA	HND	Kilmarnock South_to_Ballantrae	
	South Rigg MCZ	HND	Ballantrae_to_Pentir	
	South-West Approaches to Bristol Channel MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Swallow Sand MCZ	HND	SW_E1a_to_Lincolnshire_Connection_Node	
		HNDFUE	SW_E1c_2_to_Weston_Marsh	
			SW_E2a_2_to_Near_Richborough	
			SW_E1c_1: Lincolnshire Connection Node	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_SW_E2a_1	
		INTOG	Peterhead_to_Cenos	
	West of Copeland MCZ	HND	R4_6_to_Penwortham	
	West of Walney MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Wyre-Lune MCZ	HND	R4_6_to_Penwortham	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
			R4_5_to_Penwortham	
	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	There is potential for conservation objectives to be hindered. These sites were screened in due to the associated study corridors partially overlapping their boundaries. The conservation objectives for these sites state that protected features sensitive to the effects of increased SSC are in unfavourable or undetermined condition and must be brought into favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. As there is potential for protected features in unfavourable condition within the boundaries of these MCZs to be negatively impacted by increased SSC and sediment deposition, the current study corridor designs have the potential to undermine the conservation objectives of these sites.
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	Aspen_to_Fetteresso	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				Mitigation commitments may be sufficient to substantially reduce any potential impacts and avoid significantly hindering the conservation objectives relating to these protected features. However, the assessment of the feasibility and effectiveness of any mitigation measures must be informed by more detailed information than presently available.
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos	There is potential for conservation objectives to be hindered.
			Peterhead_to_Cenos	These sites were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features sensitive to the effects of increased SSC are in unfavourable or undetermined condition and must be brought into favourable condition; and / or that degradation and damage to the protected features beyond natural

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				change must be prevented. There is potential for protected features in unfavourable condition within the boundaries of these MCZs to be affected by increased SSC and sediment deposition. However, the designated features of this MCZ are typified by naturally occurring sediment mobilisation and higher levels of turbidity. As such, the current study corridor designs have the potential to undermine the conservation objectives of these sites. But disturbances caused my cable lay are anticipated to be relatively localised and comparable to natural variations in SSC. Additionally, mitigation commitments may be sufficient to substantially reduce any potential impacts and avoid significantly hindering the conservation objectives relating to these protected features. However, further data is

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				needed to inform the consideration of the final project design, and mitigation measures required on a case-by-case basis.
	North East of Farnes Deep HPMA	HNDFUE	SW_E1c_1: Lincolnshire Connection Node SW_E1c_2 to Weston_Marsh	There is potential for conservation objectives to be hindered. This HPMA was screened in due to the associated study corridors being located within one tidal ellipse of its boundaries As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). As such, the subsequent refinement of the current study corridor at project level, and mitigation measures will require careful consideration to avoid challenge from regulatory bodies with regard to licencing and consent. The distance between the study corridor and the HPMA

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				may mean transported SSC is likely to reduce to levels lower than or comparable to natural variation if they reach the HPMA. It is likely that further data from benthic surveys and sediment plume modelling will be required to inform these elements.
		HND	SW_E1a_to_Hawthorn Pit	The hinderance of conservation objectives cannot be ruled out. This HPMA was screened in due to the associated study corridor overlapping its boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). As such, the subsequent refinement of the current study corridor at project level will require careful consideration to avoid challenge from

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				regulatory bodies with regard to licencing and consent.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b)[23]. Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby reducing the risk of SSC significantly hindering the conservation objectives of the HPMA. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level; and should be a key consideration by developers. Without modelling the hinderance of HPMA conservation objectives cannot be confidently ruled out, however at plan-level, the greatest SSC impact is expected within a few hundred metres from any of the proposed cables. If a plume were to be transported far enough to reach the HPMA it is likely to be in negligible or undetectable concentrations. The above mitigation measures are considered reasonable methods of minimising the possibility of this occurring.

- Study corridor **PA_2_to_Berwick Bank**, **SW_E1a_to_Fiddes**, and **SW_E1a_to_Lincolnshire_Connection_Node** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**;
- Study corridor **SW_W1_to_Ballantrae** could potentially hinder the conservation objectives of the **Rathlin MCZ**.
- Study corridor **R4_5_to_Penwortham**, could potentially hinder the conservation objectives of the **Ribble Estuary**, **West of Walney**, and **Wyre-Lune MCZs**;
- Study corridor **R4_6_to_Penwortham** could potentially hinder the conservation objectives of the **Ribble Estuary, West of Copeland**, **West of Walney**, and **Wyre-Lune MCZs**.
- Study corridor **Ballantrae_to_Pentir** could potentially hinder the conservation objectives of the **South Rigg MCZ**;

[23] the effects of SSC plumes originating beyond the HPMA boundaries is not a specific consideration within the conservation advice. However, it does state that any activities likely to hinder the conservation objective of an HPMA should be avoided, unless the Public Authorities' MCZ Assessment Process determines otherwise.

- Study corridor **Kilmarnock South_to_Ballantrae** could potentially hinder the conservation objectives of the **Southern Arran MPA**;
- Study corridor **SW_E1a_to_Lincolnshire_Connection_Node** could potentially hinder the conservation objectives of the **Swallow Sand MCZ**; and

  The above study corridors are located within one tidal ellipse of MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments and / or the distance between the study corridor and the MCZ will be sufficient to avoid hindering the conservation objectives relating to these protected features. However, additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

- Study corridor **PA_1_to_Birkhill_Wood**, **R4_1_to_Birkhill_Wood**, **R4_2_to_Birkhill_Wood**, and SW_E1a_to_Lincolnshire_Connection_Node could potentially hinder the conservation objectives of the **Holderness Offshore MCZs**;

  The above study corridors overlap MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

HNDFUE

- Study corridor **SW_E1c_1: Lincolnshire Connection Node** and **SW_E1c_2 to Weston_Marsh** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**;

  It is unlikely that Sediment plumes associated with the above study corridors will reach the HPMA in concentrations likely to have an adverse effect on any receptors within the HPMA. However, activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA (Natural England & JNCC, 2022a) and should be avoided where direct or indirect effects are likely to occur. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

- Study corridor **SW_E1a_to_Branxton** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**;
- Study corridor **SW_E2a_2_to_Near_Richborough** could potentially hinder the conservation objectives of the **Goodwin Sands** and **Thanet Coast MCZs**;

- Study corridor **SW_E2b_to_Peterhead_2** could potentially hinder the conservation objectives of the **Turbot Bank MPA**;

  The above study corridors overlap MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

- Study corridor **SW_E2a_2_to_Near_Richborough** could potentially hinder the conservation objectives of the **Dover to Deal**, **Foreland**, **Kentish Knock East**, **Markham's Triangle**, and **Swallow Sand MCZs**.
- Study corridor **SW_E3_to_Fiddes** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**;
- Study corridor **SW_E1c_1: Lincolnshire Connection Node** could potentially hinder the conservation objectives of the and **Holderness Offshore** and **Swallow Sand MCZs**;
- Study corridor **SW_E1c_2 to Weston_Marsh** could potentially hinder the conservation objectives of the **Holderness Offshore** and **Swallow Sand MCZs**;
- Study corridor **SW_E2b_to_SW_E2a_1** could potentially hinder the conservation objectives of the **Turbot Bank MPA**; and
- Study corridor **Shetland_to_Blackhillock** could potentially hinder the conservation objectives of the **Southern Trench MPA**.

  The above study corridors are located within one tidal ellipse of MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. However, more additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

INTOG

- Study corridor **North_Connect_to_Cenos** and **Peterhead_to_Cenos** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA**;

  The above study corridors overlap MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. Notably, the designated features of this MCZ are typified by their relationship with naturally occurring sediment mobilisation and higher levels of turbidity disturbances caused my cable lay are anticipated to be relatively localised and comparable to natural variations in SSC. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

- Study corridors **Aspen_to_Fetteresso**, and **Peterhead_to_Cenos** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**, and **Turbot Bank MPA**;
- Study corridor **Cedar_to_Branxton** could potentially hinder the conservation objectives of the **Firth of Forth Banks Complex MPA**; and
- Study corridor **Beech_to_Cedar** and **Cedar_to_Aspen** could potentially hinder the conservation objectives of the **East of Gannet and Montrose Fields MPA**;

  The above study corridors are located within one tidal ellipse of MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. However, more additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

Celtic Sea

- Study corridor **PDA3_to_Pyworthy** could potentially hinder the conservation objectives of the **Bideford to Foreland Point MCZ**.

  The above study corridors overlap MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. Additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

- Study corridor **PDA1_to_Llandyfaelog** could potentially hinder the conservation objectives of the **North West of Lundy**;
- Study corridor **PDA2_to_South_Wales_Connection_Node** could potentially hinder the conservation objectives of the **Bideford to Foreland Point**, **Morte Platform MCZs**, and **North West of Lundy**; and
- Study corridor **PDA3_to_Pyworthy** could potentially hinder the conservation objectives of the **Hartland Point to Tintagel, Lundy**, **Morte Platform**, **North West of Lundy**, and **South-West Approaches to Bristol Channel MCZs.**

The above study corridors are located within one tidal ellipse of MCZs with protected features that are considered to be in unfavourable condition. It is possible that mitigation commitments will be sufficient to avoid hindering the conservation objectives relating to these protected features. However, more additional data, such as those obtained from benthic surveys and sediment plume modelling, are likely required to inform effective mitigation and design at project level.

All other study corridors associated with the HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

Water quality - subtidal benthic habitats and species, marine mammals, fish, and invertebrates

Changes to marine water quality arising from the use of HDD drilling fluids and additives, accidental leaks and spills from vessels, and the mobilisation of sediment bound contaminants (such as heavy metals and toxins) has the potential to indirectly affect subtidal habitats and species, fish, marine mammals, and seabirds in the marine and intertidal environment through toxicity and contamination. These effects typically occur within one tidal ellipse (10–17 km). Moreover, any change to water quality in the nearshore could affect intertidal areas during high tide, in addition to subtidal and surrounding waters, depending on the scale of the spill.

Release of HDD Drilling Fluids

Assuming some, if not all routes will adopt the use of HDD for cable installation at landfall, the discharge of drilling fluids from HDD works at breakout locations has the potential to alter water quality and affect benthic habitats and ecology at the landfall location.

Drilling fluids will be selected from the OSPAR List of Substances /Preparations Used and Discharged Offshore (2021) which are typically biologically inert and considered to Pose Little or No Risk to the Environment. Embedded mitigation measures will be implemented to minimise the release of drilling fluid leaks from the end of the ducts and any associated impacts. The discharged drilling fluids will also be subject to immediate dilution and rapid dispersal within the marine environment, particularly as the release will be in the shallow nearshore area where there is likely to be significant wave and tidal water movement. Therefore, any impacts of the release of drilling fluids and drilled solids at HDD breakout will be temporary and localised.

The release of drilling fluids and drilled solids at HDD breakout will reduce water quality locally for a period during and immediately after release of the fluids. Any drilled solids released are predicted to settle rapidly in the vicinity of the punch out. Constituents of the drilling fluids, including silt-clay sized particles such as bentonite have a maximum theoretical range of approximately one tidal excursion ellipse (which will differ for each cable route). This is believed to be an appropriate method of assumption based on both professional judgement and consideration of worst-case for fine particulates. However, dilution processes over this distance will rapidly result in no detectable change from the baseline.

The drilling fluid discharges from the Projects HDD operations will be single events over a short period of time and rapidly dispersed in an open sea coastal environment. Due to dilution / dispersal, SSC above background levels resulting from releases of drilling fluids will be restricted to the immediate vicinity of the HDD exit. Therefore, only receptors in the immediate vicinity of the HDD breakouts are likely to be in contact with drilling fluids, which pose little risk to the wider environment. Overall, given the embedded mitigation and short period of works, the magnitude of impact on benthic receptors is considered negligible, combined with a high sensitivity some of the receptors in the immediate areas, effects are predicted to be minor and therefore not significant.

Mobilisation of contaminants

Contaminants, such as heavy metals and polycyclic aromatic hydrocarbons (PAHs), present in concentrations above thresholds of concern, could also have detrimental impacts on benthic species when resuspended into sediment plumes or redeposited to the seabed. For example, hydrocarbons in sediments are known to reduce the abundance of some species, particularly crustaceans such as amphipods.

Contaminants are generally more highly associated with finer material such as silts and clays. Where finer sediments do occur, the potential for mobilisation of contaminants is limited, in the same way as the mobilisation of the sediments themselves will be limited, as set out above. In addition, dilution of suspended particulate matter, is anticipated to occur rapidly. Thus, the concentration of contaminants is not expected to exceed the existing background levels. In addition, natural disturbance to the sediment such as during storm events and periods of strong wave action will mobilise contaminants and subject benthic habitats and species to temporary and localised changes in water quality and as a result, these habitats and species will have a tolerance to moderate changes in the surrounding water quality. Whilst it is recognised that each cable route will be different, these factors mean that the likely resulting magnitude of impact will be negligible, irrespective of the value and sensitivity of benthic species. Therefore, the effect on benthic receptors from the disturbance of sediment-bound contaminants is unlikely to be significant.

Discharges, Leaks and Spills from Vessels, including Loss of Oils

The accidental release of pollutants (e.g., oil, fuels, lubricants, chemicals) and any planned release of wastewater could occur from any of the vessels associated with the Installation Phase activities and any support vessels present and has the potential to alter water quality. Vessels involved in Installation Phase activities could have cleaning fluids, oils, and hydraulic fluids onboard (as well as fuels), which could be accidentally discharged, releasing hydrocarbons and chemical pollutants into the surrounding seawater, which could then settle on the seabed with consequences for benthic habitats and species.

The benthic habitats that are designated features of an MCZ will support diverse communities of benthic invertebrates, which can be highly susceptible to effects from spills, as contaminants can settle into and remain in the sediments. Studies have indicated that benthic sediments contaminated with oils and hydrocarbons can contribute to reduced densities of macrofauna, as well as differences in recruitment and development of assemblages (Berge *et al*., 1990). However, these effects are related to extensive spills such as from large oil tankers rather than small spills from other vessels.

To ensure the risk of accidental spills is as low as reasonably practicable, therefore it has been assumed that each individual cable lay project will adhere to relevant guidance (e.g., Pollution Prevention Guidance). A CEMP including an Emergency Spill Response Plan and Waste Management Plan should also be implemented during the installation phase of each individual project to minimise releases. Appropriate HSE procedures (identified in the CEMP) will also be implemented, with strict weather and personnel limits to reduce any risk of accidental spillage. Furthermore, preparedness and swift response is essential for effective spill management and as such, response plans will be in place should an incident occur. Control measures and SOPEPs will be in place and adhered to under MARPOL Annex I requirements for all vessels. Planned effluent dischargers will be compliant with MARPOL Annex IV ‘Prevention of Pollution from Ships’ standards.

Thus, the risk of an accidental spill occurring is considered to be unlikely. However, should an accidental spill or leak occur, it would be very small in extent and subject to immediate dilution and rapid dispersal within the marine environment and thus would have only a low magnitude. Combined with a low to high sensitivity of receptors, the overall appraisal of the effect to ecology from accidental leaks and spills from vessels and equipment is appraised to be minor risk and therefore not significant.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of changes in water quality:

- CEMP including an Emergency Spill Response Plan and Waste Management Plan during the installation phase of each individual project to minimise releases;
- Appropriate HSE procedures (identified in the CEMP), with strict weather and personnel limits to reduce any risk of accidental spillage;
- Response plans, including control measures and SOPEP in place and adhered to under MARPOL Annex I requirements for all vessels;
- Planned effluent dischargers compliant with MARPOL Annex IV ‘Prevention of Pollution from Ships’ standards; and
- Drilling fluids selected from the OSPAR List of Substances / Preparations Used and Discharged Offshore (2021) which are Considered to Pose Little or No Risk to the Environment.

Assessment Conclusion

Table 69: Assessment of the potential for MCZ conservation objectives to be hindered by water quality changes associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
Water quality - subtidal benthic habitats and species, marine mammals, fish, and invertebrates	Aln Estuary MCZ	HND	PA_2_to_Berwick Bank	Conservation objectives are unlikely to be hindered. These sites were screened in due to the associated study corridors being located within one tidal ellipse of their boundaries. The conservation objectives for these sites state that protected features must remain in favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is therefore a risk that the water quality within this site could be affected. However, any effect is likely to be temporary and localised. Risk of impact can be reduced through application of appropriate best practice mitigation as outlined above.
	Clyde Sea Sill MPA	HND	Kilmarnock South_to_Ballantrae	
	Coquet to St Marys MCZ	HND	SW_E1a_to_Hawthorn Pit	
			PA_2_to_Berwick Bank	
	Fulmar MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Inshore MCZ	HNDFUE	SW_E1c_1: Lincolnshire Connection Node	
	Norwegian Boundary Sediment Plain MPA	INTOG	Aspen_to_Beech	
			Beech_to_Cedar	
			Beech_to_Beech_MPI	
			North_Connect_to_Cenos	
	Noss Head MPA	HNDFUE	Shetland_to_Blackhillock	
	Sea of the Hebrides MPA	HND	SW_W1_to_Ballantrae	
	Shaint East Bank MPA	HND	SW_N4_to_Arnish (Lewis)	
	Southern Trench MPA	HNDFUE	Shetland_to_Blackhillock	
		INTOG	Aspen_to_Fetteresso	
	Swale Estuary MCZ	HND	SW_E2a_2_to_Near_Richborough	
	West of Copeland MCZ	HND	R4_6_to_Penwortham	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
	Clyde Sea Sill MPA	HND	Ballantrae_to_Pentir	Conservation objectives are unlikely to be hindered. These MCZs were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features must remain in favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is therefore a risk that the water quality within this site could be affected. However, any effect is likely to be temporary and localised. Risk of impact can be reduced through application of appropriate best practice mitigation as outlined above.
			SW_W1_to_Ballantrae	
	Coquet to St Marys MCZ	HND	PA_2_to_Berwick Bank	
	Farnes East MCZ	HND	PA_2_to_Berwick Bank	
		HNDFUE	SW_E1a_to_Branxton	
		INTOG	Cedar_to_Branxton	
	Fylde MCZ	HND	R4_5_to_Penwortham	
			R4_6_to_Penwortham	
	Holderness Inshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
	Mousa to Boddam MPA	HNDFUE	Shetland_to_Blackhillock	
	North-east Lewis MPA	HND	SW_N4_to_Arnish (Lewis)	
		HNDFUE	SW_N3_to_Arnish	
	Noss Head MPA	HNDFUE	SW_NE2_to_Spittal	
	Southern Trench MPA	HND	SW_NE7_to_Peterhead	
			SW_NE4_to_New_Deer (ES26)	
		HNDFUE	SW_E2b_to_Peterhead_2	
			SW_NE3_to_New_Deer_2	
			SW_NE4_to_New_Deer	
			SW_NE6_to_Peterhead_2	
			SW_NE7_to_Peterhead_DCSS	
			SW_NE8_to_Peterhead_1	
		INTOG	Peterhead_to_Cenos	
			Scaraben_to_Peterhead_2	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
	Bideford to Foreland Point MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node	Conservation objectives are unlikely to be hindered. These sites were screened in due to the associated study corridors being located within one tidal ellipse of their boundaries. The conservation objectives for these sites state that protected features must remain in or be brought into favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is potential for protected features in unfavourable (or unconfirmed) condition to be affected by changes in water quality, which would have the potential to undermine the conservation objectives of these sites. However, any effect is likely to be temporary and localised. Risk of impact can be substantially reduced through application of appropriate best practice mitigation as outlined above and therefore no adverse effect on protected features is anticipated.
	Dover to Deal MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	East of Gannet and Montrose Fields MPA	INTOG	Beech_to_Cedar	
			Cedar_to_Aspen	
	Firth of Forth Banks Complex MPA	HND	PA_2_to_Berwick Bank	
			SW_E1a_to_Fiddes	
		HNDFUE	SW_E3_to_Fiddes	
		INTOG	Aspen_to_Fetteresso	
			Cedar_to_Branxton	
	Foreland MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Hartland Point to Tintagel MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Holderness Offshore MCZ	HNDFUE	SW_E1c_1: Lincolnshire Connection Node	
			SW_E1c_2 to Weston_Marsh	
	Lundy MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Kentish Knock East MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Markham's Triangle MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Morte Platform MCZ	Celtic Sea	PDA2_to_South_Wales_Connection_Node	
			PDA3_to_Pyworthy	
	North West of Lundy MCZ	Celtic Sea	PDA1_to_Llandyfaelog	
			PDA2_to_South_Wales_Connection_Node	
			PDA3_to_Pyworthy	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
	Rathlin MCZ	HND	SW_W1_to_Ballantrae	
	Ribble Estuary MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	South Arran MPA	HND	Kilmarnock South_to_Ballantrae	
	South Rigg MCZ	HND	Ballantrae_to_Pentir	
	Southern Trench MPA	HND	Kilmarnock South_to_Ballantrae	
	South-West Approaches to Bristol Channel MCZ	Celtic Sea	PDA3_to_Pyworthy	
	Swallow Sand MCZ	HND	SW_E1a_to_Lincolnshire_Connection_Node	
		HNDFUE	SW_E1c_2_to_Weston_Marsh	
			SW_E2a_2_to_Near_Richborough	
			SW_E1c_1: Lincolnshire Connection Node	
	West of Copeland MCZ	HND	R4_6_to_Penwortham	
	West of Walney MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Wyre-Lune MCZ	HND	R4_6_to_Penwortham	
			R4_5_to_Penwortham	
	Bideford to Foreland Point MCZ	Celtic Sea	PDA3_to_Pyworthy	Conservation objectives are unlikely to be hindered.
	East of Gannet and Montrose Fields MPA	INTOG	North_Connect_to_Cenos	
			Peterhead_to_Cenos	

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
	Firth of Forth Banks Complex MPA	HNDFUE	SW_E1a_to_Branxton	These sites were screened in due to the associated study corridors running directly through their boundaries. The conservation objectives for these sites state that protected features must remain in or be brought into favourable condition; and / or that degradation and damage to the protected features beyond natural change must be prevented. There is potential for protected features in unfavourable (or unconfirmed) condition to be affected by changes in water quality, which would have the potential to undermine the conservation objectives of these sites. However, any effect is likely to be temporary and localised. Risk of impact can be substantially reduced through application of appropriate best practice mitigation as outlined above and therefore no adverse effect on protected features is anticipated.
	Goodwin Sands MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Holderness Offshore MCZ	HND	PA_1_to_Birkhill_Wood	
			R4_1_to_Birkhill_Wood	
			R4_2_to_Birkhill_Wood	
			SW_E1a_to_Lincolnshire_Connection_Node	
	Thanet Coast MCZ	HNDFUE	SW_E2a_2_to_Near_Richborough	
	Turbot Bank MPA	HNDFUE	SW_E2b_to_Peterhead_2	
		INTOG	Aspen_to_Fetteresso	
	North East of Farnes Deep HPMA	HND	SW_E1c_2 to Weston_Marsh	Conservation objectives may be hindered. This HPMA was screened in due to the associated study corridors being located within one tidal ellipse of its boundaries As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). As such, the subsequent refinement of the current study corridor at project level, and mitigation measures will require careful consideration to

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				avoid challenge from regulatory bodies with regard to licencing and consent. As changes in water quality are highly likely to temporary and localised, the distance between the study corridor and the HPMA means there is minimal risk of affecting the HPMA. Further data from benthic surveys and sediment plume modelling may be required to inform this.
	North East of Farnes Deep HPMA	HND	SW_E1a_to_Hawthorn Pit	There is potential for conservation objectives to be hindered. This HPMA was screened in due to the associated study corridor overlapping its boundaries. As an HPMA the entire ecosystem within its boundaries is a protected feature. Activities related to subsea cables are considered likely to hinder the conservation objective of an HPMA and should be avoided (Natural England & JNCC, 2022a). With the application of appropriate best practice mitigation, as outlined above, the risk of impact can be substantially reduced through and therefore no adverse effect on protected features is anticipated. However, in the unlikely event that an effect did occur in overlapping areas between the study corridor and the HPMA, this would undermine the conservation objectives of the HPMA. As such, the subsequent refinement of the current study corridor at project level will require careful

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
				consideration to avoid challenge from regulatory bodies with regard to licencing and consent.

HND

- Study corridor **SW_E1a_to_Hawthorn Pit** could potentially hinder the conservation objectives of the **North East of Farnes Deep HPMA**. This is primarily due to the study corridor overlapping with the HPMA boundaries. HPMAs are designated with the highest form of protection in English waters and consider activities relating to subsea cables lay, protection, operation, maintenance, and decommissioning to hinder HPMA conservation objectives, and should be avoided (Natural England & JNCC, 2022a). Conservation advice also states that a buffer distance of 2 km from a HPMA should be maintained (Natural England & JNCC, 2022b). Study corridors which have potential to affect a HPMA either directly or indirectly will be challenged by environmental regulators and are highly likely to face issues with licencing and consent.

  It is the intention of NESO to avoid any overlap between the study corridor and HPMA boundaries. Subsequent refinement of the 5 km wide study corridor at project-level will substantially reduce its width, thereby substantially reducing the risk of changes in water quality hindering the conservation objectives of the HPMA.

All other study corridors associated with HND Implementation Plan are unlikely to hinder the conservation objectives of any MCZs as a result of this impact pathway

Barriers to migration – diadromous fish

The study corridors listed in **Table 70** are located adjacent to the mouth of the rivers Lune, Ribble, and Wyre; all known to support the migration of smelt. The exact paths of migration to natal rivers for smelt are not well understood and are expected to be highly diffuse. However, the close proximity of these study corridors mean it is highly likely that smelt will at least pass through the study corridors and or over the location of the cable in-situ.

There is abundant evidence that marine animals derive their direction, and even geographic position, from features in the main magnetic field and so cable EMF have the potential to disrupting fish movement including migration (Klimley *et al.*, 2021). This is most pertinent for electrosensitive migratory fish species, such as salmonids, eels, and lamprey. However, a field study of behavioural responses has found no significant difference to migration success (Wyman *et al.*, 2018) in juvenile salmon, nor strong avoidance actions by European eel (Westerberg & Begout-Anras, 2000). The ability for smelt to be influenced by EMF is understudied within the literature. However, comparably, other less electrosensitive demersal species, such as cod, are unlikely to have their behaviour altered by EMF (Bochert & Zettler, 2004, Bergström *et al.*, 2013; Hammar *et al.*, 2014).

The open nature of coastal waters and localised nature of cable installation activities mean they are unlikely to create a barrier for migratory fish. Furthermore, as the HVDC cables will likely be buried within the seabed (or covered by cable protection where this is not possible due to ground conditions), the cable itself is highly unlikely to create a physical barrier to migration while operational. However, the study corridor for two Schemes overlaps with a narrow upstream section of the River Ribble (ranging between ~80 m and ~200 m wide). With installation methodologies and final study corridor design not yet defined, there is potential for installation activities to prevent fish migration upstream or downstream, either by creating a barrier or disturbing fish away from their intended routes. As anadromous fish, smelt congregate in the Ribble Estuary, migrating upstream to spawn in spring (March and April) (JNCC, 2019; ZSL, 2020). Disruption during this time could significantly affect the year's smelt spawning, and thus potentially hinder the conservation objectives of the MCZs.

Mitigation

The following measures have the potential to avoid and / or reduce the impact of EMF on marine receptors:

- Raise the priority of environmental considerations to an equal footing with other, more-traditional considerations at this strategic level[20];
- Detailed route development and micro-routeing within the study corridor, informed by pre-installation evaluation of site-specific survey data to avoid or minimise localised engineering and environmental constraints, including minimising the footprint as much as possible;
- Consideration of the need for EMF modelling, to inform design;
- Consideration of the configuration of multiple cables (e.g. bundled);
- Consideration of the required depth of lowering to minimise EMF emissions
- Consideration of potential migratory routes of diadromous fish (e.g. river mouths).

Assessment Conclusion

Table 70: Assessment of the potential for MCZ conservation objectives to be hindered potential barriers to migration associated with the HND Implementation Plan study corridors

Impact Pathway	MCZs at risk	Group	Associated Study corridors	Assessment Conclusion
Barriers to migration – diadromous fish	Ribble Estuary MCZ	HND	R4_6_to_Penwortham	Conservation objectives could be hindered. This MCZ was screened in due to the associated study corridors running parallel to the rivers Lune and Wyre; perpendicular to the coast at the mouth of the River Ribble. The study corridors also cross the River Ribble upstream after making landfall. The conservation objectives for the MCZs state that the protected features "…must remain in or be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating". There is potential for installation works to obstruct or disturb diadromous migrations of smelt during a sensitive time of year. Mitigation commitments may be sufficient to avoid hindering the conservation objectives relating to these protected features. For example, using HDD route the cable under the river. However, the assessment of the feasibility and effectiveness of any mitigation measures must be informed by more detailed information than presently available.
			R4_5_to_Penwortham	
	Wyre-Lune MCZ	HND	R4_5_to_Penwortham	Conservation objectives could be hindered.
			R4_6_to_Penwortham	

	This MCZ was screened in due to the associated study corridors running parallel to the rivers Lune and Wyre, perpendicular to the coast at the mouth of the River Ribble. The study corridor also crosses the River Ribble upstream after making landfall. The conservation objectives for the MCZs state that the protected features "…must remain in or be brought into favourable condition, such that their extent is stable or increasing", that "their condition is healthy and not deteriorating". There is potential for installation works to obstruct or disturb some diadromous migrations of smelt during a sensitive time of year. However, mitigation commitments are likely to be sufficient to avoid hindering the conservation objectives relating to these protected features.

HND

- Study corridor **R4_6_to_Penwortham** and **R4_5_to_Penwortham** could potentially hinder the conservation objectives of the **Ribble Estuary MCZ**.

Each of the above study corridors have been included due to their potential to obstruct smelt migration at sensitive times of the year. Timing installation works to take place outside of the smelt spawning season should significantly reduce each Scheme’s potential to hinder the conservation objectives of these MCZs. However, this will require further assessment and consideration at Project level.

7. In-combination Effects

This section has considered the impact pathways relating to the proposed study corridors (**Section 6**) to determine potential in-combination effects with other projects or plans.

The assessment considers all potential impact pathways, including those screened out (**Table 3 - Table 10**). While these impacts may not hinder conservation objectives in isolation, acting in-combination with other impact sources the effects can be additive or synergistic, resulting in inter-project hindrance of the conservation objectives.

Checks for proposed and approved projects dealt with by competent authorities within 100 km of a study corridor were undertaken to make an assessment on whether other projects in-combination have potential to result in significant effect on any Habitats sites. This included searches of planning applications on the National Infrastructure Planning portal (2024), developments listed Crown Estate leasing portal (The Crown Estate, 2012 & 2021), and marine licence applications listed on the Marine Management Organisation (MMO) asset portal (GOV.UK, 2024; Marine Management Organisation, 2024) and the Marine.Gov.Scot portal (Scottish Government, 2025). Projects have been included which are already operational, those which are currently in development and those which are proposed. As proposed study corridors are located throughout most English, Welsh, and Scottish waters, the identified projects of interest are grouped by rough geographical regions (**Figure 5**).

Notably, NESO are working closely with government bodies to collaboratively assess impacts associated with offshore wind installations and their cable connections (for example, the revised Sectoral Marine Plan for Offshore Wind Energy (SMP-OWE) with Scottish Government) as part of the Strategic planning of the transmission infrastructure required to support the Draft Plan.

Figure 5: **Rough geographical regions for grouping projects with the potential contribution to in-combination effects**

The following projects and plans (**Table 71)** have been considered for potential in-combination effects with HND and / or HNDFUE cable routes due to their potential timing, and location within 100 km of a study corridor. In many cases the exact timeframes of activities relating to these projects and plans are not fully known, therefore a precautionary approach has been applied in the inclusion of certain projects. Furthermore, the list of projects represents an initial pre-screening exercise, attempting identify relevant projects, however, this may not be exhaustive.

Table 71: Screening of developments within 100 km of HND and HNDFUE marine corridors with the potential for intra-project marine in-combination effects

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
West Scotland (10 projects / plans)				
Scottish Sectoral Marine Plan for Offshore Wind Energy 2020[24]	Marine Plan	The Plan aims to identify the most sustainable plan options for the future development of commercial-scale offshore wind energy in Scotland. The plan has its own HRA which assesses the impacts of offshore wind energy and concludes that with mitigation it would be possible to ensure no adverse effect on sites from the Marine Plan, although this does not replace individual project appropriate assessments for planning applications.	Scottish Government	**HND** SW_E1a_to_Lincolnshire_Connection_Node PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_E2b_to_Peterhead_2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near_Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes

[24] The Scottish Sectoral Marine Plan for Offshore Wind Energy 2020 is currently being revised, with a new plan due to be adopted in Spring 2025. At the time of writing this has not been released and the contents are unknown.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				INTOG Aspen_to_Fetteresso North_Connect_to_Cenos Beech_to_Cedar Peterhead_to_Cenos Cedar_to_Aspen Cedar_to_Branxton SW_E1c_2_to_Weston_Marsh SW_E1c_1_to_Lincolnshire_Connection_Node
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to meet the future energy demand.	NESO	All routes
Blackmill Bay Harbour	Existing harbour improvements	Low impact work to improve Blackmill Bay Harbour including to improve access, wave protection and better facilities	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae Ballantrae_to_Pentir
Colonsay Harbour	Improvement works	Upgrade works to four ferry terminals to allow larger vessels to berth, on the Isle of Colonsay.	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Carradale Harbour	Improvement works and dredging	Works to install a new pontoon and dredging of the seabed to provide suitable water depths. Dredged material will be disposed of at a licenced disposal site in Campbeltown.	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae
Flex Marine Power Ltd	Offshore wind	A Marine Licence application has been made for a single turbine in the Sound of Islay, Scotland which will transport power back on land via an umbilical.	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae Ballantrae_to_Pentir
Hunterston Marine Construction Yard	Upgrades to quayside and associated infrastructure, and dredging with potential sea disposal	This proposed project involves a new quay and associated infrastructure at Hunterston Construction Yard in West Kilbride. Dredging will be required with up to 1,546,660 m^3 to be removed. The preferred option is for dredged material to be re-used as part of the development, but there may be a requirement for disposal in a licensed offshore disposal ground.	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae Ballantrae_to_Pentir
Nova Òran na Mara	Tidal Energy Project	A proposal is in place to develop a tidal energy	Marine.Gov.Scot	**HNDFUE**

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		project in the Sound of Islay with up to 30 tidal stream turbines installed on the seabed. Once installed, the turbines will be fully installed with nothing visible above the water surface.		SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae Ballantrae_to_Pentir
Port Ellen Ferry Terminal	Redevelopment of ferry terminal and dredging	A proposal is in place to redevelop the Port Ellen Ferry terminal. This includes construction of new piers and dredging of 32,000 m^3 of material (both rock and soft sediment).	Marine.Gov.Scot	**HNDFUE** SW_W1_to_Ballantrae Kilmarnock South_to_Ballantrae Ballantrae_to_Pentir
Uig Harbour Redevelopment	Harbour redevelopment	A Marine Licence has been granted for upgrades to existing infrastructure at Uig Harbour. This includes a requirement for capital dredging and disposal, and the construction of new berths.	Marine.Gov.Scot	**HND** SW_N4_to_Arnish (Lewis) **HNDFUE** SW_N3_to_Arnish
East Scotland (35 projects / plans)				
Scottish Sectoral Marine Plan for Offshore Wind Energy 2020	Marine Plan	The Plan aims to identify the most sustainable plan options for the future development of commercial-scale offshore wind energy in Scotland. The plan has its own HRA which assesses the	Scottish Government	**HND** SW_E1a_to_Lincolnshire_Connection_Node PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_E1a_to_SW_e1b SW_E1a_to_Fiddes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		impacts of offshore wind energy and concludes that with mitigation it would be possible to ensure no adverse effect on sites from the Marine Plan, although this does not replace individual project appropriate assessments for planning applications.		**HNDFUE** SW_E2b_to_Peterhead_2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near_Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes **INTOG** Aspen_to_Fetteresso North_Connect_to_Cenos Beech_to_Cedar Peterhead_to_Cenos Cedar_to_Aspen Cedar_to_Branxton SW_E1c_2_to_Weston_Marsh SW_E1c_1_to_Lincolnshire_Connection_Node
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to	NESO	All routes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		meet the future energy demand.		
Ardersier Port, Inverness	Quay wall construction and capital dredging	A Marine Licence application has been granted for the construction of a new quay wall (above MHWS) and subsequent dredging to expose the quay wall to the marine environment. The dredged material is to be disposed of at sea	Marine.Gov.Scot	**HND** SW_N1_to_Spittal SW_NE4_to_New_Deer (ES26) **HNDFUE** SW_NE4_to_New_Deer
Arven Offshore Wind Farm	Offshore wind farm	A Marine Licence application is being produced for the proposed development of an offshore wind farm on the east coast of the Shetland Islands, with two array areas. This is approximately 23 km from the Shetland Islands. Arven is a feature of HNDFUE. The consent applications and EIA are due to be submitted in 2026.	Marine.Gov.Scot	**HNDFUE** SW_NE1a_to_Shetland SW_NE1b_to_Shetland SW_NE1c_to_Shetland Shetland_to_Blackhillock
Ayre Offshore Wind Farm	Offshore wind farm	A Marine Licence application is being made for a proposed offshore windfarm, which makes landfall in Sinclair's Bay in	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Caithness and is 22 km away from the Orkney coast. Ayre is a feature of HNDFUE. The Offshore Scoping Report was submitted in July 2024, with pre-application consultation scheduled for April 2025.		
Bellrock Offshore Wind Farm	Offshore wind farm	The proposed development of an offshore wind farm with up to 80 turbines, 120 km east of Stonehaven	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG**

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Berwick Bank Offshore Transmission	Offshore transmission	The proposed development of offshore transmission infrastructure associated with Berwick Bank Offshore Wind Farm, with up to eight Offshore Substation Platforms (OSPs) / convertor station platforms, interconnector cables, up to eight offshore export cables and associated scour and rock protection. Berwick Bank OWF is a feature of HND. The applications for offshore consents in Scottish waters were submitted to the Marine Directorate in December 2022 and July 2023. These are currently being determined. The application for a marine licence in English waters was submitted to the MMO	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes SW_E1a_to_Hawthorn Pit PA_2_to_Berwick Bank SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2a_2_to_Near_Richborough SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Aspen_to_Fetteresso Cedar_to_Branxton

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		in July 2023 and is currently being determined.		
Bowdun Offshore Wind Farm	Offshore wind farm	The proposed development of up to 67 wind turbines with associated inter-array cables, up to 35 km of interconnector cables, and associated offshore transmission assets, 35 km off the coast of Aberdeen and making landfall in Benholm. The Bowdun OWF is a feature of HNDFUE. The offshore and onshore scoping reports are due to be submitted in August 2025.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Broadshore Hub	Offshore wind farm	Proposed development of three separate offshore wind farms known collectively as the Broadshore hub: Broadshore Offshore Wind Farm, Sinclair Offshore Wind Farm and Scaraben Offshore Wind Farm. The Broadshore Hub is located in the Moray Firth. The Broadshore Hub is a feature of HUNDFUE. The HRA screening was submitted in January 2024, with ornithology compensation measures submitted in June 2024.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New_Deer Shetland_to_Blackhillock SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Buchan Offshore Wind Farm	Floating offshore wind farm	Proposed development of a floating offshore wind farm in the Moray Firth and making landfall north of Peterhead. This includes up to 70 turbines with associated infrastructure. The Buchan OWF is a feature of HNDFUE. The offshore scoping report was submitted in September 2023. Applications for consent to	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New_Deer Shetland_to_Blackhillock

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		the Scottish Government are due in 2025.		SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Caledonia Offshore Wind Farm	Offshore wind farm	The proposed development of an offshore wind farm in the Moray Firth, split into two phases: Caledonia North and Caledonia South, 38 km off the coast of Aberdeenshire. The wind farm is expected to have a mix of fixed-bottom and floating technology. Caledonia OWF is a feature of HND and HNDFUE. A decision on consent from the Marine Directorate is expected in 2025.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New_Deer Shetland_to_Blackhillock SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Cenos	Floating offshore wind farm	Proposed development of an offshore wind farm 185 km offshore east of Aberdeen with up to 95 wind turbines. The export cable is proposed to make landfall in Peterhead, Scotland. Cenos is a feature of INTOG. The Scoping Report for the	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		offshore components of the project was submitted to the Marine Directorate Licensing Operations Team (MD-LOT) in 2024. An application for offshore consent including an EIA report is being prepared.		SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Central North Sea Electrification (CNSE)	Electrification of existing oil and gas infrastructure	The proposed installation of HVDC to contribute to the decarbonisation of the offshore energy sector via the electrification of existing oil and gas infrastructure in the central North Sea.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Culzean Pilot Project	Floating offshore wind farm	A proposal to demonstrate the possibility of electrifying existing oil and gas assets in the North Sea via the installation of a floating offshore wind farm connecting to the existing Culzean Field oil and gas platform	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Dales Voe, Shetland	Ultra-deep water quay	Expansion of existing deep-water facility with a proposed ultra deep-water quay development, which will facilitate the increased industrial activity and will serve offshore structures such as windfarms.	Marine.Gov.Scot	**HNDFUE** SW_NE1a_to_Shetland SW_NE1b_to_Shetland SW_NE1c_to_Shetland Shetland_to_Blackhillock
European Marine Energy Centre - Fall of Warness Tidal Test Site	Tidal test centre expansion, Orkney	This proposal relates to the expansion of the Fall of Warness tidal test centre in Orkney, including installation of subsea cables and associated protection, and new tidal testing berths	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		accommodating new tidal energy devices.		
European Marine Energy Centre - Billia Croo Wave Test Site	Tidal test centre expansion, Orkney	This proposal relates to the expansion of the Billia Croo wave test centre site, including an extension to the existing lease area for further testing.	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2
European Offshore Wind Deployment Centre	Offshore wind farm	Several Marine Licence Applications have been granted for the European Offshore Wind Deployment Centre. This is an innovative offshore wind turbine deployment facility proposed off the coast of Aberdeenshire, with approximately 11 offshore turbines.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_E1a_to_SW_e1b **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New_Deer SW_E3_to_Fiddes SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_SW_E1c_1 **INTOG** Peterhead_to_Cenos Aspen_to_Fetteresso

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Fair Isle Ferry Terminal	Upgrades to quay including dredging and sea disposal	This proposal relates to upgrades to Fair Isle Ferry Terminal in the Shetlands. New quay structures will be built, and existing breakwaters will be improved. This includes dredging to a sufficient water depth.	Marine.Gov.Scot	**HNDFUE** SW_NE2 SW_NE1a_to_Shetland SW_NE1b_to_Shetland SW_NE1c_to_Shetland Shetland_to_Blackhillock
Scammalin Bay, Isle of Faray Slipway Extension and Landing Jetty	Construction and dredging, and sea disposal	Extension of existing slipway and landing jetty in Sammalin Bay on the Island of Faray, Orkney. This includes underwater noise production, and dredging and sea disposal	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2
Flora	Offshore wind farm	An offshore wind farm is proposed to be developed offshore of Peterhead, Scotland (or Aberdeen, to be confirmed). Geophysical surveys and geotechnical surveys have already been undertaken.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Flotta Ultra-Deep Water Quay	Dredging	There is potential for dredging to occur to create an ultra-deep-water quay on the Isle of Flotta in Orkney. Dredged material will be used to reclaim land behind the quay wall so no disposal at sea will be required.	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2
Forthwind Offshore Wind Demonstration	Offshore wind farm	This involves the construction and operation of offshore turbines with associated infrastructure and an export cable, located in the Firth of Forth. This project will be delivered in several phases.	Marine.Gov.Scot	**HND** PA_2_to_Berwick Bank SW_E1a_to_Fiddes **HNDFUE** SW_E1a_to_Branxton SW_E3_to_Fiddes **INTOG**

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				Aspen_to_Fetteresso Cedar_to_Branxton
Green Volt	Offshore wind farm	Green Volt is a proposed offshore wind development located in the Moray Firth, with landfall expected in Peterhead. Up to 51 turbines are expected.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New Dee Shetland_to_Blackhillock SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Hatson Pier	Expansion and dredging	A Marine Licence application is being submitted for the proposed expansion of Hatson Pier and Ferry Terminal in Orkney. This will require dredging of 4850 m^{3}, but there will be no at-sea disposal. The dredged material will instead be incorporated into the	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		construction of the pier extension.		
Inch Cape	Offshore wind farm	Inch Cape is currently in construction with completion expected in 2027. This is expected to be one of Scotland's biggest windfarms, with up to 72 turbines being built, with associated infrastructure.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Invergordon Service Base Phase 5 Development	Harbour redevelopment	The redevelopment of Invergordon Service Base harbour in the Cromarty Firth includes the construction of a rock armour breakwater and capital dredging with sea disposal.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New Deer 2 SW_NE4_to_New_Deer Shetland_to_Blackhillock SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Morven Offshore Wind Farm	Offshore wind farm	The Morven offshore wind farm is proposed 60 km off the Aberdeenshire coast and will include up to 191 wind turbines with associated supports and structures and up to 844 km of inter-array cables. This will also require up to 751 km of inter-connector cables and up to 11 offshore platforms. Morven is a feature of HNDFUE and HND. The EIA scoping report, including	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		for the offshore HVDC, was submitted in November 2024.		SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Muir Mhòr Offshore Wind Farm	Offshore wind farm	This development is proposed to be located approximately 63 km east of Peterhead in Scotland with up to 67 turbines and 250 km of inter-array cables. There will be up to three export cables each 90 km in length. This development is a feature of HNDFUE. The planning application for both offshore and onshore elements was made in December 2024.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Ossian	Floating offshore wind farm	Located approximately 80 km southeast off the coast of Aberdeen, the Ossian floating offshore wind farm is proposed to have a maximum of 270 wind turbines supported on floating foundations. Ossian is a feature of HNDFUE. The EIA was submitted to the Scottish Government as part of the consent application in June 2024.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech Beech_to_Cedar
Pentland	Floating offshore wind farm	A Marine Licence has been secured for the development of a floating offshore wind farm approximately 7.5 km off the coast of Dounreay, Caithness. The development will include two offshore export cables and up to seven floating turbines and associated infrastructure.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_NE4_to_New_Deer (ES26) SW_N1_to_Spittal **HNDFUE** SW_E2b_to_Peterhead_2 SW_NE7_to_Peterhead_DCSS SW_NE8_to_Peterhead_1 SW_NE6_to_Peterhead_2 SW_NE3_to_New_Deer_2 SW_NE4_to_New_Deer Shetland_to_Blackhillock SW_NE2_to_Spittal **INTOG** Peterhead_to_Cenos
Port of Leith	Outer berth development and dredging	A Marine Licence Application has been submitted for the improvement of existing berths at the Port of Leith, Edinburgh. The new berth will be approximately 125 m	Marine.Gov.Scot	**HND** PA_2_to_Berwick Bank SW_E1a_to_Fiddes **HNDFUE** SW_E1a_to_Branxton SW_E3_to_Fiddes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		long and 35 m wide. This will also require dredging, with 47,000 m^3 of material to be removed as part of pre-enabling works, and further maintenance dredging required during operation.		**INTOG** Aspen_to_Fetteresso Cedar_to_Branxton
Salamander	Floating offshore wind farm	A proposal is in place for the development of an offshore wind farm 35 km east of Peterhead. This will include up to seven offshore turbines and floating substructures, and two export cables.	Marine.Gov.Scot	**HND** SW_E1a_to_SW_e1b SW_E1a_to_Fiddes PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_NE7_to_Peterhead **HNDFUE** SW_E2a_2_to_SW_E1c_1 SW_E2b_to_SW_E2a_1 SW_E2a_2_to_Near_Richborough SW_E3_to_Fiddes SW_E1c_1_to_Lincs_CN SW_E1c_1_to_SW_E1c_2 SW_E1a_to_Lincolnshire_Connection_Node SW_E2b_to_Peterhead_2 SW_NE8_to_Peterhead_1 SW_NE7_to_Peterhead_DCSS SW_E1a_to_SW_E1c_2 **INTOG** Cedar_to_Aspen Aspen_to_Fetteresso Peterhead_to_Cenos Cedar_to_Branxton Aspen_to_Beech

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				Beech_to_Cedar
West of Orkney	Offshore wind farm	An offshore wind farm is proposed off the west coast of Orkney with up to 125 fixed-bottom wind turbines, up to 500 km of inter-array cables and up to five offshore export cables. The landfall is proposed to be in Caithness. West of Orkney OWF is a feature of HND. The offshore consent applications were submitted to Scottish Ministers in early 2024.	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2
Eastern Green Link 1	Subsea Cable	This project comprises construction of a new converter station in Torness and a new substation in Branxton. Underground cables will run to the landfall at Thorntonloch Beach, where the 176 km HDVC cable will extend to the proposed landfall in Durham.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_NE7_to_Peterhead_DCSS SW_E2b_to_Peterhead 2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E2a_2_to_Near Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh **INTOG** Scaraben_to_Peterhead_2 Peterhead_to_Cenos Aspen_to_Fetteresso Cedar_to_Branxton
Eastern Green Link 2	Subsea Cable	This project comprises a 2 GW HVDC cable extending 505 km from Peterhead in Aberdeenshire to Drax in North Yorkshire. The cable will make landfall at Sandford Bay and will continue underground for approximately 1 km to a new converter station in Peterhead. It will make landfall in England in Fraisthorpe Sands, before extending underground for approximately 68 km to the	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Wren Hall converter station in Drax.		**HNDFUE** SW_NE7_to_Peterhead_DCSS SW_E2b_to_Peterhead 2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh **INTOG** Scaraben_to_Peterhead_2 Peterhead_to_Cenos Aspen_to_Fetteresso Cedar_to_Branxton
Eastern Green Link 3	Subsea Cable	This project comprises a 2 GW HVDC cable extending from Peterhead in Aberdeenshire and Lincolnshire. It will include the construction of a new converter stations in both Peterhead and Lincolnshire.	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		This project is still in its planning stages but may include up to 12 km of underground cabling in Peterhead and up to 550 km of subsea cable. The final landfall locations are also still to be confirmed.		PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_NE7_to_Peterhead_DCSS SW_E2b_to_Peterhead 2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh **INTOG** Scaraben_to_Peterhead_2 Peterhead_to_Cenos Aspen_to_Fetteresso Cedar_to_Branxton
Eastern Green Link 4	Subsea Cable	This project comprises a new HVDC cable that will connect Fife to Norfolk. It	Marine.Gov.Scot	**HND** SW_NE7_to_Peterhead SW_E1a_to_Lincolnshire Connection Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		will include a 500 km subsea cable from Kinghorn, Fife to South Humber, Lincolnshire. A 14 km underground cable will extend from the landfall in Kinghorn to a new converter station at Westfield near Ballingry, Fife. A 100 km underground cable will extend from the landfall in South Humber to a new converter station near Walpole in Norfolk.		PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_NE7_to_Peterhead_DCSS SW_E2b_to_Peterhead 2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2 SW_E1a_to_Branxton SW_E3_to_Fiddes SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh **INTOG** Scaraben_to_Peterhead_2 Peterhead_to_Cenos Aspen_to_Fetteresso

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				Cedar_to_Branxton
Eastern Green Link 5	Subsea cable	This project is a new high-voltage offshore link between Aberdeenshire, Scotland and Lincolnshire, England, with the aim to power up to two million homes in the North, Midlands and South of England.	National Grid	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh **HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Westray Tidal Array	Tidal turbine development	A proposal is in place for up to 70 tidal turbines to be placed within Westray Firth, Orkney with a maximum of five export cables and inter-array cables. This is being developed as part of the European Marine Energy Centre.	Marine.Gov.Scot	**HND** SW_N1_to_Spittal **HNDFUE** SW_NE2_to_Spittal Shetland_to_Blackhillock SW_N2_to_Near_Dounreay SW_NE3_to_New_Deer_2
North West England (21 projects / plans)				
Scottish Sectoral Marine Plan for Offshore Wind Energy 2020	Marine Plan	The Plan aims to identify the most sustainable plan options for the future development of commercial-scale offshore	Scottish Government	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		wind energy in Scotland. Whilst the plan assesses the impacts of offshore wind energy and concludes that with mitigation it would be possible to ensure no adverse effects, this does not replace individual project assessments for planning applications.		
English North West Marine Plans (inshore and offshore) 2021[25]	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via Crown Estate leasing. The impacts of the plan have been assessed and It has been concluded that with mitigation it would be possible to ensure no significant effects. However, this does not replace	North West Marine Plans	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

[25] The North West Marine Plans were published in 2021. Regular assessment of the plans is undertaken to ensure they remain valid.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		individual project appropriate assessments for planning applications. Of particular relevance, the identified HND corridors all lie within the Marine Plan area.		
Welsh National Marine Plan 2019	Marine Plan	The Welsh National Marine Plan sets out a long-term vision for the sustainable development of the Welsh marine area. The plan has assessed offshore wind, wave, and tidal energy, concluding that effects to habitats can be avoided with known available mitigation measures.	Welsh Government	**HND** R4_4_to_Bodelwyddan R4_5_to_Penwortham R4_6_to_Penwortham Ballantrae_to_Pentir **Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to meet the future energy demand.	NESO	All routes
Joint Fisheries Statement and Fisheries Management Plans	Management Plan	The Joint Fisheries Statement is a key element of the UK Fisheries Framework, setting out the policies for achieving, or	Welsh Government	All routes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		helping to achieve, the eight fisheries objectives set out in Section 2 of the Fisheries Act 2020. This plan also provides a list of Fisheries Management Plans (FMPs), to be delivered over the lifetime of the first statement.		
Mersey Tidal Power	Tidal Energy	A tidal range project to harness renewable energy using a turbine array in a barrage-type solution.	PINs	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Walney 1 and 2	Offshore Wind Farm	This offshore wind farm has been operational since 2012 and consisted of two phases, each comprising of 51 turbines. It has a capacity of 367 MW. The wind farm is located 15 km from the coast of Walney Island, covering an area of 73 km^2.	Orsted	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Walney Extension Offshore Wind Farm	Offshore Wind Farm	Construction of an offshore wind farm extension located to the west and northwest of an existing offshore wind farm with an upper generating capacity of 750 MW, together with	PINs MMO	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		offshore and onshore electrical infrastructure including cable route from the coast to a new substation located near Middleton, Lancashire.		
Ormonde Offshore Wind Farm	Offshore Wind Farm	Ormonde Offshore Wind Farm is located in the Irish Sea, 10 km west of Walney Island in Burrow in Furness, Cumbria. The development consists of 30 turbines with a potential capacity of 150 MW.	MMO	**HND** R4_5_to_Penwortham R4_6_to_Penwortham R4_4_to_Bodelwyddan
Barrow Offshore Wind Farm	Offshore Wind Farm	Barrow Offshore Wind Farm is located in the Irish Sea 7 km southwest from Walney Island near Barrow in Furness, Cumbria. The development consists of 30 turbines with an overall capacity 90 MW.	Orsted	**HND** R4_5_to_Penwortham R4_6_to_Penwortham R4_4_to_Bodelwyddan
Morgan and Morecambe Offshore Wind Farms Transmission Assets	Subsea cables, and other infrastructure	Transmission assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm including offshore substation platforms, cables between offshore substation platforms, offshore booster	PINs Crown Estate MMO	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		station(s), offshore export cables, onshore landfall infrastructure, onshore export cables, onshore substations, onshore grid connection cables and circuit breaker compounds, and other related onshore infrastructure. Morgan and Morecambe are both features of HND. The applications for development consent for both projects have been accepted for examination. Preliminary hearings for Morgan occurred in September 2024, and February 2025 for Morecambe.		
Morecambe Offshore Windfarm Generation Assets	Offshore Wind Farm	The Generation Assets of the Morecambe Offshore Windfarm, including fixed foundation wind turbine generators, inter-array cables, offshore substation platform(s) and possible platform link cables to connect offshore substations. The offshore windfarm site is located in the eastern Irish Sea, in water depths of	PINs Crown Estate	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		18-40 m. The windfarm has an expected nominal capacity of 480 MW. The offshore windfarm site is situated in the vicinity of the South Morecambe Gas Fields (which are currently expected to cease production around 2027 (+/-2 years)). An important factor in the windfarm site's selection was the potential for the project to be the first windfarm to fully co-exist with oil and gas operations on previously developed seabed. The offshore windfarm site was selected as part of The Crown Estate's Offshore Wind Leasing Round 4. Several operational windfarms are located near the site. Two larger Round 4 offshore windfarms are also planned to the west of the site. The Morecambe offshore windfarm will help achieve the UK Government's commitment to net zero by 2050 and tackle the climate emergency by producing		

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		electricity from renewable energy.		
R4 Project 4 (Mona)	Offshore Wind Farm	The Mona Potential Array Area (i.e. the area within which the offshore wind turbines will be located) is located in the east Irish sea, 28.2 km (15.2 nautical miles (NM)) from the north coast of Wales and 39.9 km (21.5 NM) from the northwest coast of England. The proposed capacity of the Mona Offshore Wind Project is 1.5 GW. Mona OWF is a feature of HND. The examination for the development consent application closed in January 2025 and is awaiting decision from the Examining Authority and Secretary of State.	Crown Estate Scoping report	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Burbo Bank Offshore Wind Farm	Offshore Wind Farm	In operation since 2007, located on Burbo Flats in Liverpool Bay. The Burbo Bank wind farm has an overall capacity of 90MW with 25 turbines.	Orsted	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Burbo Bank Extension offshore wind farm	Offshore Wind Farm	Proposed Burbo Bank Extension offshore wind farm covering an area of 40 km and with an estimated generating capacity of up to 250 MW. The proposed project would be located west of the operational Burbo Bank offshore wind farm in Liverpool Bay, around 7 km north of the North Wirral coast, 8.5 km from Crosby beach, and 12.2 km from the Point of Ayr on the Welsh coast	PINs	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
HyNet Carbon Dioxide Pipeline	Pipeline	A new build carbon dioxide (CO_2) pipeline that will transport CO_2 produced and captured by future hydrogen producing facilities and existing industrial premises in North West England and North Wales for offshore storage. The CO_2 pipeline will comprise both newbuild and existing pipelines that will be covered under the DCO. When complete it will run from the Ince AGI in Cheshire to Talacre Beach in North Wales.	PINs	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Awel y Môr Offshore Wind Farm	Offshore Wind Farm	Awel y Môr is an offshore wind farm, to generate in excess of 500MW. The project will be comprised of (but not limited to): an offshore wind farm, including wind turbine generators and associated foundations, wind measurement equipment and array cables; transmission infrastructure, including offshore substations and associated foundations, offshore and onshore export cables (underground), including associated transition bays and jointing bays, an onshore substation, and connection infrastructure into the National Grid.	PINs	**HND** R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Crown Estate Project Development Area 1	Offshore wind leasing opportunity	Spatial Design for Offshore Wind Leasing Round 5 has sought to identify the most suitable locations within the Celtic Sea to enable the first commercial scale Floating Offshore Wind leasing opportunity. Three Project Development Areas (PDAs) have been identified close to onshore	Crown Estate Report	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		grid infrastructure with lower levels of constraint. The three PDAs are located east of the Bristol Channel: south west of Milford Haven, Pembrokeshire and north west of Padstow, Cornwall. Each PDA aims to facilitate floating offshore wind turbines, generating up to 1.5GW of power. PD1 comprises the most northern area, 369 km² in size.		
Crown Estate Project Development Area 2	Offshore wind leasing opportunity	Spatial Design for Offshore Wind Leasing Round 5 has sought to identify the most suitable locations within the Celtic Sea to enable the first commercial scale Floating Offshore Wind leasing opportunity. Three Project Development Areas (PDAs) have been identified close to onshore grid infrastructure with lower levels of constraint. The three PDAs are located east of the Bristol Channel: south west of Milford Haven, Pembrokeshire and north west of Padstow,	Crown Estate Report	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Cornwall. Each PDA aims to facilitate floating offshore wind turbines, generating up to 1.5GW of power. PD2 comprises the most southern area, 358 km² in size.		
Crown Estate Project Development Area 3	Offshore wind leasing opportunity	Spatial Design for Offshore Wind Leasing Round 5 has sought to identify the most suitable locations within the Celtic Sea to enable the first commercial scale Floating Offshore Wind leasing opportunity. Three Project Development Areas (PDAs) have been identified close to onshore grid infrastructure with lower levels of constraint. The three PDAs are located east of the Bristol Channel: south west of Milford Haven, Pembrokeshire and north west of Padstow, Cornwall. Each PDA aims to facilitate floating offshore wind turbines, generating up to 1.5GW of power. PD3 comprises the most eastern area, 334 km² in size.	Crown Estate Report	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Minerals Aggregates Site: Liverpool Bay	Aggregate extraction	Marine aggregate extraction Area 392 / 393, located in Liverpool Bay north of the Flintshire It. The date of the current licence is 31/8/2024	Crown Estate	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Minerals Aggregates Site: Hilbre Swash	Aggregate extraction	Marine aggregate extraction Area, located in Liverpool Bay north of the Flintshire coast. Aggregate extraction has taken place in the current licence area and previously in an area immediately to the south for over 50 years. This is due to continue until 31/12/2029.	Crown Estate	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Tidal Stream Site: West Anglesey Demonstration Zone	Tidal power	Four green energy tidal stream projects based in waters off Anglesey. They will provide electricity to the National Grid. Hydrowing: 10 MW Verdant: 4.9 MW MOR Energy: 4.5 MW Magallanes: 3 MW	Crown Estate	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Tidal Stream Site: Holyhead Deep	Tidal power	Developing Holyhead Deep into a commercial tidal energy array is proposed to be carried out in a number of phases. The installation	Crown Estate Developer	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		of the kite array will be in accordance with a navigation risk assessment which is undertaken to minimise the impact on other sea users. In total there will be 60 1.2 MW units, with a total tidal array capacity at 80 MW (minimum). Grid connection will be made via the Morlais onshore development.		R4_4_to_Bodelwyddan
MOD Eskmeals Artillery Trial	Military	Ends 3/31/2024 Information not publicly available.	N/A	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Gwynt y Môr	Offshore Wind Farm	This operational offshore wind farm has a capacity of 576 MW with 160 turbines. It is located off the coast of North Wales between Llandudno and the Wirral.	RWE	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
Rhyl Flats	Offshore Wind Farm	Rhyl Flats has been operation since 2009 and has a capacity of 90 MW with 25 turbines. It is located in Liverpool Bay, 8	RWE	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		km off the North Wales coast.		
North Hoyle	Offshore Wind Farm	This wind farm consists of 30 turbines with a capacity of 60 MW. It covers an area of 10 km^2 and is located off the coast of North Wales between Rhyl and Prestatyn.	OSPAR Commission	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
West of Duddon Sands	Offshore Wind Farm	An operational offshore wind farm since 2014 with 108 wind turbines and a total capacity of 389 MW. It is located approximately 14 km from Walney Island in Cumbria.	Orsted	**HND** Ballantrae_to_Pentir R4_6_to_Penwortham R4_5_to_Penwortham R4_4_to_Bodelwyddan
South West (9 projects / plans)				
English South West Marine Plans (inshore and offshore) 2021[26]	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via	South West Marine Plans	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy

[26] The South West Marine Plans were published in 2021. Regular assessment of the plans is undertaken to ensure they remain valid.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Crown Estate leasing. The plan has assessed the potential impacts and concludes that with mitigation it would be possible to ensure no significant impacts. However, this does not replace individual project appropriate assessments for planning applications. Of particular relevance, the identified HND corridors all lie within the Marine Plan area.		
Welsh National Marine Plan 2019	Marine Plan	The Welsh National Marine Plan sets out a long-term vision for the sustainable development of the Welsh marine area. The plan has assessed offshore wind, wave, and tidal energy, concluding that effects to habitats can be avoided with known available mitigation measures.	Welsh Government	**HND** R4_4_to_Bodelwyddan R4_5_to_Penwortham R4_6_to_Penwortham Ballantrae_to_Pentir **Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to	NESO	All routes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		meet the future energy demand.		
Joint Fisheries Statement and Fisheries Management Plans	Management Plan	The Joint Fisheries Statement is a key element of the UK Fisheries Framework, setting out the policies for achieving, or helping to achieve, the eight fisheries objectives set out in Section 2 of the Fisheries Act 2020. This plan also provides a list of Fisheries Management Plans (FMPs), to be delivered over the lifetime of the first statement.	Welsh Government	All routes
South Hook Combined Heat & Power Station	Power station	An integrated combined heat and power (CHP) plant based on combined cycle gas turbine technology including combustion turbine generator(s); heat recovery steam generator(s); steam turbine generator(s); stack for discharge of combustion gases; electrical switchgear; and area reserved for carbon capture. The proposed CHP plant will have an installed capacity	PINs	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		of up to 500 MW and produce sufficient electricity to both meet the existing terminal's power needs and to export surplus electricity. New or upgraded electrical transmission connection, eventually to National Grid Electricity Transmission 400 kilovolt (kV) substation at Pembroke Power Station, to be resolved and possibly to be subject of separate DCO application. A number of route options are currently being considered.		
Hinkley C New Nuclear Build	Nuclear power station	Development of two new nuclear power stations on the somerset coastline at Hinkley Point, to power 6,000,000 homes.	EDF Energy	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Future Port Talbot	Floating offshore wind hub and green energy development	The development of Port Talbot, on the Swansea coastline, is proposed to enable a central location for the manufacturing, assembly and integration of FLOW for projects in the Celtic Sea.	ABP	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Llŷr	Floating Offshore Wind Farm	A floating offshore windfarm 35 km off the	NRW	**Celtic Sea** PDA1_to_Llandyfaelog

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Pembrokeshire coastline in the Celtic Sea. The development comprises 10 wind turbine generators and the export cable will make landfall at Freshwater West in Milford Haven.		PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Erebus	Floating Offshore Wind Farm	A floating offshore wind farm located 35 km southwest of the Pembrokeshire coastline, with the export cable making landfall at Milford Haven. The project comprises between 6 and 10 wind turbines with up to 23 km of inter-array cables and 49 km of offshore export cable.	NRW	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
Seaweed Farm, North Cornwall	Aquaculture	A Marine Licence application has been submitted covering a 100-hectare area of sea in order to sustainably farm native seaweed.	MMO	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
The Sizewell C Project	Nuclear Power Station	A new 3.2 GW Nuclear Power Station in Somerset; generating low-carbon electricity for ~6,000,000 homes. It will be a close copy of Hinkley Point C	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		which is already under construction; and has an expected operational life of 60 years.		
White Cross	Floating offshore wind farm	A floating offshore wind farm in development to be located 52 km off the North Devon coast. The wind farm will have up to eight turbines with a maximum capacity of 100 MW of renewable energy.	White Cross	**Celtic Sea** PDA1_to_Llandyfaelog PDA2_to_South_Wales_Connection_Node PDA3_to_Pyworthy
North East England (23 projects / plans)				
Scottish Sectoral Marine Plan for Offshore Wind Energy 2020	Marine Plan	The Plan aims to identify the most sustainable plan options for the future development of commercial-scale offshore wind energy in Scotland. The plan has assessed the impacts of offshore wind energy and concludes that with mitigation it would be possible to ensure no significant impact, although this does not replace individual project appropriate assessments for planning applications.	Scottish Government	**HND** SW_E1a_to_Lincolnshire_Connection_Node PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_E2b_to_Peterhead_2 SW_E2b_to_SW_E2a_1 SW_E2a_1_to_SW_E2a_2 SW_E2a_2_to_Near_Richborough SW_E2a_2_to_SW_E1c_1 SW_E1c_1_to_SW_E1c_2 SW_E1a_to_SW_E1c_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E1a_to_Branxton SW_E3_to_Fiddes **INTOG** Aspen_to_Fetteresso North_Connect_to_Cenos Beech_to_Cedar Peterhead_to_Cenos Cedar_to_Aspen Cedar_to_Branxton SW_E1c_2_to_Weston_Marsh SW_E1c_1_to_Lincolnshire_Connection_Node
English North East Marine Plans (inshore and offshore) 2021[27]	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via Crown Estate leasing. The plan does assess Its potential for impact, although this does not	The North East Marine Plans Documents	**HND** PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2

[27] English North East Marine Plans were published in 2021. Regular assessment of the plans is undertaken to ensure they remain valid.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		replace individual project appropriate assessments for planning applications. Of particular relevance, the identified HND and HNDFUE corridors all lie within the Marine Plan area.		
English East Marine Plans (inshore and offshore) 2014	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via Crown Estate leasing. The has assessed Its potential for impact and concludes that with mitigation it would be possible to ensure no significant effects. However, this does not replace individual project appropriate assessments for planning applications. Of particular relevance, the identified HND corridors all lie within the Marine Plan area.	East Marine Plans	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to meet the future energy demand.	NESO	All routes
Joint Fisheries Statement and Fisheries Management Plans	Management Plan	The Joint Fisheries Statement is a key element of the UK Fisheries Framework, setting out the policies for achieving, or helping to achieve, the eight fisheries objectives set out in Section 2 of the Fisheries Act 2020. This plan also provides a list of Fisheries Management Plans (FMPs), to be delivered over the lifetime of the first statement.	Welsh Government	All routes
H2Teesside	Carbon capture plant, pipelines and other infrastructure	A hydrogen production plant of up to 1,200 megawatt thermal capacity; hydrogen distribution pipelines; an air separation unit or oxygen supply pipeline; carbon dioxide capture and compression facilities and	PINs	**HND** PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		a connection to the Northern Endurance Partnership infrastructure (also known as Net Zero Teesside); a natural gas supply connection; other gas pipelines; an electricity grid connection; water supply and treatment infrastructure; wastewater treatment and disposal infrastructure; and other utilities connections, telecommunications and other associated and ancillary infrastructure.		
York Potash Harbour Facilities Order	Jetty Dredging	The installation of wharf / jetty facilities with two ship loaders capable of loading bulk dry material at a rate of 12m tons per annum (dry weight). Associated dredging operations to create berth. Associated storage building with conveyor to wharf / jetty. Including a materials handling facility (if not located at Wilton) served by a pipeline (the subject of a separate application) and conveyor to storage building and jetty.	PINs	**HND** PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit **HNDFUE** SW_E1c_1

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
The Net Zero Teesside Project	Car, utilisation and storage	A full chain carbon capture, utilisation and storage ('CCUS') project, comprising a CO2 gathering network, including CO2 pipeline connections from industrial facilities on Teesside to transport the captured CO2 (including the connections under the tidal River Tees); a combined cycle gas turbine ('CCGT') electricity generating station with an abated capacity circa 850 gigawatts output (gross), cooling water, gas and electricity grid connections and CO2 capture; a CO2 gathering / booster station to receive the captured CO2 from the gathering network and CCGT generating station; and the onshore section of a CO2 transport pipeline for the onward transport of the captured CO2 to a suitable offshore geological storage site in the North Sea.	PINs	**HND** PA_2_to_Berwick Bank SW_E1a_to_Hawthorn Pit **HNDFUE** SW_E1c_1
Dogger Bank D Wind Farm	Offshore Wind Farm	Dogger Bank D (DBD) Offshore Wind Farm encompasses a circa	PINs	**HND** R4_3_to_Weston_Marsh

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		2000MW offshore wind farm, offshore high voltage transmission and potential onshore transmission and Hydrogen Production Facility infrastructure. Dogger Bank D is a feature of HND southern cluster. The Preliminary Environmental Information Report (PEIR) is due to be submitted in June 2025.		SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E2a_2
Dogger Bank South Offshore Wind Farms	Offshore Wind Farm	The Dogger Bank South Offshore Wind Farms project comprises the two offshore wind farms (Dogger Bank South West and Dogger Bank South East) and associated offshore and onshore infrastructure including offshore and onshore high voltage electricity cables, onshore and offshore electricity substation(s), connection(s) to the National Grid and ancillary and temporary works. Dogger Bank South West and Dogger Bank South East are both features of HND southern cluster. Formal examination for	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		both OWFs is ongoing in 2025.		
Dogger Bank Creyke Beck	Offshore Wind Farm	Dogger Bank Creyke Beck (previously known as Dogger Bank Offshore Wind Farm) is the first stage of Forewind's offshore wind energy development of the Dogger Bank Zone (Zone 3, Round 3). It will comprise two wind farms, each with an installed capacity of up to 1.2GW, which are expected to connect to the national grid in the East Riding of Yorkshire. Therefore, Dogger Bank Creyke Beck could have a total installed capacity of up to 2.4GW. The offshore wind farms will be located in the Dogger Bank Zone which is located between 125 to 290 km off the coast of East Yorkshire. The onshore elements of the development will be located in the East Riding of Yorkshire.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E2a_2
Hornsea Offshore Wind Farm (Zone 4) - Project One	Offshore Wind Farm	Project One is the first development proposed within the Hornsea Zone.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Project One will constitute up to three offshore wind generating stations with a total capacity of up to 1,200 MW and will include all offshore and onshore infrastructure. The DCO for Project One would authorise the construction and operation of up to 332 wind turbines, up to two offshore accommodation platforms, up to five offshore HVAC collector substations, up to two offshore HVDC converter stations, an offshore HVAC reactive compensation substation, subsea inter-array electrical circuits, a marine connection to the shore approximately 150 km in length, a foreshore connection and from the proposed landfall point at Horseshoe Point, onshore cables which will connect the offshore wind farms to the onshore electrical transmission station and the connection from there to National Grid's existing substation at North		PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Killingholme, a distance of approximately 40 km.		
Hornsea Offshore Wind Farm (Zone 4) - Project Two	Offshore Wind Farm	Project Two is an Offshore Wind Generating Station with maximum output of 1,800MW.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2
Hornsea Project Three Offshore Wind Farm	Offshore Wind Farm	Development of the Hornsea Project Three offshore wind farm with an approximate capacity of up to 2,400MW off the coast of Norfolk. This is within the area known as Zone 4, under the Round 3 offshore wind licensing arrangements established by The Crown Estate	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E2a_2
Hornsea Project Four Offshore Wind Farm	Offshore Wind Farm	Development of the Hornsea Project Four offshore wind farm.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		This is within the western area of the former Hornsea known as Zone 4, under the Round 3 offshore wind licensing arrangements established by The Crown Estate.		PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2
TIGRE Project 1 (TP1)	Offshore gas-fired power station	Transition to integrated Gas and Renewable Energy (TIGRE™) is the development and deployment of gas-fired power station facilities offshore integrated with existing late-life gas fields to utilise the gas at source and avoid gas transportation and processing costs. Existing transmission infrastructure associated with offshore windfarms is utilised to connect the development to the National Grid. The Project is based entirely offshore (beyond 12 nm). Key components of TIGRE™ are:	TIGRE Group	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2 SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Mid to late-life gas production assets seeking production cost reduction opportunities to extend production life. Construction of proven technology of aero-derivative OCGT generators located offshore either on or adjacent to gas production facilities and close to an offshore windfarm substation. This will have a capacity of 220MW. Energy is exported through existing offshore wind farm transmission infrastructure (OFTO) utilising up to 50% spare capacity available from intermittency of wind generation.		
Outer Dowsing Offshore Wind (Generating Station)	Offshore Wind Farm	The Outer Dowsing Offshore Wind project comprises an offshore wind farm and associated offshore and onshore infrastructure including offshore and onshore high voltage electricity cables, onshore and offshore electricity substation(s), connection(s) to the	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		National Grid and ancillary and temporary works. Outer Dowsing is a feature of HND and is currently undergoing examination. Formal examination is scheduled to end in April 2025.		SW_E1c_2 SW_E2a_2
Triton Knoll Offshore Wind Farm	Offshore Wind Farm	The development comprised the construction and operation of up to 288 wind turbine generators with a maximum tip height of up to 220 metres, offshore substations, meteorological stations and underwater cabling to connect the turbines and substations. This is now operational.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2
Aldbrough Hydrogen Storage	Hydrogen storage	Underground Gas Storage Facility - up to 9 underground caverns (cavities), gas processing plant and associated development with capacity to store up to 420 standard million cubic meters (mcm) of hydrogen, having an import and export capability of up to 12.1 mcm per day.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Humber Gateway	Offshore Wind Farm	Fully operational offshore wind farm since 2015 with 73 turbines and a total capacity of 219 MW. Located 8 km from Holderness, just north of the mouth of the River Humber.	RWE	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincs_CN PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2
Humber Low Carbon Pipelines	Pipeline	Construction of carbon dioxide (to facilitate CCUS) and hydrogen (H^2) transportation pipelines between Drax in North Yorkshire and Easington in East Riding of Yorkshire, connecting various emitters and generators in the Humber. The application will include associated infrastructure comprising pipeline internal gauge (PIG) traps, a multi-junction, block valves, a compressor station and associated works. Other projects in the region linked to this project include: Hydrogen	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		Production at Saltend (Equinor); Carbon Capture (Drax); Blue & Green Hydrogen Hub (Killingholme (Uniper)); Keadby Clean Power Hub (SSE Thermal); and ZCH Enabling Paths to Sustainable Steel Making (British Steel). There is also the Zero Humber project (VPI Immingham and P66) and the Gigastack Green H2 project (Orsted and ITM Power) in the Humber.		
River Humber Gas Pipeline Replacement Project	Pipeline	The replacement of a natural gas transmission pipeline, housed within a tunnel beneath the Humber Estuary commencing approximately 2 miles north east of Goxhill, North Lincolnshire, terminating approximately 1 mile south east of Paull, East Riding of Yorkshire.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2
Able Marine Energy Park	Dredging and land reclamation	The nationally significant infrastructure project is a quay of solid construction on the south bank of the River Humber together with	PINs PINs ii PINS iii	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		an ecological compensation scheme comprising both temporary and permanent habitat creation on the opposite bank. Associated development includes dredging and land reclamation, onshore facilities for the manufacture, assembly and storage of marine energy installation components. Notably there are amendments to the original application design: An amendment to extend the period for compulsory acquisition for one parcel authorised by the Able Marine Energy Park DCO 2014; and Two amendments to the layout of the quay that was authorised by the Able Marine Energy Park Development Consent Order 2014.		R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2
Immingham Green Energy Terminal	Jetty and plant	The project comprises a new liquid bulk import terminal and associated	PINs BETA	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		processing facility, the purpose of which is to deliver a green hydrogen production facility. Imported ammonia will be stored and processed at the site to create green hydrogen, for onward transport to filling stations throughout the UK. Key project infrastructure comprises; a new approach trestle, jetty superstructure and topside infrastructure; and land side processing infrastructure.		PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HND** SW_E1c_1 SW_E1c_2
Hornsea Project Two Subtidal Cable Repairs, Replacement or Reburial Works Within the Humber Estuary SAC	Cable repair	Hornsea Project Two has applied for a Marine Licence to cover the repair or replacement of a section of cable, and also reburial of the cable if it becomes exposed for the lifetime of the project i.e. 25 years. (2020 – 2044). The Marine Licence being applied for here only covers works within the subtidal area (i.e. seaward of the intertidal area and below MLWS), the marine licence extends from the boundary	MMO	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		of MLWS to the boundary of the Humber Estuary SAC.		
Eastern Green Link 1	Subsea Cable	This project comprises construction of a new converter station in Torness and a new substation in Branxton. Underground cables will run to the landfall at Thorntonloch Beach, where the 176 km HDVC cable will extend to the proposed landfall in Durham.	Marine.Gov.Scot	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Eastern Green Link 2	Subsea Cable	This project comprises a 2 GW HVDC cable extending 505 km from Peterhead in Aberdeenshire to Drax in North Yorkshire. The cable will make landfall at Sandford Bay and will continue underground for approximately 1 km to a new converter station in Peterhead. It will make landfall in England in Fraisthorpe Sands, before extending underground for approximately 68 km to the Wren Hall converter station in Drax.	Marine.Gov.Scot	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E1c_2_to_Weston_Marsh
Eastern Green Link 3	Subsea Cable	This project comprises a 2 GW HVDC cable extending from Peterhead in Aberdeenshire and Lincolnshire. It will include the construction of a new converter stations in both Peterhead and Lincolnshire. This project is still in its planning stages but may include up to 12 km of underground cabling in Peterhead and up to 550 km of subsea cable. The final landfall locations are also still to be confirmed.	Marine.Gov.Scot	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes **HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Eastern Green Link 4	Subsea Cable	This project comprises a new HVDC cable that will connect Fife to Norfolk. It will include a 500 km subsea cable from Kinghorn, Fife to South Humber, Lincolnshire. A 14 km underground cable will extend from the landfall in Kinghorn to a new converter station at Westfield near Ballingry, Fife. A 100 km underground	Marine.Gov.Scot	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh SW_E1a_to_SW_e1b SW_E1a_to_Fiddes

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		cable will extend from the landfall in South Humber to a new converter station near Walpole in Norfolk.		**HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Eastern Green Link 5	Subsea cable	This project is a new high-voltage offshore link between Aberdeenshire, Scotland and Lincolnshire, England, with the aim to power up to two million homes in the North, Midlands and South of England.	National Grid	**HND** SW_E1a_to_Lincolnshire Connection Node PA_2_ to_Berwick_Bank SW_E1a_to_Hawthorn Pit R4_1_to_Birkhill_Wood R4_2_to_Birkhill_Wood PA_1_to_Birkhill_Wood R4_3_to_Weston_Marsh **HNDFUE** SW_E2a_2_to_Near Richborough SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Westernmost Rough	Offshore Wind Farm	Operational since 2015 with a capacity of 210 MW of renewable power and 35 turbines. Located 8 km off the coast of Withernsea in East Riding of Yorkshire.	Lindy Energy	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincs_CN PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				SW_E1c_2
East and South East England (22 projects / plans)				
English South East Marine Plans (inshore and offshore) 2021[28]	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via Crown Estate leasing. The plan has assessed its potential for impacts and concludes that with mitigation it would be possible to ensure no significant effects. However, this does not replace individual project assessments for planning applications. Of particular relevance, the identified HND corridors all lie within the Marine Plan area.	South East Marine Plan	**HNDFUE** SW_E2a_2

[28] English South East Marine Plans were published in 2021. Regular assessment of the plans is undertaken to ensure they remain valid.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
English South Marine Plans (inshore and offshore) 2018[29]	Marine Plan	The Plans provides a policy framework which will be used to help inform decision-making on what activities take place in the marine environment and how the marine environment is developed, protected, and improved in the next 20 years. It does not allocate offshore wind areas as this is done via Crown Estate leasing. The plan has assessed the impacts and concludes that with mitigation it would be possible to ensure no significant effects. However, this does not replace individual project assessments for planning applications.	South Marine Plans	**HNDFUE** SW_E2a_2
Strategic Spatial Energy Planning (SSEP)	Spatial Plan	SSEP is a GB-wide plan which will map potential locations quantities and types of electricity and hydrogen generation and storage infrastructure over time, which are required to	NESO	All routes

[29] English South Marine Plans were published in 2018. Regular assessment of the plans is undertaken to ensure they remain valid.

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		meet the future energy demand.		
Joint Fisheries Statement and Fisheries Management Plans	Management Plan	The Joint Fisheries Statement is a key element of the UK Fisheries Framework, setting out the policies for achieving, or helping to achieve, the eight fisheries objectives set out in Section 2 of the Fisheries Act 2020. This plan also provides a list of Fisheries Management Plans (FMPs), to be delivered over the lifetime of the first statement.	Welsh Government	All routes
Norfolk Boreas	Offshore Wind Farm	Offshore Wind Farm (Power Station) – Maximum Capacity 1.8GW also associated infrastructure required to export the electricity to the National Grid substation at Necton in Norfolk	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E2a_2
Nearshore Seaweed Cultivation of Native Species	Aquaculture	Seaweed farm construction planned for September 2024 and to be scaled up until 2026.	MMO	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
				R4_2_to_Birkhill Wood **HNDFUE** SW_E1c_1 SW_E1c_2
Norfolk Vanguard	Offshore Wind Farm	Norfolk Vanguard is a proposed offshore windfarm with an approximate capacity of 1800MW off the coast of Norfolk. The centre of Norfolk Vanguard West is 67 km from the Bacton coast and 63 km from the Gorleston coast at their nearest point; it is approximately 295 km^2. The centre of Norfolk Vanguard East is 98 km from the Bacton coast and 86 km from the Gorleston coast at their nearest point; it is approximately 297 km^2.	PINs	**HND** R4_3_to_Weston_Marsh SW_E1a_to_Lincolnshire_Connection_Node PA_1_to_Birkhill Wood R4_1_to_Birkhill Wood R4_2_to_Birkhill Wood **HNDFUE** SW_E2a_2
Lincs	Offshore Wind Farm	This offshore wind farm is operational with 75 turbines and a total capacity of 270 MW. It is located 8 km off the Skegness coast with the export cable extending into the Wash to the River Nene.	Lindy Energy	**HND** R4_3_to_Weston_Marsh R4_1_to_Birkhill Wood **HNDFUE** SW_E1a_to_Lincolnshire_Connection_Node SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
Lynn and Inner Dowsing	Offshore Wind Farm	Two separate offshore wind farms located 5 km off Skegness which have been merged into one. Each project has 27 turbines, resulting in a total of 54 turbines with a maximum capacity of 194.4 MW.	GLID Wind Farms	**HND** R4_3_to_Weston_Marsh R4_1_to_Birkhill Wood **HNDFUE** SW_E1a_to_Lincolnshire_Connection_Node SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
Sheringham and Dudgeon Extension Projects	Offshore Wind Farm	This relates to extensions to both the operational Sheringham Shoal Offshore Wind Farm and the Dudgeon Offshore Wind Farm. Sheringham Shoal has a total of 88 turbines with a capacity of 317 MW, and Dudgeon has 67 turbines with a total capacity of 402 MW. The extension will double the capacity of the existing wind farms.	PINs	**HND** R4_3_to_Weston_Marsh R4_1_to_Birkhill Wood **HNDFUE** SW_E1a_to_Lincolnshire_Connection_Node SW_E1c_1_to_Lincolnshire Connection Node SW_E1c_2_to_Weston_Marsh
East Anglia ONE Offshore Windfarm	Offshore Wind Farm	Development of an offshore wind farm which consisted of up to up to 325 wind turbine generators and associated infrastructure, with an installed capacity of	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		1200MW, located 43 km from the Suffolk Coast. Part of a develop of approximately 7200MW of wind capacity off the coast of East Anglia, known as Zone 5 under the Crown Estate Round 3 Offshore Wind Farm Licensing Arrangements. A joint venture between Scottish Power Renewables and Vattenfall Wind Power. This is now operational.		
East Anglia TWO Offshore Windfarm	Offshore Wind Farm	An offshore wind farm which could consist of up to 75 turbines, generators and associated infrastructure, with an installed capacity of up to 900MW, located 37 km from Lowestoft and 32 km from Southwold. From landfall, the cables will be routed underground to an onshore substation which will in turn connect into the national electricity grid via a National Grid Electricity Transmission (NGET) substation and cable sealing end compounds, the latter to	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		be owned and operated by NGET.		
East Anglia THREE Offshore Wind Farm	Offshore Wind Farm	Development of an offshore windfarm with an approximate capacity of 1200MW off the coast of East Anglia, within the area known as Zone 5, under the Round 3 Offshore Wind Licensing Arrangements.	PINs	**HNDFUE** SW_E2a_2
Five Estuaries Offshore Wind Farm	Offshore Wind Farm	Five Estuaries is an offshore wind farm expected to generate in excess of 300MW. The project will be comprised of (but not limited to): • an offshore wind farm, including wind turbine generators and associated foundations and array cables; and • transmission infrastructure, including offshore substations and associated foundations, offshore and onshore export cables (underground), including associated	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		transition bays and jointing bays, an onshore substation, and connection infrastructure into the National Grid.		
Galloper Offshore Wind Farm	Offshore Wind Farm	The development comprised the installation, operation of Galloper Wind Farm, a proposed offshore generating station and its associated electrical connection. The Galloper Wind Farm generating station would involve the development of up to 140 wind turbine generators, with a maximum capacity of 504 MW encompassing an area of 183 km^2 within three areas. Export cables would be brought to shore, and a proposed substation would be constructed to connect the project to the national grid network via existing adjacent transmission towers. This includes new electric downlines and sealing end compounds to connect the wind farm to	PINs MMO	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		the existing 400 kV network. This is now operational.		
Eastern Green Link 3	Subsea Cable	This project comprises a 2 GW HVDC cable extending from Peterhead in Aberdeenshire and Lincolnshire. It will include the construction of a new converter stations in both Peterhead and Lincolnshire. This project is still in its planning stages but may include up to 12 km of underground cabling in Peterhead and up to 550 km of subsea cable. The final landfall locations are also still to be confirmed.	Marine.Gov.Scot	**HNDFUE** SW_E2a_2_to_Near Richborough
Eastern Green Link 4	Subsea Cable	This project comprises a new HVDC cable that will connect Fife to Norfolk. It will include a 500 km subsea cable from Kinghorn, Fife to South Humber, Lincolnshire. A 14 km underground cable will extend from the landfall in Kinghorn to a new converter station at Westfield near Ballingry, Fife. A 100 km underground cable will extend from the landfall in South Humber to	Marine.Gov.Scot	**HNDFUE** SW_E2a_2_to_Near Richborough

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		a new converter station near Walpole in Norfolk.		
Sea Link	Subsea cable	The Sea Link Project comprises construction of a new converter station within 5 km of the proposed Friston substation to be connected via High Voltage Alternating Current (HVAC) underground cables between the new converter station and the proposed Friston substation. The connection will continue via High Voltage Direct Current (HVDC) underground cables from the new converter station to the coast and will join the new offshore HVDC cable at Suffolk Coast. The new HVDC offshore cable will be approximately 130 km long and will link with Kent Coast at Pegwell Bay.	PINs	**HNDFUE** SW_E2a_2
North Falls Offshore Wind Farm	Offshore Wind Farm	An offshore electricity generating station approximately 24.5 km from its nearest point at the Port of Lowestoft. It is estimated to have an installed capacity in excess	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		of 100MW and will principally comprise offshore wind turbines together with associated infrastructure (onshore and offshore) including a connection to the electricity transmission network.		
Bradwell B new nuclear power station	Nuclear Power Station	A new nuclear power station proposed to be constructed at Bradwell-on-Sea, Essex. It would be capable of generating up to 2.2GW of electricity.	Bradwell B Project	**HNDFUE** SW_E2a_2
Perrys Farm Hazardous Waste Management Facility	Hazardous Waste Facility	Continued extraction of sand and gravel, extraction of clay, along with the development and construction of a recycling and soil treatment centre, air pollution control residues treatment facility and associated works, importation and disposal of hazardous waste by landfill of up to 120,000 tonnes per annum, and a restoration scheme	Planning.Data.Gov	**HNDFUE** SW_E2a_2
Kentish Flats Extension	Offshore Wind Farm	The proposed development comprises the erection of 10 to 17 wind turbines with a	PINs	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		maximum tip height of 145 metres, monopile foundations, and underwater cabling to connect the turbines together and to export the electricity generated. The export cables will come ashore close to Hampton Pier where they will connect to the onshore underground electricity cables in a transition pit.		
Thanet Extension Offshore Wind Farm	Offshore Wind Farm	An offshore wind generating station of capacity up to 340 MW. Approximately 8 km off the east coast of Kent, in areas surrounding Thanet Offshore Wind Farm	PINs	**HNDFUE** SW_E2a_2
Disposal of dredged material	Dredged material disposal	Disposal of dredged material arising from maintenance dredging at Harwich and Felixstowe Harbour, Haven approach channel and Harwich International Port.	Harwich Maintenance Dredging Port of Felixstowe	**HNDFUE** SW_E2a_2
London Array repair works	Windfarm repair and maintenance	A new Marine Licence application intended to supplement the existing wind farm lifetime cable	MMO	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		repair / replacement marine licence. The licence was awarded on 05 May 2016 and is valid for the lifetime of the wind farm until 2039. The licence currently covers the following activities: • Array cable repair and replacement; • Maximum of 10 repair or replacement activities over the remaining operational lifetime; • Each instance of repair or replacement is limited to a maximum length of 3,110 m. Following a review of the current licensed activities at London Array Offshore Wind Farm and future requirements, the following allowances are being requested within a new and separate marine licence: An additional 20 instances of licensed cable repair or replacement activities.		
Area 528	Aggregate extraction	A Marine Licence application is being made for a total of 15 million	MMO	**HNDFUE** SW_E2a_2

Development name	Development type	Further Details	Link	Study corridors within an estimated 100 km
		tonnes of aggregate to be extracted over the licence term of 15 years, with a maximum annual tonnage of 1 million tonnes.		
Area 530	Aggregate extraction	Aggregate extraction by trailer suction hopper dredger will take place within the boundaries defined for a period of 15 years at an annual average of 1 million tonnes with the ability to increase this to 2 million tonnes if demand requires but not in excess of the total 15 million tonnes being applied for.	MMO	**HNDFUE** SW_E2a_2
Area 1806	Aggregate extraction	A Marine Licence application that will enable the company to dredge marine aggregate from Area 1806 for a period of 15 years. The area has not previously been dredged. If permitted, extraction of resources from Area 1806 will be undertaken using trailer suction hopper dredgers. Operating vessels are typically capable of removing 5,000-12,000 t per cargo.	MMO	**HNDFUE** SW_E2a_2

8. Transboundary Effects

This plan level MCZ assessment focuses the likelihood for MCZs in English, Scottish, Welsh and Northern Irish MCZs to have their conservation objectives undermined by study corridors planned throughout UK waters, as part of the HND Implementation Plan schemes. No boundaries between these countries were an influence when assessing the ZoIs of impact pathways associated with each study corridor. As such transboundary effects between UK countries are accounted for as part of this assessment.

With regard to statutory designated sites in Ireland, these comprise Special Areas of Conservation (SAC), and Special Protected Areas (SPA), also referred to as European Sites; which are considered as part of the **Holistic Network Design Implementation Plan Habitats Regulations Assessment Report**, produced alongside this report. At the time of writing MPAs have been proposed in Irish waters but have not yet been legally defined.

Regardless of this, the distances between the nearest Irish Designated Sites and the study corridors located in the Celtic Sea region are considered sufficient to not be of concern. As such, the impacts on European sites outside UK waters would be resolved by addressing the impacts in UK waters. For example, mitigation measures that apply to study corridor's that may potentially affect UK MCZs will affect highly mobile and long range foraging receptors also protected by Irish sites.

9. Alternatives

NESO has already undertaken internal appraisals to assess the constraints and feasibility of cable route corridors. The corridors assessed for each route are the current preferred, however it is acknowledged that these will be further refined as each route project progresses.

As this is a plan level MCZ assessment, the above impact pathway conclusions have been determined through the application of the precautionary principle, project experience, assumptions based on typical industry practice, and professional judgement. As the final cable designs and methodologies are not yet defined, there remains potential for many effects on MCZ protected features from cable installation, operation, and maintenance, and decommissioning to be reduced, or possibly avoided altogether through additional mitigation commitments embedded within each individual cable project design[30].

The feasibility of specific mitigation measures will vary on a case-by-case basis. As such, these measures will be considered by each project, as appropriate, as the individual cable project designs develop, and baseline data is gathered. A range of mitigation measures can be applied to help reduce or offset ecological effects where needed. In this regard, developments are expected to follow the Mitigation Hierarchy Framework, prioritising measures that will result in the least possible effect on protected features; the stages of which comprise:

- Complete avoidance;
- Minimise effects, where possible;
- Restoration of areas within the development (prioritising like-for-like habitats / species, related to the effect being mitigated); and
- Offsetting, either onsite or offsite.

Principally for those cable routes identified as running directly through an MCZ, the Projects will consider reducing the width of the study corridor to avoid entering the MCZ, or where this cannot be reasonably achieved, the Project will consider micro-siting the study corridor around sensitive and protected features within the MCZs. In the case of HPMAs, it is highly unlikely that consent will be given from regulators should a cable route or its ZoI for its associated pathways overlap a site's boundaries. Therefore, it is highly likely designs which avoid HPMA altogether, including the application of spatially appropriate impact buffer zones, will be required. Notably, JNCC and Natural England (2022) provide guidance on the refinement of study corridors into project design in relation to designated sites.

[30] Standard mitigation measures are included in **Section 6** as part of each impact pathway appraisal.

10. Considerations of Stage 2 Assessment

Overview

It is recognised that as each individual route is finalised and installation methods are developed, a project level MCZ assessment will be required for each individual route.

The Stage 2 Assessment considers whether the socio-economic impact and benefit to the public of the proposed Project outweighs the risk of damage to the environment. It will only be required if the Stage 1 assessment cannot be satisfied through avoidance or mitigation measures adopted by the project.

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 (MEEB) for the damage the project will have on the MCZ features?[31]

It will be the responsibility of the public authority to determine if the application is rejected or that the marine licence application process can continue.

As this is a plan level MCZ assessment, methodologies and final designs for each cable route are not yet defined, including any implementation of alternatives (**Section 9**), such as micro siting cables to avoid sensitive habitats, for example. This detail would typically be considered as the 'other means of proceeding' (OMP) step of Stage 1 assessment (MMO, 2013). However, due to the large number of sites and study corridors appraised in this assessment, a high-level approach was necessary. As such, consideration of OMP has been deferred to the first condition of Stage 2, comprising a separate report (**Holistic Network Design Implementation Plan Marine Conservation Zone Stage 2 Plan-Level Assessment**). The Stage 2 report provides a more detailed consideration of OMP for a small number of study corridors that could not be confidently ruled out as having potential to hinder the conservation objectives of an MCZ using a high-level approach.

[31] It is the recommendation of Natural England that Defra's Collaboration on Offshore Wind Strategic Compensation (COWSC) library of strategic compensation measures is considered as early as possible for any anticipated habitat compensation requirements.

11. Summary and Conclusions

A total of 36 study corridors have been identified as having the potential to undermine the conservation objectives of 33 MCZs. Of these study corridors, eight study corridors have been identified as being likely to hinder the conservation objectives of an MCZ, MPA, or HMPA. **Table 72** and **Table 73** present the key MCZs and impact pathways associated with each study corridor that require further consideration (Scottish and English sites respectively), colour coded as follows:

- **Amber** – This impact pathway, associated with the study corridor, has the potential to hinder the MCZ conservation objectives. At this stage mitigation measures have been identified that may be sufficient to avoid this. However, commitments cannot be made at this stage and the feasibility of these measures will need to be assessed at the project level. Additional, mitigation measures may be identified as required when further environmental and project design information are available. There is potential that with appropriate mitigation these study corridors could avoid the need for Stage 2 assessment, at project-level.
- **Red** – For the current designs the possibility of significantly hindering MCZ conservation objectives cannot reasonably be ruled out at this stage. While mitigation measures have been identified, these may not be sufficient to avoid negative effects to protected features, in particular those that are considered to be in unfavourable condition. The impact pathways associated with the study corridors will need to be carefully considered at project level. These study corridors will be taken forward to Stage 2 assessment (derogations) at plan-level.

In addition to this assessment, it is recommended that individual study corridor developments consult the JNCC Advice on Operations (AOO), and where applicable, the Marine Life Information Network (MarLIN) Marine Evidence based Sensitivity Assessment (MarESA) is consulted for each MCZ as part of the detailed project phase, to account for site specific pressures and sensitivities, and targeted comprehensive data acquisition.

Table 72: Study corridors and associated MCZs that will likely require further consideration at the individual project level – Scottish Sites

Study corridor	MCZ	Pathways
HND		
Ballantrae_to_Pentir	Clyde Sea Sill MPA	Permanent habitat loss
		Introduction of INNS
		Airborne sound and visual disturbance
SW_NE7_to_Peterhead	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_NE4_to_New_Deer (ES26)	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_E1a_to_Fiddes	Firth of Forth Banks Complex MPA	Increased SSC
Kilmarnock South_to_Ballantrae	South Arran MPA	Increased SSC
SW_W1_to_Ballantrae	Clyde Sea Sill MPA	Permanent habitat loss
		Introduction of INNS

		Airborne sound and visual disturbance
	Rathlin MCZ	Increased SSC
SW_N4_to_Arnish (Lewis)	North-east Lewis MPA	Underwater sound
PA_2_to_Berwick Bank	Firth of Forth Banks Complex MPA	Increased SSC
HNDFUE		
Shetland_to_Blackhillock	East Caithness Cliffs MPA	Airborne sound and visual disturbance
SW_E1a_to_Branxton	Firth of Forth Banks Complex MPA	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Increased SSC
SW_E2b_to_SW_E2a_1	Turbot Bank MPA	Increased SSC
SW_E2b_to_Peterhead_2	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
	Turbot Bank MPA	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Increased SSC
SW_E3_to_Fiddes	Firth of Forth Banks Complex	Increased SSC
SW_N3_to_Arnish	North-east Lewis MPA	Underwater sound
SW_NE2_to_Spittal	East Caithness Cliffs MPA	Airborne sound and visual disturbance
	Noss Head MPA	Permanent habitat loss
		Introduction of INNS
SW_NE3_to_New_Deer_2	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_NE4_to_New_Deer	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_NE6_to_Peterhead_2	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_NE7_to_Peterhead_DCSS	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
SW_NE8_to_Peterhead_1	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
INTOG		
Aspen_to_Fetteresso	Turbot Bank MPA	Introduction of INNS
		Permanent habitat loss
		Increased SSC

	Firth of Forth Banks Complex MPA	Increased SSC
Beech_to_Cedar	East of Gannet and Montrose Fields MPA	Increased SSC
Cedar_to_Aspen	East of Gannet and Montrose Fields MPA	Increased SSC
Cedar_to_Branxton	Firth of Forth Banks Complex MPA	Increased SSC
North_Connect_to_Cenos	East of Gannet and Montrose Fields MPA	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Increased SSC
Peterhead_to_Cenos	East of Gannet and Montrose Fields MPA	Permanent habitat loss
		Temporary physical disturbance
		Introduction of INNS
		Increased SSC
	Southern Trench MPA	Permanent habitat loss
		Introduction of INNS
	Turbot Bank MPA	Increased SSC
Scaraben_to_Peterhead_2	Southern Trench MPA	Permanent habitat loss

Table 73: Study corridors and associated MCZs that will likely require further consideration at the individual project level – English Sites

Study corridor	MCZ	Pathways
HND		
Ballentrae_to_Pentir	South Rigg MCZ	Introduction of INNS
		Increased SSC
PA_2_to_Berwick Bank	Berwick to St Mary's MCZ	Airborne sound and visual disturbance
	Coquet to St Marys MCZ	Permanent habitat loss
		Introduction of INNS
	Farnes East MCZ	Permanent habitat loss
		Introduction of INNS
SW_E1a_to_Hawthorn Pit	North East of Farnes Deep HPMA	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Collision risk – marine mammals
		Thermal emissions
		EMF
		Airborne sound and visual disturbance
		Underwater sound
		Increased SSC
		Changes in Water Quality
R4_6_to_Penwortham	Fylde MCZ	Permanent habitat loss
		Introduction of INNS
	Ribble Estuary MCZ	Increased SSC
		Barriers to migration
	West of Copeland MCZ	Increased SSC

	West of Walney MCZ	Increased SSC
	Wyre-Lune MCZ	Increased SSC
R4_5_to_Penwortham	Fylde MCZ	Permanent habitat loss
		Introduction of INNS
	Ribble Estuary MCZ	Increased SSC
		Barriers to migration
	West of Walney MCZ	Increased SSC
	Wyre-Lune MCZ	Increased SSC
PA_1_to_Birkhill_Wood	Holderness Inshore MCZ	Permanent habitat loss
		Introduction of INNS
	Holderness Offshore MCZ	Permanent habitat loss
		Introduction of INNS
		Increased SSC
R4_1_to_Birkhill_Wood	Holderness Inshore MCZ	Permanent habitat loss
		Introduction of INNS
	Holderness Offshore MCZ	Permanent habitat loss
		Introduction of INNS
		Increased SSC
R4_2_to_Birkhill_Wood	Holderness Inshore MCZ	Permanent habitat loss
		Introduction of INNS
	Holderness Offshore MCZ	Permanent habitat loss
		Introduction of INNS
		Increased SSC
SW_E1a_to_Lincolnshire_Connection_Node	Holderness Inshore MCZ	Permanent habitat loss
		Introduction of INNS
	Holderness Offshore MCZ	Permanent habitat loss
		Introduction of INNS
	Swallow Slans MCS	Increased SSC

HNDFUE		
SW_E1c_1: Lincolnshire Connection Node	Holderness Offshore MCZ	Increased SSC
	North East of Farnes Deep HPMA	Increased SSC
	Swallow Sand MCZ	Increased SSC
SW_E1c_2 to Weston_Marsh	Holderness Offshore MCZ	Increased SSC
	North East of Farnes Deep HPMA	Increased SSC
	Swallow Sand MCZ	Increased SSC
SW_E2a_2_to_Near_Richborough	Dover to Deal MCZ	Increased SSC
	Foreland MCZ	Increased SSC
	Goodwin Sands	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Increased SSC
	Kentish Knock East	Increased SSC
	Markham's Triangle	Increased SSC
	Thanet Coast MCZs	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
	Swallow Sand MCZs	Increased SSC
Celtic Sea		
PDA1_to_Llandyfaelog	North West of Lundy MCZ	Increased SSC
PDA2_to_South_Wales_Connection_Node	Bideford to Foreland Point MCZ	Increased SSC
	Morte Platform MCZ	Increased SSC
	North West of Lundy MCZ	Increased SSC

PDA3_to_Pyworthy	Bideford to Foreland Point MCZ	Temporary physical disturbance
		Permanent habitat loss
		Introduction of INNS
		Increased SSC
	Hartland Point to Tintagel	Increased SSC
	Lundy MCZ	Increased SSC
	Morte Platform MCZ	Increased SSC
	North West of Lundy MCZ	Increased SSC
	South-West Approaches to Bristol Channel MCZ	Increased SSC

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Glossary

Acronym	Description
AC	Alternating Current
BEIS	Business, Energy and Industrial Strategy
CCUS	Carbon Capture, Utilisation and Storage
CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
CO_2	Carbon Dioxide
CSNP	Centralised Strategic Network Plan
dB	Decibel
DC	Direct Current
DCO	Development consent Order
DESNZ	Department of Energy Security and Net Zero
DoL	Depth of Lowering
EMF	Electromagnetic Fields
GW	Gigawatt
H_2	Hydrogen
HDD	Horizontal Directional Drilling
HND	Holistic Network Design
HNDFUE	Holistic Network Design Follow-Up Exercise
HPMA	Highly Protected Marine Area
HRA	Habitats Regulations Assessment
HSE	Health, Safety, and Environment
HVAC	High-Voltage Alternating Current
HVDC	High-Voltage Direct Current
IAMMWG	Inter-Agency Marine Mammal Working Group
IMO	International Maritime Organisation
INNS	Invasive Non-Native Species
INTOG	Innovation and Targeted Oil and Gas
JNCC	Joint Nature Conservation Committee
km	Kilometre
kV	Kilovolt
m	Metres
MBES	Multi-Beam Echo Sounder
MCZ	Marine Conservation Zone (England, Wales, and Northern Ireland)
MD-LOT	Marine Directorate Licencing Operations Team
MLWS	Mean Low Wate Springs

Acronym	Description
MMMP	Marine Mammal Management Plan
MMMU	Marine Mammal Management Unit
MMO	Marine Management Organisation
MPA	Marine Protected Area (Scotland)
MW	Megawatt
NCMPA	Nature Conservation Marine Protected Area (Scotland)
NESO	National Energy System Operator
NETS	National Electricity Transmission System
NFMS	National Marine Fisheries Service
NM	Nautical Mile
OHL	Overhead Line
PAD	Pressure-Activities Database
PAH	Polycyclic Aromatic Hydrocarbons
PDA	Project Development Area
PTS	Permanent Threshold Shift
SAC	Special Area of Conservation
SBP	Sub-Bottom Profiler
SEL	Sound Exposure Level
SCOS	Special Committee on Seals
SMU	Seal Management Unit
SOPEP	Shipboard Oil Pollution Emergency Plans
SPA	Special Protection Area
SPL	Sound Pressure Level
SSEP	Strategic Spatial Energy Planning
SSS	Side-Scan Sonar
SSSI	Site of Special Scientific Interest
TIGRE™	Transition to integrated Gas and Renewable Energy
TTS	Temporary Threshold Shift
USBL	Ultra-Short Baseline
UXO	Unexploded Ordnance
ZoI	Zone of Influence
μT	Microtesla

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NESO
National Energy
System Operator