DOGGER BANK D WIND FARM

Stage 1 Marine Conservation Zone Assessment

Document Reference No: 7.11

Date: June 2025

Revision: V1

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Document Title:	**Stage 1 Marine Conservation Zone Assessment**
Document BIM No:	**PC6250-RHD-XX-OF-RP-EV-0058**
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Prepared For:	**Dogger Bank D Offshore Wind Farm**

Revision No.	Date	Status / Reason for Issue	Author	Checked by	Approved by
V1	09/06/2025	Final	LA	GA	RH

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Glossary

Term	Definition
Birkhill Wood substation	The onshore grid connection point for DBD identified through the Holistic Network Design process. Birkhill Wood substation which is being developed by National Grid Electricity Transmission and does not form part of the Project.
Commitment	Refers to any embedded mitigation and additional mitigation, enhancement or monitoring measures identified through the EIA process and those identified outside the EIA process such as through stakeholder engagement and design evolution. All commitments adopted by the Project are provided in the Commitments Register."
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Development Consent Order (DCO)	A consent required under Section 37 of the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Embedded Mitigation	Embedded mitigation includes: • Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); and • Measures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). All embedded mitigation measures adopted by the Project are provided in the Commitments Register.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Environmental Statement (ES)	A document reporting the findings of the EIA which describes the measures proposed to mitigate any likely significant effects.
Evidence Plan Process (EPP)	A voluntary consultation process with technical stakeholders which includes a Steering Group and Expert Topic Group (ETG) meetings to encourage upfront agreement on the nature, volume and range of supporting evidence required to inform the EIA and HRA process.

Term	Definition
Expert Topic Group (ETG)	A forum for targeted technical engagement with relevant stakeholders through the EPP.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.
Mitigation	Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development. All mitigation measures adopted by the Project are provided in the Commitments Register.
Monitoring	Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur. All monitoring measures adopted by the Project are provided in the Commitments Register
Offshore Development Area	The area in which all offshore infrastructure associated with the Project will be located, including any temporary works area during construction, which extends seaward of Mean High Water Springs. There is an overlap with the Onshore Development Area in the intertidal zone.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cables will be located, extending from the DBD Array Area to Mean High Water Springs at the landfall.
Offshore Export Cables	Cables which bring electricity from the offshore platform(s) to the transition joint bay at landfall.
Offshore Platform(s)	Fixed structures located within the DBD Array Area that contain electrical equipment to aggregate and, where required, convert the power from the wind turbines, into a more suitable voltage for transmission through the export cables to the Onshore Converter Station. Such structures could include (but are not limited to): Offshore Converter Station(s) and an Offshore Switching Station.
Onshore Converter Station (OCS)	A compound containing electrical equipment required to stabilise and convert electricity generated by the wind turbines and transmitted by the export cables into a more suitable voltage for grid connection into Birkhill Wood Substation.

Term	Definition
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Scoping Opinion	A written opinion issued by the Planning Inspectorate on behalf of the Secretary of State regarding the scope and level of detail of the information to be provided in the Applicant's Environmental Statement. The Scoping Opinion for the Project was adopted by the Secretary of State on 02 August 2024.
Scoping Report	A request by the Applicant made to the Planning Inspectorate for a Scoping Opinion on behalf of the Secretary of State. The Scoping Report for the Project was submitted to the Secretary of State on 24 June 2024.
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore wind Farm Project 4 Projco Limited'
The Project	Dogger Bank D Offshore Wind Farm Project, also referred to as DBD in this PEIR.
Transition Joint Bays (TJB)	An underground structure at the landfall that houses the joints between the offshore and onshore export cables.
Trenching	Open cut method for cable or duct installation.
Trenchless Techniques	Trenchless cable or duct installation methods used to bring offshore export cables ashore at landfall, facilitate crossing major onshore obstacles such as roads, railways and watercourses and where trenching may not be suitable. Trenchless techniques included in the Project Design Envelope include Horizontal Directional Drilling (HDD), auger boring, micro-tunnelling, pipe jacking / ramming and Direct Pipe.

1 Introduction

1.1 Purpose of this Document

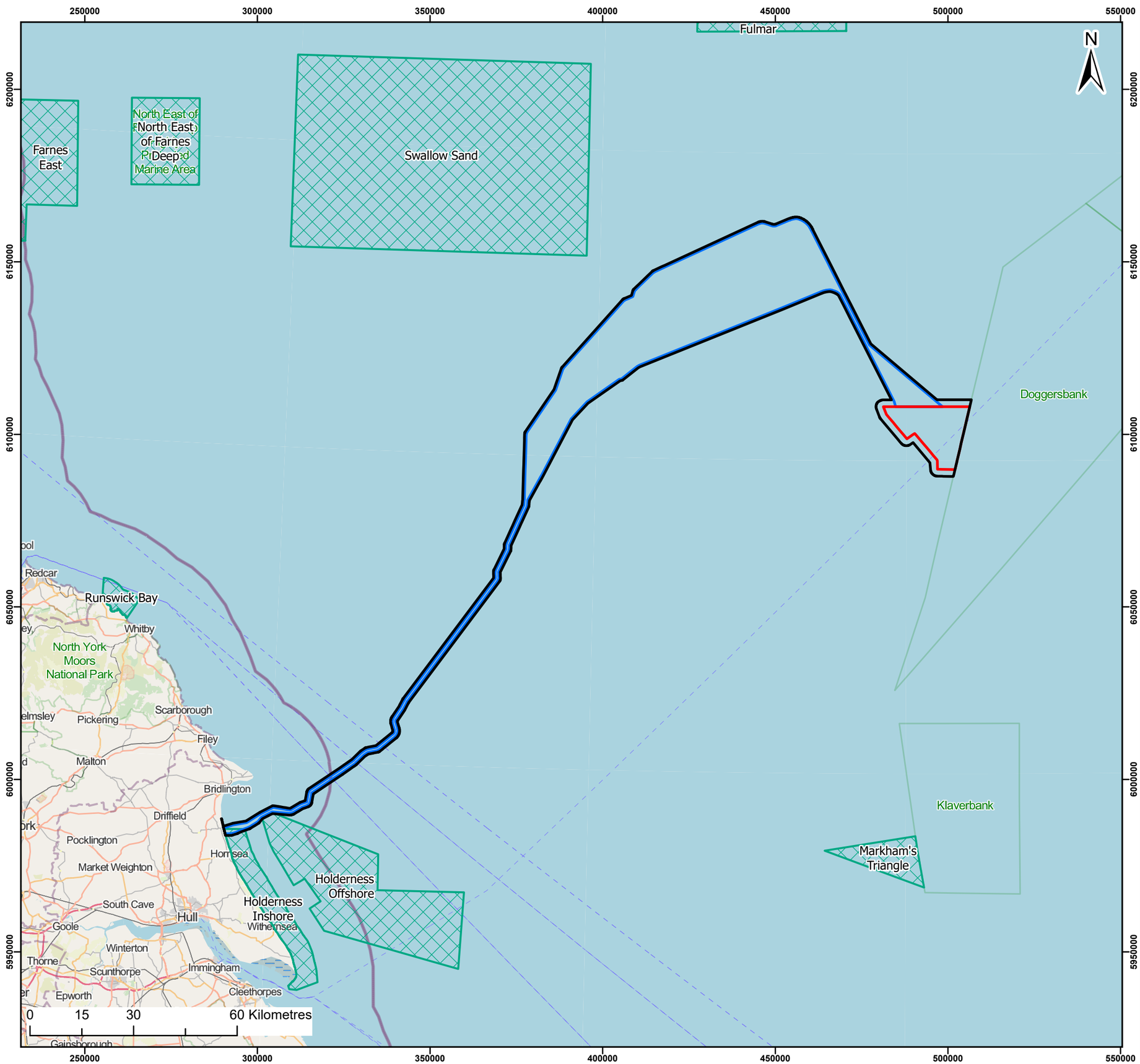
1. The purpose of this Stage 1 Marine Conservation Zone Assessment (MCZA) Report is to provide information to determine whether the proposed Dogger Bank D Offshore Wind Farm (herein 'the Project' or 'DBD') has the potential to affect the features and conservation objectives of the Holderness Offshore and Holderness Inshore Marine Conservation Zones (MCZs) (hereby referred to as 'the MCZs' or 'both MCZs').

2. MCZA's are a requirement of Section 126 of the Marine and Coastal Access Act 2009 (MCAA), which places specific duties on the regulating authority (i.e. the Marine Management Organisation (MMO) for marine licence applications and the Secretary of State (SoS) for Development Consent Order (DCO) applications) which require consideration of the MCZs when determining consent applications. As such, the MMO and SoS have incorporated the need to include a MCZA into their decision-making processes, where any MCZ has the potential to be affected by a marine licensable activity (see **Section 92**).

3. The Swallow Sand MCZ was originally screened into a draft version of the MCZA, which was issued for consultation on 27th June 2024 (see **Annex 1 – MCZA Screening Report**). Due to Project boundary refinement and subsequent consultee feedback on this (see responses in **Table 4-1**), the Swallow Sand MCZ has been screened out of this assessment. A summary of the screening process is provided in **Section 6**.

4. The Project's Offshore Development Area currently overlaps the Holderness Inshore MCZ by approximately 5.41km^2 (see **Figure 1-1**). There is potential to reduce the final construction footprint within the Holderness Inshore MCZ through refinements in routing and burial techniques. However, due to the potential technical challenges presented by such measures, final detailed design cannot be confirmed until post-consent when a construction contractor has been appointed. As a result of this, the worst-case scenario in relation to effects on the features and conservation objectives of the MCZ have been assumed at this stage (**Table 5-5**).

5. The Project's Offshore Development Area also overlaps with the Holderness Offshore MCZ by approximately 1.05km^2. This area of overlap relates only to the Offshore Development Area's buffer outside of the offshore ECC (**Figure 1-1**). Within this area construction vessels may be required to anchor temporarily, but no permanent infrastructure will be installed (see **Figure 1-1**).



Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- Marine Conservation Zones

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Location of the MCZs in Relation to the Offshore Development Area

Figure: 1-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0345

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	17/01/2025	GC	AB	A3	1:1,100,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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6. This document is based on MMO (2013) guidance on how such assessments should be undertaken and advice from the Statutory Nature Conservation Bodies (SNCBs) received during pre-application consultation. The MCZA has been undertaken based on the description of the Project provided within **Section 2** of this report and **Volume 1, Chapter 4 Project Description** of the Preliminary Environmental Impact Report (PEIR).

7. The structure of this MCZA is as follows:

- **Section 1**: (this section) Introduction to the document, structure of the assessment and project background;
- **Section 2**: Legislative context – This section provides the legislative context and details the policy and guidance given by a number of Governmental, statutory and industry bodies in relation to the MCZA process;
- **Section 3**: Overview of the MCZ assessment process – Provides an overview of the MCZA Process and the approach taken by SSE Renewables and Equinor ('the Applicant);
- **Section 4**: Consultation – Provides a summary of the consultation undertaken with respect to the MCZA including stakeholder comments and the Applicant's responses;
- **Section 5**: Project Description – An outline of the Project is given with regard to the location of infrastructure and its construction, operation and maintenance (O&M), and decommissioning;
- **Section 6**: Screening Summary – This section summarises the screening process and outcomes that have been consulted on through the Evidence Plan Process (EPP). The screening report is provided in **Annex 1 - MCZA Screening Report**;
- **Section 7**: Site Specific Surveys: A description of the site-specific survey data collected for the Project in relation to the MCZs;
- **Sections 7** and **8**: Baseline Description – A description of the MCZs, including the protected features and conservation objectives. A description of the location of protected features within the offshore ECC is also provided, incorporating the site-specific survey data that has been collected;
- **Section 9**: Stage 1 assessment – This section provides the stage 1 assessment for the MCZs. An assessment of cumulative effects with other plans and projects is also provided; and
- **Section 10**: Conclusion – A conclusion to the MCZA is provided with respect to the conservation objectives for both MCZs.

1.2 Project Background

8. As part of its third licensing round in 2008, The Crown Estate identified the Dogger Bank Zone, located between 125km and 290km off the east coast of Yorkshire, as one of nine offshore wind farm development zones in the UK. Following the 2008 licensing round, four project areas were identified within the zone to take to development consent, namely Creyke Beck A, Creyke Beck B, Teesside A and Teesside B. In 2015, development consent was granted for all four project areas.

9. In 2017, the four project areas were restructured under new ownership arrangements. Creyke Beck A, Creyke Beck B, and Teesside A were renamed as Dogger Bank A (DBA), Dogger Bank B (DBB), and Dogger Bank C (DBC) respectively and would progress collectively as the Dogger Bank Wind Farm in three build-out phases by SSE Renewables, Equinor and Vårgrønn. Teesside B was renamed as Sofia Offshore Wind Farm and would be progressed separately from the Dogger Bank Wind Farm by RWE.

10. In 2021, an opportunity was identified by SSE and Equinor (hereby referred to as "the Applicant") to maximise the capacity of the third phase of the Dogger Bank Wind Farm, namely DBC, such that additional export capacity of up to 1.5GW of renewable energy could potentially be developed in the eastern part of the original DBC site. This new development phase is known as Dogger Bank D (see **Plate 1-1**), and is an independent project being promoted by a separate commercial entity from the previous phases of the Dogger Bank Wind Farm.

11. The DBD Array Area covers an area of approximately 262km^2 and is located approximately 210km off the north-east coast of England, with its eastern boundary located adjacent to the Dutch Exclusive Economic Zone (EEZ).

12. In April 2023, the Applicant submitted a Scoping Report to the Planning Inspectorate and a Scoping Opinion was received 1st June 2023.

13. In March 2024, National Grid Electricity System Operator (ESO) confirmed that the Project will connect to a new substation near Birkhill Wood in the East Riding of Yorkshire (National Grid ESO, 2024a). This announcement resulted in a change in the design and location of the projects transmission infrastructure a result of the amended connection location and design by ESO, the Applicant submitted a revised EIA Scoping Report to the Planning Inspectorate, on 24th June 2024. A Scoping Opinion was received on 2nd August 2024 (The Planning Inspectorate, 2024) and has informed the EIA process and technical assessments presented within this PEIR. It is noted that the offshore Array Area did not change between submission of the 2023 Scoping Report and the 2024 Scoping Report and therefore where relevant the Applicant has considered feedback from the earlier Scoping Opinion.

14. The Project is being developed as a radial connection into Birkhill Wood substation, a proposed new substation north of Hull and the onshore grid connection point for DBD identified through the Holistic Network Design process. Birkhill Wood substation will be developed and constructed by National Grid Electricity Transmission (NGET) and does not form part of DBD (National Grid ESO, 2024a).

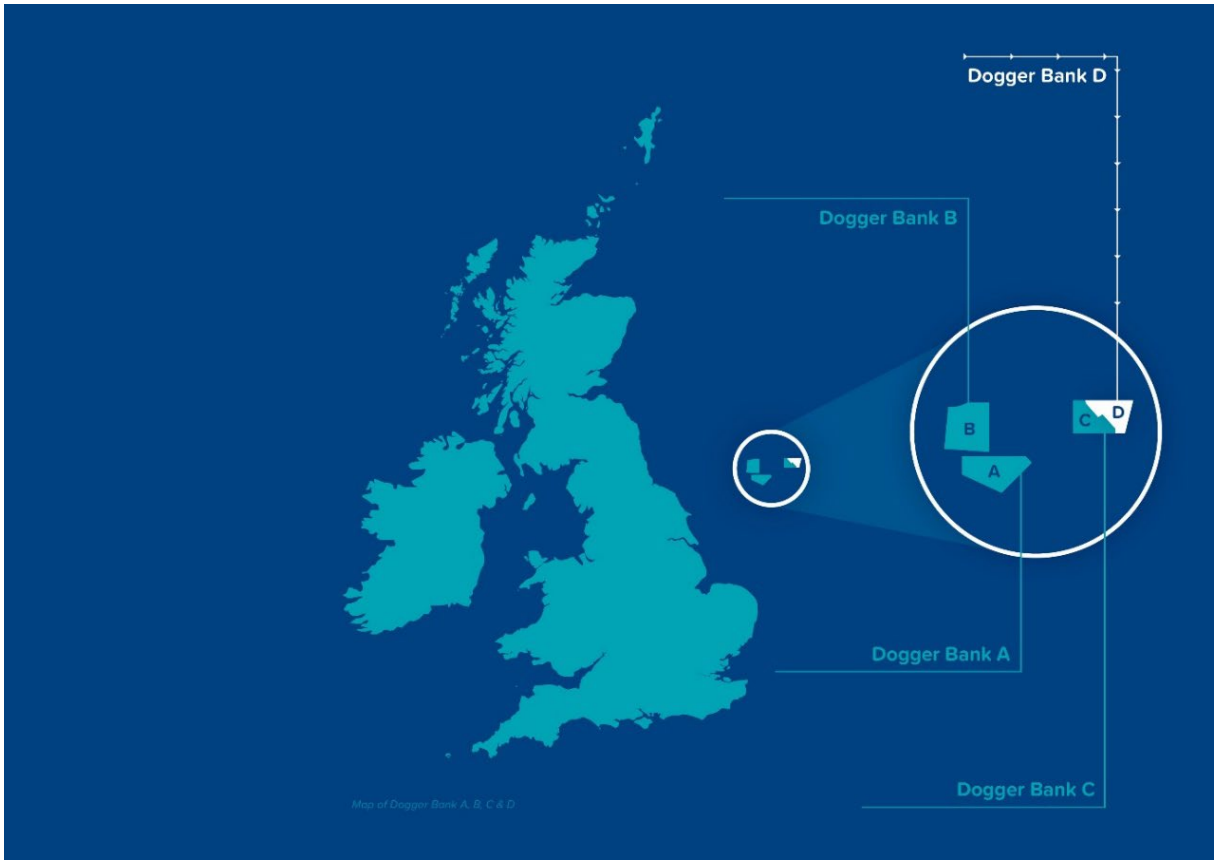


Plate 1-1 Location of Dogger Bank D Wind Farm

15. The key offshore components of the Project comprise the following:

- Wind turbines;
- Inter-array cables;
- Offshore export cables;
- Offshore platform(s), including Offshore Converter Station(s) and an Offshore Switching Station (collectively referred to as offshore platforms);
- Foundation structures for wind turbines and offshore platforms; and
- Scour and cable protection.

2 Legislative Context

2.1 Marine and Coastal Access Act (2009)

16. The MCAA introduced a range of measures to manage the marine environment including the establishment of MCZs. The Marine Conservation Zone Project was founded in 2008 by the Joint Nature Conservation Committee (JNCC) and Natural England to work with regional stakeholder led projects to identify and recommend MCZs to the Government. The MCZs were designated in three tranches (2013, 2016, and 2019) and the process is now complete.

17. Sections 125 and 126 of the MCAA place specific duties on the MMO relating to MCZs and marine licence decision making. It also places specific duties on the Secretary of State relating to DCO decision making. Section 126 applies where:

> *"(a) A public authority has the function of determining an application (whenever made) for authorisation of the doing of an act, and*
>
> *(b) The act is capable of affecting (other than insignificantly):*
>
> (i) *The protected features of an MCZ.*
>
> *(ii) Any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent*."

18. Natural England has responsibility under the MCAA to give advice on how to further the conservation objectives for the MCZ, identify the activities that are capable of affecting the designated features and the processes which they are dependent upon.

2.2 Guidance

19. The MCZA gives consideration to the following guidance:

- MMO (2013). Marine Conservation Zones and Marine Licensing guidance;
- Natural England (2019). Guidance on how to use Natural England's Conservation Advice Packages for Environmental Assessments (Draft); and
- Planning Inspectorate (PINS) (2019). Advice Note Seventeen: Cumulative effects assessment.

20. The approach to the screening assessment has also been informed by advice from Natural England and other stakeholders provided through the EPP (see Advice on Operations (AoO) and Supplementary Advice on Conservation Objectives (SACO) for both MCZs (Natural England, 2019).

3 Overview of Marine Conservation Zone

Assessment Process

21. Guidance published by the MMO (2013) describes how MCZAs should be undertaken in the context of marine licensing decisions (note: there is no PINS guidance or advice on MCZ Assessments for DCO applications). To undertake its marine licensing function, the MMO has introduced a three-stage sequential assessment process for considering impacts on MCZs.

22. To deliver its duties under Section 126 of the MCAA, this section places specific duties on all public bodies when undertaking licensing activities that could hinder the conservation objectives of an MCZ. The MCZA process is similar to, but separate from, the Habitats Regulations Assessment (HRA) process. The stages of MCZA are presented below in **Plate 3-1**.

3.1 Marine Conservation Zone Screening

23. The screening process is required to determine whether Section 126 of the MCAA (2009) should apply to the application. All applications go through an initial screening stage to determine whether:

- The plan, project or activity is within or near to an MCZ; and
- The plan, project or activity is capable of significantly affecting (without mitigation):
  - The protected features of an MCZ; or
  - Any ecological or geomorphological processes on which the conservation of any protected feature of a MCZ depends (wholly or in part).

24. Where it has been determined through screening that Section 126 applies, the application is assessed further to determine which subsections of Section 126 should apply through Stage 1 assessment and Stage 2 assessment. The MCZA screening stage is summarised in **Plate 3-1**.

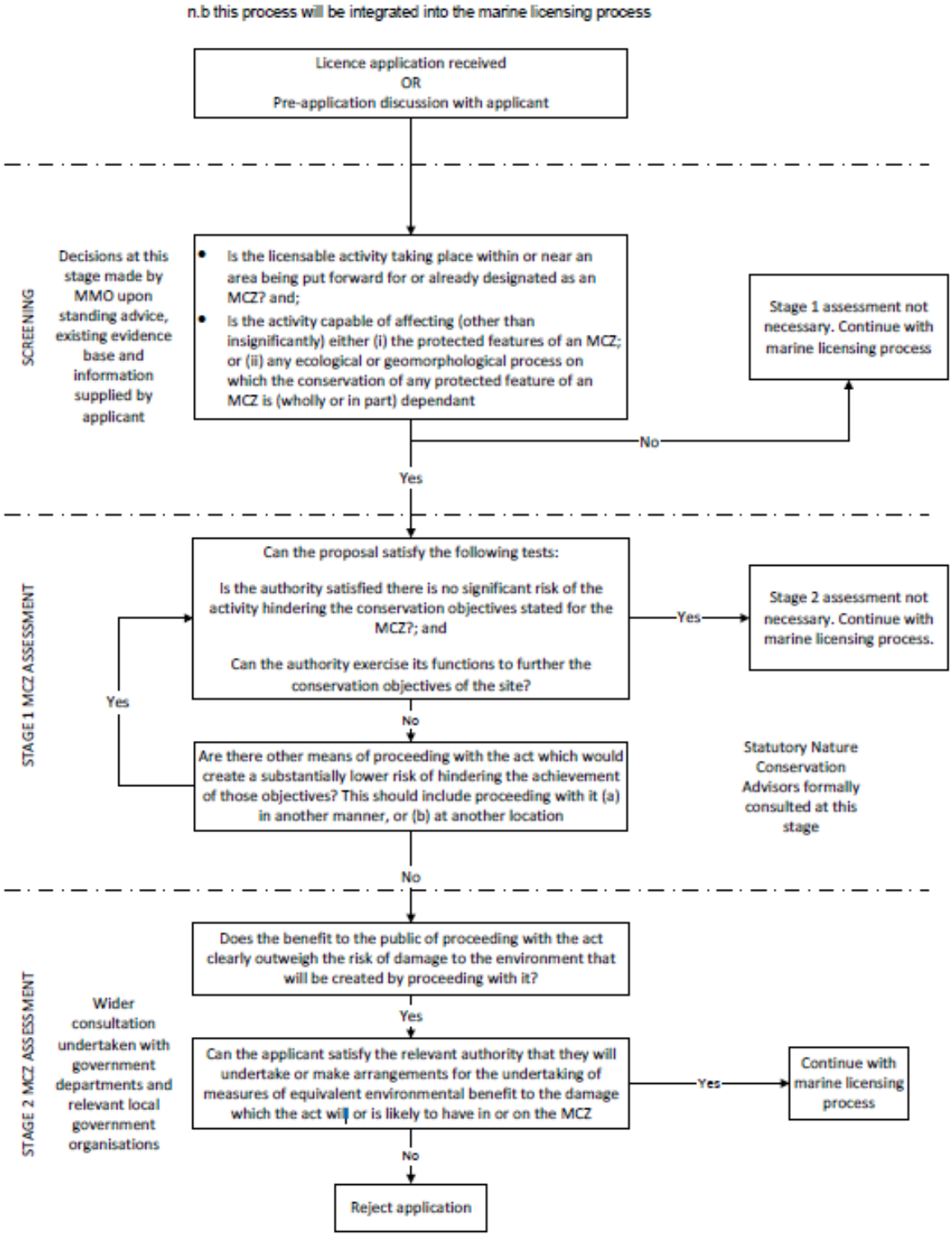


Plate 3-1 Flow Chart Summary of the MCZA Process Used by the MMO During Marine Licence Determination (MMO, 2013)

3.2 Stage 1 Assessment (This Report)

25. This Stage 1 Assessment will consider whether the conditions in Section126(6) of the MCAA can be met, to determine whether:

- There is no significant risk of the activity hindering the achievement of the conservation objectives stated for the MCZ; and
- The MMO can exercise its functions to further the conservation objectives stated for the MCZ (in accordance with Section125(2)(a)).

26. This Stage 1 Assessment considers the extent of the potential effects of the plan or project on the MCZs in more detail. The Stage 1 Assessment looks at whether the plan or project could potentially affect the conservation objectives for the site, that is, affect the site so that the features are no longer in favourable condition, or prevent the features from recovering to a favourable condition.

27. If mitigation to reduce identified effects cannot be secured, and there are no other alternative locations, then the Project will be considered under Stage 2 of the assessment process. More information on the Stage 2 Assessment is provided in **Section 9**.

28. Within the Stage 1 Assessment, "hinder" will be considered as any act that could, either alone or in combination, present the following:

- In the case of a conservation objective of "maintain", increase the likelihood that the current status of a feature would deteriorate (e.g. from favourable to degraded) either immediately or in the future (i.e. they would be placed on a downward trend); or
- In the case of a conservation objective of "recover", decrease the likelihood that the current status of a feature could improve (e.g. from degraded to favourable) either immediately or in the future (i.e. they would be placed on a flat or downward trend).

29. In order to determine if there is 'no significant risk of the activity hindering the achievement of the conservation objectives stated for the MCZ,' the MMO (2013) guidance states:

"*this should take into account 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.*"

30. The Project's approach to determining no significant risk of the activity enabling achievement of the conservation objectives is set out below in **Section 9**.

3.2.1 Assessment of Risk to Conservation Objectives

3.2.1.1 Magnitude of Effect

31. For each effect, a magnitude has been assigned, providing a definition of the spatial extent, duration, frequency and reversibility of the effect considered (where applicable). The definitions of magnitude for the purpose of the MCZA are provided in **Table 3-1**.

Table 3-1 Definitions of Magnitude

Magnitude	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness.
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptors character or distinctiveness.

3.2.1.2 Sensitivity of Receptors

32. In order to determine the sensitivity of the protected features of the MCZs, Natural England's AoO has been utilised which indicates the sensitivity of each receptor to relevant pressures. Specifically, the sensitivity range of the biotopes associated with each protected feature has been determined in relation to relevant pressures, taking the highest sensitivity as a worst-case scenario.

3.2.1.3 Assessment Against Conservation Objectives

33. Following determination of effect magnitude and receptor sensitivity, the Stage 1 assessment considers the risk that the Project could hinder the conservation objectives for the MCZs with consideration of Natural England's SACOs.

34. SACOs present attributes which are ecological characteristics or requirements of the designated species and habitats within a site. The listed attributes are considered to be those which best describe the site's ecological integrity and which, if safeguarded, will enable achievement of the Conservation Objectives. These attributes have a target which is either quantified or qualified depending on the available evidence (JNCC, 2018). A summary of the consideration or pressures against the relevant attributes is provided in **Section 9**.

3.3 Stage 2 Assessment

35. Where it is required, the Stage 2 Assessment considers the socio-economic impact of the plan or project together with the risk of environmental damage. There are two parts to the Stage 2 Assessment process:

- Does the public benefit in proceeding with the Project clearly outweigh the risk of damage to the environment that will be created by proceeding with it? If so,
- Can the Applicant satisfy that they can secure, or undertake arrangements to secure Measures of Equivalent Environmental Benefit (MEEB) for the damage the Project will have on the MCZ features?

36. Both parts to the Stage 2 Assessment process will be addressed in a MEEB derogation case document that will be submitted with the final application (if required).

3.3.1 Measures of Equivalent Environmental Benefit

37. If Stage 1 identifies a significant risk of hindering the conservation objectives of the MCZs, an assessment of MEEB must also be included in the MCZA. The conclusion of the Stage 1 MCZA is shown in **Section 10**.

38. Based on emerging precedent from other projects and the findings of this draft MCZA, the Applicant has prepared a road map that sets out potentially suitable MEEB (provided in **Benthic Measures of Equivalent Environmental Benefit - Roadmap & Evidence** (document reference 5.5.3) Following submission of the PEIR, MEEB proposals will continue be consulted on throughout the pre-application process.

3.4 Cumulative Effects

39. The MCAA does not provide any legislative requirement for explicit consideration of cumulative effects on the protected features of MCZs. However, the MMO guidelines (MMO, 2013) state that the MMO considers that in order to fully discharge its duties under section 69 (1) of the MCAA, cumulative effects must be considered. These duties include:

- The need to protect the environment;
- The need to protect human health; and
- The need to prevent interference with legitimate uses of the sea.

40. PINS Advice Note Seventeen (PINS, 2019) provides guidance on plans and projects that should be considered in the Cumulative Effects Assessment (CEA), which includes:

- Projects that are under construction;
- Permitted applications, not yet implemented;
- Submitted applications not yet determined;
- Projects on the PINS program of projects where a scoping report has been submitted;
- Projects on the PINS program of projects where a scoping report has not been submitted;
- Development identified in relevant development plans, with weight being given as they move closer to adoption and recognising that much information on any relevant proposals will be limited; and
- Sites identified in other policy documents as development reasonably likely to come forward.

41. Only projects which are reasonably well described and sufficiently advanced to provide information on which to base a meaningful and robust assessment are included in the CEA.

42. Plans and projects that existed at the time of the relevant MCZ designation or the latest status reports, undertaken every six years (whichever is most recent) are considered to be part of the baseline environment. This includes many Tier 1 projects as defined by Natural England guidance. The assessment presents relevant cumulative effects of projects based on their stage of development using the tiered approach as devised by Natural England (Parker *et al.*, 2022) and presented in **Table 3-2**.

Table 3-2 In-Combination Effects Tiered Approach (Natural England, 2022)

Tiers	Development Stage	Data Availability
Tier 1	Built and operational projects should be included within the cumulative assessment where they have not been included within the environmental characterisation survey, i.e. they were not operational when baseline surveys were undertaken, and/or any residual impact may not have yet fed through to and been captured in estimates of "baseline" conditions, such as "background" distribution or mortality rate for birds[1].	Pre-construction (and possibly post-construction) survey data from the built project(s) and environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project).
Tier 2	Tier 1 + projects under construction.	As Tier 1 but not including post-construction survey data.
Tier 3	Tier 2 + projects that have been consented (but construction has not yet commenced).	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project) and possibly pre-construction survey data from built project.
Tier 4	Tier 3 + projects that have an application submitted to the appropriate regulatory body that have not yet been determined.	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project).
Tier 5	Tier 4 + projects that have produced a PEIR and have characterisation data within the public domain.	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project) as well as information provided within the PEIR.
Tier 6	Tier 5 + projects that the regulatory body are expecting an application to be submitted for determination (e.g. projects listed under the Planning Inspectorate programme of projects).	Possibly environmental characterisation survey data (but strong likelihood that this data will not be publicly available at this stage).
Tier 7	Tier 6 + projects that have been identified in relevant strategic plans or programmes.	Historic survey data collected for other purposes/by other projects or industries or at a strategic level.

**Or if there are ongoing impacts that are greater than predicted where there is no evidence that the impacts will dissipate over the lifetime of the Project, e.g. displacement.*

[1] Or if there are ongoing impacts that are greater than predicted where there is evidence that the impacts will dissipate over the lifetime of the project, e.g. displacement of red-throated diver.

43. Projects that are operational during the latest MCZ status report are considered as part of the baseline. Offshore cumulative effects may come from interactions with the following activities and industries:

- Other offshore wind farms;
- Other renewable developments;
- Aquaculture;
- Aggregate extraction and dredging;
- Licensed disposal sites;
- Navigation and shipping;
- Sub-sea cables and pipelines;
- Potential port / harbour development;
- Oil and gas activities;
- Fisheries management areas;
- Unexploded Ordnance (UXO) clearance; and
- Carbon capture developments.

44. Other plans and projects will be screened into the cumulative MCZA using a tiered approach, in accordance with Natural England guidance (Natural England, 2022).

45. Projects classified under Tiers 1 to 4, as well as Tier 5 projects that have submitted a PEIR, are included in the MCZA. Tier 5 projects that have not yet submitted a PEIR and Tier 6 projects, will be considered only when sufficient information is available.

46. For this MCZA, the Project's activities and associated pressures are reviewed to determine whether they are capable of significantly affecting MCZs when combined with equivalent activities and associated pressures from other plans and projects. The potential for projects to act cumulatively on MCZs is considered in the context of the likely spatial and temporal extent of pressures.

4 Consultation

47. Consultation of relevance to the MCZA process has been undertaken with SNCBs and other stakeholders through scoping and an ongoing EPP.

4.1 Scoping and Marine Conservation Zone Screening

48. Consultation has been undertaken with the appropriate authorities and stakeholders as part of the scoping stage of the EIA process. The Scoping Report was submitted to PINS on 24th June 2024 and a Scoping Opinion (PINS, 2024) was received on 2nd August 2024. The MCZ Screening was submitted to the MMO and Natural England on 27th June 2024. Scoping established the potential impacts of the Project to be assessed by the ES (and by association the MCZA).

4.2 Evidence Plan Process

49. The EPP is a non-statutory, voluntary process that aims to encourage upfront agreement on the information an applicant supplies to the Planning Inspectorate as part of a DCO application.

50. The EPP includes consultation through a Seabed Expert Topic Group (ETG) which focuses on issues related to baseline environment conditions of marine physical processes, benthic and intertidal ecology, and fish and shellfish ecology. The ETG for this MCZA is ETG5 – Seabed Compensation and MEEB, which has currently had two meetings on 16/10/23 and 02/05/24. The Seabed ETG aims to agree the relevance, appropriateness and sufficiency of baseline data, key issues for the EIA, and the impact assessment approach (including MCZA). Stakeholders represented on the Seabed ETG are:

- Attended:
  - Natural England;
  - MMO;
  - Cefas;
  - Environment Agency; and
  - JNCC (via Natural England).
- Invited but did not attend:
  - North Eastern Inshore Fisheries and Conservation Authority (NEIFCA); and
  - The Wildlife Trusts (TWT).

51. A draft of the **Annex 1 - MCZA Screening Report** was made available for consultation in conjunction with the Project's Scoping Report issued on 27th June 2024. The Screening for the MCZ has been updated based on the comments received (see **Section 6**).

52. The consultation responses relevant to the MCZA which have been received to date are summarised in **Table 4-1**.

Table 4-1 Consultation Responses Relevant to the MCZA

Consultee	Date	Comment	Response
Natural England, MCZA Screening Report response	24/07/2024	We provisionally agree with the use of the 20km Zone of Influence (ZoI) used for site screening, acknowledging that the Project intends to refine this further, if necessary, once the project specific modelling is available (as detailed in the MCZA Technical Note). We advise that the Project specific modelling is included in the assessment/application to evidence that the ZoI remains appropriate.	Project specific modelling is included in **Section 8.4.3** of **Volume 1**, **Chapter 8 Marine Physical Processes** and the zone of influence (ZoI) determined in that chapter is used for this assessment.
Natural England, MCZA Screening Report response	24/07/2024	**Holderness Inshore MCZ** Since designation, there has been further development within the MCZ. Holderness Inshore MCZ features have likely being impacted since the original designation in 2016, extra caution should be taken when considering the sensitivity of features, particularly the circalittoral rock within the site. We note the Spurn Head feature of Holderness Inshore MCZ has not been screened in due to its location beyond the 20km ZoI. Natural England provisionally agrees that this is reasonable and welcomes confirmation of site-specific data on sediment dispersion being used to validate this through the EPP process.	Noted, sediment dispersion data is used and assessed in **Section 8.7** of **Volume 1**, **Chapter 8 Marine Physical Processes** with the findings used to confirm the screening out of Spurn Head (see **Section 8.1**).
Natural England, MCZA Screening Report response	24/07/2024	**Cumulative Effects Assessment** Natural England welcomes the cumulative effect assessment and confirmation of further assessments to come. We particularly welcome the use of Natural England's 7 tier approach. We would ask that consideration is given to the ECCs for Humber Gateway and Westemost Rough OWFs to be included as Tier 1 projects. It is Natural England's understanding that Marine Licences are in existence that allow for cable repair and re-burial within the MCZ.	Agreed. The Humber Gateway and Westermost Rough OWFs are included as Tier 1 projects in the CEA, see **Section 9.3**.

Consultee	Date	Comment	Response
MMO, MCZA Screening Report Response	30/07/2024	**Dredge and disposal** The MMO note that the approach to the marine conservation zone (MCZ) screening assessment seems broadly consistent with that followed in applications of similar nature. The MMO defers to the relevant SNCB Natural England regarding the impacts of the Project on the conservation features of the Dogger Bank Special Area of Conservation (SAC) and the MCZ (Holderness Inshore, Holderness Offshore and Swallow Sand) currently under assessment. The MMO notes that the 10 kilometers buffer around the Study Area, for the export cable corridor, overlaps with the Swallow Sand Marine Conservation Zone (MCZ) and this site may not be included in subsequent assessment should the likelihood of an overlap be reduced following any evidence-based reduction in buffer size.	Noted, Swallow Sand MCZ was originally screened in and has now been screened out due to boundary refinements during the EIA process.
MMO, MCZA Screening Report Response	30/07/2024	**Marine Physical Processes** The MMO agree that the relevant pressures are screened into the MCZA as summarised in Table 7-1 in the report. The MMO consider all the relevant pressures to marine physical processes have been included and have no further to add. The MMO defer to Natural England and other SNCBs for further comment on the approach and methodology of the MCZA.	Noted.

Consultee	Date	Comment	Response
MMO, MCZA Screening Report Response	30/07/2024	**Benthic Ecology** The Swallow Sand MCZ has been included in the MCZ Assessment because of overlap with the 20km Zone of Influence (buffer) around the Project Area (specifically, a section of the export cable corridor). It is likely that the export cable installation will not cause significant impact within the full extent of the Zone of Influence on benthic receptors. Therefore, depending on the final location of the installation of the cable, the Swallow Sand MCZ may be omitted from subsequent assessment and consideration when these details are confirmed if the impact pathway is removed. The MMO agree with the pressures screened in and defer to SNCBs on comments relating to impacts on designated sites.	Noted, due to the refinement of the offshore ECC the Swallow Sand MCZ is to be screened out.
MMO, MCZA Screening Report Response	30/07/2024	**Fish Ecology** The MMO agree with the ZOI ranges determined however the MMO defer to Natural England and other statutory advisors for further comments on the assessment approach. The MMO note that the nearest MCZ with fish as a designated feature is 320km away (Medway Estuary MCZ, designated for smelt (*Osmerus eperlanus*)). The ZOI for UWN is 75km, therefore the impacts of UWN arising from the proposed installation works to designated features (fish) within MCZs is not considered likely, particularly as neither of the MCZs scoped in for assessment (see point 9) have fish as designated features. The MMO note that the Holderness Offshore MCZ North Sea glacial tunnel valleys designated feature of geological interest has been screened out as the project is located more than 20km away from this feature. The MMO consider this to be appropriate, however, fish are not designed features of the Holderness Inshore, Holderness Offshore and the Swallow Sand MCZs, therefore the MMO defer to SNCBs for comment on the appropriateness of the pressures to these features.	Noted.

Consultee	Date	Comment	Response
MMO, MCZA Screening Report Response	30/07/2024	**Shellfisheries** The MMO agree with the approach to the Marine Conservation Zone (MCZ) Assessment, as set out in the report and welcome that cumulative impacts have been highlighted as an area that will be updated as this is expected to have changed significantly since development consent was awarded in 2015. The MMO defer to the relevant SNCBs for further comment on the assessment approach.	Noted.
MMO, MCZA Screening Report Response	30/07/2024	**Underwater Noise** The MMO consider that the approach to screening for the MCZ assessment seems broadly consistent with that followed in applications of similar nature having considered designated MCZ sites within a 20km radius of the Project site. In relation to underwater noise impacts, the MMO notes that the screening exercise has considered designated MCZ sites within a 75km radius of the Project site, specifically for MCZs which have a fish species as a designated feature. This is based on the following justification: "75km is considered a sufficiently conservative screening distance and is based on an appraisal of the worst-case monopile pile driving impact ranges (temporary threshold shifts (TTS) in hearing or behavioural disturbance effects) for the most sensitive hearing groups of fish (fish that have a swim bladder that is involved in hearing), considered as stationary receptors, for recent offshore wind farm projects (Table 4-1)." The MMO note that Underwater noise changes has been scoped out from further assessment during all stages of the wind and cables development, and 'barrier to species movement', and the operation stage of the cables. The MMO have no objections to the scoping out of these impacts based on the justification presented, provided that Natural England and other statutory consultees have no major comments.	Noted.

5 Project Description

53. The MCZA was based on a Design Envelope approach in accordance with National Policy Statement (NPS) EN-3 (paragraph 3.8.87) (DESNEZ, 2023a) which recognises that:

"*Owing to the complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the applicant at the time of the application to the Secretary of State. Such aspects may include:*

- *The precise location and configuration of turbines and associated development;*
- *The foundation type and size;*
- *The installation technique or hammer energy;*
- *The exact turbine blade tip height and rotor swept area;*
- *The cable type and precise cable route; and*
- *The exact locations of offshore and / or onshore substations*."

54. NPS EN-1 (paragraph 4.2.12) states:

"*Where some details are still to be finalised, the ES should, to the best of the applicant's knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed)"* (DESNEZ, 2023b).

55. The Project Design Envelope therefore provides maximum and minimum parameters where appropriate to ensure the worst-case scenario is quantified and assessed in the MCZA. This approach has been widely used in the consenting of offshore wind farms and is consistent with the Planning Inspectorate Advice Note nine: Rochdale Envelope (Planning Inspectorate, 2018) which states that:

"The Rochdale Envelope assessment approach is an acknowledged way of assessing a Proposed Development comprising EIA development where uncertainty exists, and necessary flexibility is sought".

56. The following **Section 5.1** to **Section 5.7** provide an overview of the current understanding of the potential infrastructure required for the Project, including indicative parameters.

5.1 Offshore Project Summary

57. The key offshore components that comprise the Project include:

- Wind turbines;
- Inter-array cables;
- Offshore export cables;
- Offshore platform(s), including Offshore Converter Station(s) and an Offshore Switching Station (hereafter collectively referred to as offshore platforms unless specified);
- Foundation structures for wind turbines and offshore platforms; and
- Scour and cable protection.

58. With regards to the assessment detailed in this report, only installation of the Project's Offshore Export Cables and the exit pits from the trenchless techniques may result in an effect on the MCZs (see **Section 9**). Therefore only infrastructure and activities relating to the Offshore Export Cables are described.

5.2 Offshore Export Cables

59. There would be up to two single core high voltage direct current (HVDC) offshore export cables and one fibre optic cable. Information on the Offshore Export Cables is presented in **Table 5-1**.

Table 5-1 Project Design Envelope – Offshore Export Cables

Parameter	Maximum Design Parameter
Description of transmission configuration	Up to two HVDC cables, and one fibre optic cable
Number of trenches	Two
HVDC cable voltage (kV)	Up to 500kV
Indicative external HVDC cable diameter (mm)	350
HVDC cable length (km)	800 (two cables of 400km length)
Length of trench required (km)	800 (two trenches of 400km length)
Indicative spacing between HVDC cables if unbundled (m)	200
Maximum spacing between HVDC cables if unbundled (m)	1,000

60. Each offshore export cable would be installed in a separate trench with an indicative spacing of 200m between the cables, where two export cables are installed in parallel. For the purpose of the DCO application and environmental assessment, an offshore ECC has been defined in order to encompass all required cables and the adjacent area of seabed that may be subject for temporary works, such as anchoring, lay-down or the use of jack-up vessels.

61. The offshore ECC exits the array site from the northern boundary, and then travels north-west until it reaches the northern boundary of the Dogger Bank SAC where it widens. The widening of the offshore ECC in the area to the north of the Dogger Bank SAC is to enable flexibility in the future offshore ECC routing due to current uncertainty over the potential Marine Protected Area (MPA) extension in this area. The offshore ECC then narrows to an approximately 1km wide route to the landfall, noting that it was not possible to maintain an exact 1km width for the entire route on account of a number of constraints, particularly in the nearshore region.

62. The corridor provides space for the installation works and any foreseeable O&M activities such as cable reburial or repairs. The Offshore Development Area buffer outside of the offshore ECC measures 0.5km either side, and provides room for temporary works such as anchoring, jacking up, placement of buoyage and relocation of fishing gear. No infrastructure would be installed within this buffer zone. As the final cable route for the Project has not yet been finalised and will not be identified until post-consent, the Offshore Development Area buffer is retained in locations even where the offshore ECC widens to over 1km to accommodate the necessary construction room in the event any Offshore Export Cables are buried near the perimeter of the offshore ECC boundary.

63. Due to the length of the offshore ECC, and the limitations upon cable carousel size / weight on the installation vessel, it is very likely that the export cables would be installed in sections with pre-planned cable joints along the offshore ECC. At the pre-planned cable jointing locations, the two ends of the cables are laid on the seabed with sufficient slack to allow them to be lifted onto a suitable vessel. The cable jointing is then completed onboard the vessel before the cable is lowered back down to the seabed. The cable is then buried, if possible, or protected using cable protection measures (see **Section 4.5.7** of **Volume 1, Chapter 4 Project Description**).

5.3 Cable Installation Methods

5.3.1 Pre-Lay Activities

5.3.1.1 UXO Identification and Clearance

64. The North Sea is heavily littered with UXO from World War I and World War II, and it is common to encounter these during surveys and construction. UXO pose a risk to health and safety where they coincide with locations of planned infrastructure and vessel activity, and therefore a strict approach to identify and, if required, dispose of UXO must be adhered to. If UXO are confirmed, the hierarchy to manage the risk is to avoid them entirely through re-routing the cable(s), followed by removing them (often called 'lift and shift'), and the last resort is to detonate them in-situ.

65. At this stage of the Project, it is not possible to determine if any UXO would be present in the Offshore Development Area, nor how many UXO would require detonation. A detailed UXO study would be completed prior to construction and the results of a pre-construction geophysical survey would be analysed by an appropriate UXO contractor or consultant to determine a list of potential UXO targets for investigation. A UXO identification survey (often combined with an archaeological Remotely Operated Vehicle (ROV) survey) would then be undertaken to ascertain whether any of the potential UXOs can be confirmed as such. This UXO identification and clearance procedure would be subject to individual Marine Licence application(s) upon receipt of the target list from the UXO specialist in the post-consent phase.

5.3.1.2 Boulder Clearance

66. Geophysical surveys will be undertaken prior to construction. The results of these surveys will be analysed to assess the presence of boulders on the export cable and inter-array cable routes. It is not always possible to microsite around large boulder fields; they can cause cable exposure and cause damage to the cable installation equipment. Therefore, a boulder clearance campaign may be required, depending on the density of the boulders that are confirmed.

67. Boulders can be cleared through a variety of means, the most common of which is a grab tool mounted on a ROV. However, in the event of a high-density boulder field, a clearance plough may also be used. This will be confirmed following the review of the geophysical survey results.

5.3.1.3 Sandwave Clearance

68. Sandwaves are mobile bedforms that are formed through marine processes, they may prevent the cable burial tools from operating efficiently, or pose a risk of cable exposure. To prevent this from occurring, clearance of the sandwaves may be undertaken, allowing the cables to be buried below the level where natural sandwave movement occurs.

69. The Project is not currently able to define the extent, or lack thereof, of sandwaves in the offshore ECC, due to a lack of geophysical data at PEIR. Assumptions have therefore been made about the amount of sandwave clearance that could be required with an allowance of 20% of the Offshore ECC. The Project Design Envelope for sandwave clearance activities across the entire offshore ECC is provided in **Table 5-2**. Note that offshore ECC geophysical data will be available to provide more detail at ES stage.

Table 5-2 Project Design Envelope – Sandwave Clearance

Parameter	Maximum Design Parameter
Offshore Export Cables	
Width of dredging corridor (m)	35
Sandwave clearance requirement (km)	230.4
Total cleared area (km^2)	8.064

5.3.1.4 Pre-Lay Grapnel Run

70. Following a pre-lay survey and potential boulder clearance works, a Pre-Lay Grapnel Run (PLGR) will be undertaken prior to cable laying operations to ensure the route is clear of obstructions such as discarded trawling gear or abandoned cables. A vessel would be mobilised with grapnels, chains, and recovery winch to undertake the works.

5.3.1.5 Out of Service Cable Removal

71. Where the export or inter-array cables cross out-of-service (OoS) cables, the OoS cable crossing section would be removed from the seabed prior to cable installation. It is likely the OoS cable which intersects the ECC would be de-trenched, secured and cut, and recovered to the vessel. There are not expected to be any crossings near the MCZs, however, a survey prior to construction will be conducted to determine this.

5.3.1.6 Cable Burial

72. Best endeavours will be made to ensure the Offshore Export Cables are buried beneath the seabed wherever possible, with rock placement/mattressing to be utilised in the locations where it is not possible. The full installation method and target burial depth will be defined post-consent based on a detailed cable burial risk assessment. Currently, pre-trenching, post-lay burial and simultaneous lay and burial techniques are all options. The following burial methodologies are being considered for both cable types:

- Jet-trenching (jetting);
- Ploughing; and
- Mechanical trenching (jet-assisted).

73. The Project Design Envelope for cable burial techniques is provided in **Table 5-3**, and details of the methods are in the following sub-sections.

Table 5-3 Project Design Envelope - Cable Burial Techniques

Parameter	Maximum Design Parameter		
	Jet-Trenching	Plough	Mechanical trenching
Offshore Export Cables			
Target Cable burial depth (m)	3.5		
Trench width (m)	5		
Width of disturbance (m)	15	15	15
Area of disturbance (km^2)	8.28	3.6	1.92

5.3.1.7 Jet-trenching (jetting)

74. This method involves using high-pressure water jets into the seabed to fluidise and displace the seabed sediment. It often forms a rectangular trench into which the cable will settle under its own weight. Jetting is suitable for use in sands and low to medium strength clays, but coarse gravels and high strength clays are likely to limit the performance of the tool. The cover is provided by means of natural backfill, and multiple passes are possible in order to achieve the target depth of lowering or depth of cover requirements.

5.3.1.8 Ploughing

75. This method uses a forward blade to cut through the seabed and displace the sediment to create a trench and is suitable for high strength clays. The cable can be laid into the trench for later backfilling or laid onto the seabed before being ploughed into position; however, simultaneous lay and burial is the most common approach.

5.3.1.9 Mechanical trenching (jet-assisted)

76. This method involves the mechanical cutting of a trench whilst temporarily placing the excavated sediment adjacent to the trench. The cable is then laid, and the trench is backfilled using the sediment. This approach is most suitable for high strength cohesive clay sediments and weak rock. Significant quantities of sand and gravel are likely to hinder the performance of the tool as it relies on the ripping action of cohesive soils. The cutter is often fitted with a depressor which guides the cable through fluidised material.

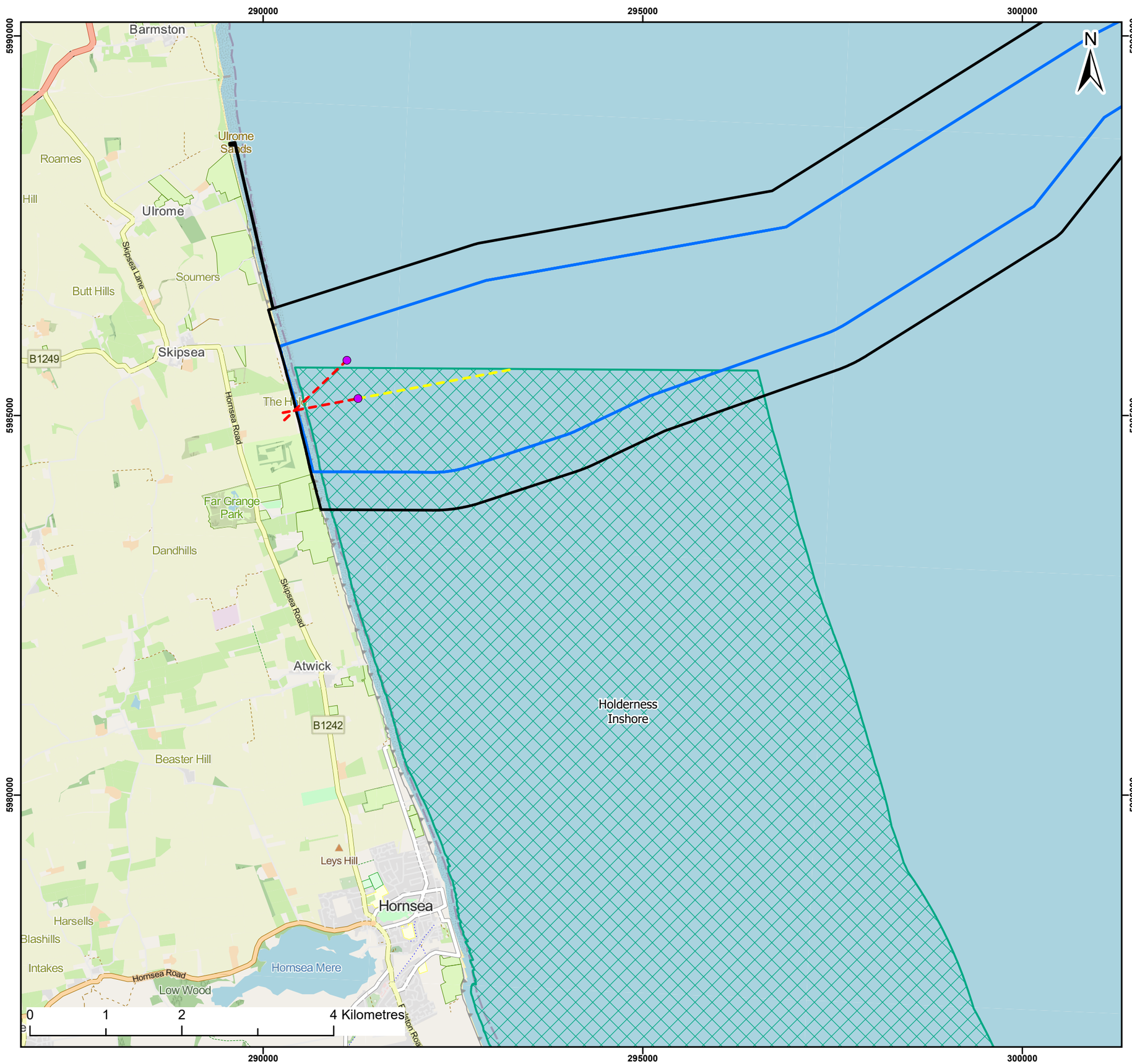
5.4 Landfall Works

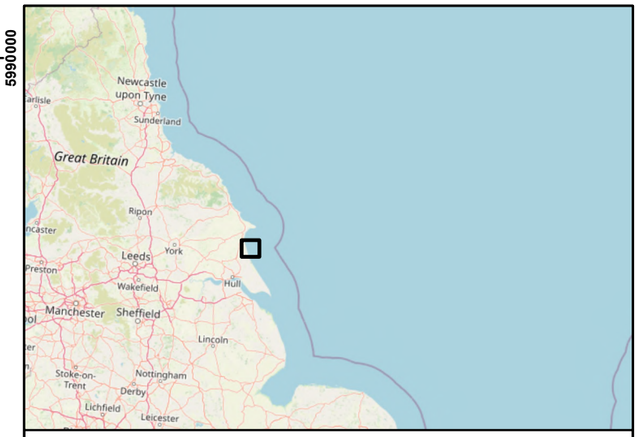
77. The Landfall project infrastructure includes Onshore ECC and offshore ECC, transition joint bay (TJB), link boxes, temporary construction compounds, access routes and exit pits offshore.

78. The offshore export cables will make landfall on land south-east of Skipsea and will be jointed to the onshore export cables at a TJB, which will be located inland. It is proposed that up to three cable ducts would be installed to accommodate the two offshore export cables brought ashore (see **Table 5-1**). It is likely that two cable ducts would be required, but an allowance for a spare duct has been made for contingency purposes.

79. Due to the cliff height, coastal erosion rates and environmental sensitivities at the landfall, the cable ducts will be installed using a trenchless technique such as HDD. The ducts will be installed between the TJB to a subtidal exit location on the seabed located below mean low water springs, and the offshore export cables will be pulled ashore through these pre-installed ducts.

80. **Plate 4-3** and **Plate 4-4** in **Volume 1**, **Chapter 4 Project Description** provides an illustration of typical landfall trenchless installation works. **Figure 5-1** shows the location of the trenchless techniques exit pits in relation to the nearby MCZs. Given that no open cut trenching is proposed for landfall construction, and a long trenchless installation exit in the subtidal zone will be used, there is no requirement for dewatering or temporary water exclusion using cofferdams or other similar temporary structures in the intertidal zone.





Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Marine Conservation Zones
- Indicative Trench Exit Pits (not to scale)
- Indicative Trenchless Route Options
- Indicative Cable Route from Exit Pit

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Trenchless Technique Exit Pit
in Relation to the Nearby MCZs

Figure:	Drawing No:
5-1	PC6250-RHD-XX-OF-DR-GS-0552

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	28/02/2025	JH	AB	A3	1:50,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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81. Two trenchless installation approaches are currently being considered in the Project Design Envelope which are illustrated on **Figure 4-3** of **Volume 1**, **Chapter 4 Project Description**. The first approach is drilling perpendicular to the coastline, the second option is aligned in a north-easterly direction, exiting outside of the Holderness Inshore MCZ, which requires a greater length of trenchless installation and coordination with the Dogger Bank South export cable route. This second option is currently being reviewed as an option to remove direct impacts to the Holderness Inshore MCZ. At this stage, the Project is assessing the technical design of the second installation options and engaging with Dogger Bank South to enable coordination of the routes. The interface between the Offshore and Onshore Development Areas has been defined to allow flexibility to accommodate the two approaches and be assessed in the PEIR.

82. The final landfall design and construction methodology, including the trenchless installation trajectory and location of the TJB, will be subject to further pre-construction surveys, engineering studies, offshore vessel considerations, as well as discussions with other developers with a nearby landfall location and confirmed at detailed design stage post-consent.

83. There will be no direct access to the beach from the compound with the only access to the beach being via an emergency access route. This will be located north of the landfall location running along the beach to an emergency laydown area at the end of North Turnpike Road. No permanent access improvement works will be undertaken along the beach, but temporary works to extend North Turnpike Road to connect to the beach and maintain ramp access in the event of coastal erosion may be required. This access and laydown area will only be in place for the duration of landfall construction works and used in the event of emergencies only such as in response to a drilling fluid frac-out event.

84. **Table 5-4** provides the key design parameters for the landfall infrastructure which form part of the Project Design Envelope. Given the options still under consideration by the Project, this report considers the worst-case scenario whereby the trenchless technique exit pits and export cable routeing in the subtidal zone are located within the Holderness Inshore MCZ.

Table 5-4 Project Design Envelope – Landfall Parameters

Parameter	Value
Maximum number of landfall cable ducts	3 (including one spare)
Maximum number of exit pits	3 (including one spare)
Exit pit dimensions (m) (length-width-depth)	100m length x 25m width x 3.5m depth

Parameter	Value
Indicative drill exit location (m LAT)	5 to 10 (Subtidal exit below MHWS)
Maximum horizontal length of trenchless installation (m)	2,000
Indicative minimum depth of trenchless installation (m)	5
Total duration of trenchless installation works	Up to a year
Total duration of landfall construction compound	Up to two years
Total duration of landfall construction works	Up to two years

5.4.1 Landfall Construction Activities

85. To enable the connection of the offshore and onshore export cables in the TJB the main landfall construction activities are likely to include:

- Construction of landfall construction compound;
- Construction of temporary haul roads to accommodate deliveries to site for plant and equipment;
- Trenchless installation works (e.g. HDD), including drilling operations and pull-in of cable ducts from barges or vessels offshore (alternatively, ducts may be pushed from onshore);
- Construction of the TJB and link box;
- Pull-in of the offshore export cables from vessels;
- Jointing of the onshore and offshore export cables at the TJB;
- Backfilling of the TJB;
- Cable testing and commissioning; and
- Site demobilisation and reinstatement works.

86. Offshore, a shallow draft jack-up barge or multi-cat vessel will be positioned at the drill exit location to assist with installation activities such as handling the drill head, connecting the offshore export cables for pull-in and dive support.

87. It is also noted that an emergency access ‘route’ is included in the Project from the landfall compound to the offshore ECC within the intertidal zone. The access route follows an existing access, therefore no construction related works are required. The access would only be used by vehicles in the event of an emergency requiring access to the intertidal zone. For example, in the event of clearance of frac-out material (see **Section 5.4.2**).

5.4.2 Trenchless Duct Installation

88. Trenchless installation of cable ducts will involve drilling a bore through which the ducts will be installed. Alternatively, the drilling and installation of cable ducts can occur simultaneously by pushing the ducts forward as the bore is drilled. Trenchless installation will start from landfall construction compound and travel underneath the beach before emerging from the seabed at the exit pits.

89. Trenchless installation operations may involve the use of drilling fluid, which is typically a mixture of water, bentonite and other additives. Drilling fluid would be continuously pumped through the installation equipment to the entry pit to facilitate the removal of spoil, stabilise the bore and lubricate the installation of cable ducts.

90. If drilling fluid is required, a drilling fluid management system would be implemented at the landfall construction compound to control the volume of drilling fluid used, process and recycle returned drilling fluid and monitor the risk of frac-out events. To control the volume of drilling fluid entering the marine environment, a return line will be implemented to recover and recycle the drilling fluid from the exit pit, and an alternative drilling fluid management system may be installed on offshore vessels.

91. The cable ducts will be assembled off-site, floated into position at the drill exit location from vessels and the ducts will be pulled into the bore from the exit pits towards the entry pits. Alternatively, the cable ducts could be assembled onshore at the landfall construction compound and pushed into the bore from the entry pits towards the exit pits. Should there be a gap between the duct installation and the pull-in of the offshore export cables, the duct ends may be capped and buried to prevent sediment ingress, and the exit pits may be temporarily backfilled. Once installed, the ducts will be pigged using compressed air or water to remove any debris and a messenger wire will also be installed within the ducts to facilitate cable installation.

92. In the event of failure during duct installation, the bore would be filled, and a further attempt made at another bore.

93. Due to the trenchless nature of duct installation, prolonged periods of access restrictions or closures to the beach will not be required, but emergency landfall works may be required to be performed on the beach, which would involve short periods of restricted access.

5.4.3 Cable Pull and Jointing

94. Upon arrival of the offshore export cable installation vessel at the drill exit location, the exit pits and TJB will be re-exposed (if buried), and the cable duct ends will be uncapped. The messenger wire pre-installed within the ducts will be retrieved and connected to the offshore export cable pull head. The pull-in winch at the landfall construction compound will be used to pull the offshore export cables through the pre-installed ducts towards the TJB. The offshore and onshore export cables will then be jointed at the TJB, and cable testing and commissioning will be undertaken.

5.4.4 Reinstatement and Site Demobilisation

95. Following cable pull-in and jointing operations, the cable ducts will be surrounded with bentonite or another suitable material, and both ends of the cable ducts will be sealed using flanges. The TJB will be backfilled with cement bound sand and excavated subsoil, and the exit pits will be backfilled with side-cast material or left to naturally backfill. Once installation is complete, the export cables will be buried at both ends.

96. Upon completion of landfall construction works, construction plant and equipment and vessels will be demobilised, and topsoil at the landfall construction compound (including the TJB) and along the haul road will be reinstated to pre-construction conditions as practicable.

5.4.5 Landfall Decommissioning

97. The final decommissioning strategy of the Project's landfall infrastructure has not yet been decided. It is likely that the export cables will be left in-situ with the cable ends cut, sealed and securely buried. Alternatively, partial removal of the export cables may be required by excavating the TJB and pulling the cables out of the ducts, and where practicable, materials and components would be recovered and recycled. The TJB and cable ducts may be decommissioned and left in-situ.

98. The final decommissioning methodology will adhere to regulatory requirements and industry best practice at the time of decommissioning and outlined in a Decommissioning Plan, which will be submitted and agreed with the relevant authorities prior to the commencement of decommissioning works.

5.5 Offshore Construction Programme

99. An indicative construction programme for the Project is presented in **Plate 4-2** of **Volume 1**, **Chapter 4 Project Description**. The programme includes offshore and onshore activities, including the commissioning works. The programme illustrates the anticipated duration of the key construction activities, with a worst-case total construction duration of up to five years. Should a DCO be granted in 2028, the earliest construction start year is anticipated to be 2029, with first power scheduled for 2032 and the Project becoming fully operational in 2033.

100. The construction programme is dependent on several factors that may be subject to change such as the grid connection timeline agreed with National Grid, consenting timeframe, funding mechanisms, the lead-in times associated with detailed design and procurement activities and site and weather conditions during construction. Therefore, details within the construction programme are indicative at this stage and provided as a reasonable basis to inform the assessment.

5.6 Worst-Case Scenario

101. The final design of the Project will be confirmed through detailed engineering design studies that will be undertaken post-consent to enable the commencement of construction. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst-case scenarios have been defined in terms of the potential effects that may arise.

102. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact. Further details are provided in **Section 6.2.4.4** in **Volume 1, Chapter 6 Environmental Impact Assessment Methodology**.

103. The realistic worst-case scenarios within the Holderness Inshore MCZ and Holderness Offshore MCZ, used for the MCZ Stage 1 assessment are summarised in **Table 5-5**. These are based on the project parameters described in **Volume 1, Chapter 4 Project Description** which provides further details regarding specific activities and their durations. **Table 5-5** provides the parameters, activities and quantities of activities that will occur within the MCZ boundaries.

Table 5-5 Realistic Worst-Case Design Parameters in relation to the Holderness Inshore and Holderness Offshore MCZ

Impact	Parameter	Notes and Rationale
Construction		
Temporary habitat loss / physical disturbance	**Holderness Inshore MCZ:** 80% of 4.5km with 15m corridor width per trench (trenching) - 108,000m^2. 20% of 4.5km with 35m corridor width per trench (sandwave levelling) - 63,000m^2. Total corridor disturbance - 171,000m^2. 12 no. anchor / jack-up operations considered at Landfall - 7,200m^2. No. of exit pits – three bores (two export cables + one contingency) . Size of each exit pit – 100m length x 25m width x 3.5m depth. Depth of cable – 3.5m target depth Maximum extent of temporary disturbance for exit pits – 7,500m^2. Total volume of sediment disturbed by exit pits – 26,250m^3. **Holderness Offshore MCZ:** One anchor operation considered - 600m^2.	Technique for trenchless cable installation is not yet decided. However, HDD is preferred. Exit pits will be located within the subtidal zone, within the Holderness Inshore MCZ. The worst-case within the Holderness Inshore MCZ is presented based on the worst-case length of cable within the MCZ averaged by the total for the offshore ECC.

Impact	Parameter	Notes and Rationale
Increased suspended sediment concentrations	**Holderness Inshore MCZ:** Total displaced sediment during sandwave levelling of export cables (63,000m^2 x 4m sandwave levelling depth) = 252,000m^3. Maximum temporary disturbance volume for cable installation (based on 4.5km distance x 15m width x two cables x 3.5m burial depth) – 472,500m^3. Total displaced sediment volume from anchoring (7,200m^2 x 6.1m depth) = 43,920m^3. **Holderness Offshore MCZ:** Total displaced sediment volume from anchoring (600m^2 x 6.1m depth) = 3,660m^3.	Amounts based on the total provided for Project offshore export cable and the length within the Holderness Inshore MCZ.
Introduction of invasive/non-native species	**Both MCZs:** Maximum peak number of export cable installation vessels – 8.	Amounts based on the total provided for Project offshore export cable and the length within the Holderness Inshore MCZ.
Operation and Maintenance		
Temporary habitat loss / physical disturbance	**Both MCZs:** Estimated number of export cable repairs over lifetime of the Project (35 repairs expected over entire corridor x 1.33% cable route within MCZ) – one (rounded up). Export cable repairs - seabed disturbance over Project lifetime will be the same as construction phase, given only one repair event expected. Footprint of a anchoring events will be the same as the anchoring numbers in the construction phase, given only one repair event expected.	Assumes average based on the length within Holderness Inshore MCZ compared to total offshore ECC disturbance within **Table 10-7** in **Volume 1**, **Chapter 10 Benthic and Intertidal Ecology**. Based on the assumption that there would be one event in the lifetime of the project along the cable within the Holderness Inshore MCZ.

Impact	Parameter	Notes and Rationale
Habitat loss / alteration	**Holderness Inshore MCZ:** Area disturbed from rock protection within MCZ assuming approximately 1/3 of cable in MCZ may require rock protection (4.5km x 1/3 x10m rock berm width x 2 cables) = 29,700m^2.	Assumes average based on the length within Holderness Inshore MCZ compared to total offshore ECC disturbance within **Table 10-7** in **Volume 1**, **Chapter 10 Benthic and Intertidal Ecology.**
Introduction of invasive/non-native species	**Both MCZs:** Annual round trips of cable maintenance vessels = 1	Estimate only one round trip annually within the lifetime of the Project so 35 trips over the Project's lifetime.
Landfall	**Holderness Inshore MCZ:** All cables will be buried below landfall, assumed no maintenance activities required during the O&M stage. As such no operational impacts predicted to occur at landfall within the intertidal zone.	
Decommissioning		
Both MCZs No final decision regarding the final decommissioning policy for the offshore project infrastructure including landfall, has yet been made. It is also recognised that legislation and industry best practice change over time. It is likely that offshore project infrastructure will be removed above the seabed and reused or recycled where practicable. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst-case scenario, the impacts will be no greater than those identified for the construction phase. A decommissioning plan for the offshore works would be submitted prior to any construction commencing.		

5.7 Embedded Mitigation

104. The Project has made several commitments to avoid, prevent, reduce or, if possible, offset potential adverse environmental effects through mitigation measures embedded into the evolution of the Project's design envelope. These embedded mitigation measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects. **Table 5-6** identifies proposed embedded mitigation measures that are relevant to the Marine Conservation Zone Assessment.

105. Full details of all commitments made by the Project are provided within the Commitments Register in **Volume 2, Appendix 6.3 Commitments Register**. A description of how the Commitments Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**. In addition, a list of draft outline management plans which are submitted with the PEIR for consultation is provided in **Section 1.10** of **Chapter 1 Introduction**. These documents will be further refined and submitted along with the DCO application. See **Volume 2, Appendix 1.2 Guide to PEIR** for a list of all PEIR documents.

106. The Commitments Register is provided at PEIR stage to provide stakeholders with an early opportunity to review and comment on the proposed commitments. Where other mitigation measures are proposed, these are detailed in the Stage 1 MCZ Assessment (**Section 9**).

Table 5-6 Embedded Mitigation Measures

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Marine Conservation Zone Assessment
CO23	At the landfall, trenchless installation techniques will be implemented and exit pits will be located beyond Mean Low Water Springs (MLWS). Installation will be at a suitable depth below the base of the cliff to avoid potential impacts to the Withow Gap Site of Special Scientific Interest (SSSI).	DCO Requirement - Code of Construction Practice	Avoids any effects associated with the intertidal zone.
CO24	A Cable Specification and Installation Plan will be provided and submitted for approval prior to offshore construction. The Cable Specification and Installation Plan will detail the methods used for construction of offshore export and inter-array cables. Where possible, cable burial will be the preferred method for cable protection. Where cable protection is required, this will be minimised so far as is feasible. All cable protection will adhere to the requirements of Marine Guidance Note (MGN) 654 with respect to changes greater than 5% to the under-keel clearance in consultation with the Maritime and Coastguard Agency (MCA) and Trinity House. Any damage, destruction or decay of cables must be notified to the MCA, Trinity House, Kingfisher and UK Hydrographic Office (UKHO) no later than 24 hours after being discovered.	DML Condition - Cable Specification and Installation Plan	Limits the effects associated with cable protection as the first option will always be cable burial, therefore reducing the effect of benthic habitat alteration.

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Marine Conservation Zone Assessment
CO25	A Project Environmental Management Plan (PEMP) will be provided in accordance with the **Outline PEMP** and will include: • A Marine Pollution Contingency Plan (MPCP), which will include plans to address the risks, methods and procedures to deal with any spills and collision incidents in relation to all activities carried out below Mean High Water Springs (MHWS) to safeguard the marine environment; • Best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the construction phase; • A Chemical Risk Assessment (CRA) to ensure any chemicals, substances and materials to be used will be suitable for use in the marine environment and in accordance with the Health and Safety Executive and the Environment Agency Pollution Prevention Control Guidelines or latest relevant available guidelines; • A marine biosecurity plan detailing how the risk of introduction and spread of invasive non-native species will be minimised; and • Details of waste management and disposal arrangements.	DML Condition - Project Environmental Management Plan	Limits the effects associated with pollution events resulting from the accidental release of pollutants.
CO26	Micro-siting of the offshore cables will be used to minimise the requirement for seabed preparation as far as is practicable.	DML Condition - Cable Specification and Installation Plan	Limits the effects associated with cable protection as the first option will always be cable burial, therefore reducing the effect of benthic habitat alteration.

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Marine Conservation Zone Assessment
CO28	An Offshore Operations and Maintenance Plan (O&M) will be provided prior to commencement of operation and will outline the reasonably foreseeable O&M offshore activities.	DML Condition - Offshore Operations and Maintenance Plan	Limits any disturbance effects associated with the O&M stage of the Project on benthic and intertidal habitats.
CO29	An In-Principle Monitoring Plan (IPMP) will be provided in accordance with the **Outline IPMP** for relevant marine receptors, providing for relevant monitoring requirements during the construction and O&M (O&M) phases.	DML Condition - In Principle Monitoring Plan	Limits any disturbance effects associated with the O&M stage of the Project on benthic and intertidal habitats.

6 Screening Summary

107. The Project's MCZ Screening process has been undertaken in consultation with relevant stakeholders through the following Seabed ETGs:

- Seabed Compensation and MEEB ETG5 Meeting 1 (16th October 2023); and
- Seabed Compensation and MEEB ETG5 Meeting 2 (2nd May 2024).

108. The **Annex 1 - MCZA Screening Report** was made available for consultation in conjunction with the Project's Scoping Report issued on 27th June 2024. The Screening Report was a 'point in time' document and was submitted for reference purposes only, noting that there have been project boundary refinements since its compilation.

109. Both MCZs are screened in for further assessment because the Project's offshore ECC routes are in close proximity to or overlap with both sites (**Figure 1-1**). Originally, the Swallow Sand MCZ was also screened in due to being within 20km of the offshore ECC. Given the refinement of the offshore ECC and the assessment for an updated ZoI in **Volume 1, Chapter 8 Marine Physical Processes**, the Swallow Sand MCZ has now been screened out on account of its distance to the Project of approximately 20km. No other MCZs are screened in, primarily on account of their distance from the Project and the range of potential effects.

110. The **Annex 1 - MCZA Screening Report** proposed that the MCZs protected features listed in **Table 6-1** are to be screened into the Stage 1 MCZ Assessment subject to the results of the site benthic characterisation surveys. Further information on the results of the characterisation surveys is provided in **Section 7**.

111. **Table 6-1** identifies all of the pressures (derived from Natural England's (2023) AoO) associated with the Project that have been screened into the Stage 1 MCZ Assessment, aligned with the relevant effects identified during EIA Scoping and MCZ Screening.

112. There has been a refinement of the offshore ECC since the original feedback from stakeholders was received regarding the Project, which has ensured it will fall outside of the Holderness Offshore MCZ. Therefore, the screening summary has changed since the original MCZ screening report given there are now no direct impacts expected and only indirect impacts, updates are shown in **Table 4-1**.

Table 6-1 Summary of Pressures Screened In, and Relationships to Impacts Identified through EIA Scoping

Potential Pressure (Scoping)	Pressure Name (AoO)	Holderness Inshore MCZ				Holderness Offshore MCZ			
		Construction	O&M	Decommissioning	Cumulative	Construction	O&M	Decommissioning	Cumulative
Temporary physical disturbance / temporary habitat loss	Abrasion / disturbance of the substrate on the surface of the seabed	✓	✓	✓	✓	✓	✓	✓	✓
	Habitat structure changes – removal of substratum (extraction)	✓	x	✓	✓	x	x	x	x
	Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion	✓	x	✓	✓	✓	x	✓	✓
Habitat loss / alteration	Physical change (to another seabed type)	x	✓	✓	✓	x	x	x	x
	Physical change (to another sediment type)	x	✓	✓	✓	x	x	x	x
Increased suspended sediment concentrations (SSC)	Changes in suspended solids (water clarity)	✓	✓	✓	✓	✓	✓	✓	✓
	Smothering and siltation rate changes (heavy)	✓	✓	x	x	✓	✓	x	x
	Smothering and siltation rate changes (light)	✓	✓	✓	✓	✓	✓	✓	✓
	Deoxygenation	✓	✓	✓	✓	✓	✓	✓	✓

Potential Pressure (Scoping)	Pressure Name (AoO)	Holderness Inshore MCZ				Holderness Offshore MCZ			
		Construction	O&M	Decommissioning	Cumulative	Construction	O&M	Decommissioning	Cumulative
Changes to bedload sediment transport	Water flow (tidal current) changes, including sediment transport considerations	×	×	×	×	×	×	×	×
Invasive species	Introduction or spread of invasive non-native species (INNS)	✓	✓	✓	✓	✓	✓	✓	✓

7 Site Specific Surveys

113. In order to provide site specific and up to date information on which to base the impact assessment and MCZA, surveys were conducted in 2023 and 2024 to characterise the seabed in the Project's Offshore Development Area, including in the offshore ECC. Two survey campaigns have been conducted due to a change in the routeing of the offshore ECC following the initial scoping exercise in 2023, as noted in **Section 1.2**; one survey for the original ECC and one survey for the new offshore ECC.

114. **Table 7-1** provides details of each survey conducted. The method statements outlining the methodology to be followed for each survey were shared with relevant stakeholders prior to the surveys being undertaken and sought agreement on approach. Comments resulting from these consultations were taken into account prior to the surveys being undertaken (see **Section 4**). The relevant guidelines to each research area were referenced and followed in each method statement, with the methods for the surveys below being detailed in the relevant appendices (for further information, see **Volume 2, Appendix 10.2 Intertidal Ecology Survey Report** and **Volume 2, Appendix 10.3 Benthic Ecology Baseline Characterisation Report**).

Table 7-1 Site-Specific Survey Data

Dataset	Survey Date	Location	Survey Techniques
Geophysical Surveys	August 2023 and September 2024	Offshore Development Area – Array Area (2023) and offshore ECC (2024)	Multibeam echosounder, side-scan sonar, sub-bottom profiler and magnetometer.
Benthic Surveys	August 2023 and September 2024	Offshore Development Area – Array Area (2023) and offshore ECC (2024)	Drop-down video, grab sampling (including one macrofaunal sample and one particle size distribution (PSD) sample at each station), sediment chemistry samples and eDNA.
Intertidal Ecology Survey	23rd July 2024	The Project landfall area	Phase 1 biotope mapping.

115. The benthic characterisation and habitat mapping are described in further detail in **Section 7.1** to **Section 7.2.1**.

7.1 Intertidal Survey

116. A Phase I qualitative intertidal ecology survey was undertaken on 23rd July 2024 at the landfall location plus an extra buffer of two transects south of the landfall for the Project. The landfall selected for the Project (Landfall 9; see **Section 5.8** in **Volume 1, Chapter 5 Site Selection and Assessment of Alternatives** for further information) falls inside the Holderness Inshore MCZ.

117. Four transects across the landfall and buffer area was surveyed to determine the habitats present and the presence/absence of any fauna. Three distinct habitats were identified within the Landfall. Instances of *Arenicola marina* worm casts and *Lanice conchilega* tubes were found along the lower shore. While distinct differences in habitat and species composition were identified across the tidal range, such differences were not significant enough to constitute a change in biotope present. As such, the entirety of the survey area was classified as the biotope barren littoral coarse sand (EUNIS biotope MA5231).

118. See **Volume 2, Appendix 10.2 Intertidal Survey Report** for further details on the methodology and results of this survey.

7.2 Project Specific Benthic Characterisation Surveys

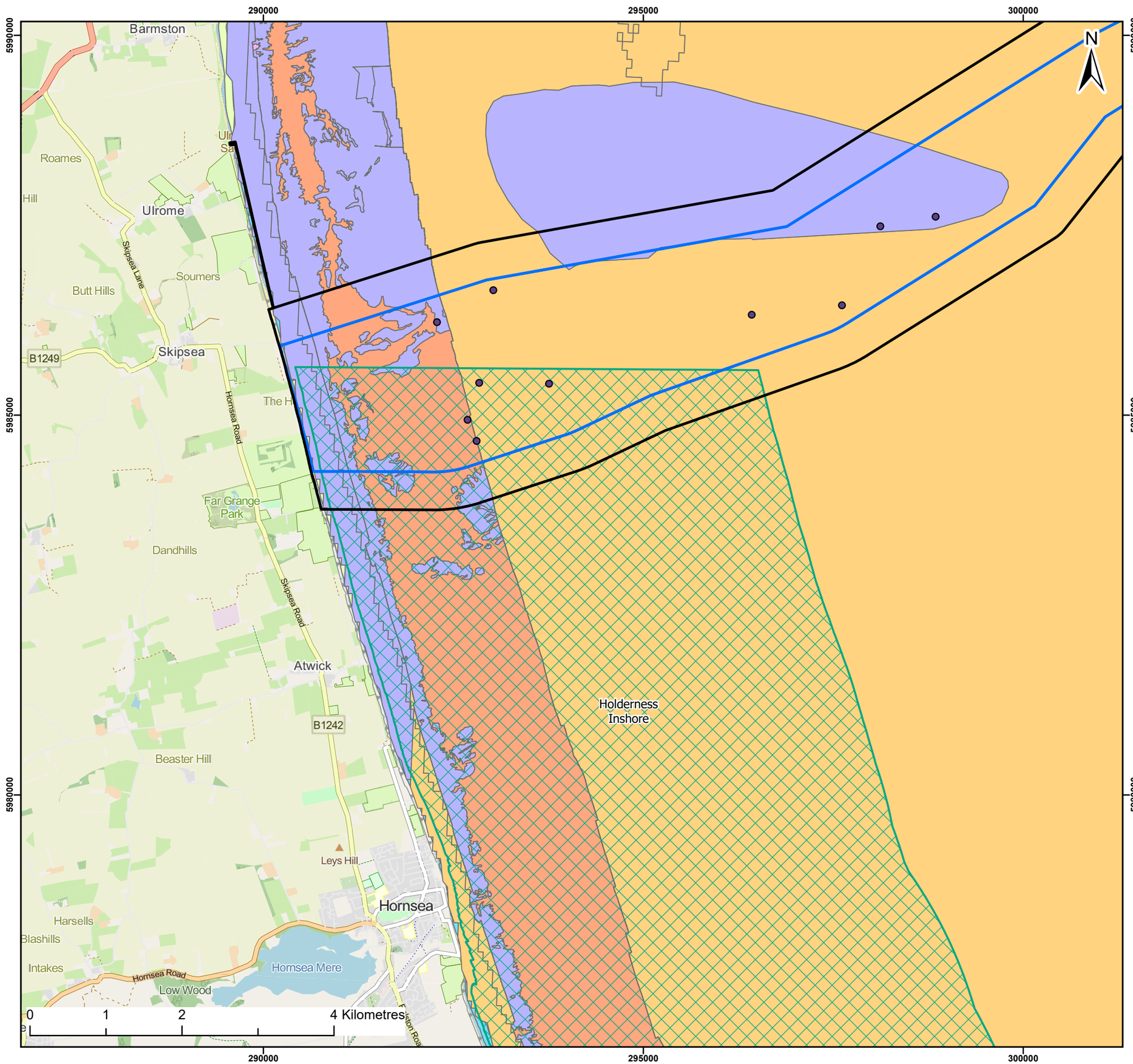
119. The site characterisation report is presented in **Volume 2, Appendix 10.3 Benthic Ecology Baseline Characterisation Report**.

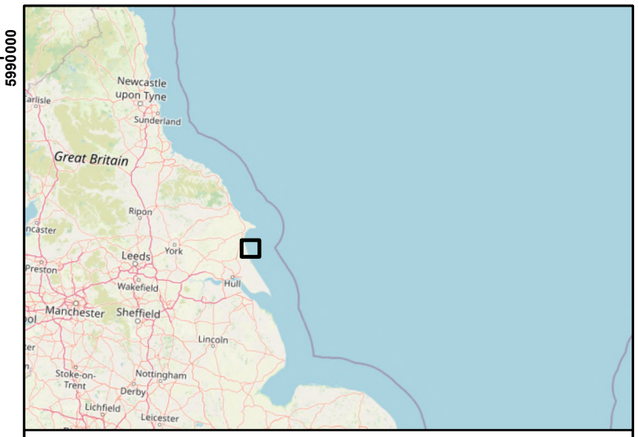
120. The surveys dates for the benthic characterisation survey are shown in **Table 7-1** and covered the Offshore Development Area. The survey included five sampling stations within the Holderness Inshore MCZ and none within the Holderness Offshore MCZ. With a further three sample stations taken just outside of the Holderness Inshore MCZ (within 1km). Three sample stations were within 1km of the Holderness Offshore MCZ, measuring approximately 0.38km at their closest point (**Figure 7-1**).

121. The sampling consisted of drop-down video (DDV), grab sampling (including one macrofaunal sample and one particle size distribution (PSD) sample at each station), sediment chemistry samples and water sampling for eDNA analysis.

7.2.1 Benthic Habitat Mapping

122. Benthic habitat maps will be produced for the Project's Offshore Development Area, defining the distribution of habitats between survey sample stations, by combining the geophysical data sets and benthic sample data (grab and drop-down video imagery) using geostatistical processing and spatial statistical analysis.





Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Marine Conservation Zones
- Benthic Survey Locations

MCZ Broadscale Habitat

- A2.2,Intertidal sand and muddy sand
- A2.4,Intertidal mixed sediments
- A3,Infralittoral rock
- A4,Circalittoral rock
- A5.1,Subtidal coarse sediment
- A5.2,Subtidal sand
- A5.4,Subtidal mixed sediments

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Holderness Inshore MCZ Protected Features with Offshore ECC Habitat Map

Figure: 7-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0346

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	17/01/2025	GC	AB	A3	1:50,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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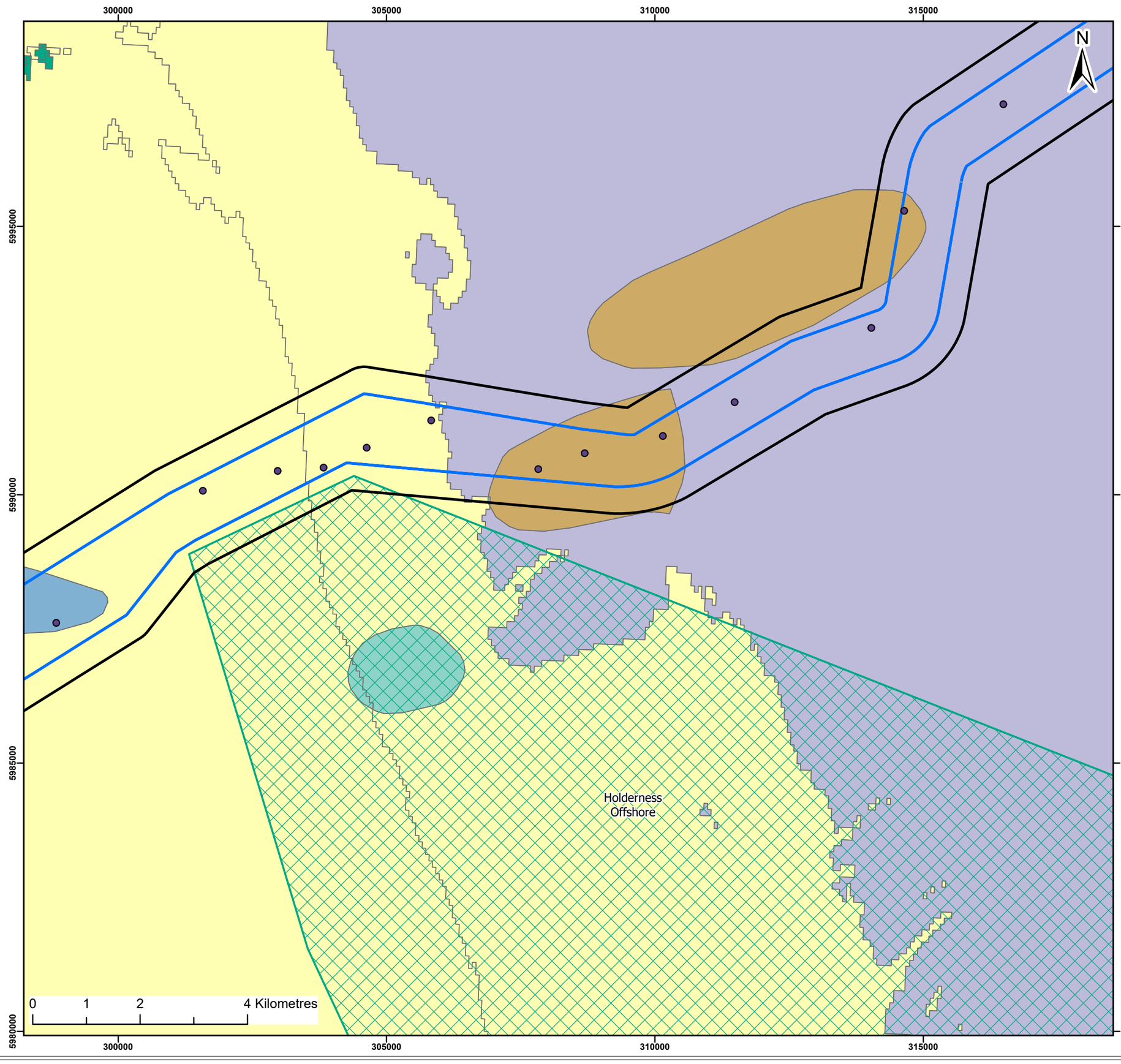
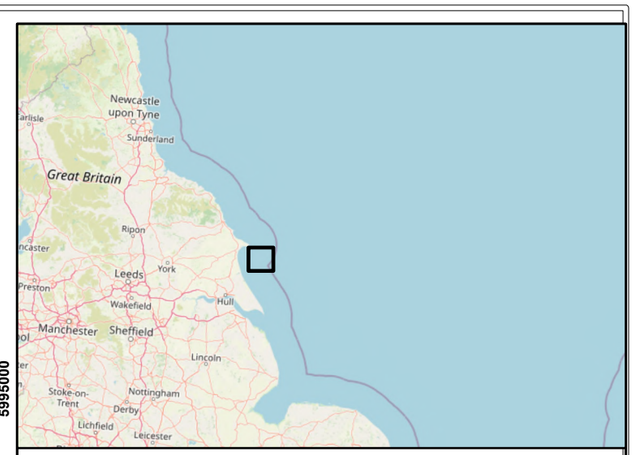
123. For PEIR, a technical report summarising the benthic habitat mapping method and results is provided in **Volume 2, Appendix 10.3 Benthic Ecology Baseline Characterisation Report**. The spatial distribution of the EUNIS Level 3 main habitats (equivalent to Marine Habitat Classification for Britain and Ireland 'habitat complexes') identified in the offshore ECC are presented on **Figure 7-1** and **Figure 7-2**. However, it should be noted the habitat maps created have not been combined with the geophysical data for the offshore ECC, but this will be available for ES.





Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Marine Conservation Zones
- Benthic Survey Locations

EUSeaMap broad-scale seabed habitat

- A5.13: Infralittoral coarse sediment
- A5.14: Circalittoral coarse sediment
- A5.15: Deep circalittoral coarse sediment
- A5.25 or A5.26: Circalittoral fine sand or Circalittoral muddy sand
- A5.44: Circalittoral mixed sediments
- A5.45: Deep circalittoral mixed sediments

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK
WIND FARM

Title:

Holderness Offshore MCZ Protected Features with Offshore ECC Habitat Map

Figure:	Drawing No:
7-2	PC6250-RHD-XX-OF-DR-GS-0347

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	17/01/2025	GC	AB	A3	1:70,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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8 Designations

8.1 Holderness Inshore Marine Conservation Zone

124. The Holderness Inshore MCZ is located north of the mouth of the Humber Estuary and covers an area of 309km^2 (see **Figure 1-1**). The seabed in this site comprises rock, sand, mud and sediment. The mosaic of habitats within the site supports a diverse range of organisms including red algae, sponges and other encrusting fauna. The site also supports fish species such as European eel, dab and wrasse, as well as commercially significant crustaceans such as edible and velvet swimming crabs and lobster. Partly above the water, the sandy beaches of intertidal sand and muddy sand are uncovered at low tide (DEFRA, 2016).

125. **Table 8-1** details the designated features of the Holderness Inshore MCZ, with **Figure 7-1** presenting the locations of these features within the MCZ (in addition to the habitat type recorded within the offshore ECC).

Table 8-1 Designated Features of the Holderness Inshore MCZ

Protected Feature	Type of Feature	Management Approach
Intertidal sand and muddy sand	Broadscale marine habitat[2]	Maintain in favourable condition
Moderate energy circalittoral rock		
High energy circalittoral rock		
Subtidal coarse sediment		
Subtidal sand		
Subtidal mud		
Subtidal mixed sediments		
Spurn Head (subtidal)		

[2] Broadscale marine habitats are groups of habitats with shared ecological requirements which capture the coarse biological and physical diversity of the seabed (JNCC, 2022).

8.1.1 Protected Features

126. There is an overlap of 5.41km^2 within the Holderness Inshore MCZ and the Project's offshore ECC, which includes the option where the trenchless technique exit location is within the MCZ. This area is the boundary where there is potential for infrastructure (i.e. the export cable) to be placed. It is currently a broad area and will be refined throughout the Project's development. This area is the worst-case overlap and any infrastructure located within it would cover a much smaller area (**Figure 7-1Table 5-5**).

127. In addition to this area, there is a further overlap of 2.98km^2 within the Holderness Inshore MCZ in relation to the Project's Offshore Development Area buffer (0.5km either side of the cable corridor). This is the area where vessel anchors working on the export cable could have an impact. As such, only anchoring events within the area of overlap between the MCZ and the Project; Offshore Development Area buffer may result in any direct effects on the protected features of the site.

128. **Table 8-2** summarises the Holderness Inshore MCZ features that, based on project specific survey and desk-based information, may be directly impacted by the offshore ECC activities. Note that the potential for indirect impacts on other MCZ features are also assessed in the Stage 1 Assessment (**Section 9**). The screening is based on the survey information available for the MCZ, this allows for a confident analysis but there could be locations missing where this habitat is present.

*Table 8-2 Holderness Inshore MCZ Protected Features that Spatially Coincide with the Export Cable Installation, Maintenance and Decommissioning Activities and potential for impact. ✓ means impact screened in for further assessment and **X** means screened out*

Designated Feature (EUNIS Code)	Possible Impact screening	Screening Reason
Intertidal sand and muddy sand (A2.2)	X	Not present within ZoI of Project.
Moderate energy circalittoral rock (A4.2)	X	
High energy circalittoral rock (A4.1)	X	
Subtidal coarse sediment (A5.1)	✓	Present within ZoI.
Subtidal sand (A5.2)	✓	
Subtidal mud (A5.3)	X	Not present within ZoI of Project.
Subtidal mixed sediments (A5.4)	✓	Present within ZoI.

Designated Feature (EUNIS Code)	Possible Impact screening	Screening Reason
Spurn Head (subtidal)	X	Not present within ZoI of Project.

8.1.2 Conservation Objectives

129. The overarching conservation objective for the site is for its designated features to be maintained in favourable condition. For each broadscale marine habitat, a favourable condition means that, within an MCZ:

- 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.

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

131. 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.

8.1.2.1 Supplementary Advice on Conservation Objectives

132. Natural England and the JNCC have provided supplementary advice on conservation objectives (SACOs) for the Holderness Inshore MCZ (Natural England, 2023). The SACOs provide further detail about the protected features' extent and distribution, structure, function and supporting processes. For these attributes, targets are provided and where possible quantified.

133. The implications of the Project on the specific attributes for the Holderness Inshore MCZ protected features have been used to inform the Stage 1 MCZA presented in this report (see **Section 9.1**).

8.2 Holderness Offshore Marine Conservation Zone

134. The Holderness Offshore MCZ is located approximately 11km offshore from the Holderness coast (**Figure 1-1**; JNCC, 2021). This site extends across inshore and offshore waters as it crosses the 12nm territorial sea limit. The MCZ has relatively shallow depth ranges from 5m down to 50m and covers an area of 1,176km^2.

135. The seabed is dominated by subtidal coarse sediment and hosts subtidal sand, subtidal mixed sediments and part of a glacial tunnel valley. The diverse seabed allows for a wide variety of species which live both in and on the sediment such as, crustaceans (crabs and shrimp), starfish and sponges. This site is also a spawning and nursery ground for a range of fish species for example lemon sole *Microstomus kitt*, plaice *Pleuronectes platessa* and European sprat *Sprattus sp*. Therefore, the species living both in and on the sediment may benefit from the protection afforded to the habitat features within this site.

136. The slow-growing (but widely occurring) bivalve, Ocean quahog *Arctica islandica* has been found in the site and within some locations of the site-specific survey, although those locations are not within the MCZ (see **Volume 2**, **Appendix 10.3 Benthic Ecology Baseline Characterisation Report**). Ocean quahog is a threatened / declining species of bivalve mollusc that can take up to 6 years to reach maturity and can live for over 500 years.

137. **Table 8-3** details the designated features of the Holderness Offshore MCZ, with **Figure 7-2** presenting the locations of these features within the MCZ (in addition to the habitat type recorded within the offshore ECC).

Table 8-3 Designated Features of the Holderness Offshore MCZ

Protected Feature	Type of Feature	Management Approach
Subtidal coarse sediment	Broadscale marine habitat	Recover to favourable condition.
Subtidal sand		
Subtidal mixed sediments		
Ocean quahog *Arctica islandica*	Species feature of conservation importance	
North Sea glacial tunnel valleys	Feature of geological interest	Maintain in favourable condition.

8.2.1 Protected Features

138. The Holderness Offshore MCZ lies approximately 150m to the south-east of the offshore ECC for cable installation and overlaps the Offshore Development Area buffer by approximately 1.05km^2.

139. As the Holderness Offshore MCZ lies outside of the offshore ECC and direct effects on its features from the infrastructure will be avoidable. However, effects relating to anchoring from vessels within the Offshore Development Area buffer have the potential to be unavoidable. There is the potential for temporary physical disturbance and temporary habitat loss from the anchoring of vessels in the Offshore Development Area buffer. Suspended sediment concentrations (SSC) could increase in the offshore ECC due to the seabed preparation for the cable installation and anchoring of vessels in the Offshore Development Area buffer. This could result in potential indirect effects on the MCZ from increases in sediment deposition or deterioration in water quality.

140. It is important to note that the bathymetry data and site surveys from nearby projects noted no sandbanks or sand waves within the proximity of the MCZ, and therefore the required preparation is likely to consist of cable ploughing which could lead to reduced anchoring within the Holderness Offshore MCZ (see Dogger Bank South (DBS), 2024; **Volume 1, Chapter 8 Marine Physical Environment**). The Project will be ground truthing this data with its own survey and the results will be available for the ES.

141. **Table 8-4** summarises the Holderness Offshore MCZ features that, based on project site-specific survey and desk-based information, may be directly impacted by the offshore ECC activities in terms of anchoring from vessels as part of the Offshore Development Area buffer lies within the MCZ. Note that the potential for indirect impacts on other MCZ features are also assessed in the Stage 1 Assessment (**Section 9**).

*Table 8-4 Holderness Offshore MCZ Protected Features that Spatially Coincide with the Export Cable Installation, Maintenance and Decommissioning Activities and potential impacts. ✓ means impact screened in for further assessment and **X** means screened out*

Protected Feature (EUNIS Code)	Possible Impact	Screening Reason
Subtidal coarse sediment (A5.1)	✓	Present within ZoI where anchoring may occur.
Subtidal sand (A5.2)	✓	
Subtidal mixed sediments (A5.4)	✓	
Ocean quahog *Arctica islandica*	X	Not present within ZoI where anchoring may occur.
North Sea glacial tunnel valleys	X	

8.2.2 Conservation Objectives

142. The conservation objectives for the Holderness Offshore MCZ are that "*the protected features:*

- *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*".

143. With respect to Subtidal coarse sediment, Subtidal sand and Subtidal mixed sediments within the MCZ, 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*".

144. With respect to ocean quahog within the MCZ, 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.*

145. *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*".

146. With respect to the North Sea glacial tunnel valleys within the MCZ, 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 detailed in the above bullets are satisfied.*

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

8.2.2.1 Supplementary Advice on Conservation Objectives

147. Natural England and the JNCC have provided SACOs for the Holderness Offshore MCZ (JNCC and Natural England, 2021). The SACOs provide further detail about the protected features' extent and distribution, structure, function and supporting processes. For these attributes, targets are provided and where possible quantified.

148. The implications of the Project on the specific attributes for the Holderness Offshore MCZ protected features has been used to inform the Stage 1 MCZA presented in this report.

9 Stage 1 Assessment

149. This section presents the Stage 1 MCZA for the effects from construction, operation and decommissioning of the Project on protected features of the MCZs. Each of the impacts and corresponding pressures (derived from Natural England's AoO (Natural England, 2019)) identified during MCZA Screening (**Section 6**) are discussed individually. The assessment has considered the effects on the attributes and targets of each protected feature as provided by the Holderness Offshore MCZ SACOs (Natural England, 2021), and the Holderness Inshore MCZ SACOs (Natural England, 2023). As discussed in **Section 1**, due to the offshore development area being updated, Swallow Sand MCZ now falls outside of the Offshore Development Area buffer and the Project's ZOI. Therefore, this will not be assessed further.

150. The attributes of each protected feature of the MCZs are listed in **Table 8-1** and **Table 8-3**, along with signposts to the relevant sections of the Stage 1 Assessment where the assessment of that feature and attribute is provided. Attributes are categorised as either physical or biological to support the assessment, which first addresses impacts on the physical attributes of features, and then the biological attributes of broadscale habitat features (which are largely dictated by physical attributes).

151. Following the assessment of each impact screened into the assessment in relation to each protected MCZ feature and corresponding attributes, an assessment is made as to whether the impact has the potential to hinder the achievement of the MCZs conservation objectives. Both direct and indirect impacts are considered during the Stage 1 assessment.

9.1 Holderness Inshore Marine Conservation Zone

152. **Table 9-1** details each pressure detailed in the AoO (Natural England, 2023) screened in for further assessment. The **Annex 1 - MCZA Screening Report** details each pressure and provides justification for why each pressure has been screened in / out of further assessment (see **Table 9-1**).

Table 9-1 Pressures Assessed in Relation to the Relevant Attributes during the Holderness Inshore MCZ Stage 1 Assessment. Grey – No Impact Pathway, Blue – Assessment Undertaken

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Construction					
Subtidal coarse sediment (A5.1), Subtidal sand (A5.2), Subtidal mixed sediments (A5.4)					
Biological	Distribution: presence and spatial distribution of biological communities	**Section 9.1.1.1.2**	N/A	**Section 9.1.1.2.2**	N/A
Physical	Structure: extent and distribution	**Section 9.1.1.1.1**	N/A	N/A	N/A
Biological	Structure and function: presence and abundance of key structural and influential species	**Section 9.1.1.1.2**	N/A	**Section 9.1.1.2.2**	N/A
	Structure: non-native species and pathogens	N/A	N/A	N/A	**Section 9.1.1.3.1**
Physical	Structure: physical structure of rocky substrate	**Section 9.1.1.1.1**	N/A	N/A	N/A
	Structure: sediment composition and distribution	**Section 9.1.1.1.1**	N/A	**Section 9.1.1.2.1**	N/A
Biological	Structure: species composition of component communities	**Section 9.1.1.1.2**	N/A	**Section 9.1.1.2.2**	N/A

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Physical	Supporting processes: energy / exposure	N/A	N/A	N/A	N/A
	Supporting processes: physico-chemical properties	N/A	N/A	N/A	N/A
	Supporting processes: sediment contaminants	N/A	N/A	**Section 9.1.1.2.1**	N/A
	Supporting processes: sediment movement and hydrodynamic regime	N/A	N/A	N/A	N/A
	Supporting processes: sedimentation rate	N/A	N/A	**Section 9.1.1.2.1**	N/A
	Supporting processes: water quality – contaminants	N/A	N/A	N/A	N/A
	Supporting processes: water quality – dissolved oxygen	N/A	N/A	N/A	N/A
	Supporting processes: water quality - nutrients	N/A	N/A	N/A	N/A
	Supporting processes: water quality - turbidity	N/A	N/A	**Section 9.1.1.2.1**	N/A

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Operation					
Biological	Distribution: presence and spatial distribution of biological communities	**Section 9.1.2.1**	**Section 9.1.2.2.2**	N/A	N/A
Physical	Structure: extent and distribution	**Section 9.1.2.1**	**Section 9.1.2.2.1**	**Section 9.1.2.3**	N/A
Biological	Structure and function: presence and abundance of key structural and influential species	**Section 9.1.2.1**	**Section 9.1.2.2.2**	**Section 9.1.2.3**	N/A
	Structure: non-native species and pathogens	N/A	N/A	N/A	**Section 9.1.2.4.1**
Physical	Structure: physical structure of rocky substrate	**Section 9.1.2.1**	N/A	N/A	N/A
	Structure: sediment composition and distribution	**Section 9.1.2.1**	**Section 9.1.2.2.1**	N/A	N/A
Biological	Structure: species composition of component communities	**Section 9.1.2.1**	**Section 9.1.2.2.2**	**Section 9.1.2.3**	N/A

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Physical	Supporting processes: energy / exposure	N/A	**Section 9.1.2.2.1**	**Section 9.1.2.3**	N/A
	Supporting processes: physico-chemical properties	N/A	N/A	N/A	N/A
	Supporting processes: sediment contaminants	N/A	N/A	N/A	N/A
	Supporting processes: sediment movement and hydrodynamic regime	N/A	N/A	N/A	N/A
	Supporting processes: sedimentation rate	N/A	N/A	**Section 9.1.2.3**	N/A
	Supporting processes: water quality – contaminants	N/A	N/A	**Section 9.1.2.3**	N/A
	Supporting processes: water quality – dissolved oxygen	N/A	N/A	N/A	N/A
	Supporting processes: water quality - nutrients	N/A	N/A	N/A	N/A
	Supporting processes: water quality - turbidity	N/A	N/A	**Section 9.1.2.3**	N/A

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Decommissioning					
Biological	Distribution: presence and spatial distribution of biological communities	**Section 9.1.3.1**	**Section 9.1.3.2**	N/A	N/A
Physical	Structure: extent and distribution	**Section 9.1.3.1**	**Section 9.1.3.2**	**Section 9.1.3.3**	N/A
Biological	Structure and function: presence and abundance of key structural and influential species	**Section 9.1.3.1**	**Section 9.1.3.2**	**Section 9.1.3.3**	N/A
	Structure: non-native species and pathogens	N/A	N/A	N/A	**Section 9.1.3.3.1**
Physical	Structure: physical structure of rocky substrate	**Section 9.1.3.1**	N/A	N/A	N/A
	Structure: sediment composition and distribution	**Section 9.1.3.1**	**Section 9.1.3.2**	N/A	N/A
Biological	Structure: species composition of component communities	**Section 9.1.3.1**	**Section 9.1.3.2**	**Section 9.1.3.3**	N/A

MCZ Feature Attributes		Effects			
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**	**Habitat loss / alteration**	**Increased suspended sediment concentrations (SSC)**	**Invasive species**
Physical	Supporting processes: energy / exposure	N/A	**Section 9.1.3.2**	**Section 9.1.3.3**	N/A
	Supporting processes: physico-chemical properties	N/A	N/A	N/A	N/A
	Supporting processes: sediment contaminants	N/A	N/A	N/A	N/A
	Supporting processes: sediment movement and hydrodynamic regime	N/A	N/A	N/A	N/A
	Supporting processes: sedimentation rate	N/A	N/A	**Section 9.1.3.3**	N/A
	Supporting processes: water quality – contaminants	N/A	N/A	**Section 9.1.3.3**	N/A
	Supporting processes: water quality – dissolved oxygen	N/A	N/A	N/A	N/A
	Supporting processes: water quality - nutrients	N/A	N/A	N/A	N/A
	Supporting processes: water quality - turbidity	N/A	N/A	**Section 9.1.3.3**	N/A

9.1.1 Potential Effects during Construction

9.1.1.1 Temporary Physical Disturbance / Temporary Habitat Loss

153. Temporary physical disturbance / temporary habitat loss will occur as a result of pre-cable installation seabed preparation including a PLGR and boulder clearance, excavation at the exit point (including drilling fluids from frac-out), and cable installation, all of which will be contained within the offshore ECC and Offshore Development Area buffer (see **Figure 7-1**). Cable burial will occur within the footprint of temporary habitat loss and physical disturbance associated with seabed preparation.

154. Whilst there is potential for repeat disturbance to these areas, the footprint will remain the same. Some activities will result in disturbance of surface sediments, and some will result in temporary habitat loss (removal of substratum and subsequent deposition).

155. Three broadscale marine habitat features have the potential to be affected by temporary physical disturbance / temporary habitat loss during construction:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

156. Intertidal sand and muddy sand (A2.2), subtidal mud (A5.3), Moderate energy circalittoral rock (A4.2), high energy circalittoral rock (A4.1) and Spurn Head (subtidal) do not have the potential to be affected by temporary habitat loss and physical disturbance due to the distance of the offshore ECC and the exit pit falling outside of their known locations within the MCZ, which is greater than one tidal ellipse of 14km (see **Figure 7-1)**.

157. The impact of temporary physical disturbance / temporary habitat loss has been defined using the following pressures identified by Natural England's AoO for the Holderness Inshore MCZ (**Table 6-1**):

- Abrasion / disturbance of the substrate on the surface of the seabed;
- Habitat structure changes – removal of substratum (extraction); and
- Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion.

158. Sediment extracted by cable installation will be backfilled into the trench, therefore there will be no long-term removal of substratum. Removal of substratum (extraction) is classed by AoO as a low-risk pressure for cable installation and given that material will be returned in the same area with similar sediment type, sensitivity to this pressure is likely to be less than for activities that permanently extract substratum.

159. **Table 5-5** presents the worst-case extent of these impacts during construction. The worst-case maximum area of seabed within the Holderness Inshore MCZ which could be disturbed during cable installation activities would be 171,000m^2. This equates to less than 0.06% of the MCZ area.

160. The remainder of this section assesses the impact of temporary habitat loss and physical disturbance during construction against the attributes and targets of each protected feature as provided by Natural England's SACOs.

9.1.1.1.1 Physical Attributes

161. The following physical attributes of protected features are relevant to temporary physical disturbance / temporary habitat loss impacts:

- Structure: extent and distribution;
- Structure: physical structure of rocky substrate; and
- Structure: sediment composition and distribution.

162. **Table 9-2** provides the maximum extent of Holderness Inshore MCZ features that will be potentially impacted by temporary habitat loss and physical disturbance.

Table 9-2 Maximum Extent of Temporary Physical Disturbance / Temporary Habitat Loss of the Holderness Inshore MCZ Features during the Construction Phase

Protected Feature	Spatial Extents (km^2)	Area of overlap (km^2)	Percentage of overlap with the MCZ Protected Feature (%)
Intertidal sand and muddy sand (A2.2)	0.24	0	0
Moderate energy circalittoral rock (A4.2)*	2.12	0	0
High energy circalittoral rock (A4.1)*			
Subtidal coarse sediment (A5.1)	202.31	0.00768	0.004
Subtidal sand (A5.2)	18.56	0.00316	0.017
Subtidal mud (A5.3)**	0.00	0	0

Protected Feature	Spatial Extents (km^2)	Area of overlap (km^2)	Percentage of overlap with the MCZ Protected Feature (%)
Subtidal mixed sediments (A5.4)	80.83	0.00701	0.009
Spurn Head (subtidal)	-	-	-

*Combined together as data only available for circalittoral rock (A4).
**The most recent surveys and data available shows no subtidal mud (A5.3) to be present within the Holderness Inshore MCZ.

163. Subtidal coarse sediment, sand and mixed sediments disturbed will not be removed or relocated and as shown in **Table 9-2**, disturbance will be minimal. Sediment disturbance has the potential to suspend fine sediments which will disperse more widely than coarse sediments, reducing the proportion of fine sediment in the disturbed area. However, as discussed in **Section 7.2** there is a low percentage of fine material along the offshore ECC.

9.1.1.1.2 Biological Attributes

164. The following biological attributes of protected features are relevant to temporary physical disturbance / temporary habitat loss impacts:

- Distribution: presence and spatial distribution of biological communities;
- Structure and function: presence and abundance of key structural and influential species; and
- Structure: species composition of component communities.

165. During construction activities (see **Section 5**), temporary physical disturbance / temporary habitat loss is likely to result in localised mortality of macrofauna and reductions in species richness and biomass.

9.1.1.1.2.1 Subtidal coarse sediment (A5.1)

166. Areas of subtidal coarse sediment in the offshore ECC were defined to EUNIS level 4 as A5.13 Infralittoral coarse sediment but not to the biotope level due to the lack of species noted in the site-specific survey (see **Volume 2, Appendix 10.3 Benthic Ecology Baseline Characterisation Report**). Natural England's AoO identifies five biotopes that may be represented within this feature. Their sensitivity to relevant pressures ranges from Not Sensitive to Medium, with the highest sensitivity being to penetration or removal of substratum (extraction) and disturbance of the substratum subsurface (both medium sensitivity) (see **Annex -2 Biotope Sensitivity Ranges**). Resilience ranges from medium to high, equating to full recovery within two to ten years for a medium resilience or within two years for a high resilience.

9.1.1.1.2.2 Subtidal Sand (A5.2)

167. Areas of subtidal sand in the offshore ECC were identified as including the biotope complex A5.23 Infralittoral fine sand and the biotope A5.233 *Nephtys cirrosa* and *Bathyporeia spp*. in infralittoral sand. The sensitivity of this biotope to relevant pressures ranges from Low to Medium, with the highest sensitivity being to penetration or removal of substratum (extraction). Sensitivity to abrasion / disturbance of the substrate on the surface of the seabed and disturbance of the substratum subsurface is Low (**Annex 2 - Biotope Sensitivity Ranges**). Resilience to all pressures is high with full recovery within two years.

9.1.1.1.2.3 Subtidal Mixed Sediments (A5.4)

168. Areas of mixed sediments in the offshore ECC were classified as the biotope complex 'Infralittoral mixed sediment' (A5.43), showing similarities to the biotope '*Crepidula fornicata* with ascidians and anemones on infralittoral coarse mixed sediment' (A5.431) mixed with areas of the biotope '*Sabellaria spinulosa* on stable circalittoral mixed sediment' (A5.611). The sensitivity of these biotopes to relevant pressures ranges from Low to Medium. These biotopes are not listed under AoO as representative of the Holderness Inshore MCZ subtidal mixed sediments feature. However, all biotopes listed against the feature have Medium sensitivity to relevant pressures with medium resilience, equating to full recovery within two to ten years.

9.1.1.1.3 Summary

169. Disturbed sediments will not be removed or relocated and based on the effects of similar activities in adjacent areas the composition and distribution of sediments will not change. Therefore, the extent, distribution and structure of these habitat features is not expected to change as a result of temporary physical disturbance / temporary habitat loss.

170. The presence and spatial distribution of associated biological communities will be maintained despite some localised mortality of macrofauna and reductions in species richness and biomass in the disturbed areas, representing a worst-case <0.01% of the all features present in the Holderness Inshore MCZ area in total (see **Table 8-4** for a breakdown by Holderness Inshore MCZ features).

171. Recovery of these communities will take place rapidly with full recovery expected within two years in many areas based on the resilience of most biotopes and partial recovery from the colonisation of impacted areas by species representative of pre-existing biological communities occurring sooner. Recovery may take longer in some coarse and mixed sediment areas but based on the post-construction monitoring conducted by the Dudgeon OWF, full recovery is expected in less than four years (DOW, 2009).

172. Therefore, based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features, it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by temporary habitat loss and physical disturbance impacts related to the construction of the Project.

9.1.1.2 Increased Suspended Sediment Concentrations

173. Temporary increases in SSC within the water column, and subsequent deposition onto the seabed may occur as a result of cable pre-installation activities including PLGR, export cable burial and at the exit pit and transition zone. Anchoring from vessels at the exit point and placement of external cable protection are not expected to increase the SSC to an extent at which it would cause an impact to benthic ecology receptors. **Section 8.7** in **Volume 1**, **Chapter 8 Marine Physical Processes** provides details of changes to SSCs and subsequent sediment deposition.

174. The installation of the export cables has the potential to disturb the seabed down to a target burial depth of 3.5m with a trench width of up to 15m. Excavation of the exit pit and transition zones will also disturb and potentially mobilise sediment into suspension. **Table 5-5** summarises the worst-case volume of sediment displaced.

175. Sand and gravel-sized sediment (which represents most of the disturbed sediment) would settle out of suspension rapidly to the bed in the immediate location of the offshore ECC. Fine sand will most likely remain in the bottom 1m to 2m of the water column, and with settling velocities of around 10mm/s, this will ensure the fine sand settles within half an hour or less or become part of the ambient near bed transport (Soulsby, 1997).

176. The majority of disturbed sediment will initially resettle within a short distance of the export cable, with almost no sand being transported much further. Deposition of sediment is expected to be localised to the point of disturbance (see **Volume 1, Chapter 8 Marine Physical Processes** for further details).

177. Mud-sized material (which represents only a very small proportion of the disturbed sediment) would be advected a greater distance and persist in the water column for hours to days. It is anticipated that under the prevailing hydrodynamic conditions, this sediment would be readily re-mobilised, especially in the shallow inshore area where waves would regularly agitate the bed. Accordingly, outside the immediate vicinity of the offshore export cable route, sediment deposition and any changes to seabed character are not expected to be measurable in practice.

178. Although SSC will be elevated, they are likely to be lower than concentrations that would develop in the water column during storm conditions (see **Section 8.6.1.10** in **Volume 1, Chapter 8 Marine Physical Processes**). Also, once installation is completed, tidal currents are likely to rapidly disperse the suspended sediment (i.e. over a period of a few hours), in the absence of any further sediment input. It is likely that the increase in concentrations would be greatest in the shallowest sections of the offshore ECC, but in these locations the background concentrations are also greater than in deeper waters. The predicted SSCs to the points of release with maximums of 1mg/l in the surface layer to 2mg/l in the bottom layer (see **Figure 8-24** in **Volume 1, Chapter 8 Marine Physical Processes**).

179. Therefore, suspended sediment concentrations are likely to remain within the range of background nearshore levels and lower than those concentrations that would develop during storm conditions. Upon cessation of construction activities, the high energy nearshore zone is likely to rapidly disperse the suspended sediment (i.e. over a period of a few hours) in the absence of any further sediment input.

180. The Project overlaps the following broadscale marine habitat features will therefore be affected by temporary increases in SSC and subsequent deposition during construction:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

181. Tidal currents close to the Holderness coast and in the Holderness Inshore MCZ are approximately parallel to the coast in a north-west to south-east direction. Given that sediment concentration are likely to remain within the range of background levels, the following Holderness Inshore MCZ features are unlikely to be impacted due to their distance from, and / or distribution inshore, of construction activities (**Figure 7-1**):

- Subtidal mud;
- High energy circalittoral rock;
- Moderate energy circalittoral rock;
- Peat and clay exposures (nearest record located approximately 1.8km to the west); and
- Subtidal chalk.

182. The impact of temporary increases in SSC and subsequent deposition has been defined using the following pressures identified by Natural England's AoO for the Holderness Inshore MCZ (**Table 6-1**):

- Changes in suspended solids (water clarity);
- Smothering and siltation rate changes (heavy);
- Smothering and siltation rate changes (light); and
- Deoxygenation.

183. The pressure 'Smothering and siltation rate changes (light)' has been used for the sensitivity assessment because 'Light' deposition is defined as "of up to 5cm of fine material added to the habitat in a single, discrete event", as opposed to 'Heavy' deposition "of up to 30cm of fine material added to the habitat in a single discrete event". Therefore, 'Light' is the more accurate pressure in relation to cable installation activities given that localised deposits of up to approximately 3cm are expected (Natural England, 2021).

184. The remainder of this section assesses the impact of construction temporary increases in SSC and subsequent deposition against the attributes and targets of each protected feature as provided by Natural England's SACOs.

9.1.1.2.1 Physical Attributes

185. The following physical attributes of protected features are relevant to temporary increases in SSC and subsequent deposition impacts:

- Structure: sediment composition and distribution;
- Supporting processes: sediment movement and hydrodynamic regime;
- Supporting processes: sedimentation rate; and
- Supporting processes: water quality – turbidity.

186. As described above, redeposition of suspended sediments will be local to the construction activity and is unlikely to change sediment composition and distribution. Changes to the sedimentation rate will be within the natural range and given the distribution of subtidal rock features in relation to the extent of effects, no impact is anticipated. Similarly, increases in SSC will be localised, short term and within the natural range of turbidity. Therefore, there will be no impact on the physical attributes and targets of Holderness Inshore MCZ features.

9.1.1.2.2 Biological Attributes

187. The following biological attributes of protected features are relevant to temporary increases in SSC and subsequent deposition impacts:

- Distribution: presence and spatial distribution of biological communities;
- Structure: species composition of component communities; and
- Structure and function: presence and abundance of key structural and influential species.

188. Increased suspended sediments have the potential to affect benthic ecology receptors by blocking feeding apparatus as well as by smothering sessile species upon deposition of sediment.

189. Natural England's AoO states that the biotopes recorded in the offshore ECC within the Holderness Inshore MCZ have either Low to Medium sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are 'Not Sensitive' (**Annex 2 - Biotope Sensitivity Ranges**). Biotopes that are represented within the subtidal mixed sediments feature according to AoO (A5.432 *Sabella pavonina* with sponges and anemones on infralittoral mixed sediment, and A5.445 *Ophiothrix fragilis* and / or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment), have 'Medium' sensitivity but were not recorded in the offshore ECC (see **Volume 2, Appendix 10.4 Benthic Ecology Baseline Characterisation Report**).

190. Circalittoral rock habitats and high energy infralittoral rock are assigned 'Medium' sensitivity, whereas subtidal chalk has 'Low' sensitivity to increased suspended sediment. However, as discussed, based on their location being greater than a tidal ellipse away from the construction activities, impacts on these features are unlikely. The resilience for all biotopes has been determined to be 'high' to 'medium' (recovery in less than two years or less than ten years respectively).

9.1.1.2.3 Summary

191. Most of the sediment mobilised by construction activities would settle out of suspension rapidly to the bed, redepositing within a short distance of the works. Fine material (which represents only a very small proportion of the disturbed sediment) would disperse further and persist in the water column for hours to days, but at a SSC that is not discernible from background concentrations. Elevated SSC will be within the range of background nearshore levels and will be lower than those concentrations that would develop during storm conditions. Once installation is completed, tidal currents are likely to rapidly disperse the suspended sediment (see **Volume 1, Chapter 8 Marine Physical Processes** for further information).

192. Biological communities recorded in the offshore ECC within the Holderness Inshore MCZ have either 'Low' sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are Not Sensitive. Other biotopes which, according to AoO, are represented within the Holderness Inshore MCZ designated features have 'Medium' sensitivity, but these have not been recorded within the spatial extent of impacts (i.e. further than a tidal ellipse away from the offshore ECC). Therefore, the biological communities that may be affected by temporary increases in SSC and subsequent deposition will either not be impacted or would recover fully within two years.

193. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features, it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition impacts related to the construction of the Project.

9.1.1.3 Invasive Species

194. The primary pathway for the potential introduction of INNS during the construction phase is from the use of vessels and infrastructure that have originated from regions that are distinctly different, such as from other seas or oceans. **Table 9-3** presents the maximum number of vessels that will be used for the Project's offshore ECC construction activities. It should be noted that this represents vessel use across the entirety of the offshore ECC and is therefore an overestimate of activity in proximity the Holderness Inshore MCZ.

195. There is also existing vessel activity within the Holderness Inshore MCZ, which includes; fishing, cargo, recreational and wind farm support vessels. Therefore, the small increase in vessel traffic in the MCZ associated with the Project will not represent a significantly increased risk of introduction of INNS. As it currently stands the port location for Project vessels is currently not known, although it is expected to be local to the UK and North Sea.

196. Although the pathway for introduction of INNS is from the use of foreign vessels and the introduction of infrastructure, which will be greatest during the construction phase, the O&M phase has potential for establishment and spread of INNS due to the vector capability of introduced artificial hard substrate which is most pronounced during the operational lifetime.

197. Artificial hard substrates introduced by the Project including cable protection could act as potential 'stepping stones' or vectors for INNS, as well as supporting species non-native to otherwise soft substrate habitats.

198. This assessment considers the effects of placement of external cable protection, increased vessel traffic and resulting colonisation by faunal communities on the areas of cable infrastructure. The ecological attributes and targets for the broadscale marine habitat features most likely to be affected by the introduction of INNS:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

199. The impact of invasive species has been defined using the following 'low risk' pressure identified by Natural England's AoO for the Holderness Inshore MCZ (**Table 6-1**):

- Introduction or spread of invasive non-native species (INNS).

9.1.1.3.1 Biological Attributes

200. The following biological attributes of protected features are relevant to invasive species:

- Structure: non-native species and pathogens (habitat).

201. The risk of spreading INNS will be mitigated by the measures set out in a PEMP(s), as noted in the **Outline PEMP** (document reference 8.6) that is to be submitted with the PEIR (CO25 in **Table 5-6**). Plus, the following relevant regulations and guidance that will be employed which highlight a range of industry standard biosecurity measures:

- International Convention for the Prevention of Pollution from Ships (MARPOL). The MARPOL sets out appropriate vessel control procedures and maintenance;
- The Environmental Damage (Prevention and Remediation (England)) Regulations 2015, which set out a polluter pays principle where the operators who cause a risk of significant damage or cause significant damage to land, water or biodiversity will have the responsibility to prevent damage occurring, or if the damage does occur will have the duty to reinstate the environment to the original condition; and
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), which provide global regulations to control the transfer of potentially invasive species.

202. **Section 10.4.3** of **Volume 1, Chapter 10 Benthic and Intertidal Ecology** also outlines the embedded mitigation measures to reduce the risk of spreading INNS.

203. Natural England's AoO states that there are no known records of non-native species or pathogens within the Holderness Inshore MCZ (i.e. in areas of intertidal sand and muddy sand). However, the Humber / Holderness area is considered to be at risk from non-native invasive species due to the high levels of shipping and infrastructure in the estuary and an associated risk that invasive species could establish easily in the local habitat (Pearce *et al.,* 2012).

9.1.1.3.2 Summary

204. The risk of introducing INNS from activities associated with the Project will be limited, given the range of protection measures as discussed above, with any potential spread of INNS arising from existing species within the wider North Sea. With the appropriate mitigations in place through commitments secured in the **Outline PEMP** (document reference 8.6), it is not anticipated that INNS will have a significant impact.

205. Based on the relevant pressures and assessment of impacts against the attributes of affected Holderness Inshore MCZ features, it can be concluded that the conservation objective of maintaining the protected features of the Holderness Inshore MCZ in a favourable condition or restoring them to favourable condition will **not be hindered** by invasive species impacts related to the construction of the Project.

9.1.2 Potential Effects during Operation and Maintenance

9.1.2.1 Temporary physical disturbance / temporary habitat loss

206. Temporary habitat loss and physical disturbance within the Holderness Inshore MCZ will occur as a result of any requirement for cable repair, replacement and reburial during the O&M phase. The worst-case footprint of temporary physical disturbance / temporary habitat loss impacts is presented in **Table 9-3**.

207. The extents of impacts presented for the O&M phase make the highly precautionary assumption that all of the offshore ECC located within the MCZ will require repair, replacement and reburial. In reality, the extent of O&M phase temporary physical disturbance / temporary habitat loss would be a fraction of that during the construction phase (**Section 9.1.1.1**), and would be intermittent and restricted to discrete locations.

208. The habitat features and attributes impacted, and the sensitivities of those habitats will be the same as those identified for construction in relation to this impact (**Section 9.1.1.1**).

Table 9-3 Maximum Extent of Temporary Physical Disturbance / Temporary Habitat Loss of the Holderness Inshore MCZ Features during the O&M Phase

Protected Feature	Spatial Extents (km^2)	Area of overlap (km^2)	Percentage of overlap with the MCZ Protected Feature
Intertidal sand and muddy sand (A2.2)	0.24	0	0
Moderate energy circalittoral rock (A4.2)*	2.12	0	0
High energy circalittoral rock (A4.1)*			
Subtidal coarse sediment (A5.1)	202.31	0.00768	0.004
Subtidal sand (A5.2)	18.56	0.00316	0.017
Subtidal mud (A5.3)**	0.00	0	0
Subtidal mixed sediments (A5.4)	80.83	0.00701	0.009
Spurn Head (subtidal)	-	-	-

209. Disturbed sediments will not be removed or relocated and, based on similar activities in adjacent areas, the composition and distribution of sediments will not change. Therefore, the extent, distribution and structure of these habitat features will not change as a result of temporary habitat loss and physical disturbance.

210. The presence and spatial distribution of associated biological communities will be maintained despite some localised mortality of macrofauna and reductions in species richness and biomass in the disturbed areas, representing a worst-case 1,000m^2 in total over the full operational period, representing <0.01% of the Holderness Inshore MCZ (total is from **Table 9-3**).

211. Recovery of these habitats is expected to take place rapidly with full recovery expected within two years in many areas. This is based on the resilience of most biotopes, and partial recovery due to high recruitment potential of impacted areas by species representative of pre-existing biological communities. Recovery may take longer in some coarse and mixed sediment areas due to a lower mobility of these sediment types in tidal conditions (Le Bot *et al.*, 2010) but based on other OWF post-construction monitoring full recovery is expected in less than four years (DOW, 2009).

9.1.2.1.1 Summary

212. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by temporary physical disturbance / temporary habitat loss impacts related to the operation of the Project.

9.1.2.2 Habitat loss / alteration

213. Habitat loss / alteration may occur within the Holderness Inshore MCZ during the O&M phase. External export cable protection may be required in locations where an adequate degree of protection has not been achieved from the burial process, and at the exit pit transition zone. The need for external cable protection will be confirmed once the geophysical surveys have been completed. The results will be included and updated in the ES.

214. The Applicant considers that external cable protection will only be used as a last resort inside the Holderness Inshore MCZ to ensure the integrity of export cable assets is maintained. Burial of cables is the preferred protection solution, but where initial cable burial is not successful, the Applicant will seek to undertake remedial burial operations prior to resorting to cable protection measures.

215. Three broadscale marine habitat features have the potential to be affected by habitat loss / alteration:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

216. The impact of habitat loss / alteration has been defined using the following pressure identified by Natural England's AoO for the Holderness Inshore MCZ (**Table 6-1**):

- Physical change (to another seabed type); and
- Physical change (to another sediment type).

217. Physical change (to another sediment type) is not relevant because external cable protection will be a hard substratum rather than a sediment. However, physical change (to another seabed type) is relevant considering the hard substratum from external cable protection will be different.

218. **Table 9-3** presents the worst-case extent of these impacts during operation. The maximum area of seabed within the Holderness Inshore MCZ which could be subject to habitat loss / alteration would be 29,700m^2, this equates to <0.01% of the MCZ area. **Table 9-4** shows the maximum proportion of each potentially impacted broadscale marine habitat feature that could be temporarily lost in the unlikely event that all long-term habitat loss is located within one feature. However, as illustrated on **Figure 7-1**, it is likely that the impact will be spread across more than one broadscale marine sediment habitat feature.

Table 9-4 Maximum Extent of Habitat Loss / Alteration of the Holderness Inshore MCZ Features during the O&M Phase

Protected Feature	Spatial Extents (km^2)	Area of overlap (km^2)	Percentage of overlap with the MCZ Protected Feature
Intertidal sand and muddy sand (A2.2)	0.24	0	0
Moderate energy circalittoral rock (A4.2)*	2.12	0	0
High energy circalittoral rock (A4.1)*			
Subtidal coarse sediment (A5.1)	202.31	0.01278	0.006
Subtidal sand (A5.2)	18.56	0.00525	0.028
Subtidal mud (A5.3)**	0.00	0	0
Subtidal mixed sediments (A5.4)	80.83	0.01167	0.014
Spurn Head (subtidal)	-	-	-

219. The remainder of this section assesses the impact of habitat loss / alteration against the attributes and targets of each protected feature as provided by Natural England's SACOs.

9.1.2.2.1 Physical Attributes

220. The following physical attributes of protected features are relevant to habitat loss / alteration:

- Structure: Extent and distribution;
- Structure: sediment composition and distribution; and
- Supporting processes: energy / exposure.

221. The extent, distribution and structure of sediment features will largely be maintained across the Holderness Inshore MCZ. The sediment would be replaced by, or buried beneath, external export cable protection in localised and discrete areas. In these locations this would change the subtidal sediment habitats to artificial hard substratum, creating areas of habitat closer to circalittoral rock (A4), or possibly infralittoral rock (A3). Of which, Moderate energy circalittoral rock (A4.2) and High energy circalittoral rock (A4.1) are protected features of the Holderness Inshore MCZ (see **Table 8-1**).

222. Therefore, there would be a reduction in the extent and distribution of the subtidal coarse sediment, subtidal sand, or subtidal mixed sediment broadscale marine habitat features. There is potential for a lower magnitude impact on more than one or all of the Holderness Inshore MCZ features. Habitat loss could occur to approximately 29,700m^2 which is <0.01% of the estimated spatial extent of broadscale marine sediment and habitat features in the MCZ (**Table 9-4**).

223. External cable protection would sit up to 1.5m proud of the original seabed level and will locally change the exposure of adjacent areas to tidal currents and wave action, and potentially cause scour effects. Associated habitat loss through changes to sediment composition would be restricted to areas of mobile sediments (i.e. subtidal sand), although exposure changes may have more subtle effects on the biological communities associated with affected adjacent sediment habitats. However, any such impacts would be highly localised and within the estimated worst-case footprint of habitat loss / alteration.

9.1.2.2.2 Biological Attributes

224. The following biological attributes of protected features are relevant to habitat loss / alteration:

- Distribution: presence and spatial distribution of biological communities;
- Structure and function: presence and abundance of key structural and influential species; and
- Structure: species composition of component communities.

225. The installation of external export cable protection on sediment habitats will potentially result in localised mortality of associated biological communities and their replacement, over time, by a community with a different species composition and different key structural and influential species.

226. All sediment biotopes, including those recorded in the offshore ECC, and the biotopes Natural England's AoO identifies as being represented within the Holderness Inshore MCZ sediment habitat features, have high sensitivity to physical change to another seabed type with no resistance and very low resilience.

227. JNCC (2018) states that the presence and spatial distribution of biological communities, and the species composition of component communities, may be vulnerable to the installation of any infrastructure that is likely to result in a change to the nature or extent of the feature (for example the addition of rock armouring to protect cables or pipelines). Potentially having a significant impact on the attribute and triggering a 'recover' target.

228. Although there is very small area of sediment habitat loss / alteration, the presence, spatial distribution and characteristics of biological communities, which form a mosaic of similar coarse sediment, mixed sediment, sand and mud biotopes, will largely be maintained across the Holderness Inshore MCZ. There will not be a significant reduction in the extent of the habitat features that are impacted (see **Table 9-2**).

9.1.2.2.3 Summary

229. The extent, distribution and structure of habitat features, and the presence and spatial distribution of associated biological communities will be largely maintained despite some localised habitat loss / alteration of an area of up to 29,700m^2 (see **Table 9-3)**. This equates to <0.01% of the estimated spatial extent of broadscale marine sediment and habitat features. In the worst-case scenario, up to <0.01% of the individual features that overlap the export cable that could be lost if all the habitat loss were to impact this feature (**Table 9-2**).

230. Therefore, it can be concluded that the conservation objective of maintaining the protected features of the Holderness Inshore MCZ in a favourable condition will **not be hindered** by habitat loss / alteration impacts related to the operation of the Project. This is based on the very limited spatial extent, which is <0.01% of the individual features and although the impact will be long lasting in nature it is not deemed significant enough to inhibit the features from being maintained in a favourable condition.

231. The Project notes that in the case of Hornsea Project Three the Secretary of State was able to rule out beyond reasonable scientific doubt significant risk of project related activities hindering the achievement of the conservation objectives for the Cromer Shoal Chalk Beds MCZ in the Stage 1 MCZA. In this particular instance project related activities assessed included installation of rock protection within the MCZ and associated operational phase long term habitat loss. Precedent set in this instance supports the approach taken and conclusions outlined above for Holderness Inshore MCZ.

9.1.2.3 Increased suspended sediment concentrations (SSC)

232. Increases in SSC within the water column, and subsequent deposition onto the seabed may occur as a result of O&M activities that require the use of anchoring from vessels, as well as cable repair, replacement and reburial activities.

233. **Table 5-5** summarises the worst-case volume of sediment displaced. Volumes, presented as annual averages and O&M phase totals, make the highly precautionary assumption that all the estimated cable repair, replacement and reburial activities for the offshore export cables occur inside the Holderness Inshore MCZ. In reality, the extent of O&M phase temporary increases in SSC and subsequent deposition would be a fraction of that during the construction phase. It is anticipated that across the lifetime of the Project, there would be less than one requirement for cable repair within or adjacent to the Holderness Inshore MCZ (see **Table 9-2** for construction and **Table 9-3** during operation).

234. The construction phase would be the worst-case in terms of increased SSC, and as described in **Section 9.1.1.2,** most of the sediment mobilised would settle out of suspension rapidly to the bed, redepositing initially resettle within a short distance of the export cable, with almost no sand being transported much further. Deposition of sediment is expected to be localised to the point of disturbance (see **Volume 1, Chapter 8 Marine Physical Processes** for further details). Elevated SSC will be within the range of background nearshore levels and will be lower than those concentrations that would develop during storm conditions. Once installation is completed, tidal currents are likely to rapidly disperse the suspended sediment.

235. Biological communities recorded in the offshore ECC within the Holderness Inshore MCZ have either low sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are not sensitive, therefore, they will either not be impacted or would recover fully within two years.

9.1.2.3.1 Summary

236. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features, it can be concluded that the conservation objective of maintaining the protected features of the Holderness Inshore MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition impacts related to the operation of the Project.

9.1.2.4 Invasive species

237. Artificial hard substrates introduced by the Project (including cable protection) could act as potential ‘stepping stones’ or vectors for INNS, as well as supporting species non-native to otherwise soft substrate habitats. This assessment considers the effects of placing external cable protection and the resulting colonisation by faunal communities on the ecological attributes and targets of the three broadscale marine habitat features most likely to be affected by the introduction of INNS. These features have been identified as present in areas where the Project activities and cable infrastructure will be located:

- Subtidal coarse sediment (A5.1);

- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

238. The risk of spreading INNS will be mitigated by the same means as discussed in **Section 9.1.1.3** and **Section 10.4.3** in **Volume 1, Chapter 10 Benthic and Intertidal Ecology**. These commitments will be secured in an **Outline PEMP** (document reference 8.6) which is submitted with this PEIR, and which will be updated and submitted with the DCO application.

239. The impact of invasive species has been defined using the following 'low risk' pressure identified by Natural England's AoO for the Holderness Inshore MCZ (**Table 6-1**):

- Introduction or spread of invasive non-native species (INNS).

9.1.2.4.1 Biological Attributes

240. The following biological attributes of protected features are relevant to temporary disturbance and habitat loss effects:

- Structure: non-native species and pathogens (habitat).

241. Although the attributes 'Distribution – presence and spatial distribution of biological communities', 'Structure and function: presence and abundance of key structural and influential species' and 'Structure: species composition of component communities' are relevant to colonisation by INNS, impacts on these attributes are already assessed under the biological effects of habitat loss / alteration (**Section 9.1.2.2**).

242. The primary pathway for the potential introduction of INNS is from the use of vessels and infrastructure that has originated from an ecologically different location than the southern North Sea. Though the initial introduction of INNS will most likely be in the construction phase, it has been assessed in the O&M phase as all the hard substrate would be installed and establishment of INNS could take place, where the substates could provide 'stepping stones' for colonisation. Therefore, the significance of effect would be greater in this phase.

243. Due to a natural lack of hard substrate in the southern North Sea, many species found in such habitats do not naturally occur across the study area (Cameron and Askew, 2011). However, increasing numbers of wreck, oil and gas rigs, and now offshore wind turbines, may make it possible for more species to successfully colonise and establish communities in sheltered, productive zones.

244. However, Natural England's AoO states that there are no known records of non-native species or pathogens in areas of intertidal sand and muddy sand within the Holderness Inshore MCZ. However, the Humber / Holderness area is considered to be at risk from non-native invasive species due to the high levels of shipping in the estuary and an associated risk that invasive species could establish easily in the local habitat (Pearce *et al*., 2012).

245. It should be noted that due to the mobile nature of the sediments in the nearshore area around the Holderness Inshore MCZ, this could prevent INNS from establishing themselves. This habitat is very wave exposed to moderately exposed, in which wave action and storms may more readily mobilise the sediment (JNCC, 2022).

9.1.2.4.2 Summary

246. There is potential for INNS to be introduced through the use of vessels and the installation of infrastructure. However, as discussed given the mobile nature of the sediments within the area this likelihood is low and the risk of introduction and spread of INNS will be mitigated through adherence to the relevant regulations and guidance and secured through **Section 6.3** in **Outline PEMP** (document reference 8.6).

247. Furthermore, seabed habitats exist in a mosaic of mixed, coarse and sandy sediments across much of the offshore ECC within the Holderness Inshore MCZ **(Figure 7-1**). Therefore, the use of external cable protection across small and localised areas along the cable route is not anticipated to change the existing potential risk for the spread of INNS.

248. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the Holderness Inshore MCZ in a favourable condition will **not be hindered** by the risks of introduction and spread of INNS related to the operation of the Project.

9.1.3 Potential Effects during Decommissioning

9.1.3.1 Temporary Physical Disturbance / Temporary Habitat Loss

249. In the worst-case scenario, temporary physical disturbance / temporary habitat loss within the Holderness Inshore MCZ during the decommissioning phase could occur due to cable removal activities. These activities will only be carried out if deemed necessary at the time of decommissioning, based on the latest guidance and consultation with the regulator (see CO21 in **Volume 2, Appendix 6.3 Commitments Register**). Impacts would be no greater than, and are expected to be less than, those of the construction phase (**Section 9.1.1**), and will affect the same features and attributes.

250. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by temporary physical disturbance / temporary habitat loss impacts related to the decommissioning of the Project.

9.1.3.2 Habitat Loss / Alteration

251. Habitat loss / alteration may occur during the decommissioning phase as a result of cable removal activities or leaving infrastructure in place. Impacts would be no greater than those of the O&M phase (**Section 9.1.2.2**) and will affect the same features and attributes.

252. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by habitat loss / alteration impacts related to the decommissioning of the Project.

9.1.3.3 Increased Suspended Sediment Concentrations

253. Temporary increases in SSC within the water column, and subsequent deposition on to the seabed may occur during the decommissioning phase as a result of cable removal activities. Impacts would be no greater than and are expected to be less than those of the construction phase (**Section 9.1.1.2**) and will affect the same features and attributes.

254. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition impacts related to the decommissioning of the Project.

9.1.3.3.1 Invasive Species

255. Introduction of INNS via vessels or hard substrate may occur during the decommissioning phase as a result of cable removal activities. Effects would be no greater than and are expected to be less than those of the construction phase (**Section 9.1.1.3**) and will be the same features and attributes.

256. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Inshore MCZ features it can be concluded that the conservation objective of maintaining the protected features of the MCZ in a favourable condition will **not be hindered** by invasive species effects related to the decommissioning of the Project.

9.2 Holderness Offshore Marine Conservation Zone

257. There is currently no advice available regarding the sensitivity of North Sea glacial tunnel valleys to the pressures of offshore wind and power cable development. The North Sea glacial tunnel valleys are geological features characterised as curved sub-linear seabed depressions generally considered to have been formed by subglacial erosion and sediment backfill beneath the outer margins of a receding ice sheet (Pearce *et al.*, 2012). Due to their status as a geological rather than ecological feature, it is considered that the tunnel valleys would not be sensitive to the effects of increased SSCs or invasive species. As such, based on professional judgement this feature has been screened out of the assessment.

258. **Table 6-1** describes each pressure detailed in the AoO screened in for further assessment. **Annex 1 - MCZA Screening Report** details each pressure and provides justification for why each pressure has been screened in / out of further assessment, see **Table 9-5**.

9.2.1 Potential Effects during Construction

9.2.1.1 Temporary Physical Disturbance / Temporary Habitat Loss

259. Temporary physical disturbance and habitat loss may occur as a result of the use of vessel anchors within the Offshore Development Area buffer. The following broadscale marine habitat feature has the potential to be affected by temporary physical disturbance / temporary habitat loss during export cable construction:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

260. The impact of temporary physical disturbance and habitat loss has been defined using the following pressures identified by Natural England's AoO for the Holderness Offshore MCZ (**Table 9-1**):

- Abrasion / disturbance of the substrate on the surface of the seabed; and
- Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion.

261. **Table 5-5** presents the worst-case extent of anchoring impacts during construction across the entirety of the offshore ECC. The only activity that could overlap with the Holderness Offshore MCZ would be anchoring activity within the Offshore Development Area buffer. The extent of temporary disturbance and habitat loss would be intermittent and restricted to discrete locations, with each anchoring activity disturbing a maximum area of 600m^2.

Table 9-5 Pressures Assessed in Relation to the Relevant Attributes during the Holderness Offshore MCZ Stage 1 Assessment. Grey – No Impact Pathway, Blue – Assessment Undertaken

MCZ Feature Attributes		Effects					
		Construction	Operation	Construction	Operation	Construction	Operation
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**		**Increased suspended sediment concentrations (SSC)**		**Invasive species**	
Subtidal coarse sediment (A5.1), Subtidal sand (A5.2) Subtidal mixed sediments (A5.4)							
Biological	Distribution: Presence and spatial distribution of biological communities	**Section 9.2.1.1**	**Section 9.2.2.1**	**Section 9.2.1.2.2**	N/A	N/A	N/A
Physical	Structure: Extent and distribution	**Section 9.2.1.1**	**Section 9.2.2.1**	N/A	**Section 9.2.2.2**	N/A	N/A
Biological	Structure and function: presence and abundance of key structural and influential species	**Section 9.2.1.1**	**Section 9.2.2.1**	**Section 9.2.1.2.2**	**Section 9.2.2.2**	N/A	N/A
	Structure: non-native species and pathogens	N/A	N/A	N/A	N/A	**Section 9.2.1.3.1**	**Section 9.2.2.3.1**
Physical	Structure: physical structure of rocky substrate	**Section 9.2.1.1**	**Section 9.2.2.1**	N/A	N/A	N/A	N/A
	Structure: sediment composition and distribution	**Section 9.2.1.1**	**Section 9.2.2.1**	**Section 1.1.1.1.1.1**	N/A	N/A	N/A

MCZ Feature Attributes		Effects					
		Construction	Operation	Construction	Operation	Construction	Operation
Attribute Type	**Attribute**	**Temporary physical disturbance / temporary habitat loss**		**Increased suspended sediment concentrations (SSC)**		**Invasive species**	
Biological	Structure: species composition of component communities	**Section 9.2.1.1**	**Section 9.2.2.1**	**Section 9.2.1.2.2**	**Section 9.2.2.2**	N/A	N/A
Physical	Supporting processes: energy / exposure	N/A	N/A	N/A	**Section 9.2.2.2**	N/A	N/A
	Supporting processes: physico-chemical properties	N/A	N/A	N/A	N/A	N/A	N/A
	Supporting processes: sedimentation rate (for subtidal rock features)	N/A	N/A	**Section 1.1.1.1.1.1**	N/A	N/A	N/A
	Supporting processes: sediment contaminants	N/A	N/A	N/A	N/A	N/A	N/A
	Supporting processes: sediment movement and hydrodynamic regime	N/A	N/A	**Section 1.1.1.1.1.1**	**Section 9.2.2.2**	N/A	N/A
	Supporting processes: water quality - contaminants	N/A	N/A	N/A	**Section 9.2.2.2**	N/A	N/A
	Supporting processes: water quality - dissolved oxygen	N/A	N/A	N/A	N/A	N/A	N/A

MCZ Feature Attributes		Effects					
		Construction	Operation	Construction	Operation	Construction	Operation
Attribute Type	Attribute	Temporary physical disturbance / temporary habitat loss		Increased suspended sediment concentrations (SSC)		Invasive species	
	Supporting processes: water quality - nutrients	N/A	N/A	N/A	N/A	N/A	N/A
	Supporting processes: water quality - turbidity	N/A	N/A	**Section 1.1.1.1.1.1**	**Section 9.2.2.2**	N/A	N/A

No final decision regarding the final decommissioning policy for the offshore project infrastructure. However, it is likely that offshore project infrastructure will be removed above the seabed and reused or recycled where practicable. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst-case scenario, the impacts will be no greater than those identified for the construction phase, which are discussed in the following sections:

- Increased SSC – **Section 9.2.3.2**; and
- Invasive Species – **Section 9.2.3.3**.

262. Therefore, whilst there will be potential for repeat disturbance to these areas, the area of overlap with the MCZ is minimal. This represents an area of <0.01% of the total area of the Holderness Offshore MCZ.

263. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by temporary physical disturbance / temporary habitat loss related to the anchoring activities for the Project.

9.2.1.2 Increased Suspended Sediment Concentrations

264. Temporary increases in SSC within the water column, and subsequent deposition onto the seabed, may occur as a result of cable pre-installation activities (including PLGR). Anchoring at the placement of external cable protection is not expected to increase SSCs to an extent that would result in a measurable effect on the MCZs' features. **Section 8.7** in **Volume 1**, **Chapter 8 Marine Physical Processes** provides details of changes to SSC and subsequent sediment deposition.

265. It is important to note that the offshore ECC does not overlap with the Holderness Offshore MCZ, with the nearest point being 0.15km north-west of the MCZ. However, due to the potential distance of sediment being transported in the water column, the following broadscale marine habitat features could be affected by temporary increases in SSC and subsequent deposition during construction:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

266. Based on the modelling undertaken for **Volume 1, Chapter 8 Marine Physical Processes**, along the offshore ECC, maximum SSCs are predicted to reach up to 15mg/l, or 300mg/l (during storm events) in localised hotspots. Closer inshore, and nearer to the MCZ, the extent of the plume can reach 35.3km due to stronger tidal currents. The maximum predicted deposition resulting from trenching will be minimal and immediately adjacent to the area of trenching, where the sediment would be continually re-suspended to reduce the thickness even further to a point where it will be effectively zero. **Table 5-5** summarises the worst-case volume of sediment displaced.

267. Sand and gravel-sized sediment would settle out of suspension rapidly to the bed in the immediate location of the offshore ECC. Fine sand will most likely remain in the bottom 1m to 2m of the water column, and with settling velocities of around 10mm/s, this will ensure the fine sand settles within half an hour or less or become part of the ambient near bed transport (Soulsby, 1997).

268. Mud-sized material would be advected a greater distance and persist in the water column for hours to days. It is anticipated that under the prevailing hydrodynamic conditions, this sediment would be readily re-mobilised, especially in the shallow inshore area where waves would regularly agitate the seabed. Accordingly, outside the immediate vicinity of the offshore ECC, sediment deposition and any changes to seabed character are not expected to be measurable in practice.

269. It is expected that the maximum predicted deposition resulting from a sediment plume will be minimal and would be less than the background levels within the offshore cable corridor. This conceptual evidence-based assessment is supported by the findings of a review of the evidence base into the physical impacts of marine aggregate dredging on sediment plumes and seabed deposits (Whiteside *et al.,* 1995; John *et al*. 2000; Hiscock and Bell, 2004; Newell *et al.,* 2004; Tillin *et al*., 2011).

270. Overall, increases in SSC are expected to be localised and short-term. Fine suspended sediment may be transported a further distance than coarse sediments. However, this is likely to be widely and rapidly dispersed and within the range of natural variability within the region. It is likely that the increase in concentrations would be greatest in the shallowest sections of the offshore ECC. SSCs are likely to remain within the range of background nearshore levels and lower than those concentrations that would develop during storm conditions. Also, once installation is completed, tidal currents are likely to rapidly disperse the suspended sediment (i.e. over a period of a few hours) in the absence of any further sediment input.

271. Based on the information presented above, the pressure ‘Smothering and siltation rate changes (light)’ has been used for the sensitivity assessment because ‘Light’ deposition is defined as “of up to 5cm of fine material added to the habitat in a single, discrete event”, as opposed to ‘Heavy’ deposition “of up to 30cm of fine material added to the habitat in a single discrete event” (Natural England, 2021).

272. The remainder of this section assesses the impact of temporary increases in SSC during construction and subsequent deposition, comparing it to the attributes and targets of each protected feature as outlined by Natural England’s SACOs.

9.2.1.2.1 Physical Attributes

273. The following physical attributes of protected features are relevant to temporary increases in SSC and subsequent deposition impacts:

- Structure: sediment composition and distribution;
- Supporting processes: sedimentation rate (for subtidal rock features); and
- Supporting processes: water quality – turbidity.

274. As described above, redeposition of suspended sediments will be local to the construction activity and is unlikely to change sediment composition and distribution. Changes to the sedimentation rate will be within the natural range and given the distribution of subtidal rock features in relation to the extent of effects (see **Figure 7-2**), no impact is anticipated. Similarly, increases in SSC will be localised, short term and within the natural range of turbidity. Therefore, there will be limited impact on the physical attributes and targets of Holderness Offshore MCZ features.

9.2.1.2.2 Biological Attributes

275. The following biological attributes of protected features are relevant to temporary increases in SSC and subsequent deposition impacts:

- Distribution: presence and spatial distribution of biological communities;
- Structure: species composition of component communities; and
- Structure and function: presence and abundance of key structural and influential species.

276. Increased SSCs have the potential to affect benthic ecology receptors by blocking feeding apparatus as well as by smothering sessile species upon deposition of sediment.

277. The AoO for the site states that the designated features of the Holderness Offshore MCZ have either Low sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are Not Sensitive (JNCC, 2021). Changes to the sedimentation rate will be within the natural range and given the distribution of subtidal rock features in relation to the extent of effects, no impact is anticipated. Similarly, increases in SSC will be localised, short term and within the natural range of turbidity. Therefore, there will be no impact on the biological attributes and targets of Holderness Offshore MCZ features.

9.2.1.2.3 Summary

278. The maximum predicted deposition resulting from a sediment plume during sandwave levelling for offshore export cable laying would be in localised areas immediately adjacent to the offshore ECC. Fine material (which represents only a very small proportion of the disturbed sediment) would disperse further and persist in the water column for hours to days, but at a level that is not expected to be measurable.

279. Elevated SSC will be within the range of background nearshore levels and will be lower than those concentrations that would develop during storm conditions. Once installation is completed, tidal currents are likely to rapidly disperse the SSC.

280. Biological communities recorded within the Holderness Offshore MCZ have either Low sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are Not Sensitive. Therefore, the biological communities that may be affected by temporary increases in SSC and subsequent deposition will either not be impacted or would recover fully within two years.

281. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition impacts related to the construction of the Project.

9.2.1.3 Invasive Species

282. Non-native species may become invasive and displace native organisms by preying on them or out-competing them for resources such as food, space or both. The primary pathway for the potential introduction of INNS during the construction phase is from the use of vessels and infrastructure that have originated from regions that are distinctly different, such as from other seas or oceans. **Table 5-5** presents the maximum number of vessels that will be used for the offshore export cable construction activities. It should be noted that this represents vessel use across the entirety of the offshore ECC and is therefore an overestimate of activity in proximity the Holderness Offshore MCZ.

283. This assessment considers the effects of increased vessel traffic and resulting colonisation by faunal communities on the ecological attributes and targets for the three broadscale marine habitat features most likely to be affected by the introduction of INNS:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and

- Subtidal mixed sediments (A5.4).

284. The impact of invasive species has been defined using the following 'low risk' pressure identified by Natural England's AoO for the Holderness Offshore MCZ (**Table 9-1**):

- Introduction or spread of invasive non-native species (INNS).

9.2.1.3.1 Biological Attributes

285. The following biological attributes of protected features are relevant to temporary habitat loss and physical disturbance impacts:

- Structure: non-native species and pathogens (habitat).

286. Although the attributes 'Distribution – presence and spatial distribution of biological communities', 'Structure and function: presence and abundance of key structural and influential species' and 'Structure: species composition of component communities' are relevant to colonisation by INNS, effects on these attributes are normally assessed under the biological impacts of habitat loss / alteration. This has been screened out of the assessment for the Holderness Offshore MCZ due to the Project's infrastructure not going through the MCZ directly.

287. The AoO for the site states that the designated features of the Holderness Offshore MCZ have Low sensitivity to the pressures associated with invasive species.

288. The risk of spreading INNS will be mitigated by the measures set out in the **Outline PEMP** (document reference 8.6) that is to be submitted with the PEIR and the following relevant regulations and guidance that will be employed which highlight a range of industry standard biosecurity measures:

- International Convention for the Prevention of Pollution from Ships (MARPOL). The MARPOL sets out appropriate vessel control procedures and maintenance;
- The Environmental Damage (Prevention and Remediation (England)) Regulations 2015, which set out a polluter pays principle where the operators who cause a risk of significant damage or cause significant damage to land, water or biodiversity will have the responsibility to prevent damage occurring, or if the damage does occur will have the duty to reinstate the environment to the original condition; and
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), which provide global regulations to control the transfer of potentially invasive species.

289. **Section 10.4.3** of **Volume 1, Chapter 10 Benthic and Intertidal Ecology** also outlines the embedded mitigation measures to reduce the risk of spreading INNS.

290. It should be noted that there is existing vessel activity within the Holderness Offshore MCZ including fishing, cargo, recreational and wind farm support vessels. Therefore, the small increase in vessel traffic in the MCZ associated with the Project will not represent a significantly increased risk of introduction of INNS.

9.2.1.3.2 Summary

291. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by the risks of introduction and spread of INNS related to the development during the construction phase of the Project.

9.2.2 Potential Effects during Operation

9.2.2.1 Temporary Physical Disturbance / Temporary Habitat Loss

292. The only activity that could overlap with the Holderness Offshore MCZ would be anchoring activity within the Offshore Development Area buffer. The extent of temporary disturbance and temporary habitat loss would be intermittent and restricted to discrete locations, with each anchoring activity disturbing a maximum area of 600m^2.

293. The habitat features and attributes impacted, and the sensitivities of those habitats will be the same as those identified for construction in relation to this impact (**Section 9.2.1.1**).

294. Disturbed habitats will not be removed or relocated and based on similar activities in adjacent areas, the composition and distribution of sediments will not change. Therefore, the extent, distribution and structure of these habitat features will not change as a result of temporary disturbance and habitat loss.

295. Whilst there is potential for recurring disturbance during maintenance, these impacts would be at discrete locations and times, and it is highly unlikely that the same stretch of cable would repeatedly fail. Therefore, recurring disturbance in the same location is considered highly unlikely.

9.2.2.1.1 Summary

296. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by temporary disturbance and habitat loss effects related to the operation of the Project.

9.2.2.2 Increased Suspended Sediment Concentrations

297. Increases in SSC within the water column, and subsequent deposition onto the seabed may occur as a result of O&M activities that require the use of anchoring from vessels, as well as cable repair, replacement and reburial activities.

298. **Section 9.1.1.2** describes the predicted impacts from construction within the offshore ECC. Overall, increases in SSC are expected to be localised and short-term. Fine suspended sediment may be transported a further distance than coarse sediments. Once activities are completed, tidal currents are likely to rapidly disperse the suspended sediment (i.e. over a period of a few hours) in the absence of any further sediment input. O&M activities will be episodic and highly localised when compared to construction.

299. **Table 5-5** summarises the worst-case volume of sediment displaced. Volumes are presented as annual averages and O&M phase totals. However, this makes the highly precautionary assumption that all the estimated cable repair, replacement and reburial activities for the offshore export cables occur in close proximity to the MCZ. In reality, the extent of O&M phase temporary increases in SSC and subsequent deposition would be much less than that during the construction phase.

300. Biological communities recorded within the Holderness Offshore MCZ have either Low sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are Not Sensitive. Therefore, they will either not be impacted or would recover fully within two years.

9.2.2.2.1 Summary

301. Based on the relevant pressures, receptor sensitivity, and assessment of impacts against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition impacts related to the operation of the Project.

9.2.2.3 Invasive Species

302. Artificial hard substrates introduced by the Project (including cable protection) could act as potential 'stepping stones' or vectors for INNS, as well as supporting species non-native to otherwise soft substrate habitats. This assessment considers the effects of placing external cable protection and the resulting colonisation by faunal communities on the ecological attributes and targets of the following three broadscale marine habitat features most likely to be affected by the introduction of INNS:

- Subtidal coarse sediment (A5.1);
- Subtidal sand (A5.2); and
- Subtidal mixed sediments (A5.4).

303. The impact of invasive species has been defined using the following 'low risk' pressure identified by Natural England's AoO for the Holderness Offshore MCZ (**Table 9-1**):

- Introduction or spread of invasive non-native species (INNS).

304. The risk of spreading INNS will be mitigated by the same means as discussed in **Section 9.1.1.3** and in **Outline PEMP** (document reference 8.6).

9.2.2.3.1 Biological Attributes

305. The following biological attributes of protected features are relevant to invasive species:

- Structure: non-native species and pathogens (habitat).

306. Although the attributes 'Distribution – presence and spatial distribution of biological communities', 'Structure and function: presence and abundance of key structural and influential species' and 'Structure: species composition of component communities' are relevant to colonisation by INNS, effects on these attributes are normally assessed under the biological impacts of long-term habitat loss. This has been screened out of the assessment for Holderness Offshore MCZ due to the Project's infrastructure not going through the MCZ directly.

307. The introduction of artificial hard substrates, namely external export cable protection, could act as potential 'stepping stones' or vectors for INNS, as well as supporting species non-native to otherwise soft substrate habitats. INNS may be introduced through the use of vessels and the installation of infrastructure. However, the risk of introduction and spread of INNS will be mitigated through adherence to the relevant regulations and guidance and secured through **Outline PEMP** (document reference 8.6).

308. Natural England's AoO suggests that the designated features of the site have a Low sensitivity to INNS. Furthermore, seabed habitats exist in a mosaic of mixed, coarse and sandy sediments across much of the offshore ECC. Therefore, the use of external cable protection across small and localised areas along the offshore ECC outside the Holderness Offshore MCZ is not anticipated to materially change the existing potential for the spread of INNS.

9.2.2.3.2 Summary

309. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by the risks of introduction and spread of INNS related to the operation of the Project.

9.2.3 Potential Effects during Decommissioning

9.2.3.1 Temporary Physical Disturbance / Temporary Habitat Loss

310. As a worst-case scenario, temporary disturbance / temporary habitat loss within the Holderness Offshore MCZ during the decommissioning phase will be as a result of cable removal activities if deemed to be required at the time of decommissioning based on up-to-date guidance and consultation with the regulator. Effects would be no greater than, and are expected to be less than, those of the construction phase (**Section 9.2.1.1**) and will affect the same features and attributes.

311. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by temporary disturbance and temporary habitat loss effects related to the decommissioning of the Project.

9.2.3.2 Increased Suspended Sediment Concentrations

312. Temporary increases in SSC within the water column, and subsequent deposition on to the seabed may occur during the decommissioning phase as a result of cable removal activities, if required. Effects would be no greater, and are expected to be less, than those of the construction phase (**Section 9.2.1.2**), and will affect the same features and attributes.

313. Based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by temporary increases in SSC and subsequent deposition effects related to the decommissioning of the Projects.

9.2.3.3 Invasive Species

314. Effects from the introduction of INNS as a result of cable removal activities would be no greater than and are expected to be less than those of the construction phase (**Section 9.2.1.3**).

315. As described in **Section 9.2.1.3**, based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by the risks of introduction and spread of INNS related to the Project.

9.3 Cumulative Effects

316. Projects, plans and activities (hereafter referred to as 'schemes') that exist at the time of the Project's data collection (field surveys, etc.) are considered part of the baseline and are screened out of the cumulative assessment. With respect to the Holderness Offshore MCZ and Holderness Inshore MCZ, this includes commercial fishing activity within the MCZs. Schemes are also screened with reference to their likely spatial and temporal extent and potential for interaction with effects rising from the Project.

317. The CEA has been based on information available on each relevant scheme as of March 2025 and will be updated again for ES. It is noted that the further information regarding the identified schemes may become available in the period up to construction, or may not be available in detail at all prior to construction. The assessment is therefore considered to be conservative, with the level of impacts expected to be reduced compared to those presented here.

318. Schemes have been assigned a tier, based on information used within the CEA. A seven-tier system, based on the guidance issued by Natural England and Defra (Parker *et al.,* 2022), has been employed and presented in **Section 1**.

319. With respect to these types of schemes, for those that are fully operational (i.e. Tier 1 schemes) at the time of the MCZs status reports, the cumulative assessment methodology considers them to be part of the baseline conditions for the surrounding area (and assumes that any residual effect has been captured within the baseline). As such, it is not expected that the Project would contribute to cumulative effects with these existing activities. Therefore, these schemes have not been the subject of further assessment.

320. A review of the other currently planned schemes in the vicinity of both MCZs has identified schemes that have the potential to interact with the proposed Project's activities are detailed in **Table 9-6** using the methodology as discussed in **Section 1**.

Table 9-6 High-Level List of Schemes Screened In / Out for Further Assessment in the Next Stage of the MCZA

Tier	Scheme	Distance to Holderness Inshore MCZ (km)	Distance to Holderness Offshore MCZ (km)	Screening
Offshore Wind Farms				
1	Westermost Rough	0 (within)	2	In
1	Humber Gateway	0 (within)	2	In
2	Triton Knoll	11	>15	Out
Offshore Wind Farm Cable Corridors				
2	Dogger Bank A	2	2	Out
2	Dogger Bank B	2	2	Out
3	Hornsea Project Four	4	1	Out
4	Dogger Bank South	0 (within)	0.65	In
1	Hornsea 1	1	4	Out
1	Hornsea Project Two	1	4	Out
4	Hornsea Project Four	2	9	Out
6	Ossian	5	0 (within)	In
Carbon Capture and Storage				
3	Northern Endurance CCS (export	0 (within)	0 (within)	In

Tier	Scheme	Distance to Holderness Inshore MCZ (km)	Distance to Holderness Offshore MCZ (km)	Screening
	line)			
Sub-sea cables				
6	Eastern Link 2 (EGL2)	5	7	Out
1	VikingLink Inter-connector	0 (within)	>15	Out
7	Third Eastern Link HVDC cable (EGL3)*	>15	0 (within)	In
7	Fourth Eastern Link HVDC cable (EGL4)*	>15	0 (within)	In
7	National Grid HND Bootstrap*	0 (within)	0 (within)	Out
Hydrogen storage facility outfall pipe				
7	Aldbrough Hydrogen Storage Project	0 (within)	Unknown	Out

*Cable route not yet finalised.

321. The schemes are screened with reference to their likely spatial and temporal extent and potential for interaction with effects arising from the Project.

322. The southern North Sea is a mature area of oil and gas development with wells and production platforms producing from primarily gas reservoirs and exporting via pipelines to onshore terminals, such as the Perenco Gas Terminal in Easington on the Holderness Coast. Some of this infrastructure is now undergoing decommissioning as hydrocarbon fields reach the end of their economic life and the rate of new field development declines. However, it is acknowledged that the Oil and Gas Authority continues to award new licences.

323. There is a concentration of pipelines to the south-east of the Project linking southern North Sea gas fields to the Perenco Gas Terminal. These pipelines traverse through the Holderness Inshore MCZ and Holderness Offshore MCZ on route to Perenco Gas Terminal. The pipelines relevant to this assessment are:

- Centrica operated Easington to Rough 47 / 3B 36 inches gas import / export pipeline (PL150);
- Spirit Energy operated Easington to York platform methanol pipeline (PL2918);
- Perenco operated West Sole to Easington gas pipeline (PL28); and
- Gassco operated Langeled pipeline Sliepner Rise to Easington (PL2071).

324. All of the above pipelines run from Easington fanning out through the Holderness Inshore MCZ and Holderness Offshore MCZ (**Figure 18.1** of **Volume 1, Chapter 18 Other Marine Users**).

325. The aforementioned pipelines are all in operation and no detail on the planned timescales or nature of decommissioning activities is available at the time of writing. Therefore, the potential impacts from decommissioning are not assessed. In terms of potential ongoing impacts, as noted above these assets are considered part of the baseline and are screened out of the cumulative assessment (see **Section 3.4**).

326. Other offshore wind farms in the vicinity of the MCZs have been screened out of further assessment due to construction being complete on these schemes prior to the Project's construction beginning, or the schemes being located too far from the MCZ for any potential cumulative effects to occur.

327. Sub-sea cables have been screened out due to the cables already being operational or being located at such a distance that cumulative effects with the Project will not occur.

9.3.1 Humber Gateway and Westermost Rough

328. Both the Humber Gateway OWF and Westermost Rough OWF were operational before the designation of the Holderness Inshore MCZ and both projects array areas fall outside the MCZ. However, the cable corridors for both projects run through the MCZs and they are therefore screened in due to both projects having live marine licences for the areas within the Holderness Inshore MCZ (see **Figure 9-1**).

9.3.2 Northern Endurance Carbon Capture and Storage

329. Overlapping the offshore ECC is the proposed pipeline corridor of the Northern Endurance CCS scheme. The associated pipelines are proposed to run from Redcar, Teesside and from Easington, Hull. Installation of the pipelines and seabed infrastructure for the project is scheduled to commence in 2025, with the first CO_2 injection anticipated to take place in 2028 (Northern Endurance Partnership, 2024).

330. The Northern Endurance CCS submitted its EIA in September 2023. This pipeline from Easington runs through the Holderness Inshore MCZ and Holderness Offshore MCZ and as part of the DCO application it is expected to submit a MCZA.

331. **Figure 9-1** shows the location of the Northern Endurance CCS pipeline and its corridor through the Holderness Inshore MCZ and Holderness Offshore MCZ.

9.3.3 Dogger Bank South

332. Running parallel to the offshore ECC in the nearshore area is the Dogger Bank South ECC, as present on their ES application. The ECC associated with DBS does not overlap with the Holderness Offshore MCZ, but it does overlap the Holderness Inshore MCZ. Although there is an overlap, DBS' MCZA noted this was for an area where vessel anchors would be but no permanent infrastructure. Therefore the submitted MCZA as part of DBS's DCO submission notes that no further stages of MCZA would be required, and the project does not hinder the condition of both MCZs individually or cumulatively (RWE, 2024).

333. As it currently stands, the assessment conducted for Dogger Bank South noted there to be no pathway for direct impact of either MCZ due to proximity to the sites and assessed the effect of increased SSCs and invasive species. Both impacts were assessed as either not being impacted or would recover fully within two years.

9.3.4 Ossian

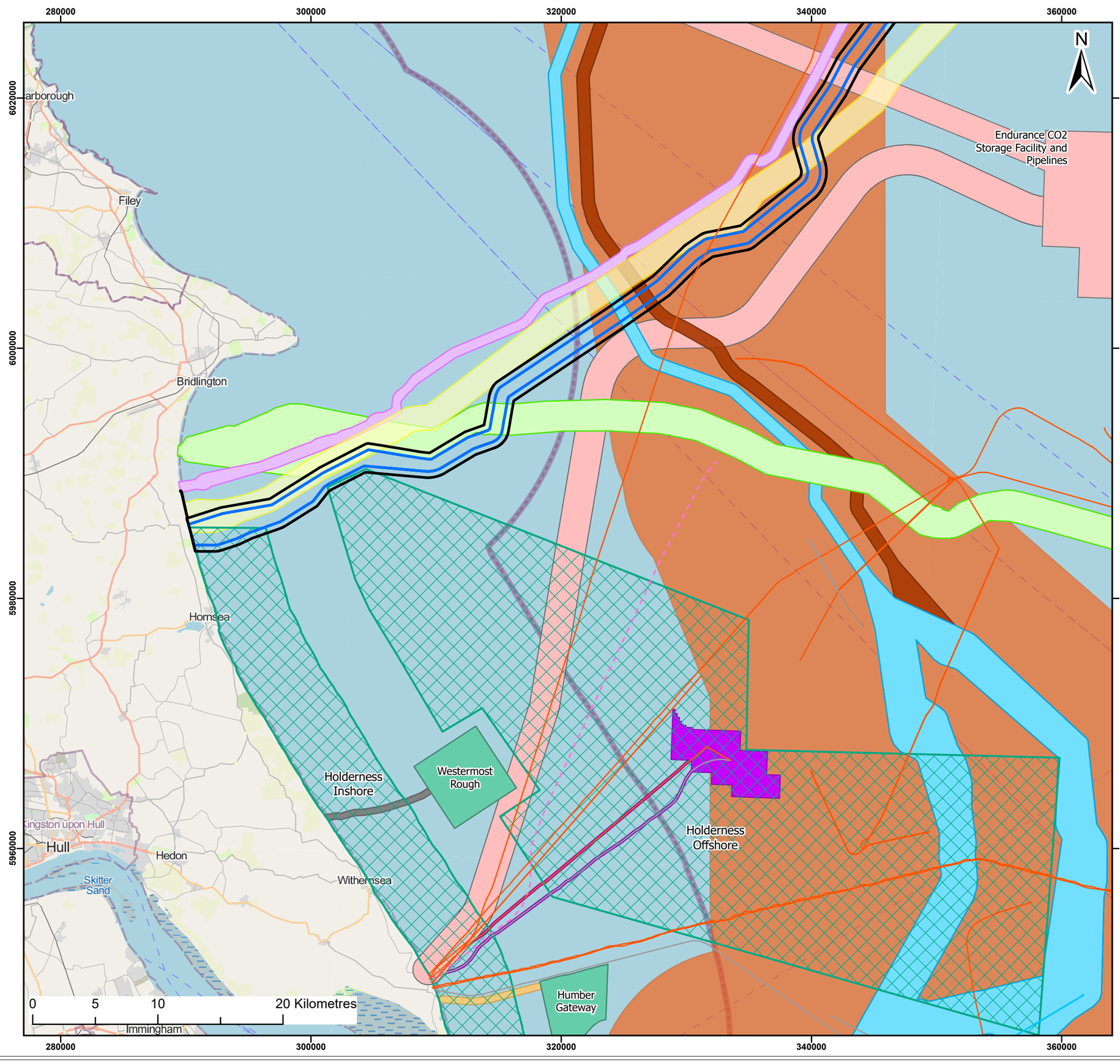
334. Ossian's transmission assets plan to come down from the project's array area that is situated in East Scotland, down to a landfall area near Skegness, close to the Wash, as presented in their scoping report (Ossian, 2025). Ossian's ECC does not overlap with the Holderness Inshore MCZ, but it does overlap with the Eastern side of the Holderness Offshore MCZ. It is expected that Ossian will submit a MCZA as part of their planning application, although no information regarding the project's plans to minimise the impact towards the Holderness Offshore MCZ is currently available.

335. As it currently stands, given there is limited information available and it is expected that the project will be submitting an MCZA and will be actively trying to minimise their impact on protected areas, the project is screened in, and information will be updated if required at the next stage of the EIA.

9.3.5 Eastern Greenlink 3 and Eastern Green Link 4

336. There is limited information available for EGL3 and EGL4 as they are in the pre-planning stage (Collaborative Environmental Advisors (CEA), 2023; CEA; 2024). However, it is known that the cable corridors for the project will be running from Eastern Scotland down towards landfall in Lincolnshire. Both projects current cable corridors fall outside of the Holderness Inshore MCZ but overlap the Holderness Offshore MCZ.

337. As it currently stands, given there is limited information available and it is expected that the project will be submitting an MCZA and will be actively trying to minimise their impact on protected areas, the project is screened in, and information will be updated if required at the next stage of the EIA.



Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Marine Conservation Zones
- Other Offshore Wind Farms
- Dogger Bank South
- Dogger Bank A + B
- Hornsea Project FOUR
- Humber Gateway OFTO
- Westermost Rough OFTO
- Ossian
- Eastern Green Link 3
- Eastern Green Link 4
- Carbon Capture and Storage Site
- Natural Gas Storage Site

Cables & Pipelines

- Abandoned Pipeline
- Active Pipeline
- Not in Use
- Precommissioned Pipeline

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK
WIND FARM

Title:

All Projects Screened in Alongside the offshore ECC in Relation to the Holderness Inshore MCZ and Holderness Offshore MCZ

Figure: 9-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0349

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: WGS 1984 UTM Zone 31N

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9.3.6 Cumulative Effects Assessment

9.3.6.1 Temporary Physical Disturbance / Temporary Habitat Loss

338. As described in **Sections 9.1.1.1** and **9.1.2.1**, resilience of the biotopes to temporary physical disturbance / habitat loss ranges from none to medium. DBS is the only project screened in where their MCZA has stated that no infrastructure will be placed within the MCZs, and therefore no direct cumulative effects are expected from this project.

339. There is currently no data available for the O&M activities planned in terms of effects on the MCZs for the Humber Gateway and Westermost Rough OWFs. However, it is assumed the maintenance activities will be minor and any disturbance will also have a negligible impact on both MCZs.

340. There is also no data currently available for the Ossian project, which has just submitted its scoping report for the transmission assets as of 27th February 2025. It is assumed the activities will be minor and any disturbance will have a negligible impact on both MCZs. However, if any information becomes available at the next stage of the EIA, then this will be added in to the MCZA. This is also the case for EGL3 and EGL4.

341. **Table 9-7** shows the cumulative impacts of temporary physical disturbance / temporary habitat loss with the overlapping habitats within both MCZs for the Northern Endurance Project and the offshore ECC.

Table 9-7 Cumulative percentage overlap with the protected features of both MCZs

Protected Feature	Percentage of overlap with the MCZ Protected Feature (%)		
	Northern Endurance (BP, 2023)	Dogger Bank D's offshore ECC	Overall
Holderness Inshore MCZ			
Intertidal sand and muddy sand (A2.2)	-	-	-
Moderate energy circalittoral rock (A4.2)*	-	-	-
High energy circalittoral rock (A4.1)*	-	-	-
Subtidal coarse sediment (A5.1)	0.0013	0.0015	0.0028
Subtidal sand (A5.2)	-	0.0006	0.0006

Protected Feature	Percentage of overlap with the MCZ Protected Feature (%)		
	Northern Endurance (BP, 2023)	Dogger Bank D's offshore ECC	Overall
Subtidal mud (A5.3)**	-	-	-
Subtidal mixed sediments (A5.4)	0.0005	0.0014	0.0019
Spurn Head (subtidal)	-	-	-
Holderness Offshore MCZ			
Subtidal coarse sediment (A5.1)	0.0019	-	0.0019
Subtidal sand (A5.2)	-	-	-
Subtidal mixed sediments (A5.4)	-	-	-
Ocean quahog *Arctica islandica*	-	-	-
North Sea glacial tunnel valleys	-	-	-

342. Given the negligible percentage of effect on the protected features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Inshore MCZ and Holderness Offshore MCZ in a favourable condition will **not be hindered** by cumulative temporary physical disturbance / temporary habitat loss.

9.3.6.2 Habitat Loss / Alteration

343. As described above and in **Section 9.1.2.2**, the impacts will be localised and miniscule. However, as there is an overlap the projects could hinder the conservation objectives for the Holderness Inshore MCZ. The areas shown in **Table 9-7** will be the same areas for habitat loss / alteration, adding on a negligible amount for the activities of Ossian OWF and the maintenance activities for Humber Gateway, Westermost Rough OWFs.

344. Therefore, it can be concluded that the conservation objective of restoring the protected features of the Holderness Inshore MCZ in a favourable condition will **not be hindered** by cumulative habitat loss / alteration given the negligible magnitude of effect on the feature conditions. Due to the Project infrastructure falling outside the Holderness Offshore MCZ, even though some projects are present, it can be concluded that the conservation objective of restoring the protected features of the Holderness Offshore MCZ in a favourable condition will **not be hindered** by the Project. The temporary small scale sediment deposition would not result in cumulative habitat loss / alteration.

9.3.6.3 Increased Suspended Sediment Concentrations

345. As described in **Sections 9.1.1.2**, **9.1.2.2**, **9.2.1.2** and **9.2.2.2**, the majority of the sediment mobilised by the Project's activities would settle out of suspension rapidly to the bed. Elevated SSC will be within the range of background nearshore levels and will be lower than those concentrations that would develop during storm conditions.

346. Suspended sediment from construction, O&M and decommissioning activities at Northern Endurance CCS, Dogger Bank South, Humber Gateway, Westermost Rough, Ossian, EGL3 and EGL4 would redeposit in a similar manner to the Project and would be in discrete locations within the MCZs. The overall volumes of sediment disturbed would be spread across the operational lifetimes of all projects. Therefore, while there is potential for increased temporal disturbance, the individual areas affected by the construction, O&M and decommissioning activities would be limited. Once activities are completed, tidal currents are likely to rapidly disperse the suspended sediment. Biological communities recorded in the offshore ECC have either Low sensitivity to the pressures associated with temporary increases in SSC and subsequent deposition or are Not Sensitive.

347. Given the short term and localised extent of effects, cumulative effects with the activities of other projects are not anticipated. Therefore, it can be concluded that the conservation objective of restoring the protected features of the Holderness Inshore MCZ and Holderness Offshore MCZ in a favourable condition will **not be hindered** by cumulative increases in SSC.

9.3.6.4 Invasive Species

348. As described in **Sections 9.1.1.3**, **9.1.2.4**, **9.2.1.3** and **9.2.2.3**, INNS may be introduced through the use of vessels and the installation of infrastructure. The risk of introduction through the use of vessels will be mitigated through adherence to relevant regulations and guidance, which is secured through **Outline PEMP** (document reference 8.6) and CO24 in **Table 5-6**. The introduction of artificial hard substrates, namely the external export cable protection, could act as 'stepping stones' or vectors for INNS.

349. Introduction and spread of INNS would be similar for the Northern Endurance CCS, Dogger Bank South, Humber Gateway, Westermost Rough, Ossian, EGL3 and EGL4 which would have a similar effect as the offshore ECC. Therefore, while there is potential for increased disturbance, the areas affected by all three projects would be minimal (see **Table 9-7**).

350. Therefore, based on the relevant pressures, receptor sensitivity, and assessment of effects against the attributes of affected Holderness Inshore MCZ and Holderness Offshore MCZ features, it can be concluded that the conservation objective of restoring the protected features of the Holderness Inshore MCZ and Holderness Offshore MCZ in a favourable condition will **not be hindered** by the risks of introduction and spread of INNS.

10 Conclusion

351. Based on the information presented in the preceding sections, which include assessments on the relevant broadscale habitats and features of geological interest, it can be concluded that the conservation objective of maintaining the protected features of the Holderness Offshore MCZ in favourable condition, or restoring them to favourable condition, will **not be hindered** by the construction, O&M, and decommissioning phases of the Project, or cumulatively with any other plan, project or activity.

352. Given only temporary disturbance / habitat loss effects from vessel anchors will occur as a result of the Project on the Holderness Offshore MCZ (see **Section 9.2** of this report), it can be concluded that in-principle MEEB proposals are not required to be developed for the Holderness Offshore MCZ.

353. Regarding the Holderness Inshore MCZ, at this stage there is the possibility of the trenchless technique exit pit and export cables being located within the MCZ. This may be subject to change following analysis of the geophysical survey data and engagement with Dogger Bank South to investigate the possibility of routing coordination.

354. However, due to the exceptionally low potential impacts on the designated features, of less than 0.01% for features assessed in terms of permanent habitat loss, the conservation objective of restoring the protected features of the Holderness Inshore MCZ in favourable conditions is assessed as **not being hindered** by the construction, O&M, and decommissioning phases of the Project, or cumulatively with any other plan, project or activity.

355. Based on the outcome of this Stage 1 Assessment, a Stage 2 MCZA is deemed as not being required, and no further assessments are required for the Holderness Inshore MCZ and Holderness Offshore MCZ. The summary of each impact and the assessment can be found in **Table 10-1**.

Table 10-1 Summary of Stage 1 MCZA

Impact	Phase	Feature Affected	Assessment
Holderness Inshore MCZ			
Temporary physical disturbance / temporary habitat loss	Construction	Subtidal coarse sediment (A5.1) Subtidal sand (A5.2) Subtidal mixed sediments (A5.4)	Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered
Habitat loss / alteration	Operation		Not being hindered
	Decommissioning		Not being hindered
Increased suspended sediment concentrations	Construction		Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered
Invasive Species	Construction		Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered
Holderness Offshore MCZ			
Temporary physical disturbance / temporary habitat loss	Construction	Subtidal coarse sediment (A5.1) Subtidal sand (A5.2) Subtidal mixed sediments (A5.4)	Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered
Increased suspended sediment concentrations	Construction		Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered
Invasive Species	Construction		Not being hindered
	Operation		Not being hindered
	Decommissioning		Not being hindered

11 Next Steps

356. MCZA involves three key stages as set out below:

- Screening – to check if the proposal is likely to have a significant effect on the site's conservation objectives, alone or in combination with other plans or projects;
- Stage 1 Assessment – to assess the implications of the proposal for the qualifying features of site, in view of the site's conservation objectives, and identify ways to avoid or minimise any effects. This stage assesses whether the proposal poses a significant risk to achieving the conservation objectives stated for the MCZ. It considers whether alternative approaches could be taken that would substantially reduce the risk of hindering these conservation objectives; and
- Stage 2 Assessment – to consider if proposals that would have an adverse effect on the integrity of a MCZ qualify for an exemption. This stage considers whether the public benefits of proceeding with the proposal clearly outweigh the environmental damage and assesses what measures the applicant will implement to provide equivalent environmental benefit to compensate for the impacts which the project will have on the MCZ.

357. This MCZA reports on the outcomes of the screening process, how associated stakeholder feedback has been addressed, and provides a Stage 1 MCZA to support the PEIR consultation process.

358. As set out in **Section 10**, the MCZA concludes no significant risk of the act hindering the achievement of the conservation objectives for the Holderness Inshore MCZ. Based on the outcome of this Stage 1 Assessment, a Stage 2 MCZA is deemed as not being required, and no further assessments are required for the Holderness Inshore MCZ.

359. The Applicant has been cognisant of conclusions drawn by the SoS for other OWF developments regarding project impacts hindering the conservation objectives of MCZs and specifically the subtidal sediment features as a result of the potential deployment of rock protection within a sensitive area containing such features. The Applicant also understands the complexity of identifying and delivering MEEB, therefore understands the need to give early consideration to these matters with as much detail as possible, so that constructive engagement on the issues can be undertaken during the pre-application period to support the consultation and assessment of the Project. Therefore, the Applicant is providing a 'without prejudice' basis for MEEB for the Holderness Inshore MCZ. Further details are provided in the MEEB Roadmap and Evidence (**document reference 5.4.4**) in the event this is deemed required.

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Acronyms

Acronym	Definition
AoO	Advice on Operations
BGS	British Geological Survey
CEA	Cumulative Effects Assessment
CRA	Chemical Risk Assessment
DBD	Dogger Bank D
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DML	Deemed Marine Licence
ECC	Export Cable Corridor
EIA	Environment Impact Assessment
EPP	Evidence Plan Process
ETG	Expert Topic Group
ES	Environmental Statement
GBS	Gravity Based Structure
HDD	Horizontal Directional Drilling
HRA	Habitats Regulation Assessment
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MARPOL	International Convention for the Prevention of Pollution from Ships
MCAA	Marine and Coastal Access Act 2009
MCZ	Marine Conservation Zones
MCZA	Marine Conservation Zone Assessment
MEEB	Measures of Equivalent Environmental Benefit

Acronym	Definition
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPCP	Marine Pollution Contingency Plan
NEIFCA	North Eastern Inshore Fisheries and Conservation Authority
NGET	National Grid Electricity Transmission
O&M	O&M
PEIR	Preliminary Environmental Information Report
PEMP	Pollution Environmental Management Plan
PINS	Planning Inspectorate
PLGR	Pre-Lay Grapnel Run
PSD	Particle Size Distribution
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SACO	Supplementary Advice on Conservation Objectives
SNCB	Statutory Nature Conservation Bodies
SoS	Secretary of State
SSC	Suspended Sediment Concentrations
TTS	Temporary Threshold Shifts
TWT	The Wildlife Trusts
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
ZoI	Zone of Influence

Annex 1 – Marine Conservation Zone Screening Report

DOGGER BANK D MCZA SCREENING REPORT

Document No: RHD-OF-ZZ-RP-Z-0010

Date: June 2024

Revision: 01

DOGGER BANK D
WIND FARM

Document Title: **Marine Conservation Zone Assessment Screening Report**	**Document No.** **RHD-OF-ZZ-RP-Z-0010**
Prepared By: **RHDHV**	Prepared For: **Dogger Bank D Wind Farm**

Revision No.	Date	Status / Reason for Issue	Author	Checked by	Approved by
01	25/06/2024	Final	EB	PT	RG

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1 Introduction

1.1 Purpose of this Document

1. This document provides the screening stage of the Marine Conservation Zone Assessment (MCZA) process for the Dogger Bank D (DBD) Wind Farm, hereafter referred to as 'the Project'.

2. The MCZA comprises up to three stages (see **Chapter 3**). The aim of this stage (Stage 1) is to determine whether or not an activity could affect (other than insignificantly) the protected features of a Marine Conservation Zone (MCZ), either directly or indirectly. This enables the competent authority to ensure compliance with the Marine and Coastal Access Act 2009 (MCAA).

3. Where it is considered that there is no potential for a significant effect as a result of the project, it is proposed that the MCZ (or relevant feature of the MCZ) is 'screened out' from further consideration. Where the potential for a significant effect on the conservation objectives cannot be discounted, it remains 'screened in' and further assessment will be undertaken.

4. This document has been submitted to consultees for comment to allow for agreement on screening for the MCZA. Further discussion will take place throughout the Evidence Plan Process (EPP) during the relevant Expert Topic Groups (ETG) namely Marine Physical Processes, Benthic and Fish and Shellfish Ecology (ETG 1), and / or the Seabed Compensation / Measures of Equivalent Environmental Benefit (MEEB) ETG (ETG 5), if required.

1.2 Project Background

5. As part of its third licence round in 2008, The Crown Estate designated the Dogger Bank Zone, located between 125 and 290km off the east coast of Yorkshire, as one of the nine offshore wind farm development zones in the UK. Following the award, four project areas were identified within the zone to take to development consent, namely Creyke Beck A, Creyke Beck B, Teesside A and Teesside B (see **Figure 1-1**). In 2015, development consent was granted for all four project areas.

6. In 2017, the four project areas were restructured under new ownership arrangements. Creyke Beck A, Creyke Beck B and Teesside A were renamed as Dogger Bank A (DBA), Dogger Bank B (DBB) and Dogger Bank C (DBC) respectively and would progress collectively as the Dogger Bank Wind Farm in three build-out phases by SSE Renewables, Equinor and Vårgrønn. Teesside B was renamed as Sofia Offshore Wind Farm and would be progressed separately from the Dogger Bank Wind Farm by RWE (see **Figure 1-1**).

7. In 2021, an opportunity was identified by SSE Renewables and Equinor (hereafter referred to as 'the Applicant') to maximise the capacity of the third phase of the Dogger Bank Wind Farm, namely DBC, such that additional capacity of up to 2GW of renewable energy could potentially be consented and constructed in the eastern part of the original DBC site. This new development phase is known as DBD.

8. The Array Area of DBD (which sits wholly within the area of Teesside A) was subject to a full Environmental Impact Assessment (EIA) and was granted development consent in 2015. The Applicant therefore intends to adopt a proportionate approach to EIA (Institute of Environmental Management and Assessment (IEMA), 2017) by building upon the robust understanding and knowledge of the environment that the wind farm sits within, and which is underpinned by a range of site-specific surveys and data already obtained for the site. The Applicant has therefore considered the principles of proportionate EIA and relevant available data in the approach throughout this report.

9. The Project would include an offshore generating station with an installed capacity exceeding 100MW and is therefore classified as a Nationally Significant Infrastructure Project (NSIP). As such, a Development Consent Order (DCO) is required under the Planning Act 2008, with an application to the Planning Inspectorate which administers the application on behalf of the Secretary of State for the Department for Energy Security and Net Zero (DESNZ).

10. The Applicant submitted a Scoping Report in 2023 (LF000016-CST-DOG-REP-0001) based on infrastructure that included the potential for the offshore generating station to either be connected to a Hydrogen Production Facility (HPF) ("the Hydrogen Option") or the UK electricity network via a shared connection to an Offshore Collector Platform ("the National Grid Option").

11. The DBD Array Area covers an area of approximately 262km^2 and is located approximately 210km off the north-east coast of England, with its eastern boundary located approximately 160m west of the Dutch Exclusive Economic Zone (EEZ).

12. In 2024, a new grid connection point was identified by National Grid Electricity System Operator (ESO), as described below, resulting in design and spatial differences from the previous "National Grid Option". In addition, following ongoing project refinement, the Hydrogen Option will no longer be progressed as part of the Project.

13. In order to avoid any doubt in relation to compliance with Regulation 14(3)(a) of the EIA Regulations, the Project is requesting a new 2024 Scoping Opinion.

1.2.1 Grid Connection

14. The Project was considered as part of the Office of Gas and Electricity Markets' (OFGEM) Offshore Network Transmission Review (ONTR) for a Holistic Network Design (HND). This review, as outlined in the National Grid ESO's "Pathway to 2030" plan, initially indicated that the National Grid Option landward of an Offshore Collector Platform would be developed by National Grid Electricity Transmission (NGET) as part of a coordinated offshore network. This coordinated design was recommended for the Project and other spatially proximate offshore wind farms off the east coast of England, known collectively as the "South Cluster" (National Grid ESO, 2022).

15. Following publication of the initial HND report, discussions through the South Cluster identified a number of challenges with the delivery of the design as presented in 2022. Design changes were therefore considered and assessed through the National Grid ESO's HND Impact Assessment Process which resulted in a design change to the South Cluster which was confirmed in March 2024 (National Grid ESO, 2024a). As a result, the Project is being developed as a radial connection (shown on **Plate 1-1**) into Birkhill Wood Substation, a proposed new substation north of Hull and the onshore grid connection point for DBD

identified through the Holistic Network Design process. Birkhill Wood substation will be developed and constructed by NGET and does not form part of DBD.

16. The Applicant is exploring the future possibility for coordination with an Offshore Hybrid Asset (OHA) which combines the offshore wind farm, via offshore platforms, with an electricity interconnector between the UK and another European country's electricity market to form a multi-purpose interconnector (MPI). The Project's design envelope therefore includes flexibility for potential coordination of the Project as an OHA, which has a separate grid connection into Birkhill Wood Substation in the East Riding of Yorkshire. The development of an OHA would increase energy security for the UK, reduce the need to curtail offshore wind output in times of oversupply on the UK electricity network and provide interconnection with other sources of low carbon electricity generation in neighbouring European countries.

1.2.2 Project Area

17. Within this MCZA Screening Report, the Offshore Project Area refers to the boundary in which all potential offshore infrastructure associated with the Project will be located, which extends seaward of Mean High Water Spring (MHWS). The Onshore Project Area refers to the boundary in which all potential onshore infrastructure associated with the Project will be located, which extends landward of MHWS. Both the Onshore and Offshore Project Areas (as identical to the Scoping Report submitted in June 2024) are shown separately on **Figure 1-1**.

18. The generation element of the Project is independent of coordination with any OHA and will remain the same whether or not an OHA is taken forward.

Indicative Infrastructure

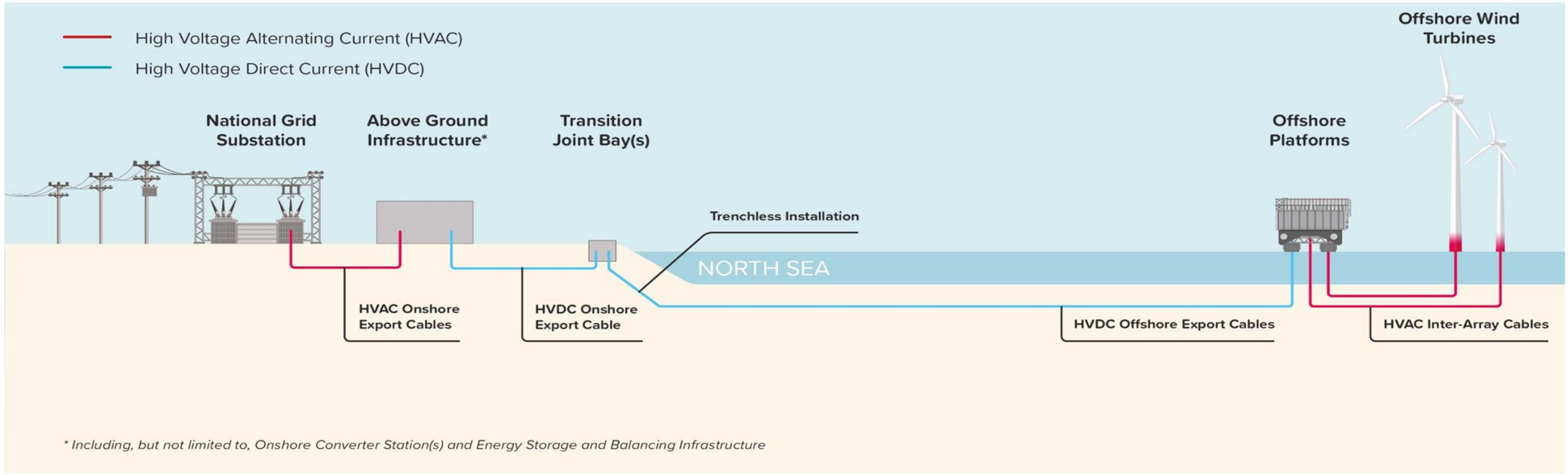
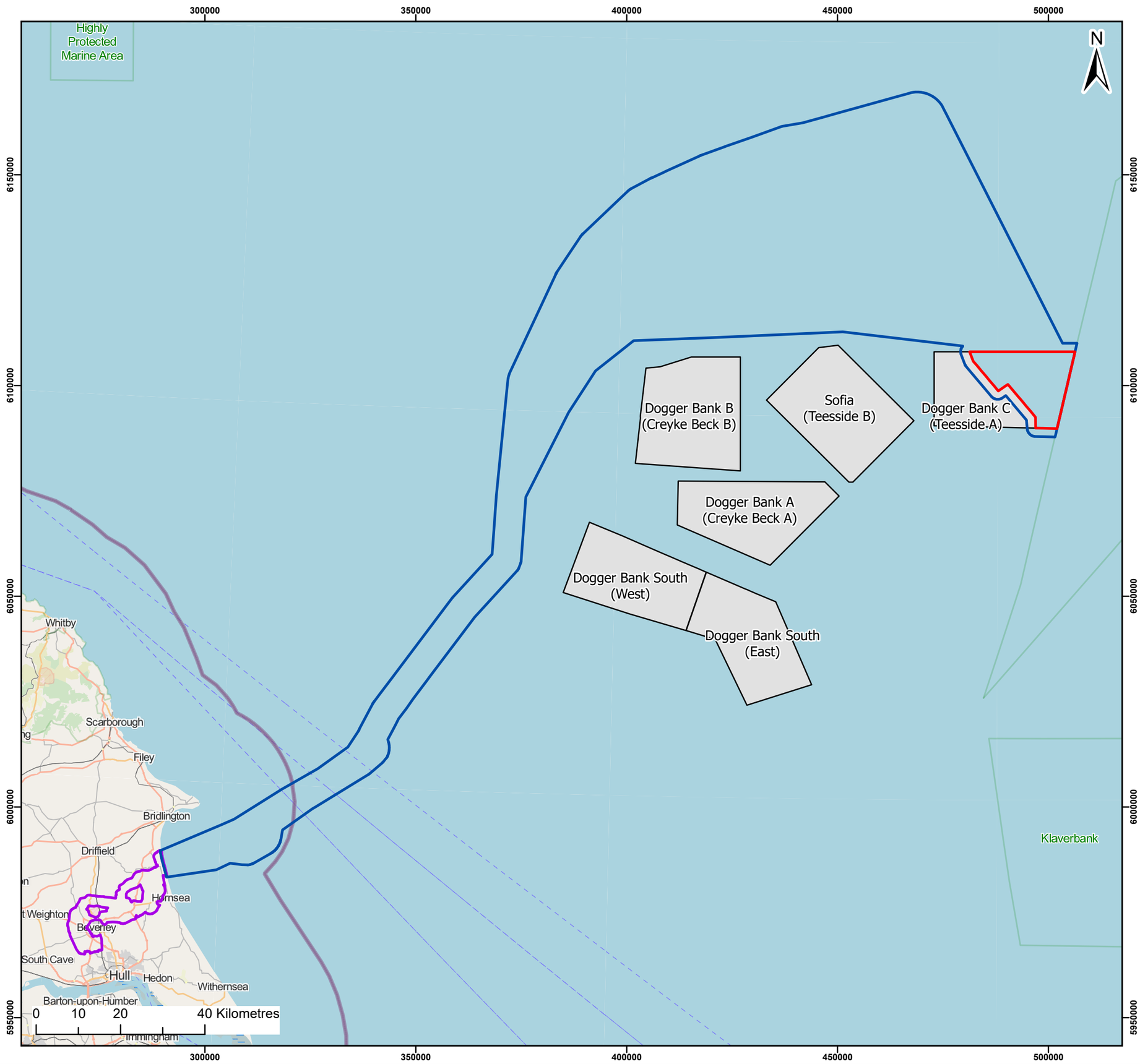


Plate 1-1 Indicative Infrastructure



Legend:

- Dogger Bank D Array Area
- Offshore Scoping Area
- Onshore Scoping Area
- Other Dogger Bank Wind Farms

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Project Scoping Area
Within the Context of the Dogger Bank Zone

Figure: 1-1

Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0024

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	07/06/2024	JH	AB	A3	1:900,000
01	26/04/2024	AB	SM	A3	1:900,000

Co-ordinate system: WGS 1984 UTM Zone 31N

sse Renewables equinor

1.3 Project Description

19. This chapter provides an indicative description of the Project for the purpose of informing the MCZA Screening exercise. The project description will be refined throughout the EIA process and a final description will be provided in the ES, which will form part of the DCO application.

20. As mentioned in **Section 1.2.1**, The Project is being developed to connect into Birkhill Wood Substation in the East Riding of Yorkshire. The Project is also exploring the potential for coordination with an OHA between the UK and another European country's electricity market. This MCZA Screening Report (and project description therein) therefore covers flexibility for potential coordination to connect as an OHA, within a realistic worst-case scenario. Futureproofing the design envelope to enable potential coordination as an OHA aligns with the Energy National Policy Statement (NPS) (EN-1) and provides potential opportunities for reducing cumulative impacts on the environment and communities by ensuring efficiency in the development of transmission infrastructure. The Applicant is also exploring wider opportunities for coordination as required by NPS-EN5 and this MCZA Screening Report provides a level of flexibility for ongoing coordination discussion with other projects where appropriate.

1.4 Design Envelope Approach

21. The NPS EN-3 (Department of Energy and Climate Change (DECC), 2011) recognises the design envelope approach which states in paragraph 2.6.42:

'Owing to the complex nature of offshore wind farm development, many of the details of a proposed scheme may be unknown to the applicant at the time of the application to the IPC [the Secretary of State], possibly including:

- *Precise location and configuration of turbines and associated development;*
- *Foundation type;*
- *Exact turbine tip height;*
- *Cable type and cable route; and*
- *Exact locations of offshore and/or onshore substations'*

22. NPS EN-3 (paragraph 2.6.43) continues:

'*Where details are still to be finalised, applicants should explain in the application which elements of the proposal have yet to be finalised, and the reason why this is the case. Where flexibility is sought in the consent as a result, applicants should, to the best of their knowledge, assess the likely worst case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed*.

23. A design envelope approach will be progressed where maximum and minimum parameters, where appropriate, will be defined to ensure the worst-case scenario can be quantified and assessed allowing likely significant effects to be identified, and mitigated for wherever possible. This approach has been widely used in the consenting of offshore wind farms and is consistent with the Planning Inspectorate Advice Note Nine: Rochdale Envelope (Planning Inspectorate, 2018) which states that:

'The Rochdale Envelope assessment approach is an acknowledged way of assessing a Proposed Development comprising EIA development where uncertainty exists, and necessary flexibility is sought'.

24. The project description, including the project design envelope, will be further refined as appropriate during the EIA process with the final design envelope set out in the Environmental Statement (ES). Such refinement will take into account:

- The Scoping Opinion;
- Consultation with a wide range of stakeholders (including the local community); and
- Further technical and engineering development along with environmental assessments.

1.5 Indicative Project Infrastructure

25. This MCZA Screening Report has been prepared using a realistic worst-case scenario approach for the Project (which includes an element of flexibility to allow for coordination with an OHA).

26. **Table 1-1** sets out key indicative parameters for the Project infrastructure. The parameters have been identified using the Applicant's knowledge of previous offshore wind developments and future changes in the market to elements such as wind turbine dimensions. These parameters will continue to be refined through the EIA process based on realistic worst-case scenarios, which will be fully justified in the ES.

Table 1-1 Key Indicative Parameters for the Realistic Worst-Case Scenario Assessed in the MCZA Screening Report

Feature	Indicative Parameter
General Parameters	
Distance to shore from the Array Area (at its closest point)	210km
Array Area	262km^2
Array Area water depths	21 to 35m at Lowest Astronomical Tide (LAT)
Offshore Infrastructure Parameters	
Maximum number of wind turbines	122
Maximum wind turbine rotor diameter	337m
Minimum blade clearance	28m above LAT
Wind turbine foundation options under consideration	Potential foundation types include monopiles, piled jackets and suction bucket jackets.
Scour protection options for foundations	Potential options include protective aprons, mattresses or matting (concrete or rock filled bags), flow energy dissipation (frond) devices and rock and gravel placement.
Maximum number of offshore platforms	Maximum of three offshore platform structures
Offshore platform foundation options under consideration	Potential foundation types include monopiles, piled jackets, suction bucket jackets, elevator platform and gravity bases.
Scour protection options for foundations	Potential options include protective aprons, mattresses (concrete or rock filled bags), flow energy dissipation (frond) devices, and rock and gravel placement.
Maximum total inter-array cable length	Up to approximately 400km.
Offshore export cable electrical current	HVDC
Maximum number of offshore export cables	Maximum of four cables.
Maximum number of trenches	Three trenches
Maximum offshore export cable length	Up to approximately 400km
Landfall Infrastructure Parameters	
Proposed landfall installation method	Trenchless methodology or open cut trenching
Maximum number of exit pits	Up to an estimated four exit pits
Maximum number of Transition Joint Bays (TJB)	Estimated three Transition Joint Bays (TJBs)
Approximate transition pit permanent footprint (per pit)	Up to approximately 50m^2 (5m x 10m)
Approximate transition pit construction footprint (per pit)	Up to approximately 250m^2
Landfall trenchless compound (length x width)	Up to approximately 125m x 125m
Onshore Infrastructure Parameters	
Maximum number of onshore export cables	Maximum of four cables
Proposed onshore export cable installation methods	Open trenching methods, with trenchless techniques where required.
Maximum number of trenches	Four trenches
Maximum onshore export cable length	Up to approximately 60km for HVDC cables from the landfall to the Onshore Converter Station(s) (OCS(s)), with up to an additional 7km for HVAC cables from OCS(s) to the Birkhill Wood Substation.
Maximum permanent corridor width	30m
Maximum temporary construction corridor width (including for trenchless techniques)	80m
Estimated maximum OCS(s) area (construction and operation area)	27ha (subject to final design) - any energy storage and balancing equipment will be housed wholly within the footprint of the OCS(s). Note that estimated maximum OCS(s) area does not consider potential area required for delivery of on-site Biodiversity Net Gain (BNG) proposals, which will be in addition to the area stated.

1.6 Infrastructure Description

1.6.1 Dogger Bank D Array Area

27. The wind turbines will be located within the DBD Array Area which is located approximately 210km off the north-east coast of England (at its closest point) in the North Sea, immediately to the east of the DBC Offshore Wind Farm, covering an area of approximately 262km^2 (**Figure 1-1**). Water depths in this area range from approximately 21 to 35m below LAT.

1.6.1.1 Wind Turbines

28. The final selection of wind turbines will be made once further surveys, technical development and engagement with the supply chain have been undertaken with the final decision made post-consent.

29. Based on the likely wind turbines available at the time DBD enters construction (with anticipated rated capacity of 14 to 27+MW per turbine), it has been assumed at this project stage that a maximum of 122 wind turbines would be deployed if wind turbines at the lower end of this power per turbine range are selected, with fewer required if the larger turbines are selected. The power rating of the wind turbines is not in itself a consenting parameter but presented indicatively in this MCZA Screening Report to assist the reader with understanding the Applicant's scope for the Project.

30. The final layout of the wind turbines within the Array Area will be confirmed post-consent, informed by site investigation works, impact assessment and wind resource modelling. The final layout will comply with relevant best practice for offshore wind farms in relation to shipping and navigation, fishing interests, offshore health and safety, and any relevant aviation interests. Note that the layout of turbines does not affect the realistic worst-case scenario for scoping purposes – the key consideration is instead the maximum area over which development could occur.

31. Wind turbines typically incorporate tapered tubular towers and three blades attached to a nacelle housing mechanical and electrical generating equipment. The minimum clearance above the HAT of the turbine blades will be 26m, subject to further project design refinement. At present, the expected maximum rotor diameter is 337m. Indicative wind turbine parameters are set out in **Table 1-1** and shown in **Plate 1-2**.

1.6.1.2 Foundations

32. The wind turbines will be secured to the seabed using fixed foundations. Foundation designs will be informed by several factors including environmental characteristics such as ground conditions, water depths, metocean conditions, and techno-economic parameters including the size of wind turbines selected, and supply chain constraints.

33. The final selection of the type(s) of foundations that will be utilised will be made following seabed surveys, engineering and environmental assessments and engagement with the supply chain, with a decision made post-consent on the finally selected foundation type(s). It is possible that more than one type of foundation could be used across the Array Area.

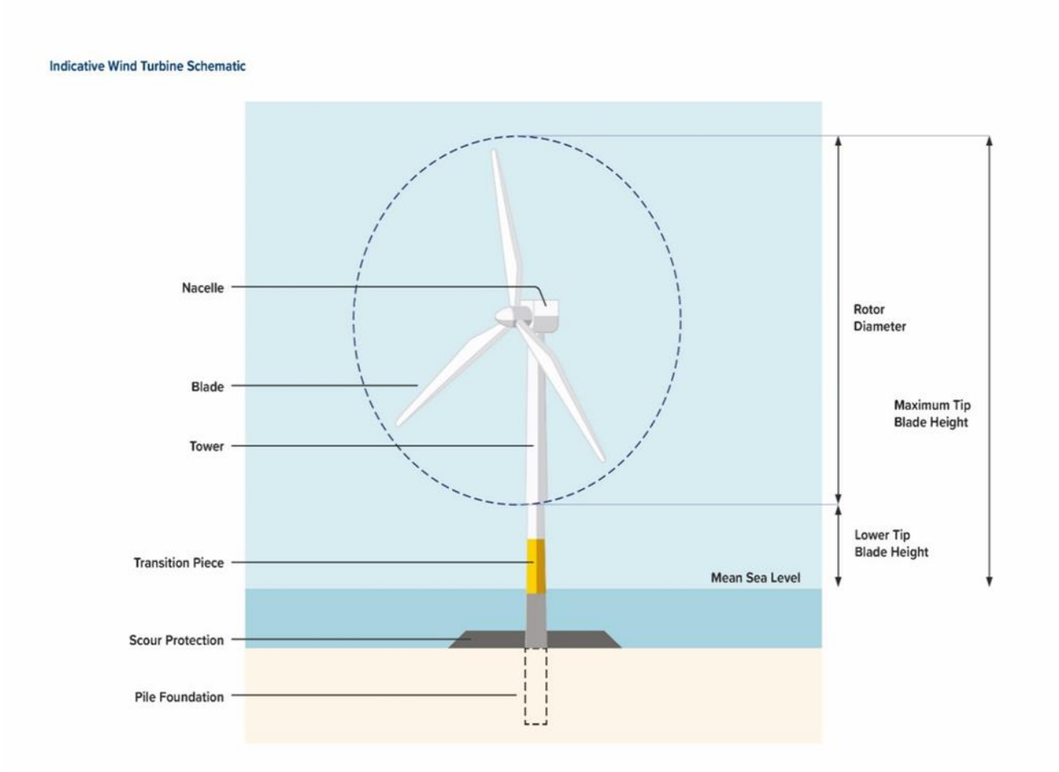


Plate 1-2 Indicative Wind Turbine Schematic

34. **Table 1-2** sets out high level details of the foundation types under consideration (noting additional options for the offshore platforms) with **Plate 1-3** providing an indicative example of what each wind turbine foundation type looks like.

Table 1-2 Offshore Infrastructure Foundation Types Under Consideration

Foundation Type	Description
Monopile	Monopiles are usually constructed from steel, with dimensions dependent on the size of the wind turbines, seabed / ground conditions, metocean conditions, and installation and transportation methods. The piles are installed vertically into the seabed using piling hammers and / or vibrational methods with the driving method determined by seabed conditions. In the most challenging seabed conditions such as stiff clays or rock, piles may be installed by a mix of driving and drilling.
Piled Jacket	The piled jacket foundation structure is initially positioned on the seabed, with piles then driven through 'skirts' and fixed into place by means of grouting. Pre-piling can also be used, whereby the piles are installed first in a different campaign, with installation of the jackets undertaken at a later stage. This way the installation of the piles can already be completed before the jackets are on location. 'Templates' are used to ensure that the jacket legs align with the piles and which also keeps the piles vertical during driving.
Suction Bucket Jacket	Suction installed foundations penetrate the seabed by self-weight with suction applied after so that pressure difference drives the bucket into the seabed to a target depth, which is normally less than 20m. This foundation type offers several advantages over conventional piled jacket structures due to its efficient installation with the jacket and bucket foundations installed in one go, and its suitability for sites with shallow bedrock, although seabed obstructions such as boulders need clearing in advance.
Elevator Platform	This foundation type is only under consideration for the offshore platforms (i.e. not the wind turbines). Elevator platforms combine the advantages of traditional fixed platforms with the versatility offered by a mobile unit. Elevator platforms can be fabricated at local yards without extensive equipment or specialist expertise. When complete they need only tugs and strand jacks for installation and relocation.
	The elevator platform concept is somewhat similar to a jack up vessel, the platform itself forming the hull for float out and "legs" penetrating this which can be extended into contact with the seabed which then raises the platform out of the water. These are then locked into place for the lifetime of the structure.
Gravity Base	This foundation type is only under consideration for the offshore platforms (i.e. not the wind turbines). Gravity base foundations sit on the seabed and are typically heavy ballasted structures made of steel and / or concrete. This foundation type primarily relies on its weight to maintain the stability of the platform(s). The gravity base is placed on a pre-prepared area of seabed which may include removal of soft, mobile sediments and other obstructions such as boulders, with the area levelled in preparation for the placement of the gravity base through the installation of a layer of rock / gravel.

35. Scour of the seabed may occur around the foundations, and scour protection measures may be required, with the following protection methods potentially being considered:

- Solid protective aprons made of preformed concrete or plastic;
- Concrete mattresses;
- Rock filled bags;
- Flow energy dissipation (frond) devices (e.g. frond mattresses); and
- Rock and gravel placement.

36. Installation of scour protection normally involves seabed preparation such as provision of a gravel bedding layer and / or seabed levelling.

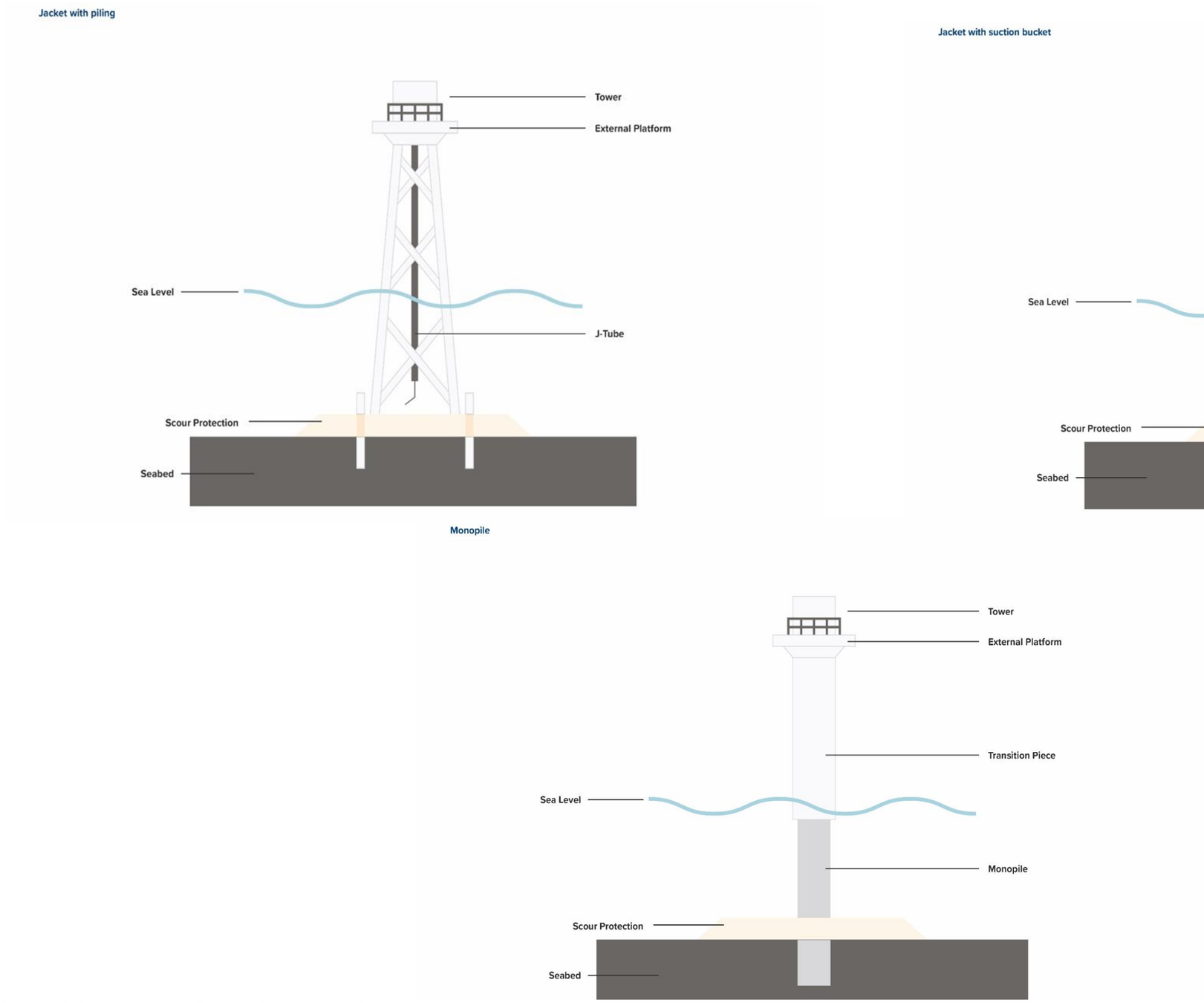


Plate 1-3 Potential Wind Turbine Foundation Types

1.6.1.3 Offshore Platforms

37. **Table 1-1** identifies the realistic worst-case scenario used in the screening exercise with respect to the number of offshore platforms potentially required for the Project. Up to three offshore platforms will be potentially required.

38. The type of foundations being considered for these platforms are the same as those being considered for the wind turbines, with the addition of the elevator platform and gravity bases (as per **Table 1-3**). It should be noted that the final design may incorporate different foundations on the offshore platforms compared to the wind turbines, with **Plate 1-4** providing an indicative example of what each offshore platform foundation type looks like.

1.6.1.4 Inter-Array Cables

39. Inter-array cables will connect the wind turbines to the Offshore Substation Platform(s) OSP(s). The length of each inter-array cable will be dependent on the final wind farm layout; however, the most realistic maximum length of the total inter-array cabling for DBD is likely to be up to approximately 400km. The final location and length of the inter-array cabling will be determined post-consent, subject to the final layout of the wind turbines.

40. The inter-array cables will be buried (where feasible) in the seabed, typically to a depth of 1m, but burial depth may range from 0.5m to 7.5m depending on ground conditions encountered and will be determined by a Burial Assessment Study (BAS) and a Cable Burial Risk Assessment (CBRA). Cables can be buried via several different techniques depending on the seabed conditions along the route. These include ploughing, jetting, trenching or post-lay burial. Decisions on the burial method will be made following further seabed characterisation and engineering design work, resulting in the identification of realistic worst-case scenarios during the EIA process to allow assessment, as well as consideration of the impacts on the designated features of the Dogger Bank SAC.

41. Where cable burial is not possible due to hard ground conditions or the presence of existing infrastructure on / under the seabed, alternative cable protection measures could be used, and this could include rock placement, grout / sand bags, concrete mattresses and / or polyethylene ducting. The appropriate level of protection will be determined based on an assessment of the risks posed to the Project in specific areas which will underpin the development of worst-case scenarios through the EIA process.

1.6.2 Offshore Export Cable Corridor

42. The export cables will be HVDC and there could be up to four export cables laid in the offshore Export Cable Corridor (ECC). Small fibre optic cables may also be installed alongside the export cables for cable monitoring and communication with the wind farm. Dependant on the export cable configuration, there may also be neutral metallic return cable(s) installed alongside the export cables.

43. Export cables will be installed in multiple trenches and protected in line with good industry practice. The export cables will be installed in separate installation campaigns per trench. The method of installation of offshore cables will depend on the seabed conditions along the cable route which, along with appropriate burial depths will be determined by a BAS and a CBRA. This will take account of risk to the cable across the seabed from damage by external factors.

44. Cable protection, where required, can take various forms with those methods under consideration described in **Table 1-3**.

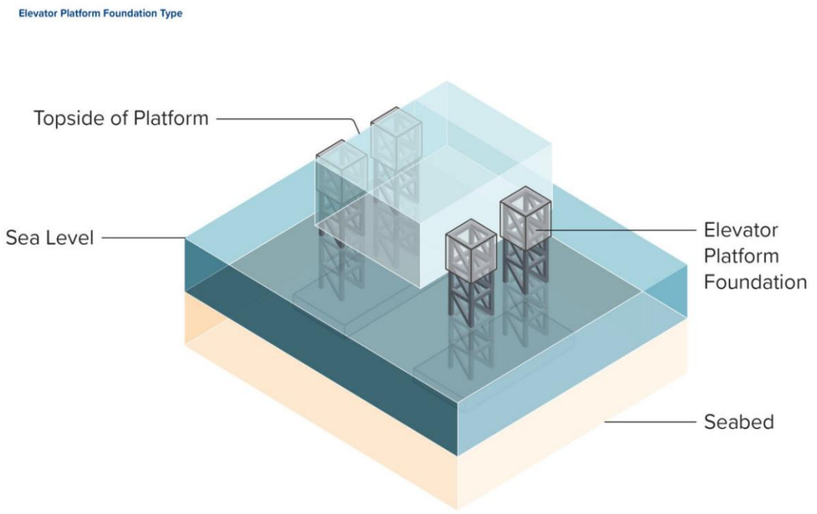


Plate 1-4 Potential Offshore Platform Foundation Types

Table 1-3 Offshore Cable Protection Methods Under Consideration

Cable Protection Method	Description
Rock Placement	In this technique, an engineered berm comprising differing sized rocks covers the cable. The rocks are normally delivered to the seabed using a fall pipe vessel with smaller rocks placed first to protect the cable from the larger rocks. The size and shape of the outer rocks can be engineered in a trapezium shape to specifically mitigate the risk from both anchor strike and dragging.
Grout / Sand Bags	Grout / sand filled bags may be used in conjunction with other cable lay protection methods, primarily (but not limited to) at cable / pipeline crossings.
Rock Bags	Rocks contained in wire or rope netted bags can be deployed via crane on to the seabed. Accurate positioning can be achieved by this method.
Concrete Mattress	Interlocking concrete slabs can be lowered to the seabed on a frame. Once the position of the frame is correct, the release mechanism is triggered, and the mattress is deployed over the cable. Mattresses provide an alternative protection system where more irregularly shaped protection (e.g. rock placement) may increase the risk of snagging from trawling activity.
Frond Mattress	A frond mattress has the additional characteristic of having buoyant fronds which slow water velocity directly above the cable, increasing sediment deposition, and therefore assisting with the protection provided by the mattress itself.
Polyethylene Ducting	Polyethylene ducting or polymer shells are installed on the submarine cable before cable laying, typically in interlocking half shell sections. These ducts or shells have good wear resistance and can protect the cable from abrasion. They can provide bend restriction, impact protection, stability, abrasion resistance and are often used in combination with mattresses and rock placement.

45. It is likely that the offshore export cables will have to cross other cables and / or pipelines. Detailed methodology for the crossing of cables and pipelines by the export cables will be determined in collaboration with the owners of the infrastructure to be crossed. A number of techniques can be utilised, including:

- Pre-lay and post lay concrete mattresses;
- Pre-lay and post lay rock dumping;
- Pre-lay steel structures; and
- Other appropriate approaches.

46. All methods will be pre-agreed with the asset owner and subject to the most appropriate industry and technical standards.

1.6.3 Landfall

47. With regard to the Onshore and Offshore Scoping Areas, the electricity will be transmitted to shore from the Array Area by offshore export cables which will make landfall south east of Skipsea.

48. Dependant on the engineering constraints of the proposed landfall, different cable installation methodologies will be considered. It is assumed that suitable technologies will include trenchless solutions. Such techniques involve drilling pilot holes between the entry (onshore) and the exit (offshore) points. These are then enlarged by a larger cutting tool passing through the holes. Cable ducts are then installed through the openings created, providing a conduit for export cables to be pulled through at a later date.

49. Trenchless cable installation would be drilled from an onshore construction compound and will exit the seabed in an exit pit at a suitable site with a water depth of approximately 10m below LAT. The length of the trenchless cable installation would also depend upon factors such as seabed topography, shallow geology / soil conditions, selected cable installation methodology, coastal erosion and environmental constraints.

50. The offshore and onshore export cables will be jointed in an onshore TJB. It is assumed there will be a maximum of three TJBs overall. The TJB is an underground structure that houses the joints between the offshore and onshore export cables together with a separate fibre optic link box in the same excavation as the TJB.

1.6.4 Onshore Export Cable Corridor

51. The onshore export cable and infrastructure associated with it, will not have an impact pathway to the offshore environment and will not be considered further in the MCZA Screening Report.

1.7 Construction Programme

52. Construction of the Project is expected to begin no earlier than 2029 and based on this date, construction is expected to be completed no later than 2035.

1.8 Operation, Maintenance and Decommissioning

53. Throughout the operational life of the Project O&M activities will be required. The overall O&M strategy will be finalised once the location of a suitable port / harbour is identified, and the technical specifications of the wind farm are known. The production of an O&M plan will be conditioned in the relevant Deemed Marine Licence (DML)(s) which will provide detail on anticipated maintenance activities.

54. Maintenance activities will include:

- Scheduled maintenance (preventative);
- Unscheduled maintenance (corrective); and
- Emergency / special maintenance (corrective).

55. It is anticipated that the Project's assets would have an operational life of a minimum of 35 years. At the end of the operation phase, it is a condition of The Crown Estate lease, as well as a statutory requirement (through the provisions of the Energy Act 2004 (as amended)), that the Project is decommissioned.

56. It is anticipated that when decommissioning takes place, all offshore structures above the seabed (foundations and electrical infrastructure) will be removed, and the site of the onshore OCS(s) will be restored. The process of removing or leaving in situ the electrical cables, both offshore and onshore, on decommissioning will be agreed through the Decommissioning Programme post-consent in consultation with relevant stakeholders. The decommissioning sequence will be undertaken in reverse of the construction sequence, involving similar types and numbers of vessels and equipment.

57. A Decommissioning Programme and associated schedule will be developed during the Project's lifespan to take account of the latest best practice and new technologies. The approach and methodologies of the decommissioning activities will be compliant with the relevant legislation, guidance and policy requirements at the time of decommissioning.

2 Legislation, Policy and Guidance

2.1 Guidance

58. The MCZA Report gives consideration to the Marine Management Organisation (MMO) (2013) Marine Conservation Zones and Marine Licensing guidance.

59. The Stage 1 MCZA will also be informed by Supplementary Advice on Conservation Objectives (SACO) for each relevant site, where available.

60. Natural England (2022) Phase III Best Practice for Data Analysis and Presentation at Examination, Version 1, will be used as guidance to inform which projects are to be screened in for a cumulative impact assessment.

2.2 Marine and Coastal Access Act

61. The MCAA establishes a range of measures to manage the marine environment, including establishing MCZs. The MCZA Project was established in 2008 by the Joint Nature Conservation Committee (JNCC) and Natural England to work with regional stakeholder led projects to identify and recommend MCZs to Government. MCZs were designated in three tranches (2013, 2016 and 2019) and the process is now complete.

62. Section 126 of the MCAA describes the duties of public authorities in relation to certain decisions and applies where:

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

63. The statutory nature conservation body (SNCB) (in this case Natural England) has responsibility under the MCAA to give advice on how to further the conservation objectives for the MCZ and identify the activities that are capable of affecting the designated features and the processes which they are dependent upon.

3 Marine Conservation Zone Screening Methodology

64. Section 126 of the MCAA, places specific duties on all public bodies in undertaking their licensing activities where they are capable of affecting (other than insignificantly) the conservation objectives of an MCZ. To undertake its marine licensing function, the Marine Management Organisation (MMO) has introduced a three-stage sequential assessment process for considering impacts on MCZ, in order for it to deliver its duties under Section 126 of the MCAA.

65. The first stage is the screening process which is required to determine whether Section 126 of the MCAA should apply to the application. All relevant applications go through an initial screening stage to determine whether:

- The plan, project or activity is within or near to an MCZ; and
- The plan, project or activity is capable of significantly affecting (without mitigation);
  - (i) the protected features of an MCZ, or
  - (ii) any ecological or geomorphological processes on which the conservation of the features depends.

66. Where it has been determined through screening that Section 126 applies, the application is assessed further to determine which subsections of Section 126 should apply through Stage 1 assessment and Stage 2 assessment. The MCZA screening stage is summarised in **Chapter 4.**

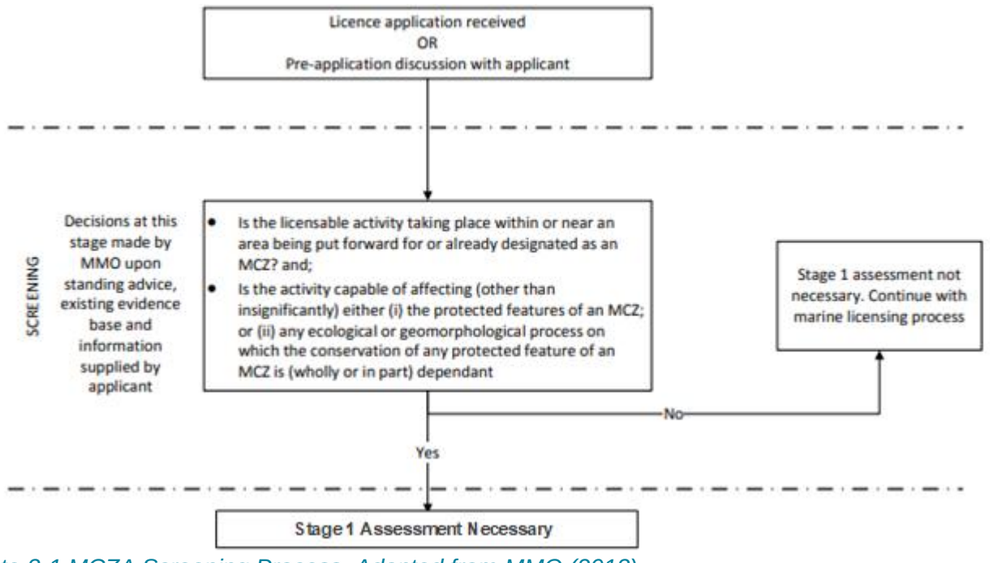


Plate 3-1 MCZA Screening Process. Adapted from MMO (2013)

3.1.1 Cumulative Effects

67. The MCAA does not provide any legislative requirement for explicit consideration of cumulative effects on the protected features of MCZs. However, the MMO guidelines (MMO, 2013) state that the MMO considers that in order for the MMO to fully discharge its duties under section 69 (1) of the MCAA, cumulative effects must be considered.

68. Offshore plans or projects that may be considered include (but are not limited to):

- Other offshore wind farms;
- Other renewables developments;
- Aquaculture;
- Aggregate extraction and dredging;
- Licenced disposal sites;
- Shipping and navigation;
- Planned construction of sub-sea cables and pipelines;
- Potential port/harbour development;
- Oil and gas development and operation, including seismic surveys;
- Unexploded Ordnance (UXO) clearance; and
- Carbon capture developments.

69. Other plans and projects will be screened into the cumulative MCZA using a tiered approach, in accordance with Natural England guidance (Natural England, 2022).

70. Only projects which are reasonably well described and sufficiently advanced to provide information on which to base a meaningful and robust assessment will be included in the cumulative assessment. This excludes Tier 6 and Tier 7 projects as defined by Natural England guidance (**Table 3-1**).

71. Plans and projects that existed at the time of the relevant MCZ designation or the latest status reports, undertaken every 6 years (whichever is most recent) are considered to be part of the baseline environment. This includes many Tier 1 projects as defined by Natural England guidance (**Table 3-1**).

72. The assessment will present relevant cumulative effects of projects using the tiered approach as detailed in Natural England's Phase III Best Practice for Data Analysis and Presentation at Examination guidance note (Natural England, 2022). This approach provides criteria that may be used to indicate the certainty that can be applied to each 'other existing development and/or approved development'. The criteria are assigned in tiers which descend from Tier 1 (most certain) to Tier 7 (least certain) and reflect a diminishing degree of certainty which can be assigned to each development. These tiers are presented in **Table 3-1.**

Table 3-1 In-Combination Effects Tiered Approach (Natural England, 2022)

Tier Description		
Tier	**Consenting or Construction Stage**	**Data Availability**
Tier 1	Built and operational projects should be included within the cumulative assessment where they have not been included within the environmental characterisation survey, i.e. they were not operational when baseline surveys were undertaken, and/or any residual impact may not have yet fed through to and been captured in estimates of 'baseline' conditions, such as 'background' distribution or mortality rate for birds1.	Pre-construction (and possibly post-construction) survey data from the built project(s) and environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project).
Tier 2	Tier 1 + projects under construction.	As Tier 1 but not including post-construction survey data.
Tier 3	Tier 2 + projects that have been consented (but construction has not yet commenced).	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project) and possibly pre-construction survey data from built project.
Tier 4	Tier 3 + projects that have an application submitted to the appropriate regulatory body that have not yet been determined.	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project).
Tier 5	Tier 4 + projects that have produced a Preliminary Environmental Information Report (PEIR) and have characterisation data within the public domain.	Environmental characterisation survey data from proposed project (including data analysis and interpretation within the ES for the project) as well as information provided within the PEIR.
Tier 6	Tier 5 + projects that the regulatory body are expecting an application to be submitted for determination (e.g. projects listed under the Planning Inspectorate programme of projects).	Possibly environmental characterisation survey data (but strong likelihood that this data will not be publicly available at this stage).
Tier 7	Tier 6 + projects that have been identified in relevant strategic plans or programmes.	Historic survey data collected for other purposes/by other projects or industries or at a strategic level.

[1] Or if there are ongoing impacts that are greater than predicted where there is no evidence that the impacts will dissipate over the lifetime of the project, e.g. displacement of red-throated diver.

73. The final assessment of cumulative effects will be undertaken during the later stages of the MCZA, once further information is available on relevant tiered projects as set out above. However, for the purposes of this screening report, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. **Chapter 6** identifies and presents preliminary information regarding cumulative effects.

4 Screening Step 1 – Is the Activity Within or Near A Marine Conservation Zone?

74. The first stage of the screening assessment is to determine whether the Project and associated activities take place within or near an MCZ.

75. Construction, operation, and decommissioning activities for the Project may result in the disturbance of sediment. This can impact receptors at distances far from the source of the disturbance and would be considered the effect with the worst-case zone of influence (ZOI) for the Project. Based on evidence from other offshore wind EIAs conducted in the UK, such as that of the nearby Dogger Bank C and Sofia (formerly Teesside A & B), sediment disturbance from array area installation activities will be highly localised, with sediment plumes settling rapidly within the water column within 10km of the disturbance origin (Forewind, 2014).

76. In relation to the offshore ECC, other projects in the nearby area (such as Dogger Bank South and Hornsea Project Four) have utilised the tidal ellipse distance to determine the ZOI of sediment dispersion resulting from installation activities in the offshore cable corridor, then eventually refining and validating the ZOI considering site-specific physical processes sediment dispersion modelling at Stage 1 of the MCZA. This approach has been accepted by stakeholders for these projects. This Project takes the same approach. Tidal ellipse distances are approximately 4km around the array areas, gradually increasing to 20km inshore. Whilst tidal ellipses vary across the Project area, the 20km ZOI is large enough to encompass worst-case tidal ellipses and is applied across the Project area for precaution and simplicity. It is expected that the 20km ZOI will be refined further in consideration of physical processes modelling at the point of conducting the Stage 1 Assessment.

77. It is acknowledged that in the case of underwater noise associated with the Project, there is potential for louder sound sources such as pile driving to cause effects on fish species at distances greater than 20km from the Project. For this reason, a larger ZOI of 75km specifically for noise impacts has also been considered for MCZs which have a fish species as a designated feature. 75km is considered a sufficiently conservative screening distance and is based on an appraisal of the worst-case monopile pile driving impact ranges (temporary threshold shifts (TTS) in hearing or behavioural disturbance effects) for the most sensitive hearing groups of fish (fish that have a swim bladder that is involved in hearing), considered as stationary receptors, for recent offshore wind farm projects (**Table 4-1**).

78. There are few MCZ designated for fish species on the UK east coast. The nearest to the Offshore Project Area is the Medway Estuary MCZ, designated for smelt Osmerus eperlanus, located approximately 320km to the south. Given that there are no MCZs designated for fish features within a 75km distance from the Project, the ZOI can be reduced to a 20km distance to encompass all other impacts and designating features besides long distance noise propagation and fish.

79. **Chapter 5** details the MCZs within this ZOI, along with the distances measured to the nearest point of the Offshore Project Area. All MCZs within the ZOI are presented in **Table 4-2**. All other MCZs are over 20km from the Offshore Project Area. As such, there is no potential pathway for impact from the Project, alone or cumulatively with other projects and these sites are screened out of further assessment. Any MCZs detailed in **Table 4-2** are considered further in **Chapter 5**.

Table 4-1 Worst-Case Monopile Pile Driving Noise Impact Ranges for Recent Offshore Wind Farm Projects

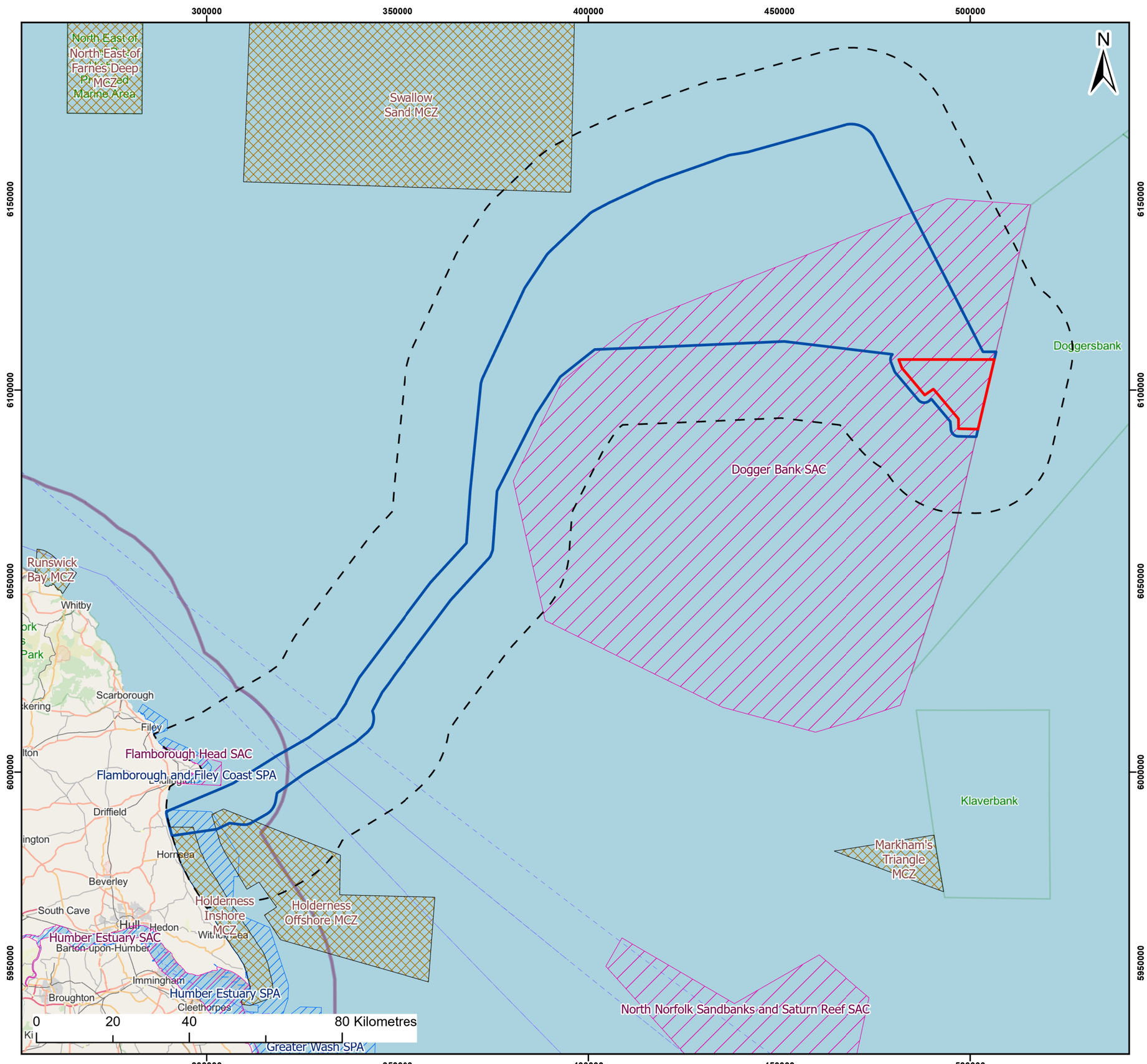
Project and Parameters	Worst-case modelled maximum impact range	Reference
Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects 16m diameter monopile Maximum blow energy 5,500 kJ	39km	Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects (2023) ES Appendix 10.2 – Underwater Noise Modelling Report (Revision C) (Clean)
Hornsea Project Four 15m diameter monopile Maximum blow energy 5,000kJ	38km	Hornsea Project Four (2021) Environmental Statement: Volume A4, Annex 4.5: Subsea Noise Technical Report Part 1
Norfolk Vanguard 15m diameter monopile Maximum blow energy 5,000kJ	58km	Norfolk Vanguard (2018) Environmental Statement Appendix 5.3 - Underwater Noise Modelling
East Anglia ONE North 15m diameter monopile Maximum blow energy 4,000kJ	39km	East Anglia ONE North Limited (2019) Environmental Statement - Appendix 11.4 - Underwater Noise Assessment

Table 4-2 MCZs located within the 20km ZOI for the Project

Marine Conservation Zone	Distance to the Project (km)
Holderness Inshore MCZ	0 (Offshore Project Area overlaps with MCZ)
Holderness Offshore MCZ	0 (Offshore Project Area overlaps with MCZ)
Swallow Sand MCZ	Within 7.5km of Offshore Project Area

80. There are three MCZ within the 20km ZOI of the Project: Holderness Inshore MCZ, Holderness Offshore MCZ, and Swallow Sand MCZ. The offshore export cable corridor overlaps with both Holderness Inshore and Offshore MCZs, so there is potential for direct impact. Swallow Sand MCZ does not overlap with the Project, but is within the 20km ZOI, so there is potential for indirect effects only.

81. No other MCZ have been identified within 20km of the Project and its activities, as shown on **Figure 4-1**.



Legend:

- Dogger Bank D Array Area
- Project Area
- 20km Zone of Influence
- Marine Conservation Zone
- Special Protection Area
- Special Area of Conservation
- 12nm Limit

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Marine Conservation Zones in proximity to other SPAs, SACs and the Project Area

Figure: 4-1

Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0098

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	24/06/2024	AB	PT	A3	1:1,000,000
01	05/10/2023	GC	PT	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

sse Renewables equinor

5 Screening Step 2 – Screening of Impacts on Protected Features

82. Of the MCZs identified above, this section considers the potential for any impacts as a result of the Project, alone or cumulatively with other plans and projects, on the protected features of the MCZ or any physical processes on which the features are dependent.

5.1 Holderness Offshore Marine Conservation Zone

5.1.1 Protected Features

83. **Table 5-1** details the designated features of the Holderness Offshore MCZ.

Table 5-1 Designated Features of the Holderness Offshore MCZ

Protected Feature	Feature Type	Condition (2021)[2]	Management Approach
Subtidal coarse sediment	Broad-scale habitat[3]	Unfavourable	Recover
Subtidal sand	Broad-scale habitat	Unfavourable	Recover
Subtidal mixed sediment	Broad-scale habitat	Unfavourable	Recover
Ocean quahog (*Arctica islandica*)	Species Feature of Conservation Importance	Unfavourable	Recover
North Sea glacial tunnel valleys	Feature of Geological Interest	Favourable	Maintain

84. The Holderness Offshore MCZ is located approximately 11km offshore from the Holderness coast (**Figure 4-1**; JNCC, 2021). The seabed is dominated by subtidal coarse sediment and hosts subtidal sand, subtidal mixed sediments and part of a glacial tunnel valley. The diverse seabed allows for a wide variety of species which live both in and on the sediment such as, crustaceans (crabs and shrimp), starfish and sponges. This site is also a spawning and nursing ground for a range of fish species for example lemon sole *Microstomus kitt*, plaice *Pleuronectes platessa* and European sprat *Sprattus* (although these species are not protected features of the site).

[2] https://jncc.gov.uk/our-work/holderness-offshore-mpa/

5.1.2 Conservation Objectives

85. The conservation objectives for the Holderness Offshore MCZ are that the protected features:

- 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.

86. With respect to Subtidal coarse sediment, Subtidal sand and Subtidal mixed sediments within the MCZ, 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.

87. With respect to Ocean quahog within the MCZ, 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.

88. 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.

89. With respect to the North Sea glacial tunnel valleys within the MCZ, 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 detailed in the above bullets are satisfied.

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

[3] Broadscale marine habitats are groups of habitats with shared ecological requirements which capture the coarse biological and physical diversity of the seabed (JNCC, 2022)

5.1.3 Potential Pressures

91. The Holderness Offshore MCZ Advice on Operations (JNCC and Natural England, 2020) details the sensitivity of the designated features of the Holderness Offshore MCZ to potential pressures associated with all phases of offshore wind development and submarine power cable installation (construction, operation and decommissioning). Sensitivities from both of these pressure types were used as both may be relevant, in cases where the sensitivity differed the highest sensitivity is used.

92. **Table 5-2** below details the pressures detailed in the Advice on Operations which have been screened in for further assessment. **Table A-1** of **Appendix A** details each pressure and provides justification for why each pressure has been screened in / out of further assessment.

93. It should be noted that where a feature is noted as being sensitive to a pressure, this may be at a high, medium or low sensitivity. The definitions of sensitivity are based on The Marine Life Information Network's (MarLIN) Marine Evidence based Sensitivity Assessment (MarESA) (MarLIN, 2021), which determines sensitivity based on resistance (tolerance) and resilience (recoverability) which are defined as:

- **Resistance**: the likelihood of damage (termed tolerance or resistance) due to a pressure; and
- **Resilience**: the rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed.

94. The sensitivity of each feature to the pressures screened in will be examined further in the next stage of the MCZA. Definitions of the sensitivity categories (as per guidance developed by Natural England (2021)) used in **Table 5-2** are detailed below:

- Sensitive - The evidence base suggests that a feature or at least one of the component biotopes of the feature has a sensitivity to the pressure at the benchmark;
- Not Sensitive – The evidence base suggests the feature is not sensitive to the pressure at the benchmark;
- Not Relevant – Recorded where the evidence base suggests that there is no direct interaction between the pressure and the biotope group or species;
- Unknown – There is no sensitivity assessment for this feature. Recorded where one of the following applies:
  - The evidence base is not considered to be adequate for an assessment of sensitivity to be made;
  - There is not enough evidence to assess the sensitivity of the specific feature / pressure combination and there is no suitable proxy information regarding the habitat (biotope) on which to base decisions;
  - Marine evidence based sensitivity assessments have not yet taken place for the feature / biotopes.

95. At the time of writing, the North Sea glacial tunnel valleys feature of geological interest is not included in the Advice on Operations list for the Holderness Offshore MCZ. However, as the Project is located more than 20km away from this feature (the ZOI distance for the Project) as shown on **Figure 4-1**, no direct disturbance / damage to the feature will occur. As such, the North Sea glacial tunnel valleys feature of geological interest has been screened out of further assessment in the MCZA process. All other features of Holderness Offshore MCZ are screened in for further assessment.

Table 5-2 Sensitivity of Holderness Offshore MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities[4]. Green = Screened Out Pressure / Feature Combinations. Orange = Screened In Pressure / Feature Combinations. S = sensitive; NS = not sensitive; NR = not relevant; U = unknown

Activity	Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Pressure Relevant to Project?	Pressure Screened In / Out
Offshore Wind and Power Cables	Abrasion / disturbance of the substrate on the surface of the seabed	All stages	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Changes in suspended solids (water clarity)	All stages	NS	S	S	S	Yes	In
Offshore Wind and Power Cables	Deoxygenation	All stages	NS	S	S	S	Yes	In
Offshore Wind and Power Cables	Habitat structure changes – removal of substratum (extraction)	Offshore wind – All stages Power cables – Construction and decommissioning	S	S	S	S	Yes	In
Offshore Wind and Power Cables	Introduction or spread of invasive non-indigenous species (INIS)	All stages	U	S	S	S	Yes	In
Offshore Wind and Power Cables	Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion	All stages	S	S	S	S	Yes	In
Offshore Wind and Power Cables	Physical change (to another seabed type)	All stages	S	S	S	S	Yes	In
Offshore Wind and Power Cables	Physical change (to another sediment type)	All stages	S	S	S	S	Yes	In
Offshore Wind and Power Cables	Smothering and siltation rate changes (heavy)	All stages	S	S	S	S	Yes	In
Offshore Wind & Power Cables	Smothering and siltation rate changes (heavy)	Offshore wind – Construction and operation Power cables – Construction	NS	S	S	S	Yes	In
Offshore Wind & Power Cables	Smothering and siltation rate changes (light)	All stages	NS	S	S	S	Yes	In
Offshore Wind & Power Cables	Water flow (tidal current) changes, including sediment transport considerations	All stages	NS	U	NS	S	Yes	In

[4] Key: **S** - Sensitive, **IE** – Insufficient Evidence to Assess, **NS** – Not Sensitive, **NR** – Not Relevant, **U** – Unknown

5.2 Holderness Inshore Marine Conservation Zone

5.2.1 Protected Features

96. **Table 5-3** details the designated features of the Holderness Inshore MCZ.

Table 5-3 Designated Features of the Holderness Inshore MCZ

Protected Feature	Feature Type	Condition (2016)[5]	Management Approach
Intertidal sand and muddy sand	Broad-scale habitat	Favourable	Maintain
High energy circalittoral rock	Broad-scale habitat	Favourable	Maintain
Moderate energy circalittoral rock	Broad-scale habitat	Favourable	Maintain
Subtidal coarse sediment	Broad-scale habitat	Favourable	Maintain
Subtidal sand	Broad-scale habitat	Favourable	Maintain
Subtidal mixed sediment	Broad-scale habitat	Favourable	Maintain
Subtidal mud	Broad-scale habitat	Favourable	Maintain
Spurn Head (subtidal) and “the Binks”	Feature of Geological Interest	Favourable	Maintain

97. The Holderness Inshore MCZ is located north of the mouth of the Humber Estuary (Department for Environment, Food and Rural Affairs (DEFRA), 2016). The seabed in this site is made up of rock, sand, mud and sediment. The mosaic of habitats within the site supports a diverse range of organisms including red algae, sponges and other encrusting fauna. The site also supports fish species such as European eel, dab and wrasse, as well as commercially significant crustaceans such as edible and velvet swimming crabs and lobster. Partly above the water, the sandy beaches of intertidal sand and muddy sand are uncovered at low tide. These beaches are home to many species, buried in the damp sand.

5.2.2 Conservation Objectives

98. The overarching conservation objectives for the site is for its designated features to be maintained in favourable condition. For each broadscale marine habitat, favourable condition means that, within an MCZ:

- 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.

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

100. For features of geological interest, favourable condition means that, within an MCZ:

- Its extent, component elements and integrity are maintained;
- Its structure and functioning are unimpaired; and
- Its surface remains sufficiently unobscured to determine the above points are satisfied.

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

5.2.3 Potential Pressures

102. There is no current advice available regarding the sensitivity of the Intertidal sand and muddy sand to the pressures of offshore wind, power cable development. As such, professional judgement has been used when determining the sensitivity of this feature to potential pressures.

103. The Spurn Head geological feature of interest is located beyond the 20km ZOI for the Project. As such no direct disturbance / damage to the feature will occur, and it is screened out of further assessment in the MCZA process. This screening out will be validated with site specific data on sediment dispersion and agreed through the EPP process.

104. **Table 5-4** details each pressure detailed in the Advice on Operations screened in for further assessment. **Table A-2** of **Appendix A** details each pressure and provides justification for why each pressure has been screened in / out of further assessment. Definitions of the sensitivity categories used in **Table 5-4** are detailed in **Section 1.1.1**

[5] https://www.gov.uk/government/publications/marine-conservation-zones-holderness-inshore

Table 5-4 Sensitivity of Holderness Inshore MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities[6]. Green = Screened Out Pressure / Feature Combinations. Orange = Screened In / Pressure Feature Combinations

Activity	Pressure	Stage of Development	Intertidal sand and muddy sand	Moderate energy circalittoral rock	High energy circalittoral rock	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Subtidal mud	Pressure Relevant to Project?	Pressure Screened In / Out
Offshore Wind, Power Cables	Abrasion/disturbance of the substrate on the surface of the seabed	All stages	S	S	S	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Changes in suspended solids (water clarity)	All stages	S	S	NS	S	NS	S	S	Yes	In
Offshore Wind, Power Cables	Habitat structure changes – removal of substratum (extraction)	Wind – All stages Cables – Construction and decommissioning	S	S	S	S	S	S	S	Yes	In
Offshore Wind and Power Cables	Introduction or spread of invasive non-indigenous species (INIS)	Wind and cables - All stages	S	U	S	S	U	S	S	Yes	In
Offshore Wind, Power Cables	Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion	All stages	S	S	S	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Physical change (to another seabed type)	All stages	NR	S	S	S	S	S	NR	Yes	In
Offshore Wind, Power Cables	Physical change (to another sediment type)	All stages	S	NR	NR	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Smothering and siltation rate changes (heavy)	Wind – Construction and operation Cables – Construction	S	S	S	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Smothering and siltation rate changes (light)	All stages	S	S	S	S	S	S	S	Yes	In
Offshore Wind, Power Cables	Water flow (tidal current) changes, including sediment transport considerations	All stages	S	S	NS	NE	NS	NS	S	Yes	In

[6] Key: **S** - Sensitive, **IE** – Insufficient Evidence to Assess, **NS** – Not Sensitive, **NR** – Not Relevant, **U** – Unknown

5.3 Swallow Sand Marine Conservation Zone

5.3.1 Protected Features

105. **Table 5-5** details the designated features of the Swallow Sand MCZ.

Table 5-5 Designated Features of the Swallow Sand MCZ

Protected Feature	Feature Type	Condition (2017)[7]	Management Approach
Subtidal coarse sediment	Broad-scale habitat	Favourable	Maintain
Subtidal sand	Broad-scale habitat	Favourable	Maintain
North Sea glacial tunnel valley (Swallow Hole)	Feature of Geological Interest	Favourable	Maintain

106. Swallow Sand MCZ is located in the northern North Sea region, covering an area of 4,746km2, approximately 100km offshore from the Northumberland coast. Subtidal sand is the most abundant feature, with evidence of patches of coarse and mixed sediments as well as mud.

5.3.2 Conservation Objectives

107. The overarching conservation objectives for the site is for its designated features to be maintained in favourable condition. For each broadscale marine habitat, favourable condition means that, within an MCZ:

- 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.

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

109. For features of geological interest, favourable condition means that, within an MCZ:

- Its extent, component elements and integrity are maintained;
- Its structure and functioning are unimpaired; and
- Its surface remains sufficiently unobscured to determine the above points are satisfied.

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

5.3.3 Potential Pressures

111. The Swallow Hole geological feature of interest is located beyond the 20km ZOI for the Project. As such no direct disturbance / damage to the feature will occur, and it is screened out of further assessment in the MCZA process. This screening out will be validated with site specific data on sediment dispersion and agreed through the EPP process.

112. **Table 5-6** details each pressure detailed in the Advice on Operations screened in for further assessment. **Table A-3** of **Appendix A** details each pressure and provides justification for why each pressure has been screened in / out of further assessment. Definitions of the sensitivity categories used in **Table 5-6** are detailed in **Section 5.1.3**.

Table 5-6 Sensitivity of Swallow Sand MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities[8]. Green = Screened out Pressure / Feature Combinations. Orange = Screened In Pressure / Feature Combinations.

Activity	Pressure	Stage	Subtidal coarse sediment	Subtidal sand	Pressure Relevant to Project?	Pressure Screened In / Out
Offshore Wind, Power Cables	Changes in suspended solids (water clarity)	All stages	S	S	Yes	In
Offshore Wind, Power Cables	Smothering and siltation rate changes (heavy)	All stages	S	S	Yes	In
Offshore Wind, Power Cables	Smothering and siltation rate changes (light)	All stages	S	S	Yes	In
Offshore Wind, Power Cables	Water flow (tidal current) changes, including sediment transport considerations	All stages	U	S	Yes	In

[7] https://data.jncc.gov.uk/data/e708f8ce-60f7-4933-9bd0-aa7181c116f5/SwallowSand-GMA-change-responses-web.pdf

[8] Key: **S** - Sensitive, **IE** – Insufficient Evidence to Assess, **NS** – Not Sensitive, **NR** – Not Relevant, **U** – Unknown

6 Cumulative Effects

113. Cumulative effects will consider indirect effects in conjunction with potential impacts to the designated features of the relevant MCZ, based on the results of the assessments of other plans and projects. **Table 6-1** details all plans / projects within 20km of the Holderness Inshore MCZ and Holderness Offshore MCZ, that could have a cumulative effect on the sites with the Project activities.

114. As discussed in **Chapter 4**, noise impacts have the potential to act at greater distances than 20km for fish receptors. However, since no MCZ with fish species as designated features is within the 75km ZOI specific to this impact, there is no potential for the Project to contribute to cumulative noise impacts on MCZ with fish features, rendering the ZOI for all other impacts, receptors and other plans and projects to be 20km.

115. Plans / projects have been assigned a tier level between 1 and 7, based on the most recent Natural England guidance (see Section 3, Table 4.1). For the full CEA at the next stage of the MCZA, this list will be reviewed and screened to ensure all relevant plans / projects are considered in the final assessment. All listed plans / projects will be re-examined at the next stage to ensure each assigned tier remains accurate at the time of writing.

116. Classes of projects that are considered to be part of the baseline conditions for the surrounding area, and therefore have not been subject to further assessment, include:

- Marine aggregate extraction;
- Oil and gas exploration and extraction;
- Existing sub-sea cables and pipelines; and
- Commercial shipping.

Table 6-1 List of Plans and Projects Currently Screened in for Further Assessment in the Next Stages of the MCZA

Tier	Plan / Project	Distance to Holderness Offshore MCZ (km)	Distance to Holderness Inshore MCZ (km)
Strategic Plans			
7	East Inshore and East Offshore Marine Plans	0 (Within East Offshore Marine Plan area only)	0 (Within both East Inshore and East Offshore Marine Plan areas)
7	North East Inshore, North East Offshore Marine Plans	0 (Adjacent but not overlapping)	0 (Adjacent but not overlapping)
Offshore Wind Farms			
1	Westermost Rough	1	2
1	Humber Gateway	4	2
2	Triton Knoll	11	>15
Offshore Wind Farm Cable Corridors			
2	Dogger Bank A	2	2
2	Dogger Bank B	2	2
5	Dogger Bank South	1	0 (Within)
1	Hornsea 1	1	4
1	Hornsea Project 2	1	4
3	Hornsea Project 4	2	9
Carbon Capture and Storage			
3	Northern Endurance CCS (export pipeline)	0 (Within)	0 (Within)
Hydrogen Storage			
6	Aldbrough Hydrogen Storage	10	0 (Scoping boundary situated within the MCZ)
Sub-sea Cables			
6	Eastern Link 2 (EGL2)	5	7
2	VikingLink Interconnector	0 (Within)	>15
7	Eastern Link 3 (EGL 3)*	0 (Within)	23
7	Eastern Link 4(EGL 4)*	0 (Within)	18
7	National Grid HND Bootstrap*	0 (Within)	0 (Within)

*Cable not yet finalised

7 Summary

117. **Table 7-1** provides a summary of the MCZ screened in for further assessment, the relevant Project components for each site, and the pressures screened in (alone or cumulatively with other plans and projects).

Table 7-1 Sites, Features and Pressures Screened into Stage 1 MCZA

Site	Features Screened In	Relevant Project Components	Pressures Screened In (Alone and Cumulatively)
Holderness Offshore MCZ	Subtidal coarse sediment Subtidal sand Subtidal mixed sediments Ocean quahog	Direct and in-direct effects from offshore export cable corridor	Abrasion / disturbance of the substrate on the surface of the seabed Changes in suspended solids (water clarity) Habitat structure changes – removal of substratum (extraction) Introduction or spread of invasive non-indigenous species (INIS) Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion Physical change (to another seabed type) Physical change (to another sediment type) Smothering and siltation rate changes (heavy) Smothering and siltation rate changes (light) Water flow (tidal current) changes, including sediment transport considerations
Holderness Inshore MCZ	Intertidal sand and muddy sand Moderate energy circalittoral rock High energy circalittoral rock Subtidal coarse sediment	Direct and in-direct effects from offshore export cable corridor (landfall and nearshore)	Abrasion / disturbance of the substrate on the surface of the seabed Changes in suspended solids (water clarity) Habitat structure changes – removal of substratum (extraction) Introduction or spread of invasive non-indigenous species (INIS)
	Subtidal mixed sediments Subtidal sand Subtidal mud		Penetration and / or physical disturbance of the substrate below the surface of the seabed, including abrasion Physical change (to another seabed type) Physical change (to another sediment type) Smothering and siltation rate changes (heavy) Smothering and siltation rate changes (light) Water flow (tidal current) changes, including sediment transport considerations
Swallow Sand MCZ	Subtidal coarse sediment Subtidal sand	In-direct effects from offshore export cable corridor	Changes in suspended solids (water clarity) Smothering and siltation rate changes (heavy) Smothering and siltation rate changes (light) Water flow (tidal current) changes, including sediment transport considerations

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Appendix A: MCZ Pressure Sensitivities

Table A-1 Sensitivity of Holderness Offshore MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities. Green = Screened Out Pressure / Feature Combinations. Orange = Screened In Pressure / Feature Combination. S = sensitive; NS = not sensitive; NR = not relevant; U = unknown

Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Screened In / Out	Justification
Abrasion / disturbance of the substrate on the surface of the seabed	Wind and cables - All stages	S	S	S	S	In	Project within the Marine Conservation Zone (MCZ), therefore potential pathway for pressure to affect designated features.
Barrier to species movement	Wind – All stages Cables – Operation	NR	U	NR	NS	Out	Features not sensitive to pressure or pressure not relevant to features.
Changes in suspended solids (water clarity)	Wind and cables - All stages	NS	S	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in changes in suspended solids within the MCZ.
Collision below water with static or moving objects not naturally found in the marine environment (e.g. boats, machinery and structures)	Wind and cables - All stages	NR	U	NR	NS	Out	Features not sensitive to pressure or pressure not relevant to features.
Deoxygenation	Cables - All stages	NS	S	S	S	In	Sediment re-deposition within the MCZ will be negligible, sediment disturbance will occur over a negligible spatial / temporal scale. Precautionarily scoped into further assessment, due to stated sensitivities in the Advice on Operations.
Electromagnetic changes	Cables - Operation	U	U	U	U	Out	Features not sensitive to pressure or pressure not relevant to features.
Habitat structure changes – removal of substratum (extraction)	Wind – All stages Cables – Construction and decommissioning	S	S	S	S	In	Project offshore export cable corridor (ECC) within MCZ, potential for removal of substratum to occur as a result of cable burial activities.

Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Screened In / Out	Justification
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a Chemical Risk Assessment (CRA) would be required as set out as part of the Project Environmental Management Plan (PEMP) or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Introduction of light	Wind and cables - All stages	NR	S	U	S	Out	Artificial light produced by the Project construction and decommissioning activities will be limited temporally and spatially.
Introduction of other substances (solid, liquid or gas)	Wind - All stages	U	U	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Introduction or spread of invasive non-indigenous species (INIS)	Wind and cables - All stages	U	S	S	S	In	Potential for Project vessels to transport INIS to MCZ, and for infrastructure to act as a 'stepping stone' for INIS spread.

Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Screened In / Out	Justification
Litter	Wind and cables - All stages	U	U	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Nutrient enrichment	Cables - All stages	NS	U	NS	NS	Out	Features not sensitive to pressure or pressure not relevant to features.
Penetration and/or physical disturbance of the substrate below the surface of the seabed, including abrasion	Wind and cables - All stages	S	S	S	S	In	Project offshore ECC within MCZ, potential for direct impacts to occur.
Physical change (to another seabed type)	Wind and cables - All stages	S	S	S	S	In	Project offshore ECC within MCZ, potential for direct impacts to occur.
Physical change (to another sediment type)	Wind and cables - All stages	S	S	S	S	In	Project offshore ECC within MCZ, potential for direct impacts to occur.
Physical loss (to land or freshwater habitat)	Wind and cables - All stages	U	S	S	S	Out	No impacts on land or freshwater habitat within the MCZs will occur as a result of the Project activities.
Smothering and siltation rate changes (heavy)	Wind – Construction and operation Cables – Construction	NS	S	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.
Smothering and siltation rate changes (light)	Wind and cables - All stages	NS	S	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.

Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Screened In / Out	Justification
Synthetic compound contamination (incl, pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Temperature decrease	Cables - Operation	NS	S	S	S	Out	Power cables do not reduce temperatures when in operation, so there is no pathway for a temperature reduction effect on features.
Temperature increase	Cables - Operation	S	S	S	S	Out	Recent evidence indicates that the surface temperature difference of operational power cables in comparison to inert sections of the same cable was negligible at a sensitivity level of 0.06°C (Taormina *et al*., 2018; 2020). As such the pressure has been screened out.
Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.

Pressure	Stage of Development	Ocean quahog	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal sand	Screened In / Out	Justification
Underwater noise changes	Wind and cables - All stages	NR	U	NS	NS	Out	Features not sensitive to pressure or pressure not relevant to features.
Visual disturbance	Wind and cables - All stages	NR	U	NR	NR	Out	Features not sensitive to pressure or pressure not relevant to features.
Water flow (tidal current) changes, including sediment transport considerations	Wind and cables - All stages	NS	U	NS	S	In	Potential for structures to be placed in the MCZ (e.g. cable protection), may result in changes to coastal process and water flow.
Wave exposure changes	Wind - Operation	NS	U	NS	NS	Out	Features not sensitive to pressure or pressure not relevant to features.

References

SSE Renewables and Equinor (2024). Dogger Bank D Offshore Wind Farm - Environmental Impact Assessment Scoping Report.

Table A-2 Sensitivity of Holderness Inshore MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities. Green = Screened Out Pressure / Feature Combinations. Orange = Screened In Pressure / Feature Combinations. S = sensitive; NS = not sensitive; NR = not relevant; U = unknown

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
Abrasion/disturbance of the substrate on the surface of the seabed	Wind and cables - All stages	NR	S	S	S	S	S	S	S	In	Project offshore export cable corridor (ECC) within MCZ, potential for direct impacts to occur.
Barrier to species movement	Wind – All stages Cables – Operation	NR	U	U	U	NS	NS	NR	S	Out	No prolonged obstruction to species movement or exposure to noise, light, visual disturbance or changes in water quality will result from the offshore ECC during all phases of the Project lifespan.
Changes in suspended solids (water clarity)	Wind and cables - All stages	NR	S	S	NS	S	S	NS	S	In	Potential for sediment disturbed by cable construction / maintenance / decommissioning activities to result in changes in suspended solids within the MCZ.
Collision below water with static or moving objects not naturally found in the marine environment (e.g. boats, machinery and structures)	Wind and cables - All stages	NR	NR	NR	NR	NR	NR	NR	NR	Out	Pressure not relevant to features.
Deoxygenation	Wind and cables – All stages	NR	S	S	S	S	S	S	S	Out	Sediment re-deposition within the MCZ will be negligible in the context of deoxygenation effects, sediment disturbance will occur over a negligible spatial / temporal scale.
Electromagnetic changes	Cables – Operation	NR	U	U	U	U	U	U	U	Out	Project offshore ECC routes through the MCZ. Any EMF associated with the cable will be restricted to within metres of the cable and does not have the potential to hinder the conservation objectives for the designated broad-scale habitat types in question.
Habitat structure changes – removal of substratum (extraction)	Wind – All stages Cables– Construction and decommissioning	NR	S	S	S	S	S	S	S	In	Project offshore ECC within MCZ, potential for removal of substratum to occur as a result of cable burial activities.

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind & cables - All stages	NR	U	U	U	U	U	U	S	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Introduction of light	Wind and cables – All stages	NR	NR	S	NR	NS	S	NR	S	Out	Artificial light produced by the Project construction and decommissioning activities will be limited temporally and spatially.
Introduction of other substances (solid, liquid or gas)	Wind and cables - All stages	NR	NR	U	U	U	U	NR	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar.

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
											All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Introduction or spread of invasive non-indigenous species (INIS)	Wind and cables - All stages	NR	S	S	U	S	S	U	S	In	Potential for Project vessels to transport INIS to MCZ, and for infrastructure to act as a 'stepping stone' for INIS spread.
Litter	Wind and cables - All stages	NR	NR	U	U	U	U	NR	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project.

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
											Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Nutrient enrichment	Wind and cables - All stages	NR	NR	U	U	U	U	NR	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Penetration and/or physical disturbance of the substrate below the surface of the seabed, including abrasion	Wind and cables - All stages	NR	S	S	S	S	S	S	S	In	Project offshore ECC within MCZ, potential for direct impacts to occur.
Physical change (to another seabed type)	Wind and cables - All stages	NR	NR	S	S	NR	S	S	S	In	Project offshore ECC within MCZ, potential for direct impacts to occur.
Physical change (to another sediment type)	Wind and cables - All stages	NR	S	S	S	S	S	NR	NR	In	Project offshore ECC within MCZ, potential for direct impacts to occur.

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
Physical loss (to land or freshwater habitat)	Wind and cables - All stages	NR	S	S	S	S	S	S	S	Out	No impacts on land or freshwater habitat within the MCZs will occur as a result of the Project activities.
Smothering and siltation rate changes (heavy)	Wind – All stages Cables – Construction	NR	S	S	S	S	S	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.
Smothering and siltation rate changes (light)	Wind and cables - All stages	NR	S	S	S	S	S	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.
Synthetic compound contamination (incl, pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	NR	U	U	U	U	U	U	S	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Temperature decrease	Cables - Operation	NR	S	S	S	NS	S	NS	NS	Out	Power cables do not reduce temperatures when in operation, so there is no pathway for a temperature reduction effect on features.

Pressure	Stage of development	Spurn Head and "the Binks"	Intertidal sand and muddy sand	Subtidal coarse sediment	Subtidal mixed sediments	Subtidal mud	Subtidal sand	High energy circalittoral rock	Moderate energy circalittoral rock	Screened In / Out	Justification
Temperature increase	Cables - Operation	NR	NS	S	NS	S	S	S	S	Out	Recent evidence indicates that the surface temperature difference of operational power cables in comparison to inert sections of the same cable was negligible at a sensitivity level of 0.06°C (Taormina *et al.*, 2018). As such the pressure has been screened out.
Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	NR	U	U	U	U	U	U	S	Out	Best-practice measures for pollution control embedded into Project design, therefore the pressure has been screened out.
Underwater noise changes	Wind and cables - All stages	NR	NR	NS	NS	NS	NR	NR	NS	Out	Pressure not relevant to features.
Visual disturbance	Wind and cables - All stages	NR	NR	NR	NR	NR	NS	NR	NR	Out	Pressure not relevant to features.
Water flow (tidal current) changes, including sediment transport considerations	Wind and cables - All stages	NR	S	NS	NS	S	NS	NS	S	In	Potential for structures to be placed in the intertidal zone (e.g. HDD exit pit), may result in changes to coastal process and water flow.
Wave exposure changes	Wind - Operation	NR	S	NS	NS	NS	NS	NS	NS	Out	Pressure only relevant to the physical presence of turbines. Only interaction between the Project and the MCZ is the Project's offshore ECC.

S = sensitive; NS = not sensitive; NR = not relevant; U = unknown

References

SSE Renewables and Equinor (2024). Dogger Bank D Offshore Wind Farm - Environmental Impact Assessment Scoping Report.

Table A-3 Sensitivity of Swallow Sand MCZ Designated Features to Offshore Wind and Power Cable Construction, Operation and Decommissioning Activities. Green = Screened Out Pressure / Feature Combinations. Orange = Screened In Pressure Feature Combinations

Pressure	Stage of development	Subtidal coarse sediment	Subtidal sand	Screened In / Out	Justification
Abrasion/disturbance of the substrate on the surface of the seabed	Wind and cables - All stages	S	S	Out	Project offshore export cable corridor (ECC) does not overlap with MCZ. No potential for direct impacts to occur.
Barrier to species movement	Wind – All stages Cables – Operation	U	NS	Out	No prolonged obstruction to species movement or exposure to noise, light, visual disturbance or changes in water quality will result from the offshore ECC during all phases of the Project lifespan.
Changes in suspended solids (water clarity)	Wind and cables - All stages	S	S	In	Potential for sediment disturbed by cable construction / maintenance / decommissioning activities to result in changes in suspended solids within the MCZ.
Collision below water with static or moving objects not naturally found in the marine environment (e.g. boats, machinery and structures)	Wind and cables - All stages	NR	NR	Out	Pressure not relevant to features.
Deoxygenation	Wind and cables – All stages	S	S	Out	Sediment re-deposition within the MCZ will be negligible in the context of deoxygenation effects, sediment disturbance will occur over a negligible spatial / temporal scale.
Electromagnetic changes	Cables – Operation	U	U	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur. Any Electro-Magnetic Fields (EMF) associated with the cable will be restricted to within metres of the cable and does not have the potential to hinder the conservation objectives for the designated broad-scale habitat types in question.
Habitat structure changes – removal of substratum (extraction)	Wind – All stages Cables– Construction and decommissioning	S	S	Out	Project offshore ECC does not overlap with MCZ. Mo potential for direct impacts to occur.
Hydrocarbon & PAH contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.

Pressure	Stage of development	Subtidal coarse sediment	Subtidal sand	Screened In / Out	Justification
Introduction of light	Wind and cables - All stages	S	S	Out	Artificial light produced by the Project construction and decommissioning activities will be limited temporally and spatially.
Introduction of other substances (solid, liquid or gas)	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Introduction or spread of invasive non-indigenous species (INIS)	Wind and cables - All stages	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for project to spread INIS directly to MCZ.
Litter	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Nutrient enrichment	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar.

Pressure	Stage of development	Subtidal coarse sediment	Subtidal sand	Screened In / Out	Justification
					All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Penetration and/or physical disturbance of the substrate below the surface of the seabed, including abrasion	Wind and cables - All stages	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur.
Physical change (to another seabed type)	Wind and cables - All stages	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur.
Physical change (to another sediment type)	Wind and cables - All stages	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur.
Physical loss (to land or freshwater habitat)	Wind and cables - All stages	S	S	Out	No impacts on land or freshwater habitat within the MCZs will occur as a result of the Project activities.
Smothering and siltation rate changes (heavy)	Wind – All stages Cables – Construction	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.
Smothering and siltation rate changes (light)	Wind and cables - All stages	S	S	In	Potential for sediment disturbed by cable burial / maintenance / decommissioning activities to result in smothering and siltation rate changes within the MCZ.
Synthetic compound contamination (incl, pesticides, antifoulants, pharmaceuticals). Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.

Pressure	Stage of development	Subtidal coarse sediment	Subtidal sand	Screened In / Out	Justification
Temperature decrease	Cables - Operation	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur.
Temperature increase	Cables - Operation	S	S	Out	Project offshore ECC does not overlap with MCZ. No potential for direct impacts to occur.
Transition elements & organo-metal (e.g. TBT) contamination. Includes those priority substances listed in Annex II of Directive 2008/105/EC	Wind and cables - All stages	U	U	Out	Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency's Pollution Prevention Control Guidelines, or a CRA would be required as set out as part of the PEMP or similar. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan, which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout the project. Further details can be found within **Chapter 7.3 Marine Water and Sediment Quality** of the Scoping Report (SSE and Equinor, 2024). Given these best-practice measures for pollution control embedded into Project design, this pressure has been screened out.
Underwater noise changes	Wind and cables- All stages	NS	NR	Out	Pressure not relevant to features.
Visual disturbance	Wind and cables – All stages	NR	NS	Out	Pressure not relevant to features.
Water flow (tidal current) changes, including sediment transport considerations	Wind and cables – All stages	NS	NS	In	Potential for cable protection to be placed in the ECC, may result in changes to water flow.
Wave exposure changes	Wind – Operation	NS	NS	Out	Pressure only relevant to the physical presence of turbines. Only interaction between the Project and the MCZ is the Project's offshore ECC.

S = sensitive; NS = not sensitive; NR = not relevant; U = unknown

References

SSE Renewables and Equinor (2024). Dogger Bank D Offshore Wind Farm - Environmental Impact Assessment Scoping Report.

Taormina, B. *et al*. (2018). A review of potential impacts of submarine power cables on the marine environment: Knowledge gaps, recommendations and future directions. Renewable and Sustainable Energy Reviews, 96, pp.380–391. Available at: doi:10.1016/j.rser.2018.07.026.

Appendix B: Glossary

Term	Definition
Birkhill Wood Substation	A proposed new substation north of Hull and the onshore grid connection point for DBD identified through the Holistic Network Design process. Birkhill Wood substation will be developed and constructed by NGET and does not form part of DBD.
Construction Compounds	Areas set aside to facilitate the construction works for the onshore infrastructure.
DBD Array Area	The area within which the wind turbines, inter-array cables and Offshore Platform(s) will be located.
Deemed Marine Licence (DML)	A consent required under the Marine and Coastal Access Act 2009 for certain activities undertaken within the UK marine area, which may be granted as part of the Development Consent Order.
Development Consent Order (DCO)	A consent required under the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Environmental Impact Assessment (EIA) Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, which sets out the EIA process for assessing the likely significant effects of a project on the environment.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Evidence Plan Process (EPP)	A voluntary consultation process with technical stakeholders to encourage upfront agreement on the nature, volume and range of supporting evidence required to inform the EIA and Habitats Regulation Assessment (HRA) process.
Grid Connection	Electricity transmission network connection at Birkhill Wood Substation.
Habitat Regulations	As set out in the Planning Inspectorate's Advice Note 10 (Habitats Regulations Assessment relevant to nationally significant infrastructure projects) the following are covered by the term 'Habitats Regulations': the Conservation of Habitats and Species Regulations 2017 (as amended), and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) (for plans and projects beyond UK territorial waters (12 nautical miles). Such regulations set out the requirement for Competent Authorities to consider whether a development will have a likely significant effect (LSE) on a European site (now known as National Network Sites). Where LSE are likely and a project is not directly connected with or necessary to the management of that site(s), an appropriate assessment (AA) is required of the implications of the plan or project for that site(s) in view of its conservation objectives.
Holistic Network Design (HND)	A strategic and coordinated approach to planning grid connections and developing offshore-onshore transmission infrastructure for offshore wind farms in the UK led by National Grid Electricity System Operator. The Project falls within the scope of the Holistic Network Design process.
Horizontal Directional Drilling (HDD)	A type of trenchless cable or duct installation method (see Trenchless Techniques).
Impact	An impact is a change resulting from an activity associated with the Project, defined in terms of magnitude.
Inter-Array Cables	Cables which link the wind turbines to the Offshore Platform(s).
Landfall Area	The point on the coastline at which the offshore export cables are brought onshore, connecting to the onshore cables at the transition joint bays above Mean High Water Springs.
Link Boxes	Underground structures housing electrical equipment located along the onshore export cable corridor, alongside each jointing bay.
Mean High Water Springs (MHWS)	The average throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	The average throughout the year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Micro-Siting	A mitigation measure that involves siting infrastructure to avoid or minimise impacts to receptors.
Mitigation	Measures identified to avoid, minimise, offset or compensate impacts to receptors, which can be embedded within the design (primary and tertiary mitigation) or identified as additional measures through the EIA process (secondary process) to reduce and / or eliminate any likely significant effects.
National Site Network	A network of core breeding and resting sites for rare and threatened species and habitats on land and at sea in the UK, adapted from the European Union's Natura 2000 ecological network post-Brexit. National Site Network sites are formerly known as European sites.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cables will be located, extending from the DBD Array Area to Mean High Water Springs at the landfall.
Offshore Export Cables	Cables which bring electricity from the Offshore Platform(s) to the transition joint bays at landfall.
Offshore Hybrid Asset (OHA)	A network infrastructure that combines transmission assets associated with offshore wind generation with interconnectors to increase coordination and enable the efficient use of renewable energy.

Term	Definition
Offshore Platform(s)	Fixed structures located within the DBD Array Area that contain electrical equipment to aggregate and, where required, convert the power from the wind turbines, into a more suitable voltage for transmission through the export cables to the onshore converter station(s). Such structures could include (but are not limited to): Offshore Converter Station(s), Collector Platform(s) and Accommodation Platform(s). This also includes a Switching Station platform to enable coordination as an Offshore Hybrid Asset. This combines infrastructure for offshore electricity generation with an interconnector to facilitate the transfer of electricity generated by the Project between different countries.
Offshore Scoping Area	The boundary in which all potential offshore infrastructure associated with the Project will be located, which extends seaward of Mean High Water Springs.
Onshore Converter Station(s) - OCS(s)	A compound, or compound(s), containing electrical equipment required to stabilise and convert electricity generated by the wind turbines and transmitted by the export cables into a more suitable voltage for grid connection into Birkhill Wood Substation.
Onshore Converter Station (OCS) Zone	The area within which the Onshore Converter Station(s) and Energy Storage and Balancing Infrastructure (ESBI) will be located in the vicinity of Birkhill Wood Substation.
Onshore Export Cable Corridor (ECC)	The area within which the onshore export cables will be located, extending from the landfall to the Onshore Converter Station Zone and Birkhill Wood Substation.
Onshore Export Cables	Cables which bring electricity from the transition joint bays to the Onshore Converter Station(s) and onwards to the grid connection point at Birkhill Wood Substation.
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The project design envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Safety Zones	Safety zones as prescribed under the Energy Act 2004 exist as 'no-go' areas around an Offshore Renewable Energy Installation (OREI). Safety Zones are temporary in nature (except in exceptional circumstances) and as a consequence are of short duration and usually cover construction, major maintenance and decommissioning.
Scour Protection	Protective materials used to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow.
Study Areas	A geographical area and / or temporal limit defined for each topic within the EIA to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor.

Term	Definition
The Project	The Dogger Bank D Offshore Wind Farm (DBD) Project
Transition Joint Bays (TJB)	Underground structures at landfall that house the joints between the offshore and onshore export cables.
Trenching	Open cut method for cable or duct installation.
Trenchless Techniques	Trenchless cable or duct installation methods used to bring offshore export cables ashore at landfall, avoid crossing major onshore obstacles such as roads, railways and watercourses and where trenching may not be suitable.
Wind Turbines	Power generating devices located within the DBD Array Area that convert kinetic energy from wind into electricity.

Appendix C: List of Abbreviations

Term	Definition
BAS	Burial Assessment Study
BNG	Biodiversity Net Gain
CBRA	Cable Burial Risk Assessment
CRA	Chemical Risk Assessment
DBA	Dogger Bank A
DBB	Dogger Bank B
DBC	Dogger Bank C
DBD	Dogger Bank D
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DML	Deemed Marine Licence
ECC	Export Cable Corridor
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
EPP	Evidence Plan Process
ESO	Electricity System Operator
ETG	Expert Topic group
HND	Holistic Network Design
HPF	Hydrogen Production Facility
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MarESA	Marine Evidence based Sensitivity Assessment
MarLIN	Marine Life Information Network
MCAA	Marine and Coastal Access Act
MCZ(A)	Marine Conservation Zone (Assessment)
MEEB	Measures of Equivalent Environmental Benefit
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MPI	Multi-purpose Interconnector
NGET	National Grid Electricity Transmission
NPS	National Policy Statement
OCS	Onshore Converter Station
OFGEM	Office of Gas and Electricity Market
OHA	Offshore Hybrid Asset
ONTR	Offshore Network Transmission Review
PEMP	Project Environmental Management Plan
SAC	Special Area of Conservation
SACO	Supplementary Advice on Conservation Objectives
TJB	Transition Joint Bay
TTS	Temporary Threshold Shift
UXO	Unexploded Ordnance
ZOI	Zone of Influence

Annex 2 – Biotope Sensitivity Ranges

361. The impact assessment presented in the MCZA uses Natural England's AoO for the Holderness Inshore and Holderness Offshore MCZs in relation to the sensitivity of the biotopes associated with the protected features of the MCZs. The definition of sensitivity used by Natural England's Conservation Advice Packages are based on Marine Life Information Network (MarLIN's) Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters *et al.*, 2018). MarESA determines sensitivity based on resistance (tolerance) and resilience (recoverability) which are defined as:

- Resistance: the likelihood of damage (termed intolerance or resistance) due to a pressure; and
- Resilience: the rate of (or time taken for) recovery (termed recoverability, or resilience) once the pressure has abated or been removed.

362. Descriptions of Resistance and Resilience are presented in **Table 1**.

Table 1 Resistance and Resilience Scale Definitions

Level	Description
Resistance (Tolerance)	
None	Key functional, structural, characterizing species severely decline and / or physicochemical parameters are also affected e.g. removal of habitats causing a change in habitats type. A severe decline / reduction relates to the loss of 75% of the extent, density or abundance of the selected species or habitat component e.g. loss of 75% substratum (where this can be sensibly applied).
Low	Significant mortality of key and characterizing species with some effects on the physicochemical character of habitat. A significant decline / reduction relates to the loss of 25% to 75% of the extent, density, or abundance of the selected species or habitat component e.g. loss of 25% to 75% of the substratum.
Medium	Some mortality of species (can be significant where these are not keystone structural / functional and characterizing species) without change to habitats relates to the loss
High	No significant effects on the physicochemical character of habitat and no effect on population viability of key / characterizing species but may affect feeding, respiration and reproduction rates.
Resilience (Recovery)	
Very Low	Negligible or prolonged recovery possible; at least 25 years to recover structure and function.
Low	Full recovery within 10 to 25 years.

Level	Description
Medium	Full recovery within 2 to 10 years.
High	Full recovery within 2 years.

363. The MarESA assessment of sensitivity is guided by the presence of key structural or functional species / assemblages and / or those that characterize the biotope groups. Physical and chemical characteristics are also considered where they structure the community. MarESA uses a matrix approach to determine sensitivity based on both recovery and resilience. The sensitivity matrix used in the impact assessment in the MCZA based on MarESA is presented in **Table 2**.

Table 2 Sensitivity Matrix

		Resistance			
		None	**Low**	**Medium**	**High**
Resilience	**Very Low**	High	High	Medium	Low
	Low	High	High	Medium	Low
	Medium	Medium	Medium	Medium	Low
	High	Medium	Low	Low	Negligible

Sensitivity Assessment

364. **Table 3** sets out the MarESA sensitivity assessment of biotopes associated with the protected features of the Holderness Inshore MCZ obtained from Natural England's AoO, which were used in the impact assessment in the MCZA. The Holderness Offshore MCZ has not been assessed in the same way given its proximity falling outside of the MCZ.

Table 3 Sensitivity ranges for the potential biotopes associated with the Holderness Inshore MCZ protected features, in relation to the pressures screened into the Stage 1 assessment. NI = no interaction between receptor and the pressure therefore sensitivity range is not provided; NR = Not relevant, as determined by Natural England's AoO; NA = Not Assessed by Natural England (Natural England, 2021).

Pressure (Scoping)	Pressure (AoO)	Spurn Head (subtidal)	Intertidal sand and muddy sand	Subtidal coarse sediment (A5.1)	Subtidal mixed sediments (A5.4)	Subtidal mud (A5.3)	Subtidal sand (A5.2)	High energy circalittoral rock (A4.1)	Moderate energy circalittoral rock (A4.2)
Temporary physical disturbance / temporary habitat loss	Abrasion / disturbance of the substrate on the surface of the seabed	NA	NA	Not sensitive - Low	Medium	Low – Medium	Not sensitivity - Low	NA	Low - Medium
	Habitat structure changes – removal of substratum (extraction)	NA	NA	Medium	Medium	Medium – High	Medium	NA	High
	Penetration and / or disturbance of the substratum below the surface of the seabed	NA	NA	Not sensitive – Medium	Medium	Low – High	Low	NA	Medium – High
Habitat loss / alteration	Physical change (to another seabed type)	NA	NA	High	High	NA	High	NA	High
	Physical change (to another sediment type)	NA	NA	High	Not sensitive – High	High	High	NA	NA
	Physical loss (to land or freshwater habitat)	NA	NA	High	High	High	High	NA	High
Increased SSC	Smothering and siltation rate changes (light)	NA	NA	Not sensitive – Low	Not sensitive – Medium	Not sensitive – Low	Not sensitive – Low	NA	Not sensitive – Medium
	Changes in suspended solids (water clarity)	NA	NA	Not sensitive – Low	Not Sensitive	Not sensitive – Low	Not sensitive – Low	NA	Not sensitive – Low
Invasive Species	Introduction or spread of invasive non-native species (INNS)	NA	NA	Not Sensitive – High	Medium	Not Sensitive – Medium	Not Sensitive – Medium	NA	Not Sensitive - High