DOGGER BANK D WIND FARM

Preliminary Environmental Information Report

Report to Inform Appropriate Assessment (Part 2 of 3)

Document Reference No: 5.3 **Date:** June 2025 **Revision:** V1

sse Renewables equinor

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Appendix A.2 Dogger Bank D HRA Screening and HRA Addendum Reports

Habitats Regulations Assessment Screening Report

Dogger Bank D Offshore Wind Farm

19th December 2023

Revision: 02

Document reference number: LF000016-CST-DOG-REP-0003

Company:	SSE Renewables and Equinor	**Asset:**	Development		
Project:	Dogger Bank D Offshore Wind Farm	**Sub Project / Package:**	Consents		
Document Title or Description:	Habitats Regulations Assessment Screening Report				
Document Number:	LF000016-CST-DOG-REP-0003	**Contractor Reference Number:**	PC3991-RHD-ZZ-ZZ-RP-PM-0006		
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Rev No.	**Date**	**Status / Reason for Issue**	**Author**	**Checked by**	**Approved by**
00	09 / 06 / 2023	First Draft	SS	AP	LT / RG
0.1	04 / 09 / 2023	Second Draft	SS / PT	CM	LT / RG
01	27 / 10 / 2023	Third Draft	SS / PT	PT	LT / RG
02	19 / 12 / 2023	Final	SS / PT	PS	RH

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Glossary

Term	Definition
Areas of Search	Broad geographical areas considered during the site selection process for the project infrastructure.
Array Area	Refers to the area where the generation assets (wind turbines) will be located. The Array Area is common to all Electrical Connection Opportunities.
Array Cables	The cables which link the wind turbines to the offshore substation / collector platform(s).
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.
Dogger Bank D Wind Farm	The Dogger Bank D Wind Farm Project including the generation infrastructure and three potential Electrical Connection Opportunities to utilise the energy produced.
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, which sets out the Environment Impact Assessment (EIA) process for assessing the likely significant effects of a project on the environment.
Electrical Connection Opportunities	Refers to the three opportunities being considered and presented for Dogger Bank D Wind Farm including; the Hydrogen Opportunity, the National Grid Opportunity, and the Hybrid Opportunity.
Greenhouse Gases	Gases such as carbon dioxide and methane that absorb infrared radiation and trap heat in the atmosphere, an increase of which due to human activity has led to climate change. The term 'Carbon emissions' is commonly used as a shorthand for referring to greenhouse gas emissions.
Habitats 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.
Horizontal Direct Drilling (HDD)	A trenchless method of installing underground cables which ensures minimal disturbance to the ground surface.
Horizontal Directional Drilling	A trenchless method of cable installation where a cable is pulled through into a small-bore tunnel used to bring offshore export cables ashore at landfall and to avoid crossing important features.

Term	Definition
HRA Screening Area	The area on which the HRA Screening exercise is based. This encompasses the broadest spatial area for the Project (i.e. the Project Area) including all Electrical Connection Opportunities plus the Zones of Influence specific to each receptor / qualifying feature.
Hybrid Opportunity	Refers to the opportunity to connect to the electrical transmission system via a mixture of the National Grid and Hydrogen Opportunities.
Hydrogen Opportunity	Refers to the opportunity to produce hydrogen from the energy generated by Dogger Bank D.
Hydrogen Production Facility Site	The area(s) in the East Riding of Yorkshire where a Hydrogen Production Facility and associated infrastructure are proposed to be located.
Impact	An impact is a change resulting from an activity associated with the Project, defined in terms of magnitude.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity, defined in terms of significance.
Inter-Array Cables	Cables which link the wind turbines to the Offshore Substation Platform.
Jointing Bay	Underground structures that are constructed at regular intervals along the onshore export cable corridor to join sections of cable and facilitate the installation of cables into the buried ducts.
Landfall	The location where the offshore export cables come ashore on the East Yorkshire coast, which is yet to be selected.
Landfall Electrical Infrastructure	Landfall electrical infrastructure, including Horizontal Directional Drilling (HDD) for the offshore export cables, construction of the Transition Joint Bay (TJB) and associated temporary construction compound.
Link Boxes	Below ground structures housing electrical equipment located along the onshore export cable corridor, alongside each jointing bay.
Macro-Tidal	Tidal range over 4m.
Mean High Water Springs	The highest level reached by the sea at high tide during mean high water spiring tide, which is determined by averaging throughout the year, the heights of two successive high waters during a 24-hour period in each month when the range of the tide is at its greatest.
National Grid Opportunity	Refers to the opportunity to connect to the electrical transmission system via a connection into the UK national grid.
National Site Network	A network of core breeding and resting sites for rare and threatened species and habitats within the UK, adapted from the European Union's Natura 2000 ecological network post-Brexit.

Term	Definition
Onshore Project Area	The area within the East Riding of Yorkshire associated with the Dogger Bank D Offshore Wind Farm (DBD) Project for the Hydrogen Opportunity, which extends landward of Mean High Water Springs. This includes the area encompassing all associated infrastructure from landfall to the onshore Hydrogen Production Facility, comprising all permanent infrastructure areas, temporary work areas and mitigation areas. The Onshore Project Area will be refined following consultation and the engineering review process and defined within the Preliminary Environmental Information Report / Environmental Statement.
Offshore Collector Platform	The Offshore Collector Platform would collect energy from several wind farms in the wider area for further transmission onwards to a yet-to-be-determined landfall location and grid connection point.
Offshore Electrical Infrastructure	Offshore electrical infrastructure, including Offshore Substation Platform (OSP) foundations, inter-array cables and offshore export cables in the export cable corridor, including the assembly, laying and commissioning of such infrastructure.
Offshore Export Cable Corridor	This is the area which will contain the offshore export cables between the Array Area and the Transition Joint Bays (TJB).
Offshore Export Cables	Cables which bring electricity from the Offshore Substation Platform to the Offshore Collector Platform for the National Grid Opportunity and to the Transition Joint Bay at landfall for the Hydrogen Opportunity.
Offshore Project Area	The Area associated with the Project, including all Electrical Connection Opportunities comprising all permanent offshore infrastructure area, temporary work areas and mitigation areas which extends seaward of Mean High Water Springs. The Offshore Project Area be refined through consultation and the engineering review process and defined within the Preliminary Environmental Information Report / Environmental Statement.
Offshore Substation Platform	The Offshore Substation Platform will aggregate and convert power from the wind turbines into a more suitable voltage for transmission via the offshore export cables.
Project Design Envelope	A range of design parameters defined to enable the identification and assessment of likely significant effects arising from the worst case scenario. The Project Design Envelope incorporates flexibility where required and will be further refined where possible during the EIA process and includes details of parameters for each Electrical Connection Opportunity.
Project Worst Case Scenario	The Project Worst Case Scenario will be based on considerations of the maximum parameters of infrastructure requirements for all three Project Electrical Connection Opportunities.
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 Area	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.

Term	Definition
Synthetic Compounds	Pre-existing chlorinated compounds at risk of disturbance within the benthos including polychlorinated biphenols (PCBs), dichlor-diphenyl-trichloroethane (DDT) & 2,3,7,8-tetrachlorodibenzo(p)dioxin (2,3,7,8-TCDD) can all be highly persistent and often very toxic.
The Applicant	SSE Renewables and Equinor.
Transition Elements And Organo-Metals	For marine sediments the main elements of concern are Arsenic, Cadmium, Chromium, Copper, Mercury, Nickel, Lead and Zinc Organo-metallic compounds such as butyl tins (Tributyltin and its derivatives) can all be highly persistent.
Transition Joint Bay	An underground structure at landfall that houses the joint between the offshore and onshore export cables.
Trenching	Open cut method for cable or duct installation.
Wind Turbines	Power-generating devices located within the Array Area that convert kinetic energy from wind into electricity.
Zone Of Influence	A precautionary buffer used to screen in potential effects which could occur to European designated site habitats and any functionally linked land which indirectly supports qualifying features of sites. This may vary depending on the qualifying feature of focus.

Part 1: Introductory Chapters

1 Introduction

1.1 Overview

1. As part of its third offshore wind licencing round in 2008, The Crown Estate designated 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 United Kingdom (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. In 2015, development consent was granted for all four project areas.

2. 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, being developed as a joint venture between 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.

3. SSE Renewables and Equinor (hereafter referred to as 'the Applicant') have identified an opportunity to maximise the capacity of the third phase of the Dogger Bank Wind Farm, namely DBC, such that additional capacity 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 the Dogger Bank D (DBD) Wind Farm, hereafter referred to as 'the Project'.

1.2 Habitats Regulations Assessment

4. This document has been produced to inform the screening stage of the Habitats Regulations Assessment (HRA) process for the Project. It provides information to enable the screening of the Project with respect to its potential to have a likely significant effect (LSE) on those features designated under the European Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') and Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') (hereafter 'European sites').

5. The scope of this document covers all offshore and onshore relevant European sites and relevant qualifying interest features alongside any potential effects from infrastructure. European sites are proposed to be 'screened out' where no LSE from the Project is predicted. Where LSE cannot be ruled out at this stage the European sites are 'screened in' for further assessment. The effects considered within this report are aligned with the DBD Scoping Opinion (The Planning Inspectorate, 2023).

6. The Habitats Regulations require that a HRA must be carried out on all plans and projects that are likely to have significant effects on European sites, which include Special Areas of Conservation (SACs), candidate SACs (cSACs), Sites of Community Importance (SCI), Special Protection Areas (SPAs) and as a matter of policy, possible SACs (pSACs), potential SPAs (pSPAs) and Ramsar Sites (listed under the Ramsar Convention on Wetlands of International Importance) where also designated as a European site.

2 Project Description

2.1 Electrical Connection Opportunities

7. The Applicant is currently developing a number of connection opportunities for how the electricity from the Project will be used. These opportunities are the Hydrogen Opportunity, the National Grid Opportunity, or a hybrid of the two (i.e. Hybrid Opportunity). Collectively, these opportunities are referred to throughout this report as the Electrical Connection Opportunities. The worst case parameters across the connection opportunities have been used in the development of the screening report (see **Section 2.5**).

8. **Table 2-1** identifies the infrastructure requirements for each Electrical Connection Opportunity. The worst-case scenario covers the maximum design parameters for all electrical connection opportunities (see **Figure 2-1**).

9. The National Grid Opportunity has been identified through the National Grid's Holistic Network Design process and would see power from Dogger Bank D connect to a point offshore, from which National Grid will provide an onward connection to shore, as part of the outcomes of the Offshore Transmission Network Review. The National Grid Opportunity includes the Array Area infrastructure, the offshore infrastructure relating to electricity transmission and has the potential to include the offshore collector platform.

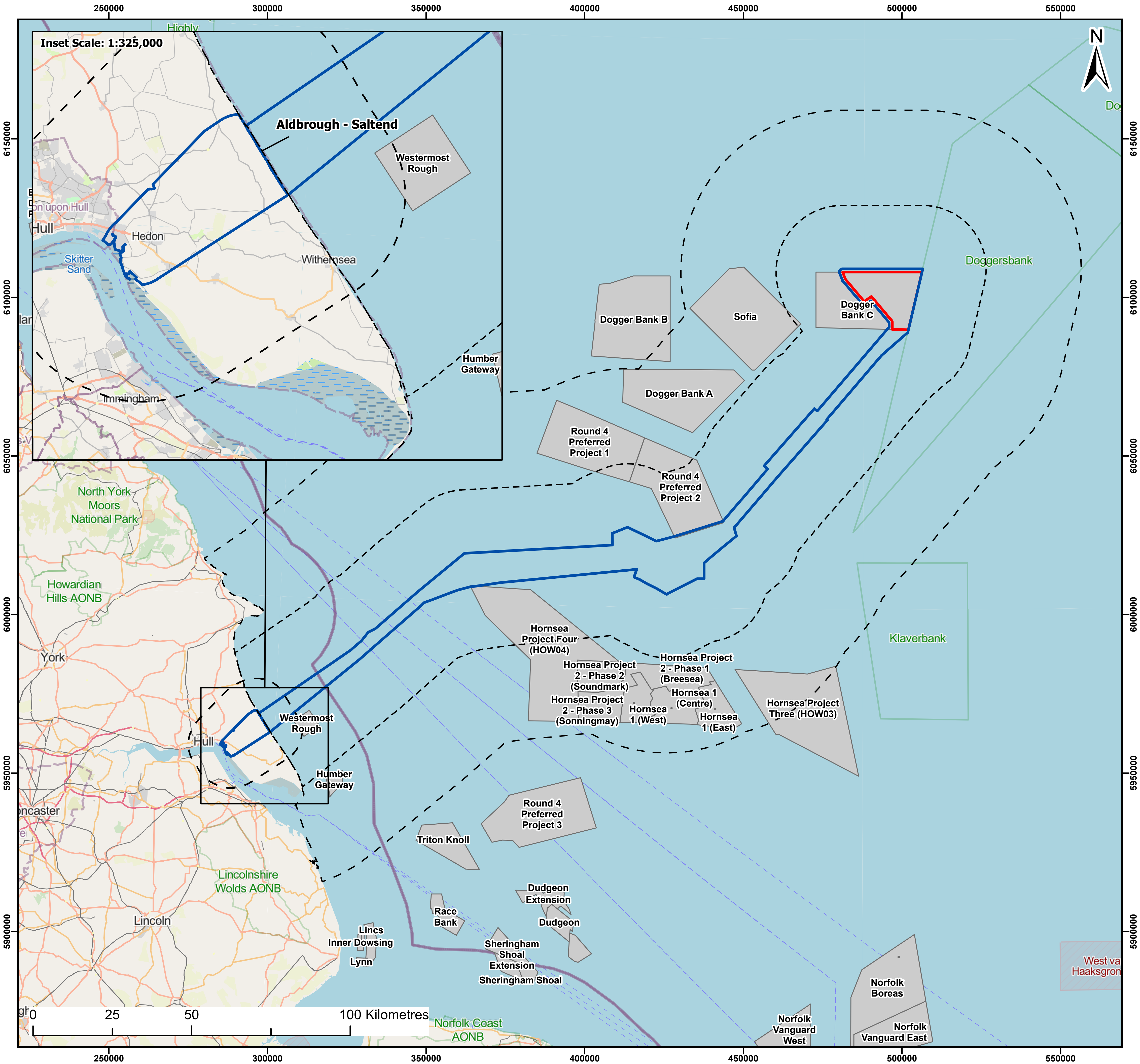
10. The Hydrogen Opportunity includes the Array Area infrastructure; the offshore infrastructure relating to electricity transmission; the onshore infrastructure relating to electricity transmission to a Hydrogen Production Facility (HPF); and the onward pipeline connection to the hydrogen network or storage. The HPF would utilise electricity produced by the project to generate green hydrogen at a dedicated electrolysis facility in the Humber region. The facility, if developed, could become the UK's largest green hydrogen project and, subject to supportive Government policy and supply chain alignment, could significantly contribute to the UK Government's 2030 green hydrogen ambitions.

11. The Hybrid Opportunity includes elements associated with both the national grid opportunity and the Hydrogen Opportunity. Where elements are shared these are highlighted in **Table 2-1**.

12. The HRA Screening exercise for the Project has been undertaken using a worst-case scenario approach. This includes ensuring that all electrical connection opportunities are included in this report to enable full consideration as part of the Report to Inform Appropriate Assessment (RIAA).

Table 2-1: Infrastructure Requirements for Each Electrical Connection Opportunity

Infrastructure		Electrical Connection Opportunity		
		Hydrogen	National Grid	Hybrid
Offshore Array	Turbines	✓	✓	✓
Offshore Electrical Infrastructure	Inter-array cables	✓	✓	✓
	Offshore Platform(s) in offshore array	✓	✓	✓
	Offshore Export Cable	✓	✓	✓
Onshore Electrical Infrastructure	Landfall Electrical Infrastructure	✓	x	✓
	Onshore Converter Station	✓	x	✓
	Onshore Export Cable	✓	x	✓
Onshore Hydrogen Infrastructure	Hydrogen production facility	✓	N/A	✓



Legend:

- Dogger Bank D Array Area
- Project Area
- The Crown Estate Lease / Agreement Area
- Onshore Project Area ZoI (10km)
- Annex I Offshore Sites ZoI (20km)
- Annex II Migratory Fish ZoI (50km)

Source: © Haskoning DHV UK Ltd, 2023; © The Crown Estate, 2023; © OpenStreetMap (and) contributors, CC-BY-SA

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Project Area

Figure:	2-1	Drawing No:	PC3991-RHD-ZZ-ZZ-DR-Z-0084		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
03	23/11/2023	AB	SS	A3	1:1,200,000
02	02/10/2023	GC	SS	A3	1:1,200,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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2.2 Offshore Infrastructure

13. At this early stage in the development of the Project, the project description is indicative. Subsequent to this screening stage, the project and its description will develop throughout the Environmental Impact Assessment (EIA) process and a final description will be provided in the Environmental Statement (ES), which will form part of the Development Consent Order (DCO) application.

14. The Project's HRA will be based on a design envelope approach in accordance with the National Policy Statement (NPS) EN-3 (paragraph 2.8.64) (Department for Energy Security & Net Zero, 2023) 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 tip height and rotor swept area;*
- *The cable type and precise cable or offshore transmission route; and*
- *The exact locations of offshore and / or onshore substations."*

15. The design envelope will therefore provide maximum and minimum parameters where appropriate for each electrical connection opportunity to ensure the worst-case scenario can be quantified and assessed in the HRA. 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*".

16. The following sections provide an overview of the current understanding of the potential infrastructure required for the Project, including indicative parameters.

2.2.1 Wind Turbines

17. 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 decision made post-consent. Based on the likely wind turbines available at the time DBD enters construction (14 to 27+ Megawatts (MW)), it has been assumed at this screening stage that up to a maximum of 128 wind turbines would be deployed if wind turbines at the lower end of this range are selected, with fewer required if the more powerful turbines are selected. The power rating of the wind turbines is not in itself a

consenting parameter but presented indicatively in this HRA Screening Report to assist the reader with understanding the Applicant's scope for the Project.

18. 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 Highest Astronomical Tide (HAT) of the turbine blades will be 22m, subject to further project design refinement. At present, the expected maximum rotor diameter is 340m.

19. The overall layout of the wind turbines within the wind farm site will be confirmed post-consent, informed by site investigation works, impact assessment and wind resource modelling, and 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 worst-case scenario for HRA screening purposes – the key consideration is instead the maximum area over which development could occur.

2.2.2 Foundations

20. Foundation designs will be informed by several factors including environmental characteristics such as ground conditions, water depths and metocean conditions, and techno-economic parameters including the size of wind turbines selected, and supply chain constraints. The findings of the EIA and HRA will also be used to refine the foundation designs. It is possible that more than one type of foundation could be used across the Array Area. The following foundation design opportunities are currently being considered:

- Monopiles;
- Elevator platform;
- Suction buckets jacket;
- Piled jackets; and
- Gravity bases (only for offshore platforms).

2.2.3 Offshore Electrical Infrastructure

21. Worst-case offshore electrical infrastructure will include the following:

- Array cabling;
- Up to three offshore platforms; and
- Export cabling to bring the electricity from the Array Areas to the landfall.

22. The location and length of the array cabling will be determined post consent, subject to the final layout of the wind turbines, up to a maximum offshore export cable length of 310km with up to approximately 400km of inter-array cabling. The electricity will be transmitted to shore from the Array Area by offshore export cables which will make landfall along the Holderness Coast in the East Riding of Yorkshire (see **Section 2.3** below).

23. The export cables will be High Voltage Direct Current (HVDC) and it is expected that there could be up to six export cables laid in the offshore Export Cable Corridor (ECC) for all Electrical Connection Opportunities. Small fibre optic cables may also be installed alongside the export cables for cable monitoring and communication with the Wind Farm, these will be bundled with the export cables.

24. Each export cable will be installed in a separate trench and protected in line with good industry practice. The export cables will be installed in separate installation campaigns as the installation vessel can only install one cable at a time. The method of installation of offshore cables will depend on the seabed conditions along the cable route, however the best methodology for installation, along with appropriate burial depths will be determined by a Burial Assessment Study (BAS) and a Cable Burial Risk Assessment (CBRA). The purpose of cable burial is to ensure that the cables are protected from damage by external factors. Foundation types (and required scour protection) will be determined during detailed design.

2.3 Landfall

25. With regard to the Onshore and Offshore Project Areas, the electricity will be transmitted to shore from the Array Area by offshore export cables which will make landfall along the Holderness Coast. The preferred landfall location will be subject to further site selection considering relevant consultation feedback, the collection of further environmental information and the evolution of the engineering design.

26. Dependant on the engineering constraints of any proposed landfall, different cable installation methodologies will be considered. It is assumed that suitable technologies will include trenchless solutions such as Horizontal Directional Drilling (HDD). 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.

27. The HDD is 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 Lowest Astronomical Tide (LAT). The length of the HDD will also depend upon factors such as seabed topography, shallow geology / soil conditions, selected cable installation methodology, coastal erosion and environmental constraints.

28. The offshore and onshore export cables will be jointed in an onshore Transition Joint Bay (TJB) with multiple jointing bays depending on the number of cable circuits. 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.

2.4 Onshore Infrastructure

2.4.1 Onshore export cables

29. The onshore export cable will be installed via open cut trenching methods and, where required, using trenchless crossings (e.g. HDD or other trenchless technology). A maximum temporary construction corridor of 100m is assumed for the onshore ECC for up to a maximum onshore export cable length of 18km. This width accounts for the cable trenches, haul roads, topsoil storage, drainage, etc.

30. Jointing bays will be used to pull the cables into the ducts, preinstalled during the HDD process, and to join the cable lengths to each other. Link boxes are used for earthing cables and will be installed inside a protective concrete chamber. The jointing bays are subsurface structures, while the link boxes will require access (for inspections) from the surface during the operation phase and will therefore be located at or above ground level. At the jointing location, there will be one link box per joint.

2.4.2 Hydrogen Production Facility infrastructure

31. As part of the Hydrogen and Hybrid Opportunities, there will be production of electrolytic hydrogen at an onshore Hydrogen Production Facility with a direct link to the DBD wind farm and connecting into the wider hydrogen value chain, currently under development in the Humber. There is significant potential for decarbonising heavy industry and transport applications in this region, and a hydrogen project of this size would contribute substantially to the UK's 2030 target of at least 5 Gigawatts (GW) of green hydrogen.

32. The HPF will be located on a site with an area of up to 55 hectares (ha) (inclusive of the required construction area) within the East Riding of Yorkshire, within the Onshore Project Area shown in **Figure 2-1**. The HPF will indicatively comprise the following key parts:

- A hydrogen production system including:
  - Water electrolysis stacks;
  - Gas / liquid separators;
  - Hydrogen drying units;
  - Hydrogen compression, purification and metering system;
  - Cooling system; and

  - Hydrogen / oxygen venting as required.
- Water supply and treatment system including:
  - Water supply / abstraction (opportunities under consideration include wastewater from industry, groundwater and marine waters);
  - Wastewater discharge point(s) (including potential discharge to marine waters); and
  - Potential desalinisation plant if abstraction is from marine waters.
- Hydrogen export infrastructure which may include:
  - Any connection required to a proposed wider hydrogen distribution network (with any such pipelines included in the Project up to the connection point itself); and / or
  - Connection to any hydrogen storage facility (with any such pipelines included in the Project, up to the connection point itself).
- Power infrastructure potentially comprising of:
  - An Onshore Converter Station / Substation;
  - Auxiliary grid connection(s) for essential site services;
  - Energy storage and back-up power equipment with opportunities under consideration including battery storage, supercapacitors, inverter systems, on-site photo-voltaic systems, or a back-up power station or fuel cell;
  - Safety and control systems; and
  - Utility and telecommunication equipment.

33. Design of the HPF will continue through the pre-application phase due to the novel nature of the Hydrogen infrastructure associated with the Hydrogen and Hybrid Opportunities. Detailed design studies and site selection are ongoing, which will feed into the EIA process at key development points.

2.5 Summary of Indicative Project Parameters

34. The parameters, as shown in **Table 2-2**, 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 with the ES based on Maximum Design Scenarios, which will be set out in the ES.

Table 2-2: Key Indicative Parameters for the Worst Case Scenario (Infrastructure included in all Electrical Connection Opportunities)

Feature	Indicative Parameter
General	
Distance to shore from the Array Area (at its closest point)	210km
Array Area	262km^2
Array Area water depths	21 to 35m at LAT
Wind Turbines	
Maximum number of wind turbines	128
Maximum wind turbine rotor diameter	340m
Minimum blade clearance	22m above HAT
Wind turbine foundation opportunities under consideration	Potential foundation types include monopiles, piled jackets and suction bucket jackets.
Scour protection for foundations	Potential opportunities include protective aprons, mattresses (concrete or rock-filled bags), flow energy dissipation (frond) devices and rock and gravel placement.
Platforms	
Maximum number of platforms	Maximum of three offshore platform structures (based on all Electrical Connection Opportunities)
Platform foundation opportunities under consideration	Potential foundation types include monopiles, suction bucket jackets, piled jackets, elevator platform and gravity bases.
Scour protection for foundations	Potential opportunities include protective aprons, mattresses (concrete or rock-filled bags), flow energy dissipation (frond) devices and rock and gravel placement.
Inter-Array Cables	
Maximum total inter-array cable length	Up to approximately 400km.
Offshore Export Cables	
Electrical current	HVDC

Feature	Indicative Parameter
Maximum number of offshore export cables	Maximum of six cables. Each export cable is installed in a separate trench, with each cable bundled with a fibre optic cable.
Offshore export cable length	Approximately 310km.
Landfall	
Number of Horizontal Directional Drilling (HDD) exit pits	Up to an estimated six HDD exit pits.
Transition Joint Bays (TJB)	A single excavation (transition joint bay) at landfall, with multiple jointing bays depending on the number of circuits. One jointing bay per circuit.
Proposed landfall installation method	HDD or open cut trenching.
Onshore Infrastructure	
Cable installation	Open trenching methods, where trenchless techniques such as HDD are not suitable.
Onshore export cable length	Up to approximately 18km.
Maximum construction corridor width	100m.
Estimated onshore Hydrogen Production Facility	c. 55ha (subject to final design).

3 The Habitats Regulations

3.1 Legislative context

35. The Conservation of Habitats and Species Regulations 2017 (2017 No. 1012) (as amended) and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (2017 No. 1013) (as amended) are the principal pieces of secondary legislation which, prior to the UK's departure from the European Union (EU), transposed the terrestrial and offshore marine aspects of the EU Habitats Directive (Council Directive 92/43/EEC) and certain elements of the EU Wild Birds Directive (Directive 2009 /147/EC) into the domestic law. Together, these regulations are collectively known as the "Habitats Regulations". The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (2019 No. 579) set out the changes that apply now that the UK has left the European Union. These confirmed that:

- All protected sites and species retain the same level of protection; and
- Among other things, the requirement for HRA to be undertaken continues to apply.

36. Unless the UK government implements further legislative changes which may affect the HRA process[1], the obligations, process and terminology of the Habitats Regulations will, for the purposes of this report, remain as set out in existing legislation and regulations. The role of the European Commission (EC) is now taken by UK Ministers.

3.1.1 European Sites (Post EU Exit)

37. The Europe-wide network of nature conservation areas that are the subject of the HRA process was established under the Habitats Directive. The Habitats Directive establishes a network of internationally important sites, designated for their ecological status. For EU member states (and traditionally for the UK), SACs are designated under the Habitats Directive and promote the protection of flora, fauna and habitats. SPAs are designated under the Birds Directive to protect rare, vulnerable and migratory birds. European sites located within an EU Member State combine to create a Europe-wide network of designated sites (the Natura 2000 network) and may be referred to as Natura 2000 Sites.

38. Following the UK's departure from the EU on 31 December 2020, the UK is no longer an EU Member State. However, through the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 (the "EU Exit Regulations") the HRA process implemented under the Habitats Regulations continues to apply, subject only to minor changes. These changes are considered to have no material implications on the

[1] Energy Security Bill factsheet: Offshore wind environmental improvement package - GOV.UK (www.gov.uk)

requirement or process for a HRA for the Project. This report will hereafter refer to the 'Habitats Regulations' as including any changes enacted by the EU Exit Regulations.

39. European sites located within the UK are no longer part of the Natura 2000 network (nor Natura Sites) but instead combine to form the UK's "National Site Network". Hereafter, sites within the UK and the EU are both referred to as European sites. The National Site Network comprises European sites in the UK that already existed (i.e., were established under the Nature Directives) on 31st December 2020 (or proposed to the EC before that date) and any new sites designated under the Habitats Regulations under an amended designation process.

40. Note that Ramsar sites are not included within the National Site Network but are still included within this HRA as they remain protected in the same way as SACs and SPAs.

3.1.2 The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

41. The Ramsar Convention (United Nations, 1971) was adopted in 1971 and ratified by the UK in 1976. It provides an international mechanism for protecting sites of global importance and is thus of key conservation significance, covering all aspects of wetland conservation. The Convention has three main uses:

- The designation of wetlands of international importance as Ramsar Sites;
- The promotion of the wise use of all wetlands in the territory of each country; and
- International co-operation with other countries to further the wise use of wetlands and their resources.

42. The criteria for assessing a site for designation as a Ramsar site include whether or not the wetland supports 20,000 water birds and / or supports 1% of the individuals in a population of one species or subspecies of water birds.

43. UK Government policy affords the same protection to Ramsar sites as European designations such as SPAs and SACs, known collectively as National Site Network sites in the UK. The UK has generally chosen to underpin the designation of its Ramsar sites through prior notification of these areas as Sites of Special Scientific Interest (SSSI).

3.2 The HRA Process

44. The HRA process consists of up to three stages that are described in more detail below. For all plans and projects which are not wholly directly connected with, or necessary to the conservation management of a site's qualifying features, this will include formal screening for any LSE either alone or in-combination with other plans or projects. The following description of the HRA process is based on the most recent guidance provided by the Department for Environment, Food & Rural Affairs (Defra,

2021) and the Planning Inspectorate (2022). Other guidance also exists regarding specific aspects of the HRA process, and these are identified later in this report in the relevant sections.

3.2.1 Stage 1 – Screening (this report)

45. For all plans and projects which are not wholly, directly connected with or necessary to the conservation management of a site's qualifying features (such as the proposed Projects), Stage 1 Screening is required, as a minimum.

46. In Stage 1, European sites are screened for LSE (either alone or in-combination with other plans or projects). Where it can be determined that there is no potential for LSE to occur to qualifying features of a site, that site is sought to be 'screened out'. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no LSE. If the effect may cause LSE or is not known, this would trigger the need for an Appropriate Assessment (AA).

47. In accordance with the 2018 European Court of Justice ruling in the case of People Over Wind, Peter Sweetman v Coillte Teoranta (C-323/17), mitigation, including embedded mitigation is not considered in Stage 1 Screening.

48. The designations considered within this HRA Screening are:

- SPAs (some of which are also Ramsar sites);
- pSPAs - SPAs that are approved by the UK Government but are still in the process of being classified;
- SACs - protected areas in the UK designated under the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales and the Conservation of Offshore Marine Habitats and Species Regulations 2017 in the UK offshore area;
- pSACs - A site which has been identified and approved to go out to formal consultation;
- cSACs - Following consultation on the pSAC, the site is submitted to the EC for designation and at this stage it is called a cSAC; and
- SCI - Once the EC approves the site it becomes an SCI before the national government then designates it as a SAC (please note that any remaining cSACs and SCIs within the UK are sites that were adopted by the EC before the end of the Transition Period following the UK's exit from the EU).

49. Consideration is also given to any effects on Ramsar sites. Ramsar sites protect wetland areas and extend only to 'areas of marine water the depth of which at low tide does not exceed six metres'.

3.2.2 Stage 2 – Appropriate Assessment (AA)

50. For those sites where LSE cannot be excluded in Stage 1, further information to inform an appropriate assessment is prepared by the Applicant, normally presented as the RIAA. The assessment will determine whether the Project alone or in-combination could adversely affect the integrity of the European site in view of its conservation objectives. The Competent Authority (CA) will then draw its own conclusions based on this report.

3.2.3 Stage 3 – HRA Derogation

51. In the event of it not being possible to reach an agreement with Statutory Nature Conservation Bodies (SNCBs) on the absence of Adverse Effect on Integrity (AEoI) of a European Site beyond reasonable scientific doubt, it may be necessary to provide a 'without prejudice' derogation proposal including compensatory measures. For some sites and features, it may already be established that a derogation is required. In that event, consent should not be granted unless the project satisfies each of the following legal tests:

- There are no feasible alternative solutions that would be less damaging or avoid damage to the site;
- The proposal needs to be carried out for Imperative Reasons of Overriding Public Interest (IROPI); and
- The necessary compensatory measures can be secured.

52. Without prejudice to the potential findings of the RIAA or the conclusions of the Competent Authority's AA, the Applicant will progress the development of information to support HRA derogation during the pre-submission phase, in consultation with the relevant stakeholders.

3.3 Approach to Screening

53. To facilitate the identification of the European sites and features to be considered in the LSE screening for the Project, an initial pre-screening of effects and sites has been undertaken as part of the wider screening assessment.

54. Each topic assessed within this HRA Screening Report follows the same structural assessment of effects and sites which includes:

- A consideration of the pathways for LSE during each phase of the Project;
- A description of any potential effects that have been identified for the construction, operation and decommissioning phases;
- The identification of sites and features following the criteria set out in **Table 3-1**;
- The determination of LSE (both alone and in-combination); and

- A summary of potential effects.

55. The criteria adopted for the initial identification of European sites are outlined in **Table 3-1**. This approach takes account of the location of the European sites (including Ramsar Sites) in relation to the Project, the anticipated zone of influence (ZOI) (as clarified in Paragraphs **56-61**) of potential effects associated with the Project, and the ecology and distribution of qualifying interest features.

Table 3-1: Criteria for Initial Identification of Relevant European Sites

Criterion	Criterion Definition
1	The site boundaries of the Project overlap with a European or Ramsar site(s).
2	European or Ramsar site(s) with qualifying mobile features / species (e.g. Annex I birds, Annex II marine mammals, migratory fish) whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Project.
3	European or Ramsar site (s) and / or qualifying interest features located within the ZOI of effects associated with the Project (e.g. habitat loss / disturbance, noise and risk of collision).

56. Broad buffer zones for the Onshore Project Area have been identified and are subject to ongoing design refinement during the Project's EIA process. The Onshore Project Area encompasses all potential onshore infrastructure landward of Mean High Water Springs (MHWS), with the Offshore Project Area encompassing all potential infrastructure between MHWS and Mean Low Water Springs (MLWS) for intertidal and seaward of MLWS for offshore features.

57. European sites with qualifying features or species which are located within the ZOI associated with Onshore and Offshore Project Area activities will be taken forward for consideration of LSE. Receptors can be impacted by disturbances from activities far from their source, with this distance being considered the maximum worst-case ZOI.

58. An initial precautionary buffer of 30km of the Onshore Project Area was used to scope potential effects on mobile species such as bats or otters. There are no European Sites designated for bats or otters within this distance, therefore a smaller buffer of 10km has been used for this HRA.

59. Designated sites within a 10km buffer of the Onshore Project Area within this HRA include SPA, SAC and Ramsar that the Project could have the potential to have an LSE upon. These sites were screened in for further assessment depending on the individual ZOI of designated features for each site.

60. The ZOI for water pollution and / or discharge of sediments risks is 10km for locations where there is a direct discharge into a watercourse within or connected to a European Site.

61. The ZOI for Onshore habitats and surface water flow is considered to be 1km.

62. The ZOI for qualifying terrestrial features, or features that may use the Onshore Project Area as functionally linked land (i.e. foraging or roosting habitat of SPA birds), have a ZOI of 1km. This is based on evidence from previous reporting on the disturbance of bird species throughout their life history, which concluded that disturbance of birds from onshore works is predominantly limited to within 1km of the impact sources (Ruddock and Whitfield, 2007).

63. For the offshore Project Area, the following buffers were used for identification of LSE on designated sites:

- Annex I Offshore Sites: 20km (informed by tidal ellipse distance, as detailed in **Section 4.1.4.2**);
- Annex II Migratory Fish: 50km (maximum effect range from worst-case piling noise, as detailed in **Section 4.3.3.2**);
- Annex II Marine Mammals: All European Sites for certain species (wide-ranging, screening has been based on the potential connectivity for each species, as detailed in **Section 4.4.3**); and
- Marine Ornithology: Varies per species as defined in **Section 4.5.3.2** (mean maximum foraging range + 1 standard deviation during the breeding season and the Biologically Defined Minimum Population Size (BDMPS) region (Furness 2015) surrounding the Array area, during the non-breeding season).

64. The types of effects associated with wind farm development will vary in their magnitude and significance, depending on a range of factors including the type of technology and process involved and the location and timing of activity. With respect to designated habitats and species populations, these effects may be direct (e.g. habitat loss associated with infrastructure installation) or indirect (e.g. via changes in water quality).

65. Screening is based on a conceptual 'source-pathway-receptor' approach:

- Source:
  - The origin of a potential effect (noting that one source may have several pathways and receptors) e.g. foundation installation;
- Pathway:
  - The means by which the effect of the activity could impact a receptor e.g. noise from foundation installation such as piling; and
- Receptor:
  - The element of the receiving environment that is impacted e.g. marine mammals within the range of the noise disturbance.

66. This approach identifies potential effects resulting from the proposed construction, operation, maintenance, and decommissioning of the project.

67. Where there is no pathway, or the pathway has sufficient distance such that the effect from the source has dissipated to a negligible level before reaching the receptor, there may be justification for the screening out of that particular receptor (i.e. feature) for the site in question.

68. Note that sites are screened in if, for any one of their qualifying features (i.e. a species or habitat), a source-pathway-receptor relationship and potential for LSE cannot be ruled out (including in-combination effects). However, each qualifying feature of that site will be considered separately, and it may be that the screening process rules out LSE for some features at this stage.

69. As described above, mitigation is not taken into account at Stage 1 but will be considered where relevant in the Stage 2 assessment.

70. The approach to screening for each receptor is outlined in **Sections 4.1 to 0** and is based on the known distribution, ecology and sensitivities of each receptor group and therefore the potential for being affected by the project.

71. Where there is insufficient information available at this stage to screen out a site or feature, the site is screened in for further consideration. If, on receipt of that information, it is then possible to screen out a site or feature this will be documented as part of the Stage 2 assessment and the screening outcomes updated accordingly.

3.3.1 Consideration of In-Combination Effects

72. The Habitats Regulations require that the potential effects of a project on designated sites are considered both alone and in-combination with other plans or projects.

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

- Housing developments;
- Onshore wind farms;
- Solar arrays;
- Agricultural developments;
- Planned construction of onshore cables and pipelines;
- Potential National Highways developments;
- Oil and gas development and operation; and
- Carbon capture developments.

74. 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.

75. The assessment will present relevant in-combination 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 3-2** below.

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

Tier Description		
	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 birds*2.	Pre-construction (and possibly post-construction) survey data from the built project(s) and environmental characterisation survey data from the proposed project (including data analysis and interpretation within the ES for the project).

[2] 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.

Tier Description		
Tier 2	Tier 1 + projects under construction.	As for 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 the proposed project (including data analysis and interpretation within the ES for the project) and possibly pre-construction survey data from the 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 the 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 the 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.

76. All plans and projects are considered in the HRA Screening. However, those in Tier 5 and onwards will be considered to the extent that the available data allows meaningful consideration, with assessments of plans / projects at these stages likely to be qualitative rather than quantitative.

4 Identification of European Sites and Features and Determination of Likely Significant Effect

77. This section provides a list of European sites (and Ramsar Sites) and their features for which there is the potential for connectivity with the Project, using the criteria outlined in **Table 3-1, Section 3.3**, and therefore those which should be taken forward for consideration of LSE. Sites designated for the following receptor groups are considered in turn:

- Sites Designated for Annex I Habitats (**Section 4.1**);
- Sites Designated for Annex II Terrestrial Ecology and Ornithology (**Section 4.2**);
- Sites Designated for Annex II Migratory Fish (**Section 4.3**);
- Sites Designated for Annex II Marine Mammals (**Section 4.4**); and
- Sites Designated for Annex II Marine Ornithology (**Section 4.5**).

4.1 Sites Designated for Annex I Habitats

78. The scope of this section covers all relevant European sites and relevant qualifying interest features and potential direct impacts of infrastructure on sites landward of MHWS for onshore, intertidal features between MHWS and MLWS and seaward of MLWS for offshore features. Specific locations for offshore infrastructure have not been determined.

4.1.1 Approach to Screening

79. As detailed in **Section 3.3**, this stepwise pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the Project along with listing potential effects on designated sites.

80. Direct or indirect effects on UK terrestrially designated sites and designated sites in the North Sea which have benthic habitats (Habitats Directive Annex I) as a qualifying feature have been considered for HRA screening.

81. Potential effects may arise from the permanent or temporary physical presence of infrastructure and / or activities relating to the construction, operation, maintenance and decommissioning of DBD.

82. This HRA Screening only assesses pathways of effect for individual features. Stage 2 would consider the effect of the Project Area on the integrity of the European Site(s) as a whole.

83. This HRA screening exercise considers sites which meet the following criteria

- A component of the Project Area directly overlaps a site whose qualifying features include a habitat; and / or
- The distance between the Project Area and the habitat qualifying feature is within the range for which there could be an interaction (i.e. within a ZOI for a physical process change resulting from DBD.

84. Information on SACs with Annex I habitats features as a qualifying feature and habitats designated under Ramsar criterion are taken from SAC citations / Natura 2000 forms, Information Sheet on Ramsar Wetlands (RIS), conservation objectives, and other relevant information as published by the relevant SNCBs. Distances between the Project and SAC sites were measured in GIS (the shortest straight-line distance) using shapefiles downloaded from SNCB websites.

85. SPAs are assessed under **Section 4.5** Onshore Pathways for LSE.

4.1.1.1 Direct and indirect pathways

86. There are no European Sites located within the Onshore Project Area, therefore there is no pathway for direct effects to occur during construction, operation and maintenance or decommissioning. Direct effects on European Sites are Screened out of this assessment and not considered further in this report.

87. Within the Onshore Project Area and ZOI (10km for watercourses and 1km for habitats and surface water runoff and functionally linked land), construction and maintenance activities could potentially cause indirect disturbance through changes in suspended solids (water clarity), the introduction of substances (such as pollutants or sediments), and Invasive / Non-Native Species (INNS). Decommissioning effects would be expected to cause similar effects to those identified during construction.

88. **Table 4-1** details the potential effects in relation to the construction, operation and maintenance, and decommissioning phases of the Project within the Onshore Project Area.

Table 4-1: Potential Effects Identified for Onshore Annex I Habitats

Potential Effect	Construction	Operation and Maintenance	Decommissioning
Direct effects on European Sites	x	x	x
Changes in suspended solids (water clarity)	✓	✓	✓
Introduction of other substances (such as pollutants or sediments)	✓	✓	✓

Potential Effect	Construction	Operation and Maintenance	Decommissioning
Introduction or Spread of INNS	✓	✓	✓

4.1.1.2 Potential effects during construction

89. The potential effects upon Annex I habitats during construction screened in for LSE are:

- Changes in suspended solids (water clarity);
- Introduction of other substances (solids, liquid or gas); and
- Introduction or spread of INNS.

4.1.1.2.1 Changes in suspended solids (water clarity)

90. Construction activities could lead to the disturbance of substrate within the river systems. As the Onshore Project Area is adjacent to, and hydrologically linked via field drains, to the Humber Estuary SAC and Ramsar sites. Therefore, a hydrological pathway exists that could lead to the sediment entering the European sites, leading to a reduction in water clarity. As such, the potential effects of a change in suspended solids are screened in and will be assessed in the HRA.

4.1.1.2.2 Introduction of other substances (solids, liquid or gas)

91. Construction activities could lead to the contamination of watercourses and habitats as a result of pollution events which could impact the designated features due to hydrological connectivity with the Humber Estuary SAC and Ramsar sites. As such, the potential effects associated with the introduction of other substances (solids, liquids or gas) are screened in and will be assessed in the HRA.

4.1.1.2.3 Introduction or spread of INNS

92. Construction activities and movements of vehicles from outside of the Onshore Project Area could lead to the introduction or spread of INNS to the Humber Estuary SAC and Ramsar sites. As such, effects from the introduction or spread of INNS have been screened in and will be assessed in the HRA.

4.1.1.3 Potential effects during operation and maintenance

4.1.1.3.1 Changes in suspended solids (water clarity)

93. Operation and Maintenance activities could lead to the disturbance of substrate within the river systems. The Onshore Project Area is adjacent to, and hydrologically linked via field drains, to the Humber Estuary SAC and Ramsar sites. Therefore, a hydrological pathway exists that could lead to the sediment entering the European

sites, leading to a reduction in water clarity. As such, the potential effects of a change in suspended solids are screened in and will be assessed in the HRA.

4.1.1.3.2 Introduction of other substances (solids, liquid or gas)

94. Operation and Maintenance activities could lead to the contamination of watercourses and habitats as a result of pollution events which could impact the designated features due to hydrological connectivity with the Humber Estuary SAC and Ramsar site. As such, the potential effects associated with the introduction of other substances (solids, liquids or gas) are screened in and will be assessed in the HRA.

4.1.1.3.3 Introduction or spread of INNS

95. Maintenance activities and movements of vehicles from outside of the Onshore Project Area could lead to the introduction or spread of INNS to the Humber Estuary SAC and Ramsar sites. As such, effects from the introduction or spread of INNS have been screened in and will be assessed in the HRA.

4.1.1.4 Potential effects during decommissioning

96. It is anticipated that any decommissioning impacts would be similar in nature to those of construction, although the magnitude of impact is likely to be lower.

97. The same potential indirect effects identified for construction are therefore screened in for decommissioning, namely:

- Changes in suspended solids (water clarity);
- Introduction of other substances (solids, liquid or gas); and
- Introduction or spread of INNS.

4.1.2 Offshore Pathways for LSE

98. Within the Offshore Project Area and ZOI (see **Figure 2-1** and **Section 3.3**), construction activities such as the installation of foundations, cables and ancillary structures, associated seabed preparation works, and the placement of jack-up vessel legs, would cause direct physical disturbance and indirect disturbance through the elevation of suspended sediment (Joint Nature Conservation Committee (JNCC), 2022b).

99. Operation of the Project would create long term effects through the loss of existing habitat and introduction of new substrate, such as rock or concrete mattresses used as cable and foundation scour protection as well as the foundation structures themselves. In addition, there would be intermittent indirect disturbance through the elevation of suspended sediment (e.g. from scour). The worst case scenario for the Project is considered to include the Array Area infrastructure (including the wind turbines) and the offshore infrastructure relating to electricity transmission, including

the offshore export cables running from the array to a landfall along the Holderness Coast. The operation of the HPF may involve the discharge of water used in the hydrogen production process and potentially an intake and outfall system for desalination. Subsequently, long term effects associated with the HPF potentially include salinity changes and temperature increases during the operational phase.

100. Other temporary effects identified during operation may be caused by maintenance activities such as the use of jack-up vessels and the replacement and repair of any cables.

101. Decommissioning effects will be primarily caused by the removal of structures from the seabed. Decommissioning would be expected to cause similar effects to those identified during construction, however these will be comparable to or less than the construction and operation phase.

102. The potential effects on offshore habitats from DBD have been identified as shown in **Table 4-2**.

Table 4-2: Potential Effects Identified for Annex I Habitats to be Considered in the LSE Screening

Potential effect as described in the Scoping Report	Potential pressure as described in JNCC (JNCC, 2022b)	Construction	Operation and Maintenance	Decommissioning
Temporary physical disturbance / Physical disturbance	Abrasion / disturbance of the substrate on the surface of the seabed Penetration and / or disturbance of the substrate below the surface of the seabed, including abrasion	✓	✓	✓
	Habitat structure changes – removal of substratum (extraction)	✓	✓	✓
Long term habitat loss	Physical change (to another seabed type) Physical change (to another sediment type)	x	✓	x

Potential effect as described in the Scoping Report	Potential pressure as described in JNCC (JNCC, 2022b)	Construction	Operation and Maintenance	Decommissioning
	Barrier to species movement	x	x	x
Increased suspended sediment concentrations (SSC)	Changes in suspended solids (water clarity) Smothering and siltation rate changes (heavy) Smothering and siltation rate changes (light)	✓	✓	✓
Remobilisation of contaminated sediments	Hydrocarbon & Polyaromatic Hydrocarbon (PAH) contamination	✓	✓	✓
	Transition elements & organo-metal (e.g. TBT) contamination	✓	x	✓
Pollution events resulting from the accidental release of pollutants	Hydrocarbon & PAH contamination	✓	x	✓
	Transition elements & organo-metal (e.g. TBT) contamination	✓	x	✓
	Synthetic compound contamination	x	✓	x
	Introduction of other substances (solid, liquid or gas)	x	x	x

Potential effect as described in the Scoping Report	Potential pressure as described in JNCC (JNCC, 2022b)	Construction	Operation and Maintenance	Decommissioning
Underwater noise and vibration	Underwater noise changes Vibration	✓	✓	✓
Interactions of Electromagnetic Field (EMF) (including potential cumulative EMF effects)	Electromagnetic changes	x	✓	x
Introduction of marine INNS from vessel traffic	Introduction or spread of INNS	x	x	x
Colonisation of introduced substrate	Introduction or spread of INNS	x	✓	x
Salinity increase (Hydrogen and hybrid opportunities only)	Salinity increase	x	✓	x
Temperature increase (Hydrogen and hybrid opportunities only)	Temperature increase	x	✓	x
Changes to longshore sediment processes	Water flow (tidal current) changes, including sediment transport considerations	x	✓	x
In-combination effects	N / A	✓	✓	✓
Transboundary effects	N / A	✓	✓	✓

4.1.2.1 Potential effects during construction

103. The potential effects during construction are based on the standardised pressure names outlined in JNCC's Dogger Bank MPA Conservation Advice (JNCC, 2022b).

104. The potential effects on Annex I habitats and associated species during construction which have been considered for LSE assessment are:

- Abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum below the surface of the seabed including abrasion;
- Habitat structure changes – removal of substratum (extraction);
- Smothering and siltation rate changes (heavy / light) and changes in suspended solids (water clarity). 'Heavy' deposition is defined as a deposition of up to 30cm of fine material added to a habitat in a single discrete event, and 'light' deposition is defined as a deposition of up to 5cm of fine material added to the habitat in a single, discrete event (JNCC, 2022b);
- Hydrocarbon & PAH contamination and transition elements & organo-metal (e.g. TBT) contamination; and
- Underwater noise changes and vibration.

4.1.2.1.1 Abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum below the surface of the seabed

105. Installation of the turbine foundations and the inter-array / export cables will lead to the disturbance of the underlying substrate. As such, the potential effects associated with abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum below the surface of the seabed are screened in and will be assessed in Stage 2.

4.1.2.1.2 Habitat structure changes – removal of substratum (extraction)

106. Seabed levelling may potentially be required during scour protection installation. As such, the pressure of habitat structure changes – removal of substratum (extraction) has been screened in and will be assessed in Stage 2.

4.1.2.1.3 Smothering and siltation rate changes (heavy / light) and changes in suspended solids (water clarity)

107. Installation of the turbine foundations and trenching activities associated with cable installation could lead to the suspension of sediments, which in turn could be deposited in another location within the ZOI. The potential increase in suspended sediments may also lead to a reduction in water clarity. This may result in large deposits of sediment closer to the source of the disturbance ('heavy') or smaller deposits occurring at a further distance ('light'). As such, the pressures of smothering and siltation rate changes (heavy / light) have been screened in and will be assessed in Stage 2.

4.1.2.1.4 Hydrocarbon & Polyaromatic Hydrocarbon (PAH) contamination and transition elements & organo-metal (e.g. TBT) contamination

108. Should any potentially contaminated sediments be disturbed by construction activities for the Project, they may be re-suspended in the water column and contaminate the seabed within the ZOI. Previous contamination data collected in the vicinity of DBD does not indicate significant levels of chemicals within the sediments that could potentially be disturbed. The coarse and sandy nature of the offshore sediments further reduces this risk. The Dogger Bank Teesside A & B ES concluded that a deterioration in water quality due to re-suspension of contaminated sediments would have a negligible impact (Forewind, 2014). However, given the uncertainty of the location of the landfall, and the potential for increased sediment contamination concentrations in nearshore sediments this effect has been screened in for further assessment. Furthermore, if pollution events resulting from the accidental release of pollutants occur, there could be an increase in contaminants in the water column and subsequently on the seabed within the ZOI. As such, the pressure of Hydrocarbon & PAH contamination and transition elements & organo-metal (e.g. TBT) contamination has been screened in and will be assessed in Stage 2.

4.1.2.1.5 Underwater noise changes and vibration

109. Underwater noise changes and vibration through construction activities could have a LSE on benthic receptors. Underwater noise sources during construction (e.g. vessel traffic) are unlikely to have an LSE effect on benthic receptors due to existing vessel activity in the offshore project area. There is no evidence to suggest this low level of noise and vibration has a significant effect on benthic ecology. UXO clearance required ahead of construction would also have small spatial and temporal impacts due to the nature of the activity and would therefore not have potential of LSE on benthic ecological receptors. However, piling may provide a pathway for effect on benthic receptors, it is therefore proposed that this pressure be screened in and will be assessed in Stage 2.

4.1.2.2 Potential effects during operation and maintenance

110. The potential effects during operation and maintenance are based on the standardised pressure names outlined in JNCC's Dogger Bank MPA Conservation Advice (JNCC, 2022b). The potential effects for Annex I habitats and associated species during operation and maintenance considered for LSE assessment are:

- Abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum 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 / light) and changes in suspended

solids (water clarity);

- Habitat structure changes – removal of substratum (extraction);
- Hydrocarbon & PAH contamination;
- Synthetic compound contamination;
- Underwater noise changes and vibration;
- Electromagnetic changes;
- Introduction or spread of INNS;
- Salinity increase;
- Temperature increase; and
- Water flow (tidal current) changes, including sediment transport considerations.

4.1.2.2.1 Abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum below the surface of the seabed

111. There is potential for direct physical disturbance of the seabed construction activities such as the installation of foundations, cables, seabed preparation (dredging), sandwave levelling and indentations on the seabed from jack-up vessels. Areas affected by installation activities would be relatively small scale in relation to the wider environment. As such, this pressure has been screened in for further assessment in Stage 2.

4.1.2.2.2 Habitat structure changes – removal of substratum (extraction)

112. Seabed levelling may potentially be required during scour protection installation to prevent the effects of erosion. As such, the pressure of habitat structure changes – removal of substratum (extraction) has been screened in and will be assessed in Stage 2.

4.1.2.2.3 Physical change (to another seabed / sediment type)

113. The long term presence of novel substrate through the installation of the turbine foundations and the inter-array / export cables will lead to a physical change to the seabed and sediment type within the ZOI. The introduction of hard substrate into the Dogger Bank SAC will also provide a suitable habitat for INNS to colonise where previously they were unable to establish. As such, the pressures of physical change (to another seabed type / to another sediment type) during the lifetime of the Project have been screened in and will be assessed in Stage 2.

4.1.2.2.4 Smothering and siltation rate changes (heavy / light) and changes in suspended solids (water clarity)

114. There exists the potential for fine sediment to be disturbed during maintenance activities for the Project or in the instance of any potential cable reburial activities. Such activities could in turn result in heavy / light smothering of the seabed. As such, the pressures of smothering and siltation rate changes (heavy / light) have been screened in and will be assessed in Stage 2.

4.1.2.2.5 Hydrocarbon & Polyaromatic Hydrocarbon (PAH) contamination and transition elements & organo-metal (e.g. TBT) contamination

115. As previously discussed in **Section 4.1**, the effects of the re-mobilisation of contaminated sediments cannot be determined until further project details regarding the landing site are confirmed. As operation and maintenance activities are anticipated to disturb sediments, this pressure has been screened in for further assessment in Stage 2 for consideration upon updated project details.

4.1.2.2.6 Synthetic compound contamination

116. There exists the potential for routine maintenance of the paint covering of the wind turbines and foundations to result in 'flakes' of synthetic paint material to enter the water column. It is likely that any emissions would be episodic over the Project's lifetime and any flakes dispersed by physical processes. However, there is potential for such 'flakes' to contribute to microplastic pollution in the local environment, in addition to being a source of copper and zinc pollution from the anti-foulant nature of the paints (Gaylarde *et al*. 2021). However, there is not considered to be an LSE on the benthos so has been screened out of further assessment.

4.1.2.2.7 Underwater noise changes and vibration

117. As details of the operation and maintenance activities are yet to be confirmed, the effects of underwater noise and vibration on benthic receptors cannot be determined. As such, this pressure has been screened in for further assessment in Stage 2 where this will be reviewed upon updated project details.

4.1.2.2.8 Electromagnetic changes

118. EMF emissions from the array and export cables could result in impacts on the invertebrate species residing within the ZOI. Current evidence on the impacts associated with EMF on invertebrates are mixed in their conclusions. For example, one recent study by Scott *et al*. (2021) found that the edible crab *Cancer pagarus* displayed clear attraction to 500 microteslas (μt) and above, while another study by Taormina *et al*. (2020) found no change in behaviour in European lobster juveniles when exposed to an artificial magnetic field gradient. Further to this, the assessment carried out on the Teesside A & B projects concluded minor adverse impacts due to the low magnitude (Forewind, 2014). However, as there is limited evidence as to the effects of

EMF on benthic receptors, this pressure has been screened in for further assessment in Stage 2.

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

119. The introduction of infrastructure to the offshore project area from locations outside of the project area could lead to the introduction or spread of INNS within the ZOI. As such, the pressure of the introduction or spread of INNS has been screened in and will be assessed in Stage 2.

4.1.2.2.10 Salinity changes

120. The Hydrogen and Hybrid Opportunities would introduce the potential for salinity changes in the inshore benthic environment due to the presence of outfall pipes associated with the HPF. The benchmark for this pressure is ‘a decrease in one Marine Nature Conservation Review (MNCR) salinity category outside the usual range of the biotope / habitat for one year’, or ‘an increase in one MNCR category outside the usual range of the biotope / habitat for one year’ (JNCC, 2022b). However, the Project boundary (and thus the location of discharge) is located in excess of 20km from the Humber Estuary SAC and Ramsar site. A review of various projects' salinity modelling outputs of varying categories and scales indicates salinity levels achieve a background average between 1km and 4.5km from the discharge location. Given this, the distance to any sites is significantly greater and therefore no pathway for potential impact would arise. Consequently, a potential LSE from salinity changes has been screened out.

4.1.2.2.11 Temperature increase

121. The Hydrogen and Hybrid Opportunities would introduce the potential for temperature increase in the inshore benthic environment due to the presence of outfall pipes associated with the HPF. The benchmark for this pressure is ‘an increase in 5°C for one month, or 2°C for one year’ (JNCC, 2022b). Whilst project details of the HPF are yet to be confirmed, given the distance of 20km or more from the nearest site (Humber Estuary SAC and Ramsar) it is expected that dilution and dispersal of the temperature difference from discharges would have reached background baseline levels. Consequently, a potential LSE from temperature changes has been screened out.

4.1.2.2.12 Water flow (tidal current) changes, including sediment transport considerations

122. The introduction of hard infrastructure to the benthic environment has the potential to disrupt sediment transport pathways. In turn, this provides a pathway for LSE on benthic habitats in the ZOI of the Project. Therefore, this pressure has been screened in for further assessment in Stage 2.

4.1.2.3 Potential effects during decommissioning

123. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of smaller magnitude. The potential effects for Annex I habitats during decommissioning considered for LSE are:

- Abrasion / disturbance of the substrate on the surface of the seabed and penetration and / or disturbance of the substratum below the surface of the seabed including abrasion;
- Smothering and siltation rate changes (heavy / light) and changes in suspended solids (water clarity);
- Habitat structure changes – removal of substratum (extraction);
- Hydrocarbon & PAH contamination and transition elements & organo-metal (e.g. TBT) contamination;
- Underwater noise changes and vibration.

124. Decommissioning may require the removal of foundation structures and either the cutting or removal of subsea cables resulting in physical disturbance, potential disturbance and displacement of impacts associated with suspended sediment and smothering and siltation rate changes. Effects caused during decommissioning would be similar to those during the construction phase.

4.1.2.4 In-combination Effects

125. In-combination effects will consider direct and indirect effects in conjunction with potential impacts on Annex I benthic habitats of other plans and projects. It is anticipated that the effects will be localised, therefore, a 15km search area has been used to identify plans or projects for consideration in Stage 2.

126. Projects that are operational are considered baseline, in-combination effects arising are considered in **Section 4.1.5.2**. Existing activities, developments and projects are considered to be a component of the baseline conditions and are therefore not considered in the in-combination assessment.

127. Projects within the ZOI include:

- Dogger Bank C offshore wind farm;
- Dogger Bank South (east) offshore wind farm;
- Hornsea project 4 offshore wind farm;
- Humber Gateway offshore wind farm;
- Westermost Rough offshore wind farm; and

- Aldborough Hydrogen Storage.

4.1.3 Identification of Onshore Sites and Features for Annex I Habitats

4.1.3.1 Sites directly overlapping with the Project's boundaries

128. European sites which overlap with the boundaries of the Onshore Project Area will be taken forward for consideration of LSE. There are no European sites which meet this criterion for Annex I habitats, therefore no sites are screened in for further consideration on this basis.

4.1.3.2 Sites within the ZOI of the Project's effects

129. European sites with Annex I habitats which are located within the ZOI of impacts (as described in **Section 3.3**) will be taken forward for consideration of LSE. On this basis, the following sites are screened in for determination of LSE:

- Humber Estuary SAC; and
- Humber Estuary Ramsar Site.

130. The Humber is the second-largest coastal plain Estuary in the UK and the largest coastal plain estuary on the east coast of Britain. The estuary supports a full range of saline conditions from the open coast to the limit of saline intrusion on the tidal rivers of the Ouse and Trent. The range of salinity, substrate and exposure to wave action influences the estuarine habitats and the range of species that utilise them; these include a breeding bird assemblage, winter and passage waterfowl, river and sea lamprey, grey seals, vascular plants and invertebrates.

131. The Humber is a muddy, macro-tidal estuary, fed by a number of rivers including the Rivers Ouse, Trent and Hull. Suspended sediment concentrations are high, and are derived from a variety of sources, including marine sediments and eroding boulder clay along the Holderness coast. This is the northernmost of the English east coast estuaries whose structure and function are intimately linked with soft eroding shorelines. The extensive mud and sand flats support a range of benthic communities, which in turn are an important feeding resource for birds and fish. Wave-exposed sandy shores are found in the outer / open coast areas of the estuary, which change to the more moderately exposed sandy shores and then to sheltered muddy shores within the main body of the estuary and up into the tidal rivers.

4.1.3.2.1 Humber Estuary SAC

132. Humber Estuary SAC is designated for the following Annex I habitats:

- Estuaries; and
- Mudflats and sandflats not covered by seawater at low tide.

133. Annex I habitats that are present within the Humber Estuary SAC but are not a primary reason for the selection of the site:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*);
- Coastal lagoons*;
- Dunes with *Hippophae rhamnoides*;
- Embryonic shifting dunes;
- Fixed dunes with herbaceous vegetation (`grey dunes`)*;
- Salicornia and other annuals colonising mud and sand;
- Sandbanks which are slightly covered by sea water all the time; and
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes').

4.1.3.2.2 Humber Estuary Ramsar

134. The Humber Estuary Ramsar includes habitats designated under Criterion 1:

- Dune systems and humid dune slacks;
- Estuarine waters;
- Intertidal mud and sand flats;
- Saltmarshes; and
- Coastal brackish / saline lagoons.

4.1.4 Identification of Offshore Sites and Features for Annex I Habitats

4.1.4.1 Sites directly overlapping with the Project's boundaries

135. European sites which overlap with the boundaries of the Project will be taken forward for consideration of LSE. On this basis, the following sites are screened in for determination of LSE:

- Dogger Bank SAC.

136. Dogger Bank SAC is designated for the Annex I habitat Sandbanks which are slightly covered by sea water all the time, an extensive sublittoral sandbank in the southern North Sea formed by glacial processes and submergence through sea-level rise. A large part of the southern area of the bank is covered by water typically no deeper than 20m below chart datum. The bank is non-vegetated and comprises moderately mobile, clean sandy sediments (JNCC, 2019).

137. The conservation objectives of this site are (JNCC, 2022a):

- *For the feature to be in favourable condition thus ensuring site integrity in the long term and contribution to the Favourable Conservation Status of Annex I Sandbanks which are slightly covered by seawater all the time. This contribution would be achieved by maintaining or restoring, subject to natural change:*
    - The extent and distribution of the qualifying habitat in the site;
    - The structure and function of the qualifying habitat in the site; and
    - The supporting processes on which the qualifying habitat relies.

138. Associated species with the SAC include segmented polychaete worms, amphipods, and small clams which burrow into the sand. Fauna like hermit crabs, flatfish and starfish also live on top of the sandbank (JNCC, 2017).

4.1.4.2 Sites within the ZOI of the Project’s Effects

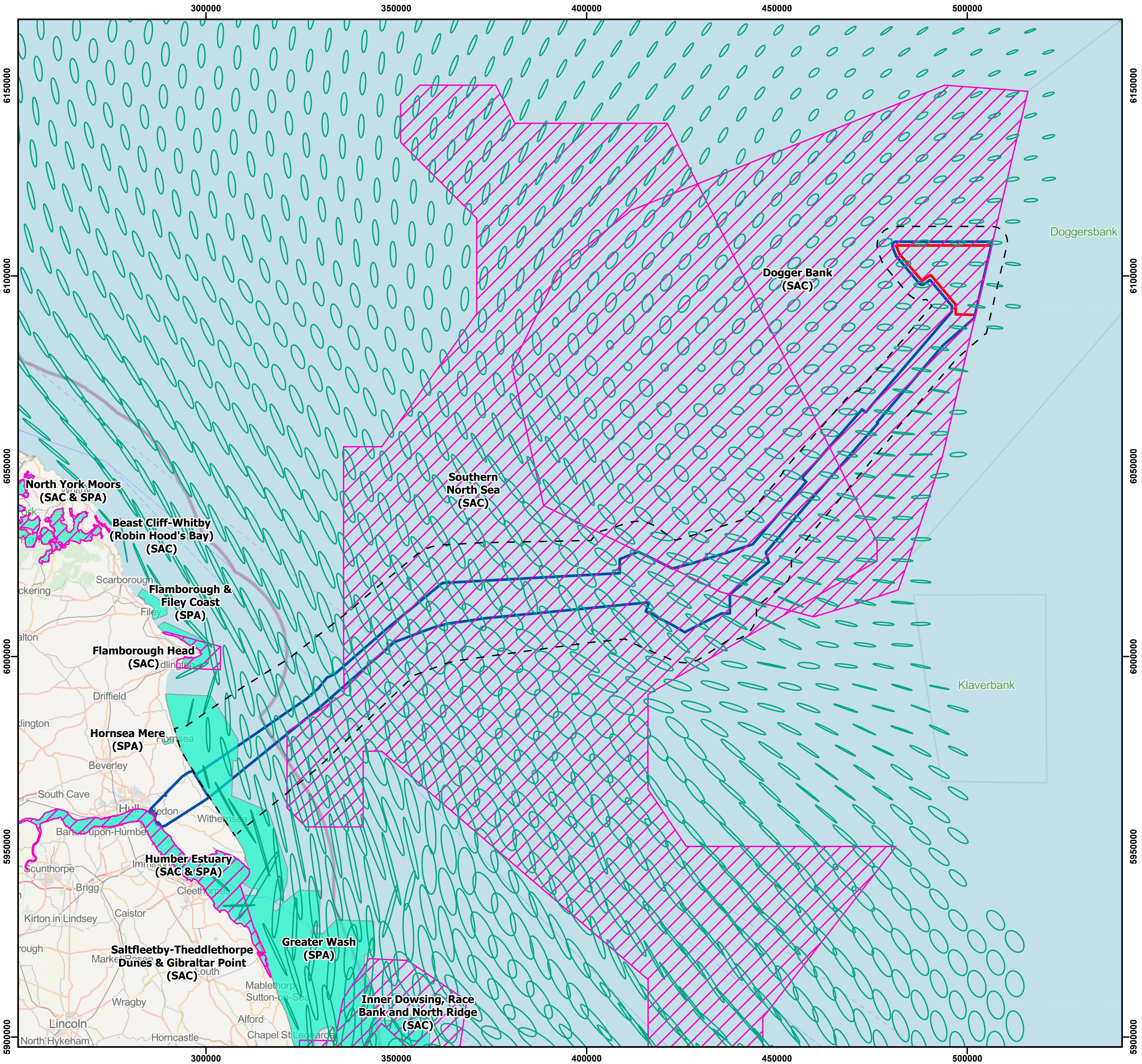
139. European sites with qualifying features / species which are located within the potential ZOI of the Project’s activities will be taken forward for consideration of LSE. Construction, operations, maintenance and decommissioning activities for the Project may result in the disturbance of sediment. This can have an indirect effect on receptors away from the source of the disturbance. The ZOI for the Project has been defined using tidal ellipse distance to determine sediment dispersion resulting from installation activities. It is approximately 4km around the array areas, gradually increasing to 20km inshore (see **Figure 4-1**). On this basis, there are no European sites within the ZOI to be assessed for LSE.

4.1.5 Determination of LSE for Annex I Habitats

140. The designated sites screened in for further assessment can be seen in **Figure 4-2** and are provided in **Table 4-3**. A review of GIS showed that all of the habitats listed in the table below are adjacent to (0m from) the Onshore Project Area for the Humber Estuary SAC and Ramsar, with the Dogger Bank SAC being within the Offshore Project Area.

141. It has not been possible to rule out LSE on the qualifying features of the Humber Estuary SAC and the Humber Estuary Ramsar. There is the potential for the qualifying features to be affected during the construction, operation and maintenance and decommissioning of the Project Area. Therefore, information to inform Stage 2 (AA) will be required.

142. The potential for LSE on the Dogger Bank SAC would be dependent on the characteristics of the habitats and communities (receptors) present within the footprint of the impact and in particular, the capacity of the affected communities to recover from those effects identified.



Legend:

- Dogger Bank D Array Area
- Project Area
- Zone Of Potential Influence of the Tidal Regime
- Spring Tidal Ellipses
- Special Area of Conservation (SAC)
- Special Protection Areas (SPA)

Source: © Haskoning DHV UK Ltd, 2023; © JNCC, 2022; © Natural England, 2023; © OpenStreetMap (and) contributors, CC-BY-SA

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Offshore ZoI Tidal Regime

Figure: 4-1

Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0088

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	13/12/2023	AB	SS	A3	1:1,000,000
03	02/10/2023	GC	PT	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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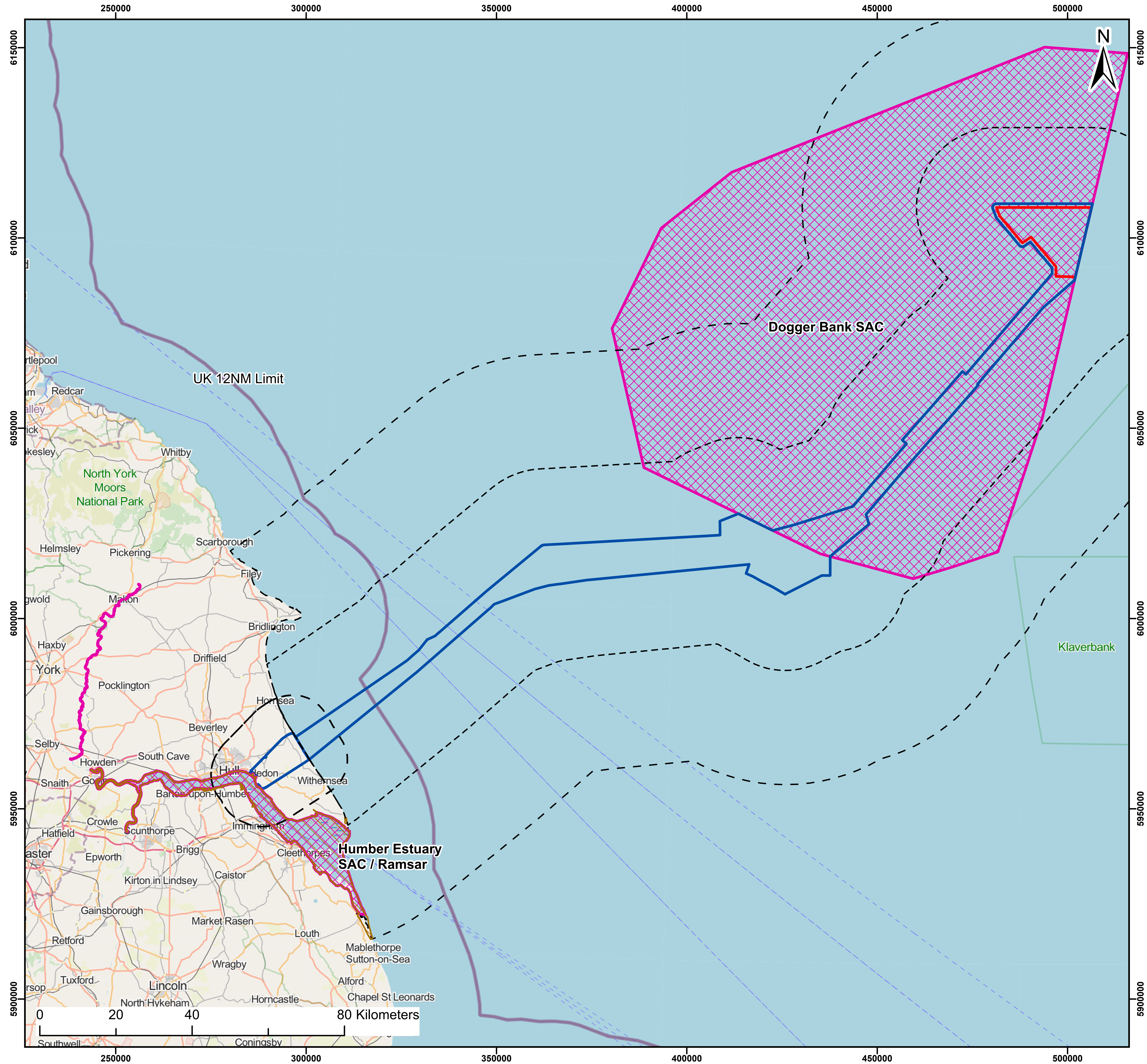
Table 4-3: Screening of European Sites Designated for Annex I Habitats

European Site	Annex I Habitat Features	Distance from the Project Area	Screened In?	Rationale
Humber Estuary SAC (Site code: UK00300170)	Estuaries Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Coastal lagoons* Dunes with *Hippophae rhamnoides* Embryonic shifting dunes Fixed dunes with herbaceous vegetation (`grey dunes`)* *Salicornia* and other annuals colonising mud and sand Sandbanks which are slightly covered by sea water all the time Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')	Within ZOI as the designated site is 400m from the Onshore Project Area	✓	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	Dune systems and humid dune slacks Estuarine waters Intertidal mud and sand flats Saltmarshes Coastal brackish / saline lagoons	Within ZOI as the designated site is 400m from the Onshore Project Area	✓	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.
Dogger Bank SAC (Site Code: UK0030352)	Sandbanks which are slightly covered by seawater all the time	Within the Offshore Project Area array areas	✓	The site is directly within the DBD proposed Offshore Project Area.

143. As the Project's array area is located directly within the Dogger Bank SAC, there is potential for its designated features, 'Sandbanks which are slightly covered by sea water all the time' to be impacted during construction, operation & maintenance or decommissioning of the Project. As such there exists the potential for LSE to occur to qualifying features of the Dogger Bank SAC.



Legend:

- Dogger Bank D Array Area
- Project Area
- Special Area of Conservation (SAC)
- Ramsar
- Onshore Project Area ZoI (10km)
- Annex I Offshore Sites ZoI (20km)
- Annex II Migratory Fish ZoI (50km)

Source: © Haskoning DHV UK Ltd, 2023; © Natural England, 2023; © OpenStreetMap (and) contributors, CC-BY-SA

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Sites Designated for Annex I Habitats Taken Forward for Further Assessment

Figure: 4-2

Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0083

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	29/11/2023	AB	SS	A3	1:1,000,000
01	02/10/2023	GC	MJW	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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144. It has not been possible to rule out LSE on the Dogger Bank SAC during Stage 1 (screening). As such, information to inform Stage 2 (AA) will be required for this site. Site-specific benthic survey and consultation with statutory stakeholders, including Natural England will be undertaken to inform this process.

4.1.5.1 Onshore In-combination and transboundary effects

145. No potential for transboundary effects is present for the Onshore Project Area due to the Onshore Area of the Project not being adjacent to or within proximity to any internationally designated areas.

146. There is potential for in-combination effects to arise whereby other projects or plans could act collectively with the Project activities in the Onshore Project Area to affect Annex I habitats. The in-combination assessment will identify where the predicted effects of the construction, operation and maintenance, and decommissioning of the Project could interact with effects from different activities, plans or projects within the same zone of influence as Annex I sites and / or supporting habitat.

147. The types of plans and projects to be taken into consideration are listed in **Section 3.3.1**. Both the East Riding of Yorkshire Council planning portal and Planning Inspectorate will be searched for relevant plans and projects that may cause in-combination effects related to onshore project infrastructure and activities. Screening of plans and projects will be considered based on the following key points:

- They are located within the relevant ZoI (see **Section 4.1.1.1**); and,
- There is the potential for in-combination effects during the construction, operation and maintenance, or decommissioning of the proposed Project.

148. The Onshore Project Area could have additional impacts on Annex I habitats, notably those presented in **Table 4-2,** through interactions with other planned projects.

4.1.5.2 Offshore In-combination and transboundary effects

149. All offshore wind farms under planning or under construction within the Dogger Bank SAC (Dogger Bank A, B, C, Dogger Bank South and Sofia) will be considered in the in-combination assessment, due to the potential in-combination effects upon the Dogger Bank SAC.

150. Hornsea Project Four is located adjacent to the offshore export cable corridor, as such in-combination effects will be considered between the projects. As the Hornsea Project Two and Three offshore wind farms and Viking Link Interconnector are located over 20km from the Offshore Project Area, no in-combination effects are predicted to occur with these projects.

151. There is potential for transboundary effects upon Annex I benthic habitats due to the Project's construction, operation and maintenance and decommissioning activities. Potential transboundary effects, including those associated with underwater noise and

sediment plumes, will be assessed and the Applicant, where possible, will liaise with developers in European Economic Area (EEA) Member States to obtain up-to-date project information to inform the assessment.

152. The North Sea Programme 2022-2027 (Noordzeeloket, 2022) outlines the management and use of the North Sea territorial waters within the Netherland's territory. The programme outlines a Natura 2000 designated site that lies adjacent to the Array Area. It is therefore proposed that transboundary impacts are screened in for further assessment in Stage 2.

4.1.6 Summary for Sites Designated for Annex I Habitats

153. Relevant effects listed for each individual site are presented in **Table 4-4**.

Table 4-4: The Screening Decision on LSE for Annex I Designated Features within the Humber Estuary Ramsar and SAC and Dogger Bank SAC

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
Humber Estuary SAC	- Estuaries - Mudflats and sandflats not covered by seawater at low tide - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) - Coastal lagoons - Dunes with *Hippophae rhamnoides* - Embryonic shifting dunes - Fixed dunes with herbaceous vegetation (\`grey dunes\`) - Salicornia and other annuals colonising mud and sand - Sandbanks which are slightly covered by sea water all the time - Shifting dunes along the shoreline with Ammophila arenaria (\`white dunes')	Within ZOI as the designated site is located 0m from the Onshore Project Area.	Direct Impacts	x	x	x	There is no pathway for direct impacts from Project phases due to no overlap between the Project and the designated site.
			Changes in suspended solids (water clarity)	✓	✓	✓	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.
			Introduction of other substances (such as pollutants or sediments)	✓	✓	✓	
			INNS	✓	✓	✓	

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
Humber Estuary Ramsar	- Dune systems and humid dune slacks - Estuarine waters Intertidal mud and sand flats - Saltmarshes - Coastal brackish / saline lagoons	Within ZOI as the designated site is located 0m from the Onshore Project Area.	Direct Impacts	x	x	x	There is no pathway for direct impacts from Project phases due to no overlap between the Project and the designated site.
			Changes in suspended solids (water clarity)	✓	✓	✓	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.
			Introduction of other substances (such as pollutants or sediments)	✓	✓	✓	
			INNS	✓	✓	✓	
Dogger Bank SAC	Sandbanks which are slightly covered by seawater all the time	Within the Offshore Project Area.	Abrasion/disturbance of the substrate on the surface of the seabed	✓	✓	✓	The site is directly within the Project's proposed array areas.
			Changes in suspended solids (water clarity)	✓	✓	✓	The site is directly within the Project's proposed array areas.

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
			Penetration and/or disturbance of the substratum below the surface of the seabed	✓	✓	✓	The site is directly within the Project's proposed array areas.
			Habitat structure changes – removal of substratum (extraction)	✓	✓	✓	Screened in for construction due to the potential for scour protection installation and the need to remove sediment for infrastructure installation. Screened in for operation and maintenance, and decommissioning as there exists the potential for erosion at and around structure areas which would require scour protection.
			Hydrocarbon & PAH contamination	✓	✓	✓	The site is directly within the Project's proposed array areas.

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
			Transition elements & organo-metal (e.g. TBT) contamination	✓	✓	✓	The site is directly within the Project's proposed array areas.
			Synthetic compound contamination	x	x	x	Screened out as the effects from synthetic compounds are small-scale and temporary in nature.
			Physical change (to another seabed type/to another sediment type)	x	✓	x	This pressure has been screened in for operation and maintenance due to the installation of infrastructure complete at this phase.
			Smothering and siltation rate changes (heavy/light)	✓	✓	✓	The site is directly within the Project's proposed array areas.

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
			Introduction or spread of INNS from colonisation of introduced substrate	x	✓	x	The effects of INNS have been screened in for operation and maintenance as this phase provides an opportunity for INNS to establish and colonise in the offshore project area.
			Electromagnetic changes	x	✓	x	The effects of EMF have been screened in for the operation and maintenance phase as EMF will only be present during this phase of the Project lifetime.
			Underwater noise changes	✓	✓	✓	The site is directly within the Project's proposed array areas.
			Vibration	✓	✓	✓	The site is directly within the Project's proposed array areas.

European Site	Designated Features	Distance from the Project Area	Effect Pathways	C	O&M	D	Rationale
			Water flow (tidal current) changes, including sediment transport considerations	x	✓	x	The effects of water flow have been screened in for the operation and maintenance phase as the pathway for effect is associated with the presence of hard infrastructure.

4.2 Sites Designated for Terrestrial Ecology and Ornithology

4.2.1 Approach to Screening

154. Direct and indirect effects on designated terrestrial sites have been considered for HRA screening. Potential effects may arise from the permanent or temporary physical presence or activities relating to the construction, operation and maintenance or decommissioning of the onshore cable corridor for the Onshore Project Area.

155. As detailed in **Section 3.3**, this stepwise pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the Project along with listing potential effects on designated sites.

156. This HRA Screening only assesses pathways of effect for individual features. This HRA screening exercise considers sites which meet either of the following criteria:

- A component of the Onshore Project Area directly overlaps a site whose qualifying features include a habitat; and / or
- The distance between the Onshore Project Area and the qualifying feature is within the range for which there could be an interaction (i.e. within a ZOI for noise, visual or air quality effects).

157. Information on SPAs with Annex I species as a qualifying feature, as well as qualifying features listed under Ramsar criterion, are taken from SPA citations / Natura 2000 forms, Ramsar Information Sheets, conservation objectives, and other relevant information as published by the relevant SNCBs. Distances between the Onshore Project Area and SPA and Ramsar sites were measured using GIS.

4.2.2 Pathways for LSE

158. Direct or indirect effects on designated terrestrial ecological features may arise from permanent or temporary physical presence of the project and / or activities relating to the construction, operation and maintenance or decommissioning of the Onshore Project Area and associated infrastructure. Potential effects include direct habitat loss / degradation, pollution of supporting habitats, fatally injuring individuals, and noise and visual disturbance of associated species.

159. The key factors considered during the HRA screening process are:

- Potential effects (source); and
- Proximity of source to feature (i.e. the distance between the potential effects and features from designated sites) (pathway and receptor).

160. **Table 4-5** details the potential effects in relation to the construction, operation and maintenance and decommissioning phases of the Onshore Project Area which are further discussed below.

Table 4-5: Potential Effects Identified for Terrestrial Ecology Features

Potential Effect	Construction	Operation and Maintenance	Decommissioning
Direct effects on European Sites	x	x	x
Permanent and temporary loss of designated Annex I Habitats	x	x	x
Disturbance / displacement	✓	✓	✓
Long term and temporary loss of functionally linked land	✓	✓	✓
Indirect impacts through effects on designated habitats and prey species	✓	✓	✓
Fatally injuring individuals	✓	✓	✓

4.2.2.1 Potential effects during construction

161. The potential effects for terrestrial ecology features during construction screened in for LSE are:

- Disturbance / Displacement of Annex II Species;
- Long term and temporary loss of functionally linked land;
- Indirect impacts through effects on designated habitats and prey species; and
- Fatally injuring individuals.

4.2.2.1.1 Disturbance / displacement

162. Construction activities could generate vibration, noise and visual (including light) pollution. This has the potential to cause disturbance / displacement to ecological features within designated sites within the ZOI and to the ecological features using functionally linked land within the Onshore Project Area.

4.2.2.1.2 Long term and temporary loss of functionally linked land

163. Construction activities could cause the long term and temporary loss of functionally linked land which would impact qualifying terrestrial ecological features.

4.2.2.1.3 Indirect impacts through effects on habitats and prey species

164. Construction activities could cause pollution to water and air (fugitive dust emissions), indirectly impacting qualifying terrestrial ecological features by affecting supporting and functionally linked land and prey species.

4.2.2.1.4 Fatally injuring individuals

165. Construction activities could directly affect terrestrial ecological features by increasing the mortality of terrestrial ecological features.

4.2.2.2 Potential effects during operation and maintenance

166. The potential effects for terrestrial ecology during operation and maintenance screened in for LSE are:

- Disturbance / displacement (eg noise or visual disturbance);
- Temporary loss of functionally linked land;
- Indirect impacts through effects on designated habitats and prey species; and
- Fatally injuring individuals.

4.2.2.2.1 Disturbance / displacement

167. Operation and maintenance activities will generate noise and lighting effects. This has the potential to cause disturbance / displacement to ecological features within the designated sites and to the ecological features using functionally linked land within the zones of influence.

4.2.2.2.2 Temporary loss of functionally linked land

168. Operation and maintenance activities have the potential to cause the temporary loss of functionally linked land which would impact qualifying terrestrial ecological features.

4.2.2.2.3 Indirect impacts through effects on habitats and prey species

169. Operation and maintenance activities could cause pollution to water and air (fugitive dust emissions), indirectly impacting qualifying terrestrial ecological features by affecting supporting and functionally linked land and prey species.

4.2.2.2.4 Fatally injuring individuals

170. Operation and maintenance activities could directly affect terrestrial ecological features by increasing the mortality of terrestrial ecological features.

4.2.2.3 Potential effects during decommissioning

171. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of smaller magnitude. The potential effects for terrestrial ecology features during decommissioning screened in for LSE are therefore:

- Disturbance / displacement;
- Long term and temporary loss of functionally linked land;
- Indirect impacts through effects on designated habitats and prey species; and
- Fatally injuring individuals.

4.2.3 Identification of Sites and Features

4.2.3.1 Sites directly overlapping with the Project's boundaries

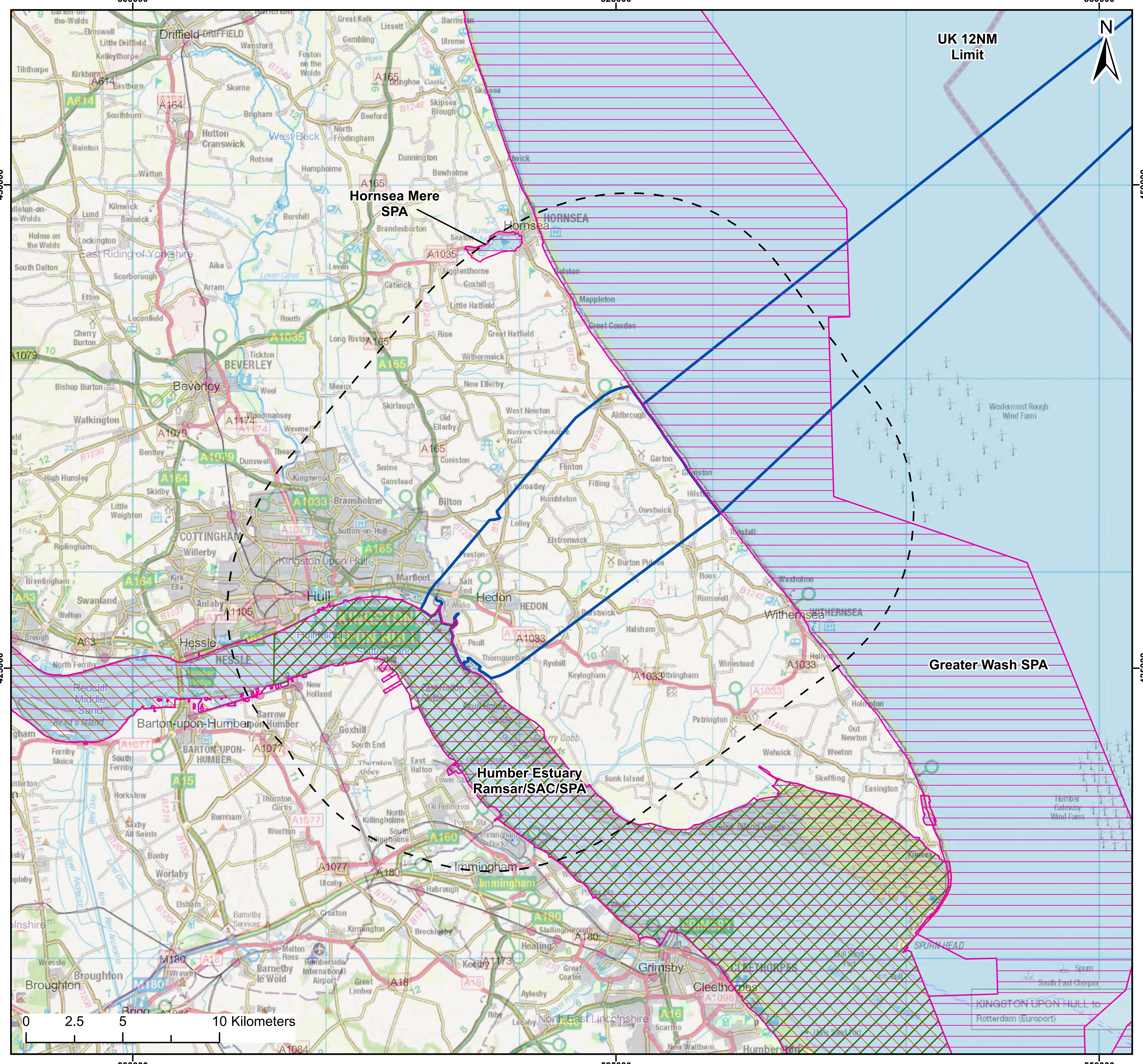
172. There are no European Sites located within the Onshore Project Area, therefore there is no pathway for direct effects to occur. Direct effects on European Sites are Screened out of this assessment and not considered further in this report.

4.2.3.2 Sites within the ZOI of the Project's Effects

173. European sites with qualifying mobile features / species which are located within the ZOI of impacts (as described in **Section 3.3** and shown in **Figure 4-3**) associated with the Onshore Project Area will be taken forward for consideration of LSE. A European Site within the ZOI of indirect effects from dust / noise will be subject to different effects from bird species which are directly impacted by the Onshore Project Area, but which are using i.e. functionally linked land outside the European site's boundary.

174. Five European sites were identified within a 10km buffer of the Onshore Project Area (**Figure 4-3**):

- Humber Estuary SAC; located adjacent to the Onshore Project Area (as addressed in **Section 4.1.3**);
- Humber Estuary SPA; located adjacent to the Onshore Project Area;
- Humber Estuary Ramsar; located adjacent to the Onshore Project Area;
- Greater Wash SPA; located adjacent to the Onshore Project Area within the intertidal zone, and
- Hornsea Mere SPA; located approximately 8.6km to the north of the Onshore Project Area.



Legend:

- Project Area
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Onshore Project Area ZoI (10km)

Source: © Haskoning DHV UK Ltd, 2023; © JNCC, 2022; © Natural England, 2023; © OpenStreetMap (and) contributors, CC-BY-SA

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: European Sites within 10km of the Onshore Project Area

Figure: 4-3 | Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0088

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
05	14/12/2023	AB	SS	A3	1:200,000
04	23/11/2023	AB	SS	A3	1:200,000

Co-ordinate system: British National Grid

sse Renewables equinor

4.2.3.2.1 Humber Estuary Ramsar

175. The site is designated for its terrestrial ecology under Criterion 3:

- The dune slacks at Saltfleetby-Theddlethorpe on the southern extremity of the Ramsar site are the most north-easterly breeding site in Great Britain of the natterjack toad *Bufo calamita*.

176. The site is designated for its ornithological features under Criterion 5; assemblages of international importance:

- 153,934 waterfowl, non-breeding season (5-year peak mean 1996 / 97-2000 / 2001).

177. The site is designated for its ornithological features under Criterion 6; species / populations occurring at levels of international importance:

- Eurasian golden plover *Pluvialis apricaria altifrons* (17,996 individuals, representing an average of 2.2% of the population (1996-2000)) – passage;
- Red knot *Calidris canutus islandica* (18,500 individuals, representing an average of 4.1% of the population (1996-2000)) – passage;
- Dunlin *Calidris alpina alpina* (20,269 individuals, representing an average of 1.5% of the population (1996-2000)) – passage;
- Black-tailed godwit *Limosa limosa islandica* (915 individuals, representing an average of 2.6% of the population (1996-2000)) – passage;
- Common redshank *Tringa totanus totanus* (7,462 individuals, representing an average of 5.7% of the population (1996-2000)) – passage;
- Common shelduck *Tadorna tadorna* (4,464 individuals, representing an average of 1.5% of the population (1996/7 to 2000/1)) – wintering;
- European golden plover (30,709 individuals, representing an average of 3.8% of the population (1996/7 to 2000/1)) – wintering;
- Red knot (28,165 individuals, representing an average of 6.3% of the population (1996/7 to 2000/1)) – wintering;
- Dunlin (22,222 individuals, representing an average of 1.7% of the population (1996/7 to 2000/1)) – wintering;
- Black-tailed godwit (1,113 individuals, representing an average of 3.2% of the population (1996/7 to 2000/1)) – wintering; and
- Bar-tailed godwit *Limosa lapponica lapponica* (2,752 individuals, representing an average of 2.3% of the population (1996/7 to 2000/1)) – wintering.

4.2.3.2.2 Humber Estuary SPA

178. The site qualifies under Article 4.1 of the Directive (79/409/EEC) for the following Annex I ornithological features:

- Avocet *Recurvirostra avosetta* (59 individuals (5-year peak mean 1996/97 – 2000-01)) – wintering;
- Bittern *Botaurus stellaris* (4 individuals (5-year peak mean 1998/99 – 2002-03)) – wintering;
- Hen harrier *Circus cyaneus* (8 individuals (5-year peak mean 1997/98 – 2001/02)) – wintering;
- Golden plover (30,709 individuals (5-year peak mean 1996/97 – 2000/01)) – wintering;
- Bar-tailed godwit (2,752 individuals (5-year peak mean 1996/97 – 2000/01)) – wintering;
- Ruff *Philomachus pugnax* (128 individuals (5-year peak mean 1996 – 2000)) – passage;
- Bittern (2 booming males (3-year mean 2000 – 2002)) – breeding;
- Marsh harrier *Circus aeruginosus* (10 females (5-year mean 1998 – 2002)) – breeding;
- Avocet (64 pairs (5-year mean)) – breeding; and
- Little tern *Sterna albifrons* (51 pairs (5-year mean 1998 – 2002)) – breeding.

179. The site further qualifies under Article 4.2 of the Directive (79/409/EEC) as it is regularly used by 1% or more of the biogeographical populations of the following regularly occurring migratory species (other than those listed in Annex I in any season):

- Shelduck (4,464 individuals (5-year peak mean 1996/97 – 2000 / 01)) – wintering;
- Knot (28,165 individuals (5-year peak mean 1996-97 – 2000/01)) – wintering;
- Dunlin (22,222 individuals (5-year peak mean 1996/97 – 2000/01)) – wintering;
- Black-tailed godwit (1,113 individuals (5-year peak mean 1996/97 – 2000-01)) – wintering;
- Redshank (4,632 individuals (5-year peak mean 1996/97 – 2000/01)) – wintering;
- Knot (18,5000 individuals (5-year peak mean 1996 – 2000)) – passage;

- Dunlin (20,269 individuals (5-year peak mean 1996 – 2000)) – passage;
- Black-tailed godwit (915 individuals (5-year peak mean 1996 – 2000)) – passage; and
- Redshank (7,462 individuals (5-year peak mean 1996 – 2000)) – passage.

4.2.3.2.3 The Greater Wash SPA

180. The Onshore Project Area is adjacent to the Greater Wash SPA, designated for offshore bird species. The Greater Wash SPA is located in the mid-southern North Sea between Bridlington Bay in the north and the Outer Thames Estuary SPA in the south. To the north, off the Holderness coast in Yorkshire, seabed habitats primarily comprise coarse sediments, with occasional areas of sand, mud and mixed sediments. Subtidal sandbanks occur at the mouth of the Humber Estuary, primarily comprising sand and coarse sediments. Offshore, soft sediments dominate, with extensive areas of subtidal sandbanks off The Wash as well as north and east Norfolk coasts. Closer inshore at The Wash and North Norfolk coast, sediments comprise a mosaic of sand, muddy sand, mixed sediments and coarse sediments, as well as occasional Annex I reefs. The area off the Suffolk coast continues the mosaic habitats mostly dominated by soft sediment.

181. The site qualifies under Article 4.1 of the Directive 2009/147/EC by regularly supporting populations of national importance of the Annex I species:

- Red-throated diver *Gavia stellata* (1,407 individuals (4-year peak mean 2002 – 2006)) – non-breeding;
- Little gull *Hydrocoloeus minutus* (1,255 individuals (2-year peak mean 2004 – 2006));
- Sandwich tern *Thalasseus sandvicensis* (3,852 pairs (5-year peak mean 2010–2014)) – breeding;
- Common Tern *Sterna hirundo* (510 pairs (5-year peak mean 2010 – 2014)) – breeding; and
- Little tern (798 pairs (5-year peak mean 2009 – 2013)) – breeding.

182. In addition, the site qualifies under Article 4.2 of the Directive 2009/147/EC by regularly supporting a population of international importance of the migratory species:

- Common scoter *Melanitta nigra* (3,449 individuals (5-year peak mean 2002 – 2008)) – passage.

183. The screening considers the potential for disturbance and displacement effects and changes to prey availability, due to construction, operation and maintenance or decommissioning on the qualifying feature species of Greater Wash SPA.

4.2.3.2.4 Hornsea Mere SPA

184. Hornsea Mere is the only remaining mere in Holderness, Humberside and is the only major freshwater body for wintering ducks in a wide area. It consists of a large, shallow (in general only 1m-2m), eutrophic lake of 120 hectares (300 acres), together with associated fen, carr woodland and reedswamp dominated by common reed *Phragmites australis*, reedmace *Typha latifolia* and grey club-rush *Schoenoplectus tabernaemontani*.

185. The site qualifies under article 4.2 of the EC Birds Directive by regularly supporting populations of internationally important wintering populations of the following species:

- Gadwall *Anas strepera* (210 individuals (5-year peak mean 1987/88 – 1991/92)).

186. The site further qualifies by supporting a nationally important post-breeding and moulting population of the following species:

- Mute swan *Cygnus olor* (189 individuals (5-year peak mean 1988 – 1992)).

4.2.4 Determination of LSE for Terrestrial Ecology and Ornithology

187. The dune slacks at Saltfleetby-Theddlethorpe, which support natterjack toad as part of the Humber Estuary Ramsar Site are located approximately 29km to the south of the Onshore Project, therefore there will be no pathway for LSE. This species is screened out from further assessment.

188. Suitable ornithological habitats within the Onshore Project Area are dominated by arable farmland interspersed with drains, ditches and hedgerows. There are also areas of woodland and scrub.

189. As both the Humber Estuary Ramsar and SPA are located within the ZOI for the Onshore Project Area, there is the potential for the designated ornithological features to be impacted during construction, operation and maintenance and decommissioning of the Onshore Project Area. As such, there is the potential for LSE to occur to qualifying features of the Humber Estuary Ramsar and the Humber Estuary SPA sites.

190. A review of publicly available habitat data and aerial photographs has determined that habitats within, and adjacent to, the Onshore Project Area have suitability to support designated ornithological features of the Humber Estuary SPA and Ramsar Site for use by breeding, passage and wintering species, particularly the arable land (i.e. functionally linked land).

191. Bittern is part of the designation for the Humber Estuary SPA. This species is mainly restricted to *Phragmites australis* reedbed and mixed fen habitat (Humber Nature Partnership (Undated). ‘Humber Management Scheme; Fact sheet: Breeding birds’). The nearest record of this habitat type is approximately 3.7km south-west of the Onshore Project Area which is outside of the zone of influence for functionally linked

land, noise and visual disturbance. Onshore Project Area. As such, this species can be screened out as there will be no pathway for LSE to occur to this species Onshore Project Area.

192. It has not been possible to rule out LSE for the remaining ornithological features of the Humber Estuary SPA or the Humber Estuary Ramsar site during stage 1 (screening), therefore these features are screened in and will be assessed in the HRA.

193. Of the species for which the Greater Wash SPA is designated, the following considerations and conclusions are made with respect to LSE in relation to works within the terrestrial environment down to MLWS:

- Common scoter (non-breeding) – no LSE is expected due to the key activities and presence of common scoter being offshore and they are not expected or identified as present within the terrestrial or adjacent intertidal areas. However, a potential for LSE is expected due to the potential for discharges from HPF affecting their supporting habitat.

- Common tern (breeding) – there exists the potential for LSE as breeding common tern could potentially forage within the intertidal adjacent to the terrestrial activities and features, as well as discharges from HPF affecting their supporting habitat.

- Little gull (breeding and on-breeding) – there exists the potential for LSE as breeding and non-breeding little gull could potentially forage within the intertidal adjacent to the terrestrial activities and features, as well as discharges from HPF affecting their supporting habitat.

- Little tern (breeding) – there exists the potential for LSE as breeding little tern could potentially forage within the intertidal adjacent to the terrestrial activities and features, as well as other functionally linked habitat within the areas of potential disturbance, as well as discharges from HPF affecting their supporting habitat.

- Red-throated diver (non-breeding) – no LSE is expected due to the key activities and presence of common scoter being offshore and they are not expected or identified as present within the terrestrial or adjacent intertidal areas. However, a potential for LSE is expected due to the potential for discharges from HPF affecting their supporting habitat.

- Sandwich tern (breeding) – there exists the potential for LSE as breeding Sandwich tern could potentially forage within the intertidal adjacent to the terrestrial activities and features, as well as discharges from HPF affecting their supporting habitat.

194. It has not been possible to rule out the ornithological features of the Greater Wash SPA during Stage 1 (screening), therefore these features are screened in and will be assessed in the HRA.

195. Hornsea Mere SPA is designated for mute swan and gadwall, species which are typically found in areas such as gravel pits, lakes and reservoirs. These habitats are not located within the Onshore Project Area. Additionally, data consultation from the local biological records centre for the Scoping Report did not return any records of these species within 5km of the Onshore Project Area.

196. **Table 4-6** provides a summary of the sites considered.

Table 4-6: Screening of Sites Designated for Terrestrial Ecology and Ornithology Features

European Site	Terrestrial ecology feature	Distance from the Onshore Project Area	Screened In?	Rationale
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	Natterjack toad	Within ZOI as the designated site is located 400m from the Onshore Project Area	x	Due to the distance to suitable habitat (29km) from the Onshore Project Area, it is considered unlikely that there is any pathway for LSE.
	Bar-tailed godwit – wintering Black-tailed godwit – passage Black-tailed godwit – wintering Dunlin – passage Dunlin – wintering Golden plover – passage Golden plover – wintering Knot – passage Knot – wintering Redshank – passage Redshank – wintering Shelduck – wintering Waterbird assemblage – wintering	Within ZOI as the designated site is located 400m from the Onshore Project Area	✓	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked habitats may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked habitats. As such, LSEs may occur to ornithological terrestrial ecology features of the Humber Estuary Ramsar.

European Site	Terrestrial ecology feature	Distance from the Onshore Project Area	Screened In?	Rationale
Humber Estuary SPA (Site code: UK9006111)	Bittern – breeding Bittern – non-breeding	Within ZOI as the designated site is located 400m from the Onshore Project Area	x	Due to the distance to suitable habitat (3.7km) from the Onshore Project Area, it is considered unlikely that there is any pathway for LSE.
	Avocet – breeding Avocet – non-breeding Bar-tailed godwit – breeding Black-tailed godwit – non-breeding Dunlin – non-breeding Golden plover – non-breeding Hen harrier – non-breeding Knot – non-breeding Little tern – breeding Marsh harrier – breeding Redshank – non-breeding Ruff – non-breeding Shelduck – non-breeding Waterbird assemblage	Within ZOI as the designated site is located 400m from the Onshore Project Area	✓	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked land may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked land. As such, LSEs may occur to ornithological terrestrial ecology features of the Humber Estuary SPA.

European Site	Terrestrial ecology feature	Distance from the Onshore Project Area	Screened In?	Rationale
The Greater Wash SPA (Site code: UK9020329)	Little tern - breeding Common tern - breeding Sandwich tern - breeding Little gull – breeding and non-breeding Common scoter - non-breeding Red-throated diver - non-breeding	Within ZOI as the site is adjacent to areas of onshore activity and potential discharge zone	✓	It is considered unlikely that any direct impacts may occur from onshore activities. Indirect impacts relating to disturbance from noise, visual and light. However, some species (common scoter and red-throated diver) are not frequently present in the onshore areas or intertidal and are not likely to be affected. Additionally, the loss or degradation of supporting and functionally linked land may occur for little tern. Water pollution may occur as a result of HPF discharges which could affect prey species or supporting habitat. As such, LSEs may occur to ornithological ecology features of the Greater Wash SPA.
Hornsea Mere SPA (Site code: UK9006171)	Mute swan Gadwall	Approximately 8.6km from the Onshore Project Area	✓	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked land may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked land. As such, LSEs may occur to ornithological terrestrial ecology features of the Hornsea Mere SPA.

4.2.4.1 In-combination and transboundary effects

197. No potential for transboundary effects is present for the Onshore Project Area due to the Onshore area of the Project not being adjacent or within proximity to any internationally designated terrestrial areas.

198. There is potential for in-combination effects to arise in which other projects or plans could act collectively with works undertaken in the Onshore Project Area to affect terrestrial ecology and ornithology.

199. The Onshore Project Area could have additional impacts on terrestrial ecology and ornithology through interactions with other planned projects from:

- Disturbance / displacement of qualifying features of designated sites;
- Long term and temporary loss / fragmentation of functionally linked land;
- Introduction or spread of INNS; and
- Fatally injuring individuals.

200. These will be further considered for the sites and features screened into the Stage 2 assessment.

4.2.5 Summary for Terrestrial Ecology and Ornithology

201. There are no European Sites located within the Onshore Project Area, therefore there is no pathway for direct effects to occur. LSE as a result of direct effects on European Sites are screened out of this assessment.

202. LSE as a result of indirect effects to the Humber Estuary SPA (bittern only), and Humber Estuary Ramsar (natterjack toad only) either alone or in-combination are screened out of this assessment.

203. LSE to the Humber Estuary SPA and Ramsar (breeding and non-breeding bird assemblages), Hornsea Mere SPA and The Greater Wash SPA are screened into the next stage of assessment as a result of:

- Disturbance / displacement of Annex II Species;
- Long term and temporary loss of functionally linked land; and
- Indirect impacts through effects on designated habitats and prey species; and
- Fatally injuring individuals

204. A summary of sites and effect pathways screened for Terrestrial Ecology and Ornithology is set out in **Table 4-7**.

Table 4-7: Summary of sites and effects pathways screened in for Terrestrial Ecology and Ornithology

Site	Effect pathway	Construction	Operation and maintenance	Decommissioning	Rationale
Humber Estuary SPA / Ramsar	Disturbance / displacement	✓	✓	✓	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked land may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked land. As such, LSEs may occur to ornithological terrestrial ecology features of the Humber Estuary SPA / Ramsar, Hornsea Mere SPA and The Greater Wash SPA.
	Long term and temporary loss of functionally linked land	✓	✓	✓	
	Indirect impacts through effects on designated habitats and prey species	✓	✓	✓	
	Fatally injuring individuals	✓	✓	✓	
Hornsea Mere SPA	Disturbance / displacement	✓	✓	✓	
	Long term and temporary loss of functionally linked land	✓	✓	✓	
	Indirect impacts through effects on designated habitats and prey species	✓	✓	✓	
	Fatally injuring individuals	✓	✓	✓	

Site	Effect pathway	Construction	Operation and maintenance	Decommissioning	Rationale
The Greater Wash SPA	Disturbance / displacement	✓	✓	✓	
	Long term and temporary loss of functionally linked land	✓	✓	✓	
	Indirect impacts through effects on designated habitats and prey species	✓	✓	✓	
	Fatally injuring individuals	✓	✓	✓	

4.3 Sites Designated for Annex II Migratory Fish

4.3.1 Approach to Screening

205. Direct or indirect effects on Annex II migratory fish species may arise from the permanent or temporary physical presence or activities relating to the construction, operation or decommissioning of the wind farms and associated infrastructure. Potential effects include loss of habitat, disturbance and displacement.

206. As detailed in **Section 3.3**, this stepwise pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the Project along with listing potential effects on designated sites.

207. This HRA Screening only assesses pathways of effect for individual features. Stage 2 would consider the effect of the Project on the integrity of the European Site(s) as a whole.

208. This HRA screening exercise considers sites which meet the following criteria:

- The Project Area directly overlaps a site whose interest features include an Annex II migratory fish species;
- The distance between the Project Area and a site with a fish interest feature is within the range for which there could be an interaction e.g. the distance of the site from the source of suspended sediment is within the range at which sediment deposition could occur;
- The distance between the Project Area and resources on which the interest feature depends (i.e. an indirect effect acting through prey or access to habitat) is within the range for which there could be an interaction; and
- There is a likelihood that a foraging area or a migratory route will occur within the Project Area.

209. Information on SACs with Annex II migratory fish features as a qualifying feature is taken from SAC citations / Natura 2000 forms, conservation objectives, and other relevant information as published by the relevant SNCBs. Distances between the Project and SAC sites were measured in GIS (the shortest straight-line distance) using shapefiles downloaded from SNCB websites.

4.3.2 Pathways for LSE

210. The key factors that are considered in the HRA screening process are:

- Potential effects (source); and
- Proximity of source to feature (distance between the Project Area and either A) SACs; or B) the migration routes of Annex II fish species connected to SAC populations) (pathway and receptor).

211. **Table 4-8** details the potential effects in relation to the construction, operation and maintenance and decommissioning phases of the Project. The effects identified are based on the standardised pressure names outlined in Natural England's' Phase III Best Practice Advice for Evidence and Data Standards (Parker *et al.*, 2022).

Table 4-8: Summary of Potential Effects Identified for Annex II Migratory Fish Considered in the HRA Screening

Potential Effect	Construction	Operation and Maintenance	Decommissioning
Barrier to species movement (excl. EMF)	✓	x	✓
Changes in suspended solids (water clarity)	✓	✓	✓
Electromagnetic changes	x	✓	x
Physical change (to another seabed or sediment type)	✓	✓	✓
Smothering and siltation rate changes (Heavy)	✓	✓	✓
Smothering and siltation rate changes (Light)	✓	✓	✓
Underwater Noise	✓	x	x

212. During construction within the Onshore Project Area, activities which result in disturbance to rivers which connect to the Humber Estuary and the generation of suspended sediments have the potential to disturb and displace fish from supporting habitats and migratory routes.

213. During the construction within the Offshore Project Area, activities which result in disturbance to the seabed and the generation of suspended sediment have the potential to disturb and displace fish from supporting habitats or migratory routes.

214. The Onshore Project Area ZOI is considered to be approximately 1km for habitats and surface water flow (**Figure 2-1**). As such, there is potential for effects that originate in the terrestrial environment to transfer 1km into adjacent riverine and coastal environments. During the construction of the Onshore Project Area, activities which result in disturbance to rivers which connect to the Humber Estuary and the generation of suspended sediments have the potential to disturb and displace fish from supporting habitats and migratory routes.

215. EMF from subsea cables will not occur until they begin carrying electrical current (operation and maintenance) and are therefore screened out of the construction phase.

4.3.2.1 Potential effects during construction

216. The potential effects on migratory fish during construction that are screened in for LSE are:

- Barrier to species movement;
- Changes in suspended solids (water clarity);
- Physical change (to another seabed or sediment type);
- Smothering and siltation rate changes (Heavy);
- Smothering and siltation rate changes (Light); and
- Underwater Noise.

4.3.2.1.1 Barrier to species movement

217. Underwater noise generated by Offshore Project Area construction activities, such as piling and UXO clearance, has the potential to displace fish from supporting habitats or migratory routes by acting as a barrier. The potential effects of underwater noise are considered in **Section 4.3.2.1.5**. This effect has been screened in and will be assessed in Stage 2.

4.3.2.1.2 Changes in suspended solids (water clarity)

218. During construction activities, there may be a temporary increase in suspended sediment concentrations. Suspended sediment has the potential to impair respiratory, filter feeding or reproductive functions, including the disruption of migration / spawning activity. This effect has been screened in and will be assessed in Stage 2.

4.3.2.1.3 Physical change (to another seabed / sediment type)

219. During construction activities, there may be a temporary physical change to the seabed and sediment type within the ZOI. As such, the pressures of physical change (to another seabed type / to another sediment type) during the lifetime of the Project have been screened in and will be assessed in Stage 2.

4.3.2.1.4 Smothering and siltation rate changes (Light and Heavy)

220. During construction activities, there may be a temporary increase in suspended sediment concentrations. This sediment will then fall out of suspension, introducing a risk that fauna located at the seabed (or estuary bed) may be smothered. Smothering may alter the suitability of the benthos for Annex II fish feeding or spawning. This effect has been screened in and will be assessed in Stage 2.

4.3.2.1.5 Underwater Noise

221. Underwater noise generated by Offshore Project Area construction activities, such as piling and UXO clearance, has the potential to displace fish from supporting habitats or migratory routes by acting as a barrier. Whilst underwater noise modelling has not yet been undertaken for DBD, previous experience suggests that a maximum effect range from worst-case piling noise is likely to be 50km (assuming cumulative SEL causing temporary threshold shift (TTS) in hearing sensitivity for a stationary fish receptor) (Forewind, 2014, Barham and Mason, 2021). For context, DBA and DBB found a maximum piling noise impact range of 21km for fish (Forewind, 2014). Given that the DBD array area is >200km from shore at the nearest point, the piling for Wind Turbine Generators would not affect Annex II fish species within coastal waters. Offshore platforms outside of the array area may also form part of the final project design, with a potential offshore HVDC Collector Station (in the vicinity of Dogger Bank South) (see **Section 2**), which would likely be located approximately 140km from shore, again beyond the range of noise impact on estuarine and coastal species. Whilst no sites can be directly impacted by piling noise, individual Annex II fish species migrating within the 50km ZOI of piling from the Offshore Project Area may be affected. These affected individuals could theoretically be travelling to, or from, a riverine SAC for which they are an interest feature. SACs for which there is a reasonable likelihood of this occurring to an extent where an LSE cannot be ruled out will be screened in for this reason.

222. In contrast, previous experience suggests that worst-case UXO clearance may cause injury to fish to a range of approximately 1km (Barham and Mason, 2021). Whilst the impact range is lower, UXO clearance may be required in inshore coastal regions, the effect of UXO clearance will also be screened in for further assessment. Cumulative and medium to long term effects are not expected from UXO clearance as this is effectively an instantaneous event. This effect has been screened in and will be assessed in Stage 2. As specific surveys to identify potential locations of UXO will not be undertaken until the DCO is granted (and pre-construction), it is not yet known if UXO clearance will be required along the offshore export cable corridor.

4.3.2.2 Potential effects during operation and maintenance

223. The potential effects on migratory fish during operation and maintenance that are considered in the screening in for LSE are:

- Changes in suspended solids (water clarity);
- Electromagnetic changes;
- Physical change (to another seabed or sediment type);
- Smothering and siltation rate changes (Heavy); and
- Smothering and siltation rate changes (Light).

Electromagnetic changes

224. Subsea electrical cabling produces EMFs whilst in operation and carrying electrical current. These EMFs may affect Annex II fish migratory behaviours, as some species are considered to use the earth's geomagnetic field to orient themselves for migration. EMFs have the potential to interfere with the ability to detect the natural geomagnetic field. This effect has been screened in and will be assessed in Stage 2.

4.3.2.2.1 Physical change (to another seabed / sediment type)

225. During the operation and maintenance phase of the Project, the physical presence of turbine foundations and associated components (offshore platforms, export cables, array cables) will result in the loss or replacement of existing habitats. This will likely take the form of loss of soft substrate and replacement with hard substrate. The loss of habitat and introduction of new habitat may be of relevance to Annex II migratory species that use those habitats. As such, the pressures of physical change (to another seabed type / to another sediment type) during the lifetime of the Project have been screened in and will be assessed in Stage 2.

4.3.2.2.2 Changes in suspended solids (water clarity)

226. During operation and maintenance activities (e.g. subsea cable repair), there may be a temporary and localised increase in suspended sediment concentrations. Suspended sediment has the potential to impair respiratory, filter-feeding or reproductive functions, including the disruption of migration / spawning activity. This effect has been screened in and will be assessed in Stage 2.

4.3.2.2.3 Smothering and siltation rate changes (Light and Heavy)

227. During operation and maintenance activities (e.g. subsea cable repair), there may be a temporary increase in suspended sediment concentrations. This sediment will then fall out of suspension, introducing a risk that fauna located at the seabed (or estuary bed) may be smothered. Smothering may alter the suitability of the benthos for Annex II fish feeding or spawning. This effect has been screened in and will be assessed in Stage 2.

4.3.2.2.4 Underwater noise

228. No UXO clearance or pile driving is anticipated to occur at the operation and maintenance stage of the Project. The only sources of underwater noise at this stage arise from vessel movements related to intermittent maintenance activities and operational turbines. Previous underwater noise modelling suggests that impact ranges for these activities are highly localised (<50m) (Barham and Mason, 2021). As such, underwater noise effects and the barrier effects that they may produce during the operational phase of the Project have been screened out for further assessment.

229. Maintenance activities (particularly those involving maintenance to cables) during the operational phase may result in localised disturbance or displacement.

4.3.2.3 Potential effects during decommissioning

230. Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of smaller magnitude. The potential effects for Annex II migratory fish during decommissioning screened in for LSE are:

- Barrier to species movement;
- Changes in suspended solids (water clarity);
- Physical change (to another seabed or sediment type);
- Smothering and siltation rate changes (Heavy); and
- Smothering and siltation rate changes (Light).

231. Decommissioning may require the removal of foundation structures and either the cutting or removal of subsea cables resulting in physical disturbance, potential disturbance and displacement of impacts associated with increases in suspended sediment. Effects caused during decommissioning would be similar to those during the construction phase.

232. As with the operation and maintenance phase of the Project, no UXO clearance or pile driving is anticipated to occur at the decommissioning stage of the Project. Noise from other decommissioning activities is expected to have impact ranges of <50m (Barham and Mason, 2021). As such, underwater noise effects during the decommissioning stage of the Project have been screened out of further assessment.

233. For both Onshore and Offshore Project Areas, effects caused during decommissioning would be similar to those during the construction phase.

4.3.3 Identification of Sites and Features

4.3.3.1 Sites directly overlapping with the Project's boundaries

234. European sites which overlap with the boundaries of the Project Area will be taken forward for consideration of LSE. There are no sites that meet this criterion.

4.3.3.2 Sites within the ZOI of the Project's Effects

235. European sites with qualifying mobile features / species which are located within the potential ZOI of impacts associated with the Project will be taken forward for consideration of LSE. Sediment disturbance is likely to be highly localised, with sediment plumes settling rapidly within the water column within 10km of the disturbance origin. Underwater noise modelling conducted for other offshore wind farm EIAs, such as Dogger Bank Teesside A and B (Forewind, 2014) Sheringham Extension Project (SEP) and Dudgeon Extension Project (DEP) (Equinor, 2022) indicates that

the maximum distance at which moderate avoidance behaviour would occur from piling activities was 19km.

236. However, as a conservative estimate, all sites with fish-qualifying features within 50km of construction activities for the Offshore Project Area have been screened in for further assessment. On this basis, no further sites are screened in for determination of LSE.

237. European sites with qualifying mobile features / species which are located within the potential ZOI (1km for habitats and surface water flow, see **Section 85**) associated with the Onshore Project Area and will be taken forward for consideration of LSE. Construction, operation and maintenance and decommissioning activities for the Onshore Project Area may result in indirect effects as a result of contamination of habitats from pollution via water and air. On this basis, the following European sites meet this criterion for Annex II migratory fish and are screened in for determination of LSE (**Figure 4-4** displays the location of this site):

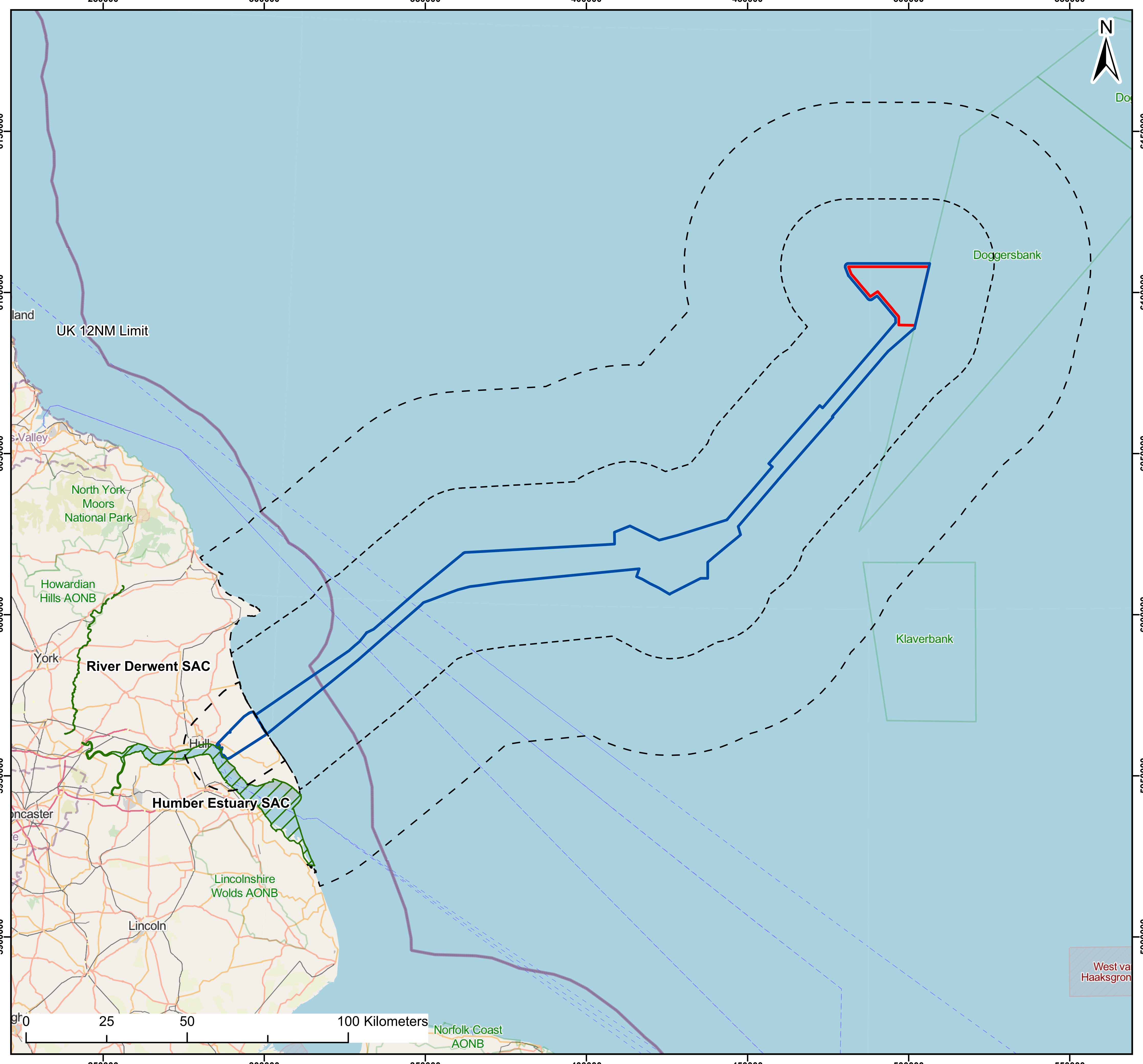
- Humber Estuary SAC – Sea lamprey *Petromyzon marinus* and river lamprey *Lampetra fluviatilis* (present as a qualifying feature, but not a primary reason for site selection).

- Humber Estuary Ramsar – Criterion 8 ‘The Humber Estuary acts as an important migration route for both river lamprey and sea lamprey between coastal waters and their spawning areas’.

4.3.3.3 Sites containing species whose range overlaps with the Project’s effects

238. Based on a review of available information the following Annex II species are known to either migrate through or spend part of their lifecycle in the North Sea; Atlantic salmon *Salmo salar*, allis shad *Alosa alosa*, twaite shad *Alosa fallax* and sea lamprey. Whilst river lamprey is found in the North Sea, it is restricted to coastal, and predominantly estuarine, waters (Canal & River Trust, 2023). Relatively little is known about the precise habitats occupied by adult sea lamprey and although adults are sometimes caught at sea, the precise conditions in which they occur have not been described. Most adults are found in freshwater, and spawning and larval life history stages occur in rivers. Sea lamprey habitat seems only to be important in relation to their ability to return to the spawning beds. Similarly, river lamprey are restricted to estuaries of major rivers when not in upstream river systems (Maitland, 2003). In order to undertake a conservative screening process, with consideration of potential in-combination interactions, all sites designated for such species on the east-coast of England have been considered. On this basis, the following site is screened in for determination of LSE (**Figure 4-4** displays the location of this site):

- River Derwent SAC – River lamprey (primary reason for selection of this site) and sea lamprey (present as a qualifying feature, but not a primary reason for site selection).



Legend:

- Dogger Bank D Array Area
- Project Area
- Special Area of Conservation (SAC)
- Onshore Project Area ZoI (10km)
- Annex I Offshore Sites ZoI (20km)
- Annex II Migratory Fish ZoI (50km)

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: SACs for Annex II Migratory Fish Features Screened in for Further Assessment

Figure: 4-4

Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0077

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	02/10/2023	GC	EB	A3	1:1,200,000
01	30/08/2023	JR	EB	A3	1:1,200,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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239. It should be noted that some sites on the east coast of England contain Annex II migratory fish species that are of ‘D’ grade, meaning that the species is present within the site but at a non-significant abundance (JNCC, 2023a). These are non-qualifying species and as such are not included within a site’s conservation objectives. Therefore, such sites have not been considered in this report.

4.3.4 Determination of LSE for Annex II Migratory Fish

240. Disturbance to supporting habitats due to the installation of infrastructure or due to temporary works will be localised within the Offshore Project Area. Sediment plumes and changes to seabed characteristics are expected to be restricted to within 15km of the Offshore Project Area.

241. Underwater noise, particularly from piling activity may cause behavioural effects to a range of 10’s of kilometres from the piling source and thus could affect a wide area. The Humber Estuary SAC is located approximately 22km south east of the export cable corridor at its closest point, approximately 140km from the nearest potential piling at an offshore HVDC Collector Station, and approximately 236km south-west of the DBD array areas at its closest point. As detailed in **Section 4.3.2.1.5**, a likely maximum effect range for piling noise (based on a worst-case TTS for stationary fish with swim bladders) is 50km from the piling source. In general, there is a lack of information available on hearing in lamprey and no reported audiograms exist. However, it should be noted that sea and river lamprey do not possess swim bladders, lack otolith organs and have a gelatinous skeleton and are therefore considered to have low noise sensitivity (Popper *et al*., 2014), meaning that the 50km impact range (based on highly sound sensitive fish species) can be considered conservative. As such, Project activities will not have a direct effect on the fish within the Humber Estuary SAC itself. Given that both river and sea lamprey are river / coastal dwelling species (JNCC, 2023a, 2023b) and the nearest potential piling at an offshore HVDC Collector Station (in the vicinity of Dogger Bank South) (see **Section 2.1**), which would likely be located approximately 140km from shore, there exists no pathway for LSE between piling activities for the Project and the features of the Humber Estuary SAC or River Derwent SAC.

242. As specific surveys to identify potential locations of UXO will not be undertaken until the DCO is granted (and pre-construction), it is not yet known if UXO clearance will be required along the offshore export cable corridor.

243. UXO clearance works are not included in the Project envelope i.e. will not be included with the DCO application. In the event that UXO clearance is required prior to the construction of the Project, a separate Marine Licence Application process will be undertaken which will provide a full assessment of effects to marine mammals (and will include site-specific underwater noise modelling). A Marine Wildlife Licence (or European Protected Species (EPS) licence) will also be applied for in the case of UXO clearance being required. While UXO clearance will be subject to a separate Marine Licencing process in the post-consent phase (should UXO clearance be required), an indicative assessment will be provided with the DCO application, based on underwater noise modelling of an estimated charge size. This is provided for information purposes

only, as the size and method of any UXO clearance will not be known until pre-construction surveys have been undertaken.

244. As such, the potential for UXO clearance to occur in coastal waters cannot be ruled out at this stage of the assessment (although the impact range for mortality and injury based on Popper *et al.* (2014) thresholds would likely be <1km. Therefore, there exists a pathway for LSE to occur between UXO clearance activities for the Project and the features of the Humber Estuary SAC and River Derwent SAC in the coastal waters immediately surrounding these SACs.

245. Sound levels associated with the Onshore Project Area and transferring into the adjacent waters are expected to be greatly reduced in comparison to offshore activities such as piling and UXO clearance. However, given the direct overlap of the Onshore Project Area with the Humber SAC and Ramsar, underwater noise associated with the Onshore Project Area will be considered further.

246. According to Natural England (March, 2022) river lamprey migrate from the North Sea to spawning sites within the River Ouse, River Derwent and Trent tributaries between November and March. Sea lamprey migrate from the North Sea to spawning grounds in the River Ouse catchment. To do so they travel through the Humber Estuary. These river catchments connect to the Humber Estuary at its western-most extent. The Onshore Project Area 1km ZOI for habitats and surface water flow overlaps with the Humber Estuary SAC or Ramsar site and so could potentially affect migratory fish present within the area. **Table 4-9** presents the findings of this HRA screening exercise with justification for the scoping of individual sites.

Table 4-9: Screening of European Sites designated for Annex II Migratory Fish

European Site	Annex II Migratory Fish Features	Distance from the Project	Screened In?	Rationale
River Derwent SAC (Site code: UK0030253)	Annex II species that are a primary reason for the selection of this site: **River lamprey** Annex II species present as a qualifying feature, but not a primary reason for site selection: **Sea lamprey**	56km west of the Offshore Project Area (inland)	✓ for: • Inshore UXO clearance associated with the Offshore Project Area • 1km ZOI effects associated with the Onshore Project Area	Individuals from the site may be disturbed / subject to mortality by potential UXO clearance in coastal waters. For other effect pathways, the features are beyond the range of potential direct impact from the Offshore Project Area, and interaction with individuals outside of the site with the Offshore Project Area's activities is unlikely. 1km ZOI effects from the Onshore Project Area will not overlap with this site, but will overlap with the shores of the Humber Estuary downstream of this site, and will be considered further at Stage 2.

European Site	Annex II Migratory Fish Features	Distance from the Project	Screened In?	Rationale
Humber Estuary SAC (Site code: UK0030170)	Annex II species present as a qualifying feature, but not a primary reason for site selection **Sea lamprey** **River lamprey**	22km south east of the Offshore Project Area Overlaps with the Onshore Project Area 1km ZOI.	✓ for: • Inshore UXO clearance associated with the Offshore Project Area • 1km ZOI effects associated with the Onshore Project Area	Individuals from the site may be disturbed / subject to mortality by potential UXO clearance in coastal waters. For other effect pathways, the features are beyond the range of potential direct impact from the Offshore Project Area, and interaction with individuals outside of the site with the Offshore Project Area's activities is unlikely. 1km ZOI effects from the Onshore Project Area cannot be ruled out at this stage and will be considered further at Stage 2.
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	**River lamprey** **Sea lamprey**	Overlaps with the Onshore Project Area 1km ZOI.	As for Humber Estuary SAC.	As for Humber Estuary SAC.

4.3.4.1 In-combination and transboundary effects

247. There is no potential for in-combination effects to arise in which other projects or plans could act collectively with the Onshore Project Area to affect migratory fish.

248. Due to the presence of several other offshore wind farms currently in the planning / pre-construction phase of their lifespans in the vicinity of the Project, there exists the potential for underwater noise changes from these projects to result in an in-combination effect on the Annex II Migratory Fish features of the Humber Estuary SAC and River Derwent SAC. Such impacts will be explored further in the next stage of the assessment.

249. **Table 4-10** details the closest distances between the Project's offshore area and those of the nearest transboundary SACs designated for Annex II Migratory Fish. Given the large distances to designated sites and the location of the Project away from coastal waters, it is considered that there would be no pathway for any significant transboundary impact upon migratory fish.

Table 4-10: The Distance between the Project Area and the Closest Point of the Boundary of the Nearest Transboundary SAC for Each Annex II Migratory Fish Species

Annex II Migratory Fish Species	SAC	Distance (km)
Atlantic Salmon	Vlakte van der Raan SCI	314
Sea Lamprey	Noordzeekustzone SAC	214
River Lamprey		
Allis Shad		
Twaite Shad		

4.3.5 Summary for Sites Designated for Annex II Migratory Fish

250. The sites screened in for further assessment, in relation to their Annex II migratory fish interest features are:

- The Humber Estuary SAC (River Lamprey and Sea Lamprey);
- The Humber Estuary Ramsar (River Lamprey and Sea Lamprey); and
- The River Derwent SAC (River Lamprey and Sea Lamprey).

251. These sites have been screened in for the effects of UXO clearance (from mortality to disturbance) in inshore areas of the export cable corridor. The 1km ZOI for habitats and surface water flow of the Onshore Project Area also overlaps with the Humber Estuary SAC and Ramsar sites and will be assessed further. Whilst the River Derwent SAC is beyond the range of the 1km ZOI for the Onshore Project Area, in acknowledgement that the Derwent flows into the Humber estuary where overlap does occur, the effects of the Onshore Project Area on the conservation objectives of the River Derwent SAC will also be considered further.

252. A summary of sites and effect pathways screened for Annex II fish species in is set out in **Table 4-11**.

Table 4-11: Summary of Sites and Effects Pathways Screened in for Annex II fish Species

Site	Relevant features	Effect pathway	Construction	Operation and maintenance	Decommissioning	Rationale
River Derwent SAC	River lamprey Sea lamprey	Inshore UXO clearance associated with the Offshore Project Area	✓	✓	✓	Individuals from the site may be disturbed / subject to mortality by potential UXO clearance in coastal waters.
		1km ZOI effects associated with the Onshore Project Area	✓	✓	✓	1km ZOI effects from the Onshore Project Area will not overlap with this site, but will overlap with the shores of the Humber Estuary downstream of this site, and will be considered further at Stage 2.
Humber Estuary SAC	River lamprey Sea lamprey	Inshore UXO clearance associated with the Offshore Project Area	✓	✓	✓	Individuals from the site may be disturbed / subject to mortality by potential UXO clearance in coastal waters.
		1km ZOI effects associated with the Onshore Project Area	✓	✓	✓	1km ZOI effects from the Onshore Project Area cannot be ruled out at this stage and will be considered further at Stage 2.

Site	Relevant features	Effect pathway	Construction	Operation and maintenance	Decommissioning	Rationale
Humber Estuary Ramsar	River lamprey Sea lamprey	Inshore UXO clearance associated with the Offshore Project Area	✓	✓	✓	Individuals from the site may be disturbed / subject to mortality by potential UXO clearance in coastal waters.
		1km ZOI effects associated with the Onshore Project Area	✓	✓	✓	1km ZOI effects from the Onshore Project Area cannot be ruled out at this stage and will be considered further at Stage 2.

4.4 Sites Designated for Annex II Marine Mammals

4.4.1 Approach to Screening

253. For marine mammals, the approach to HRA screening primarily focuses on the potential for connectivity between individual marine mammals from designated populations and the Offshore Project Area (i.e. demonstration of a clear source-pathway-receptor relationship). This is based on the distance of the Offshore Project Area from a European site, the range of each effect, the potential for animals from a European site to be within range of an effect, and the overall distribution and movement patterns of each marine mammal species.

254. As detailed in **Section 3.3**, this stepwise pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the Project along with listing potential effects on designated sites.

255. The HRA screening exercise therefore considers European sites (SCIs and SACs) which meet the following criteria:

- The distance between the potential effect of the Offshore Project Area and a European site with marine mammals as a qualifying feature is within the range for which there could be an interaction (see **Section 4.4.3** for more details on each species). For example, the distance is within potential effect ranges from underwater noise and therefore the site is within the area of effect for underwater noise effects;
- The distance between the Offshore Project Area and resources on which the qualifying marine mammal feature depends (i.e. an indirect effect acting through prey or access to habitat) is within the potential area of effect (for example the distance is within potential effect ranges); and
- The likelihood that a foraging area or a migratory route occurs within the area of effect of the proposed Project (applies to mobile interest features when outside the designated site).

256. Designated European sites that did not meet these criteria have been screened out from further assessment.

257. The approach taken was informed by HRA screening reports for Offshore Wind Farms (OWFs) recently submitted to the Planning Inspectorate (principally Dogger Bank South, North Falls, Dudgeon and Sheringham Shoal Extensions, East Anglia ONE North and East Anglia TWO), along with corresponding stakeholder feedback.

258. Assessment of species-specific risk to potential effects of OWFs is informed by industry-standard advice and guidance, relevant scientific papers, and representations from both applicants and stakeholders during DCO examinations for OWFs.

259. With respect to marine mammal designated features (namely harbour porpoise, bottlenose dolphin, grey seal and harbour seal), the screening considers any designated sites where the species is considered as a grade A, B or C feature. Grade D indicates a non-significant population, therefore these sites have not been considered further.

260. The approach to screening for seal species was undertaken based on the identified connectivity with SACs through tagging studies, SAC-specific population range and density estimates (e.g. Carter *et al.,* 2022) with identified connectivity for seal species.

261. The Moray Firth SAC, a designated site for bottlenose dolphins within the Celtic and Greater North Sea Management Unit (MU), was considered for screening, as evidence of possible connectivity was identified.

262. Information on SACs with marine mammals as a qualifying feature is taken from SAC citations / Natura 2000 forms, conservation objectives, and other relevant information as published by the relevant SNCBs. Advice on operations for marine protected areas was not considered necessary for screening but will be referred to as required for appropriate assessment.

263. Distances between the Project and SAC sites were measured in GIS (the shortest straight-line distance) using shapefiles downloaded from SNCB websites.

4.4.2 Pathways for LSE

4.4.2.1 Potential effects considered in screening

264. Direct or indirect effects on marine mammals may arise from permanent or temporary physical presence of the Project and / or activities relating to the construction, operation and maintenance or decommissioning of the Project and associated offshore infrastructure. Potential effects include indirect effects, for example through impacts on prey species, and direct effects, for example from underwater noise and vessel interactions.

265. The key factors considered during the HRA screening process are:

- Potential effects (source); and
- Proximity of source to feature (i.e. the distance between the potential effects and marine mammals from designated sites) (pathway and receptor).

266. **Table 4-12** presents a summary of the potential effects during construction, operation and maintenance and decommissioning considered in the HRA screening. Further information on each of the potential effects is provided in the following sections of this report.

Table 4-12: Summary of Potential Effects on Marine Mammals Considered in HRA Screening

Potential Impact	Construction	Operation	Decommissioning
Underwater noise: physical and auditory injury resulting from impact piling during construction	✓	x	x
Underwater noise: behavioural impacts resulting from impact piling during construction	✓	x	x
Underwater noise: physical and auditory injury resulting from operational wind turbine noise	x	✓	x
Underwater noise: behavioural impacts resulting from operational wind turbine noise	x	✓	x
Underwater noise: physical and auditory injury resulting from noise associated with other construction and maintenance activities (such as dredging and rock placement) and vessel noise	✓	✓	✓
Underwater noise: behavioural impacts resulting from other construction and maintenance activities (such as dredging and rock placement), and vessel noise (including disturbance to foraging areas)	✓	✓	✓
Underwater noise: barrier effects	✓	✓	✓
Disturbance at seal haul-out sites	✓	✓	✓
Vessel interaction (increase in risk of collision)	✓	✓	✓
Changes to prey resource	✓	✓	✓
Changes to water quality	✓	✓ (HPF only)	✓
Barrier effects from the physical presence of the wind farm during operation	x	✓	x
Effects from EMF during operation	x	x	x
In-combination effects	✓	✓	✓
Transboundary effects	✓	✓	✓

4.4.2.2 Potential effects during construction

267. The potential effects for marine mammals during construction that are screened in for LSE are:

- Underwater noise;
- Disturbance at seal haul-out sites;
- Vessel interaction;
- Changes to prey resources; and
- Changes to water quality.

4.4.2.2.1 Underwater noise

268. Activities that have the potential to generate underwater noise associated with the construction of the Project are:

- Piling of the foundations for the offshore substation;
- Installation of foundations (depending on the method used) for the wind turbines;
- Other construction activities such as seabed preparation, cable laying and rock placement; and
- Vessels.

269. The key potential effects during construction for marine mammals are expected to be those from underwater noise, which has the potential for LSE due to the following:

- Physical injury;
- Permanent auditory injury / permanent loss of hearing sensitivity (Permanent Threshold Shift (PTS));
- Temporary auditory injury / temporary loss in hearing sensitivity (TTS);
- Disturbance and behavioural effects;
- Effects on prey species;
- Disturbance to seals foraging at sea; and
- Barrier effects.

270. The potential for PTS and TTS due to other construction activities (such as dredging and rock placement), as well as construction vessels is not expected to be significant. Noise modelling undertaken for other offshore wind projects in the North Sea show PTS cumulative ranges (i.e. the noise over a period of 24 hours (PTS_{cum})[3]) to have the potential to cause PTS or TTS within 100m of the construction activity or vessel (with the exception of up to 500m or 1,000m for rock placement activities (for PTS and TTS respectively), or up to 150m or 250m for dredging (for PTS and TTS respectively)[4]. This is considered unlikely to be of significant risk to any marine mammal species, however, further assessment will be undertaken, as it is not currently possible to exclude the potential for LSE, and therefore this has been screened in.

271. Site-specific underwater noise modelling will be undertaken for all potential noise sources that could affect marine mammals. The assessments for piling will take into account soft-start and ramp-up procedures, as well as the number of piles to be installed each day, and the number that may be installed at the same time. It is expected that the underwater noise modelling will be undertaken using the Southall *et al*., 2019 thresholds as the current best practice.

272. There is potential for LSE associated with underwater noise, and this will be assessed in the HRA, taking into account the most recent and robust research, guidance and information available.

273. UXO clearance works are not included in the Project envelope i.e. will not be included with the DCO application. In the event that UXO clearance is required prior to the construction of the Project, a separate Marine Licence Application process will be undertaken which will provide a full assessment of effects on marine mammals (and will include site-specific underwater noise modelling). A Marine Wildlife Licence (or European Protected Species (EPS) licence) will also be applied for in the case of UXO clearance being required. While UXO clearance will be subject to a separate Marine Licencing process in the post-consent phase (should UXO clearance be required), an indicative assessment will be provided with the DCO application, based on underwater noise modelling of an estimated charge size. This is provided for information purposes only, as the size and method of any UXO clearance will not be known until pre-construction surveys have been undertaken.

274. Geophysical surveys are not included in the project envelope as they will follow the notification procedure for carrying out geophysical surveys as set out by the MMO. All geophysical surveys will follow the JNCC guideline for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017).

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[3] Based on either the National Marine Fisheries Services (NMFS) (2018) or Southall *et al*. (2019) thresholds.

[4] Including at Norfolk Boreas (Norfolk Boreas Limited, 2019), East Anglia ONE North (East Anglia ONE North Limited, 2019), both the Dudgeon Extension and Sheringham Shoal Extension Projects (Equinor New Energy Limited, 2022), and Hornsea Project Four (Orsted Hornsea Project Four Limited, 2021).

4.4.2.2.2 Disturbance at seal haul-out sites

275. Disturbance from landfall works and vessel transits to and from the Project and the local port has the potential to disturb seals at haul-out sites, depending on the route and proximity to the haul-out sites (**Figure 4-5**) (note that for DBA and DBB vessel mobilisation has been largely from international ports, with UK ports being used for crew transfers). There is however the potential for LSE due to disturbance at seal haul-out sites, and the assessment will take into account the most recent and robust research, guidance and information available.

276. Whilst seals from the haul-out sites swim to forage at sea, there is the potential to disturb them through the above-mentioned construction activities. This disturbance will also be determined.

4.4.2.2.3 Vessel interaction

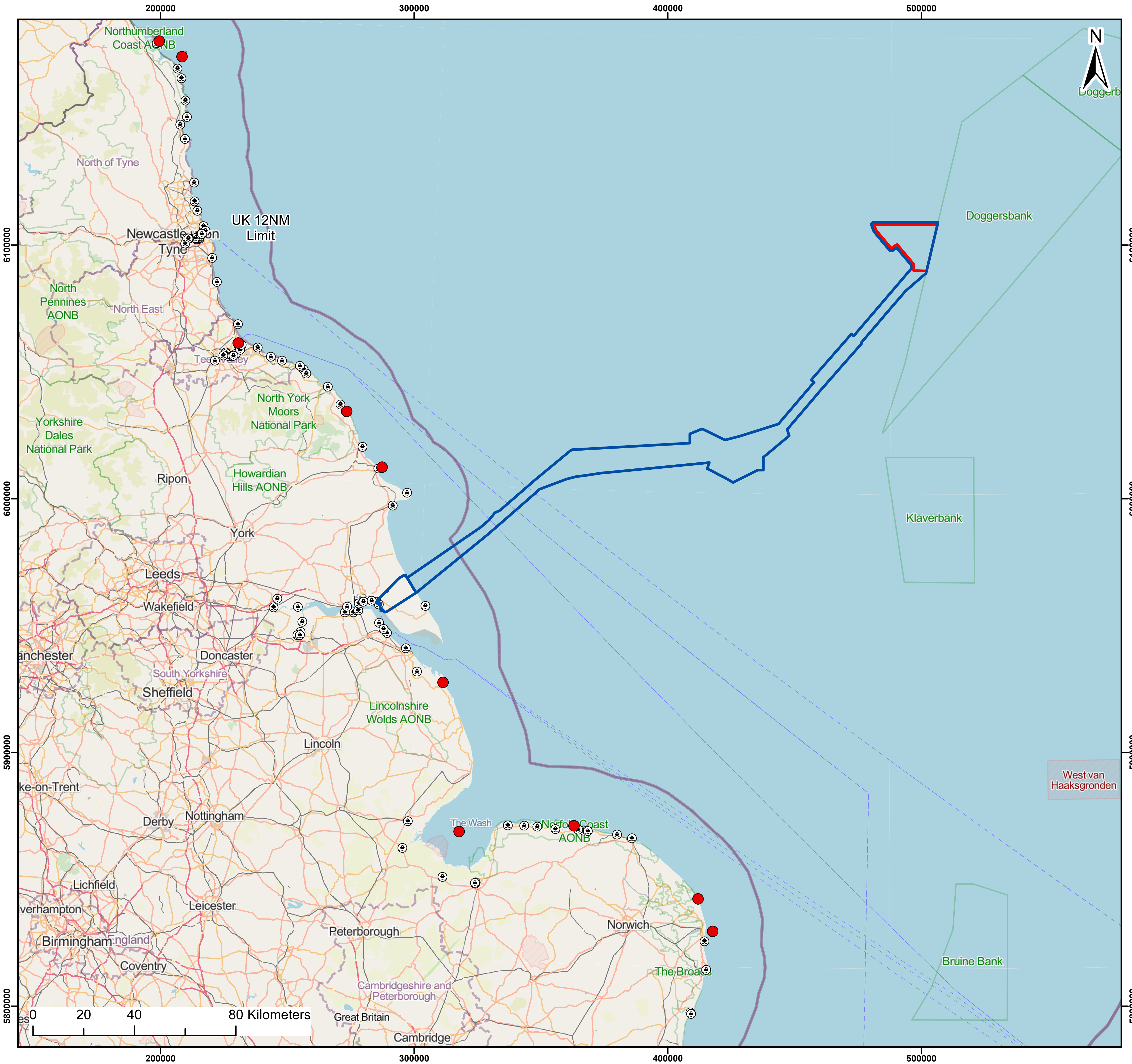
277. Despite the potential for marine mammals to detect and avoid vessels, ship strikes are known to occur (Wilson *et al.* 2007). An increase in vessels could potentially lead to an increase in vessel collision risk. Therefore, the potential for interactions / an increase in collision risk with construction vessels during the construction phase is also screened in, with the potential for LSE.

278. The increased risk of collision with marine mammals will be assessed further in the HRA.

4.4.2.2.4 Changes to Prey Resource

279. The potential effects on fish species and therefore the prey resource for marine mammals during construction can result from:

- Physical disturbance and temporary habitat loss of seabed habitat, spawning or nursery grounds or migration;
- Permanent habitat loss;
- Increased suspended sediments and sediment re-deposition;
- Re-mobilisation of contaminated sediment;
- Underwater noise effects on hearing sensitive species during pile driving and other activities (vessels, seabed preparation, cable installation etc); and
- Cumulative effects from underwater noise, permanent habitat loss, and changes to seabed habitat.



Legend:

- Dogger Bank D Array Area
- Project Area
- UK Ports
- Seal Haul-Out Sites

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Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Seal Haul-Out Sites and Port Locations in the Vicinity of the Project Location

Figure: 4-5 Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0086

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	02/10/2023	GC	SS	A3	1:1,500,000
01	25/05/2023	JR	LL	A3	1:1,500,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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280. While it is not expected that would be any potential for significant effect due to a change in prey, it is currently not possible to conclude there is no potential for LSE. Therefore, the potential for any changes to the prey resource for marine mammals during construction will be assessed further in the HRA, drawing as appropriate on information from other aspects of the environmental assessment, including fish ecology.

4.4.2.2.5 Changes to Water Quality

281. Potential changes in water quality during construction could occur through:

- Deterioration in water quality due to an increase in suspended sediment associated with seabed preparation for the installation of foundations, array, and interconnector cables;
- Deterioration in water quality due to an increase in sediment concentrations from drill arisings generated during the installation of piled foundations for wind turbines and OSP;
- Deterioration in water quality due to increases in suspended sediment associated with the installation of the offshore export cable; and
- Deterioration in water quality associated with the release of sediment-bound contaminants.

282. Increased suspended sediment is unlikely to have any direct or indirect impacts on marine mammals. Marine mammals often inhabit turbid environments, and cetaceans utilise sonar to sense the environment around them, and there is little evidence that turbidity affects cetaceans directly (Todd *et al*., 2014). Pinnipeds are not known to produce sonar for prey detection purposes; however, it is likely that other senses are used instead of, or in combination with, vision. Studies have shown that vision is not essential to seal survival, or the ability to forage (Todd *et al*., 2014). Therefore, any effects associated with an increase in suspended sediments are screened out.

283. Where impacts would occur during cable and foundation installation, the risk of sediment-bound contaminant release is significantly reduced by the coarse and sandy sediments in near- and offshore regions where low levels of contaminated sediments were identified. Previous studies carried out for both Creyke Beck A&B (DBA and DBB) and Teesside A&B (and Sofia) (Forewind, 2013; Forewind, 2014), have demonstrated a low risk of effects on water quality, however, the results of sediment sampling surveys for the Offshore Project Area will be reviewed to determine the potential for suspended sediments to be contaminated. While it is not expected that there would be a significant risk to any marine mammal species as a result of suspended contaminated sediments, this effect pathway will be screened in. It is likely that this particular effect pathway will be later screened out from further assessment once the survey results have been reviewed.

4.4.2.3 Potential effects during operation and maintenance

284. The potential effects for marine mammals during operation and maintenance with the potential for LSE are:

- Underwater noise;
- Disturbance at seal haul-out sites;
- Vessel interaction;
- Changes to prey resources;
- Changes to water quality; and
- Physical barrier effects.

285. The potential effects for marine mammals during operation that have no potential for LSE, and are therefore screened out, are:

- Effects due to EMF.

4.4.2.3.1 Underwater Noise

286. Potential sources of underwater noise during the operation and maintenance phase include:

- Operational noise from wind turbines;
- Maintenance activities, such as cable re-burial and any additional rock placement; and
- Operation and maintenance vessel activity.

287. The key potential effects during operation and maintenance for marine mammals are expected to be:

- Physical and auditory injury (PTS, TTS);
- Vessel interaction;
- Disturbance and behavioural effects;
- Effects on prey species; and
- Barrier effects.

288. Disturbance will be assessed for operational wind turbine noise as well as operation and maintenance activities such as dredging, and cable burial. The operation and maintenance activities are expected to be similar to other construction activities (see **Section 4.4.2.2**).

289. Physical and auditory injury resulting from noise associated with maintenance activities (such as cable re-burial and rock placement) and vessel noise during operation is considered unlikely to have the potential for a significant effect, as described in **Section 4.4.2.2**. However, this effect has been screened in for further site-specific assessment.

290. The potential effects associated with underwater noise during operation and maintenance (including disturbance and behavioural effects, effects on prey species and barrier effects) have the potential for LSE and will be considered further in the HRA.

4.4.2.3.2 Disturbance at Seal haul-out sites

291. Disturbance from onshore operation and maintenance activities, and vessel transits to and from the Project and the local port also has the potential to disturb seals at haul-out sites, depending on the route and proximity to the haul-out sites. The disturbance at seal-haul-out sites has the potential for LSE and will be considered for further assessment, which will take into account the most recent and robust research, guidance and information available.

4.4.2.3.3 Vessel Interactions

292. It is anticipated that the effects associated with vessel activities during operation and maintenance would be similar to, or less than those during the construction phase. Although the number of operation and maintenance vessels is lower, the timeframe in which they are present is much longer. Therefore, as outlined for construction, the increased risk of collision with marine mammals will be given further consideration in the HRA, as there is the potential for LSE.

4.4.2.3.4 Changes to Prey Resource

293. There is the potential for LSE to marine mammal species, as a result of effects on prey species. The potential effects on fish species (the prey resource for marine mammals) during operation and maintenance can result from:

- Permanent habitat loss;
- Temporary habitat loss / physical disturbance;
- Increased suspended sediments and sediment re-deposition;
- Re-mobilisation of existing contaminated sediments if present;
- Underwater noise and vibration;

- EMF;
- Introduction of hard substrate and associated fish aggregation; and
- Changes in fishing activity.

294. The potential for any changes to the prey resource for marine mammals during operation and maintenance will be assessed further in the HRA.

4.4.2.3.5 Changes to Water Quality

295. Potential changes in water quality during operation and maintenance could occur through:

- Reduction in water quality associated with the remobilisation of sediment-bound contaminants;
- Localised increases in suspended sediments;
- Reduction in water quality due to discharging and releasing treated water used in the hydrogen production process; and
- Accidental pollution.

296. As discussed in **Section 4.4.2.2,** sediment contamination level varies within the Offshore Project Area. Whilst in the Humber Estuary contaminant levels exceed due to high industry and port activities, they are of no concern to cause potential pollution (ABP, 2014). Low level of sediment contamination in the offshore region and the very low likelihood of any remobilisation of sediments occurring during operation and maintenance (see details in **Scoping Report Section 7.3.3.1**)., it is not considered that there would be the potential for LSE due to the remobilisation of existing contaminated sediments, for operational impacts associated with array infrastructure and export cables. Therefore, any effects associated with an increase in suspended sediments are screened out.

297. The operation of the HPF may involve the requirement for a discharge of water used in the hydrogen production process and also potentially an intake and offtake system for desalination. The potential effects of discharging and releasing treated water on marine water quality are expected to be highly localised but require further assessment and are therefore screened in.

298. With regard to the potential for accidental spillages, control measures as required under MARPOL will be in place, as well as standard good practice measures to be secured within a Project Environmental Management Plan. Therefore, the potential for effects on marine mammals as a result of any accidental spills are screened out of further assessment.

4.4.2.3.6 Physical Barrier Effect

299. The spacing between wind turbines would allow animals to move between infrastructure and through the operational wind farm site. This means that animals can be expected to move between infrastructure and through the operational wind farm, irrespective of layout.

300. Monitoring studies at Nysted and Rødsand have indicated that operational activities have had no impact on regional seal populations (Teilmann *et al.,* 2006; McConnell *et al.,* 2012). Tagged harbour seals have been recorded within two operational OWF sites (Alpha Ventus in Germany and Sheringham Shoal in the UK) with the movement of several of the seals suggesting foraging behaviour around wind turbines (Russell *et al.,* 2014). Both harbour porpoises and seals have been shown to forage within operational OWFs (e.g. Lindeboom *et al.,* 2011; Russell *et al.,* 2014), indicating no restriction to movements in operational OWF sites.

301. **Plate 4-1** shows tagged grey seal movements around the UK coastlines, from 114 grey seals (left) and 239 harbour seals (right).

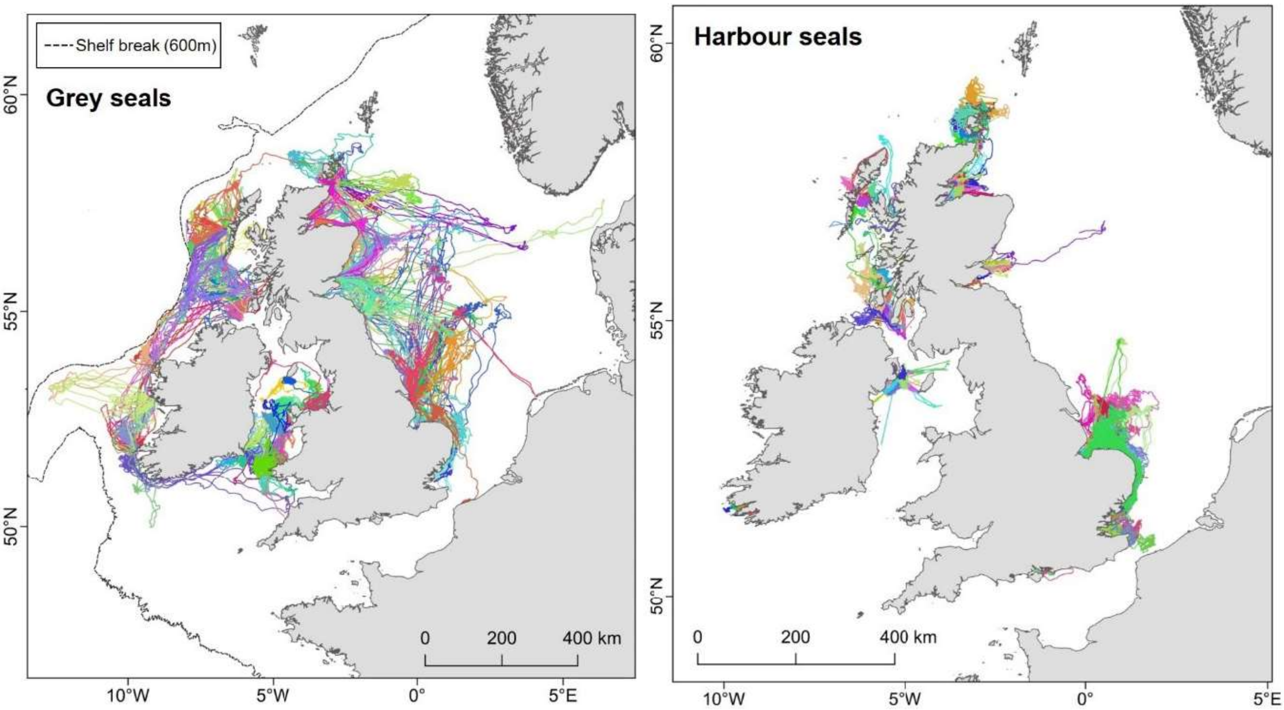


Plate 4-1: Tagged (a) Grey Seal and (b) Harbour Seal Movements along the East Coast of England (Carter *et al.*, 2020)

302. These tagging studies indicate that grey seals associated with haul-out sites on the east coast of England (including from the Humber Estuary SAC) forage at significant distances offshore, with grey seals travelling through the Project Area (Carter *et al.,* 2020). For harbour seals, the tagging studies show a smaller foraging range than for grey seals, with limited potential for connectivity with the Project Area. However, as noted above, seals are known to still utilise operational wind farm areas, and there is

no indication that the physical structures would cause a barrier to their movement or a reduction in their foraging.

303. Effects on harbour porpoises are more difficult to assess as various operational activities may influence the species differently. Teilman & Carstensen (2012) have found that harbour porpoises may habituate themselves to the wind farm post-construction (possibly due to habitat enrichment and reduced fishing) but the physical presence of the wind turbines is unlikely to create a barrier to the species (Tougaard *et al.,* 2005).

304. Research regarding physical barrier effects on dolphin species is limited, however the bottlenose dolphins in this Project Area are considered a coastal species (Hacket, 2022) and unlikely to be restricted in their movement as they are not known to utilise the offshore regions.

305. It is expected that turbine spacing would allow for marine mammals to transit through the wind farm site while maintaining distance between themselves and the infrastructure. There is limited potential for any significant disturbance (or barrier to movement) due to the physical presence of the infrastructure, however, this is currently screened in for further site-specific assessment. Considering the evidential presence of species in the wind farm array post-construction, the effects of physical barriers on all marine mammal species are not expected to be significant.

4.4.2.3.7 Effects from EMF

306. Information on the effects of EMF on marine mammals is limited, however, there is no evidence to date that marine mammal activity will change as a result of the presence of increased EMF in the environment from cables. Magnetic field intensities reduce as a function of distance from the source and are highly localised, decreasing rapidly with distance from the cable, from 7.85μT at 0m, to 1.47μT at 4m, based on the average wind farm inter-array cable buried 1m below the seabed (Normandeau *et al.,* 2011). This is well below the detectable level for magneto-receptive marine mammal species of 5uT (Normandeau *et al.,* 2011).

307. Direct effects of EMF on marine mammals are unlikely to cause LSE and will not be assessed further. However, the potential for EMF to affect prey has been screened in for further assessment, as discussed above.

4.4.2.4 Potential effects during decommissioning

308. It is anticipated that the decommissioning effects would be similar in nature to those of construction, although the magnitude of effect is likely to be lower depending on the method used during decommissioning.

309. Potential effects during decommissioning, with the potential for LSE and therefore screened in for further assessment include:

- Physical and auditory injury and behavioural effects resulting from underwater noise disturbance from vessels and barrier effects due to underwater noise;
- Disturbance at seal haul-out sites;
- Increase in risk of collision due to vessel interaction; and
- Changes to prey resources; and
- Changes to water quality.

4.4.3 Identification of Sites and Features

310. The following section details the process taken to identify the designated sites with relevant Annex II marine mammals to be taken forward for detailed determination of LSE.

311. The approach adopted for this HRA screening report focuses on the Annex II marine mammal features for which there is considered to be a potential for impact as a result of the Project. While pathways of effect for individual features are considered, the consideration for the HRA is acknowledged to be for the integrity of a designated site(s) as a whole.

312. HRA screening for marine mammals considers designated sites and potential in-combination effects within the relevant areas for each species. These are:

- Harbour porpoise *Phocoena phocoena* – North Sea MU (**Plate 4-2**);
- Bottlenose dolphin *Tursiops truncatus* – Coastal East Scotland MU (**Plate 4-7**);
- Grey seal *Halichoerus grypus;* and
- Harbour seal *Phoca vitulina.*

313. For grey seal and harbour seal, connectivity with UK SACs was determined based on the potential for seal presence as shown by each of the SAC-specific relative densities provided by Carter *et al*. (2022). For European designated sites with grey seal and harbour seal as a feature, connectivity was determined initially by the foraging ranges of each species, followed by consideration of their known movements as provided by various tagging studies.

314. **Table 4-14** provides the initial screening list for all designated sites, with either harbour porpoise, grey seal, harbour seal and bottlenose dolphin listed as a qualifying feature within the identified screening areas for each species.

Table 4-13: Summary of Sites and Effect Pathways, in order of Distance from the Offshore Project Area, screened in with the potential for LSE

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Southern North Sea SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	
Doggersbank SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal and grey seal	As for construction.	x	x	✓	
Humber Estuary SAC	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction	x	✓	x	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
		– Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects				
		As for construction.	x	x	✓	
Klaverbank SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal and grey seal	As for construction.	x	x	✓	
The Wash and North Norfolk Coast SAC	Harbour seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	
Doggerbank SCI **Berwickshire and North Northumberland Coast SAC**	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
		– In-combination effects – Transboundary effects				
	Harbour seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal	As for construction.	x	x	✓	
	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise	x	✓	x	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
		– Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects				
		As for construction.	x	x	✓	
Isle of May SAC	Grey Seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
		As for construction.	x	x	✓	
European sites for grey seal: – **Sylter Außenriff SCI** – **Noordzeekustzone SAC** – **Duinen Terschelling SAC** – **Duinen Vlieland SAC** – **Nationalpark Niedersachsisches Wattenmeer SAC** – **Duinen en Lage Land Texel SAC** – **Waddenzee SAC** – **Duinen Ameland SAC** – **Sydlige Nordsø SAC** – **SPA Ostliche Deutsche Bucht SPA** – **Nationalpark Niedersächsisches Wattenmeer SAC** – **Voordelta SAC and SPA** – **Duinen Goeree & Kwade Hoek SAC** – **Grevelingen SAC** – **Vlaamse Banken SAC** – **NTP S-H Wattenmeer und angrenzende Kustengebiete SAC** – **Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC** – **Vlakte van de Raan SAC** – **Oosterschelde SPA and SAC** – **Helgoland mit Helgolander Felssockel SAC** – **Westerschelde & Saeftinghe SAC** – **Vlakte van de Raan SCI** – **Steingrund SAC** – **Bancs des Flandres SAC** – **Dünenlandschaft Süd-Sylt SAC** – **Küsten- und Dünenlandschaften Amrums SAC** – **Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC** – **Hamburgisches Wattenmeer SAC**	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
– **Recifs Gris-Nez Blanc-Nez SAC** – **Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC** – **Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC** – **Baie de Canche et couloir des trois estuaires SAC** **Estuaires et littoral picards (baies de Somme et d'Authie) SAC**						
Moray Firth SAC	Bottlenose dolphin	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

4.4.3.1 Harbour Porpoise

315. A large-scale survey of the presence and abundance of cetacean species around the north-east Atlantic undertaken in the summer of 2016 (the SCANS-III survey; Hammond *et al*., 2021) shows harbour porpoise to be present in the relevant survey block (Block O) within which the Offshore Project Area is located. The Joint Cetacean Protocol Phase III report (Paxton *et al*., 2016) and distribution maps of cetacean species within the north-east Atlantic (Waggitt *et al*., 2019) show similar results.

316. In addition, surveys carried out for Teesside A&B (now known as DBC and Sofia) (Forewind, 2014) between January 2010 and January 2012, harbour porpoise was by far the most commonly encountered marine mammal during these surveys. Surveys carried out for offshore Creyke Beck (now known as DBA and DBB) (Forewind, 2013) reported similar findings between November 2009 and July 2011.

317. One year of offshore aerial surveys for the Project have been undertaken (October 2021 to September 2022) where harbour porpoise was the most frequently recorded marine mammal, recorded every month, with a total of 577 animals.

318. Harbour porpoise within the eastern North Atlantic are generally considered to be part of a continuous biological population that extends from the French coastline of the Bay of Biscay to northern Norway and Iceland (Tolley and Rosel, 2006; Fontaine *et al*., 2007, 2014; IAMMWG, 2022). However, for conservation and management purposes, it is necessary to consider this population as smaller, discrete MUs.

319. The Offshore Project Area is located in the North Sea MU, which has an estimated harbour porpoise abundance of 346,601 (IAMMWG, 2022).

320. MUs provide an indication of the spatial scales at which effects of plans and projects alone, and in-combination, need to be assessed for the key cetacean species in UK waters, with consistency across the UK (IAMMWG, 2022). The IAMMWG defined three MUs for harbour porpoise: North Sea (NS); West Scotland (WS); and the Celtic and Irish Sea (CIS).

321. The Project is located within the North Sea MU (**Plate 4-2**). Therefore, this HRA screening considers any European sites within the North Sea MU which have harbour porpoise as a qualifying feature of the designation. All European sites beyond the North Sea MU have been screened out from further consideration.

322. The export cable corridor to the offshore collector platform as part of the Offshore Project Area lies in the summer area of the Southern North Sea SAC and is the designated area of the SAC that has persistently higher densities of harbour porpoise during the summer months (April to September inclusive).

323. There is potential connectivity for harbour porpoise from the Doggersbank SAC, Doggerbank SAC and Klaverbank SAC.

4.4.3.2 Grey Seal

324. Grey seals are utilising the North Sea along the north-east coast of England, with a few haul-out sites situated along the coast. Grey seals are wide-ranging and can breed and forage in different areas (Russell *et al*., 2013). Carter *et al*., 2020 gained GPS tracking data for seals, 114 grey seals were tagged. Foraging trips generally occur within 100km of their haul-out sites, although grey seals can travel up to 448km (Carter *et al*., 2022) offshore to forage. Haul-out clusters of abundances are found nearshore of the east coast of England but modelled hotspots are extending all the way to the fringes of Dogger Bank (Russel *et al*., 2017; Carter *et al*., 2022). Grey seals generally travel between known foraging areas and back to the same haul-out site, but will occasionally move to a new site. **Plate 4-2** shows tagged seal movements along the east coast of England and indicates that grey seal travel between haul-out sites along the east coast of England, as well as to Scotland.

325. One year of offshore aerial surveys for the Project has been undertaken (October 2021 to September 2022) and the second-year data is expected later this year. There were only six individual grey seals recorded within the study area over the entire survey period. These observations were also made during surveys for Teesside A&B (now known as DBC and Sofia) (Forewind, 2014) between January 2010 and January 2012, where grey seals were typically below 15 throughout the year.

326. Donna Nook is located in the Humber Estuary SAC, which is the largest grey seal breeding site in England, and one of the biggest in the UK, provides an important area for grey seal pup production (see **Plate 4-3**) (Carter *et al*., 2022) and breeding (SCOS, 2021). Densities in this area are particularly high (see **Plate 4-4**) and indicate how far the ranges from this population reach. Just north of the Humber estuary lies the Holderness coast where a survey recorded 78 grey seals for the Humber Offshore OWF (RPS Planning Transport & Environment, 2005).

327. The SAC-specific relative density maps show that within the HRA Offshore Project Area, there is the potential for grey seal to be present from the Humber Estuary SAC, with significantly increased relative densities close to landfall (**Figure 4-6**), the Berwickshire and North Northumberland Coast SAC (**Figure 4-7**), Isle of May SAC (although in limited number) (**Figure 4-8**). Therefore, within the UK, these three grey seal SACs will be screened in for further assessment. All assessments will utilise this SAC-specific density data when quantitative assessments are possible.

328. To take the wide range and movements of grey seals into account, all European sites within the potential foraging range of grey seal have been considered.

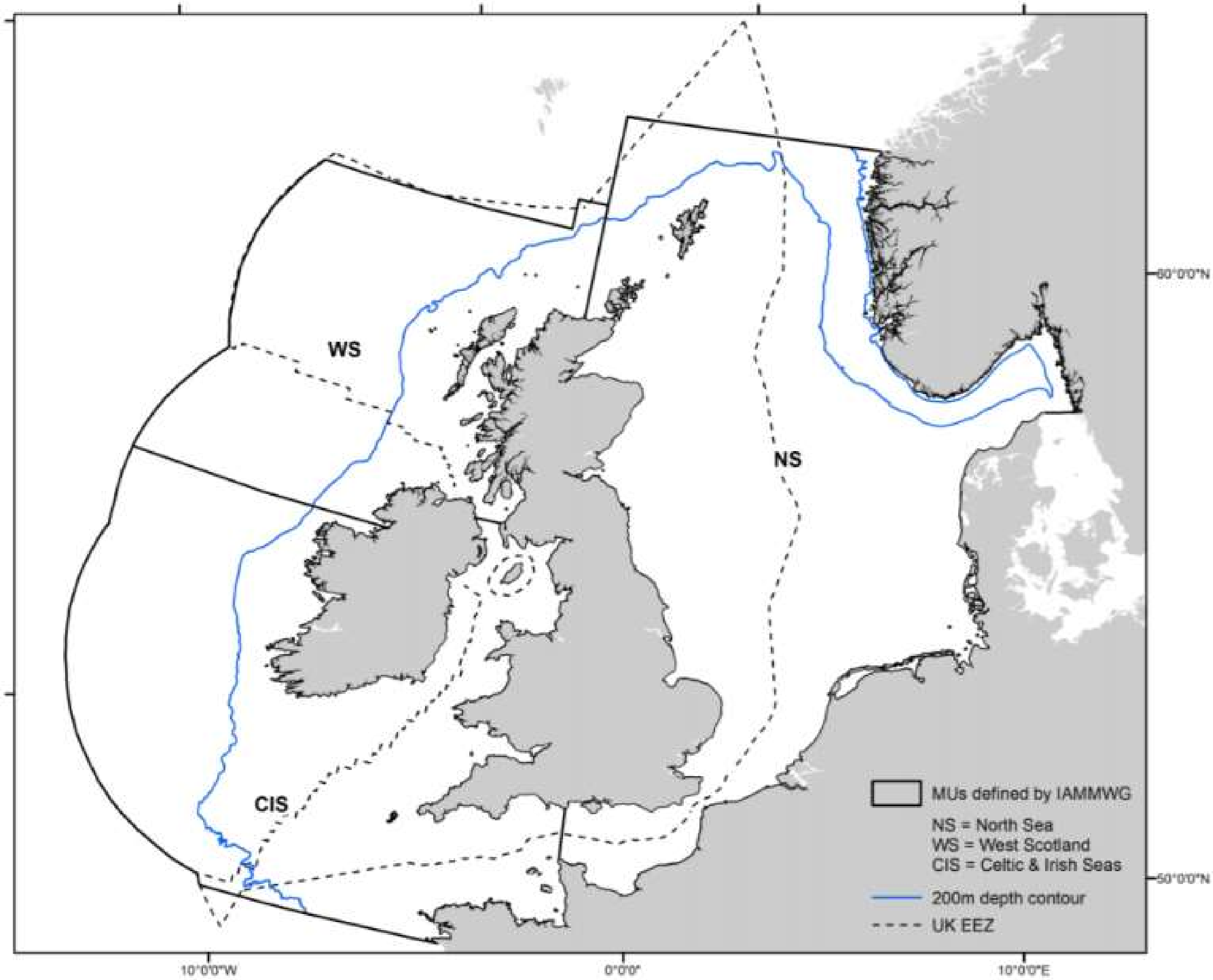


Plate 4-2: Grey Seal Management Units (IAMMWG, 2023)

329. There is potential of connectivity from grey seals in the Netherlands to the UK, as satellite-tracked individuals have been shown to utilise the entire southern North Sea, swimming long distances as far as Shetland (Brasseur *et al*., 2017). Individuals tagged in eastern France moved to known colonies on the north-east coast of the UK and the North Sea (Vincent *et al*., 2017). Furthermore, tagged grey seal pups from Germany have also been observed moving across the North Sea to UK waters, further indicating the potential connectivity between countries (Peschko *et al*., 2020). Thus, all SACs from France, Belgium, Netherlands, and Germany, listed in **Table 4-14**, cannot be screened out and will be considered for further assessment.

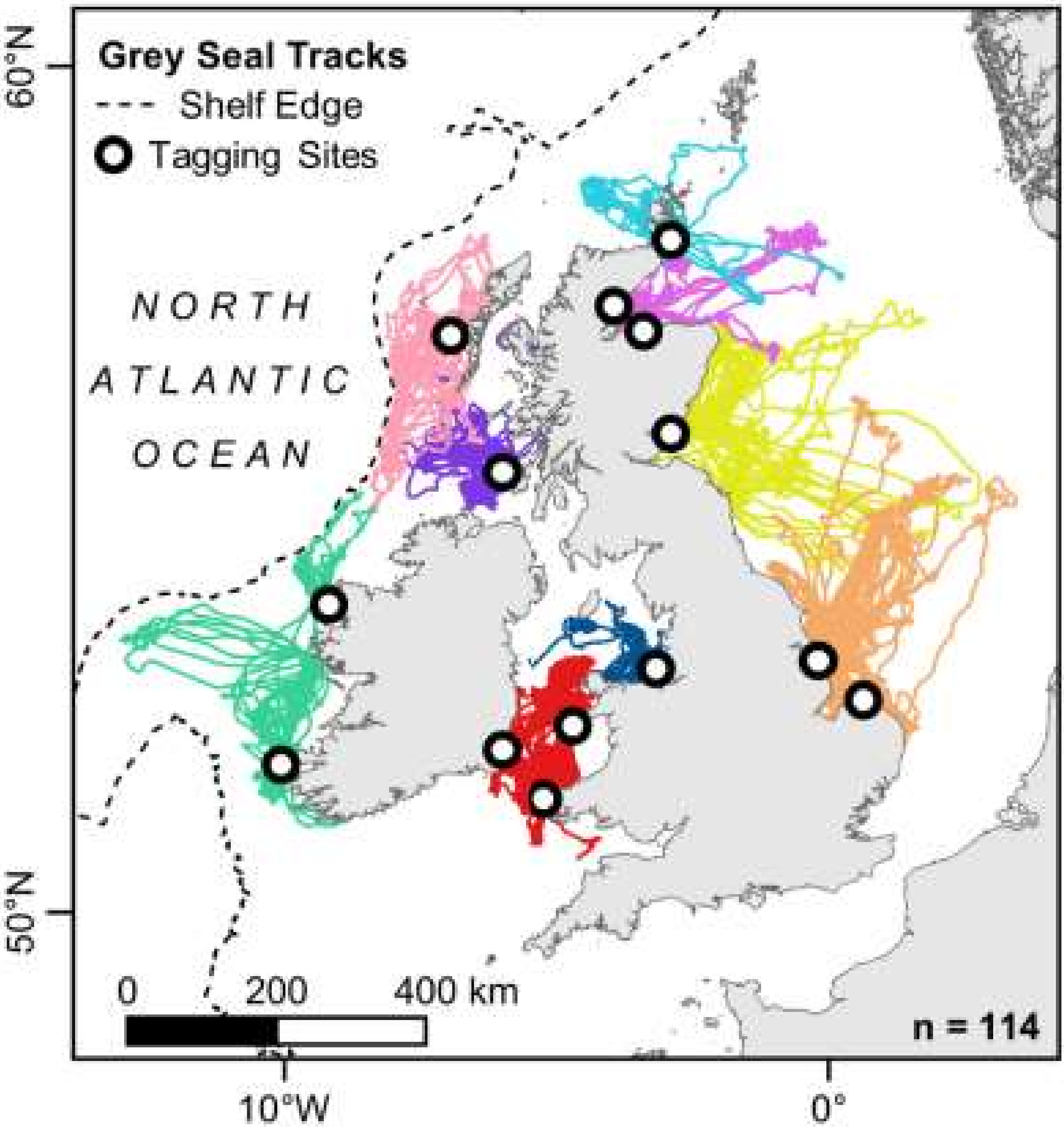


Plate 4-3: Satellite Tracking Data for Grey Seals Available for Habitat Preference Models (Carter *et al.*, 2022)

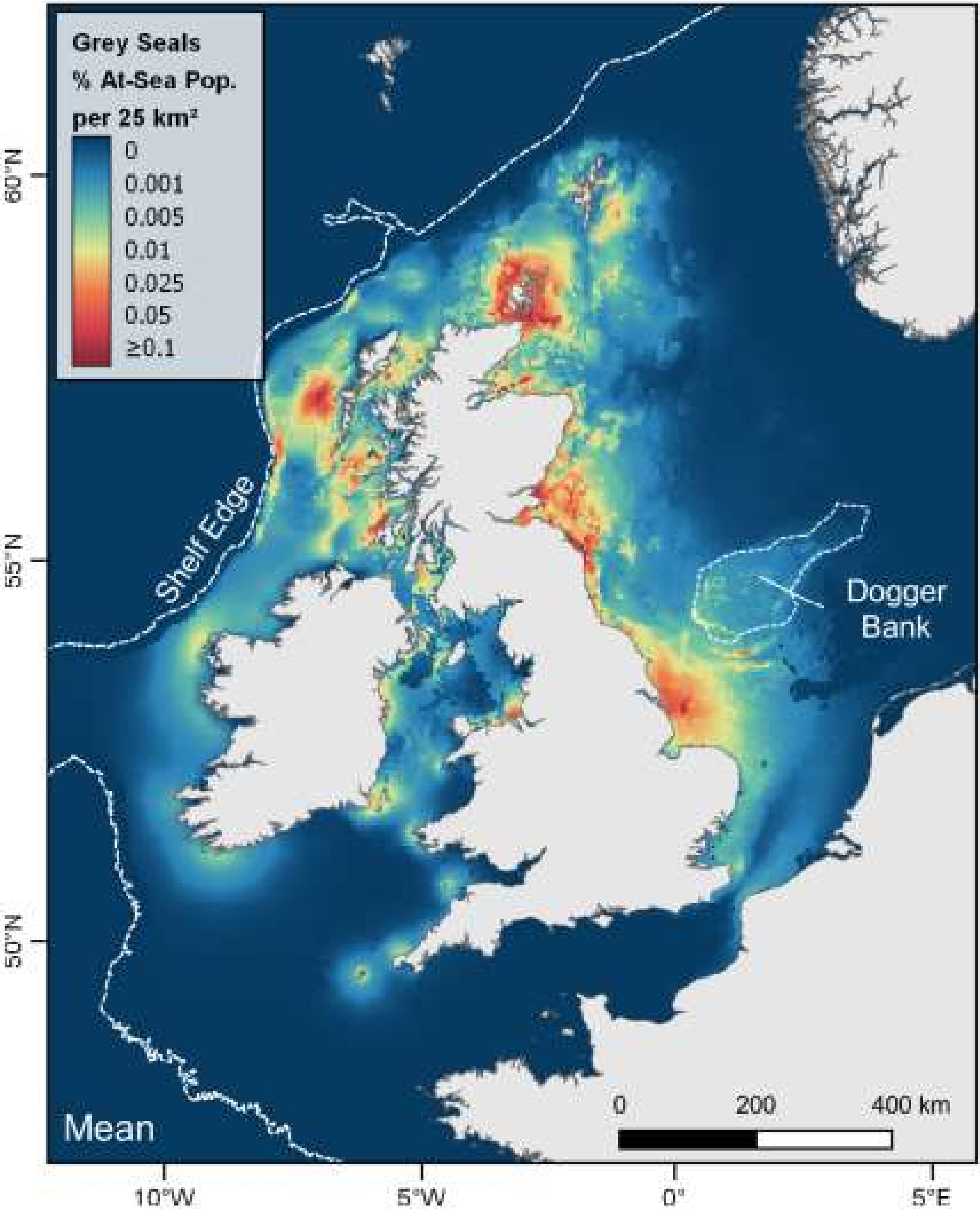
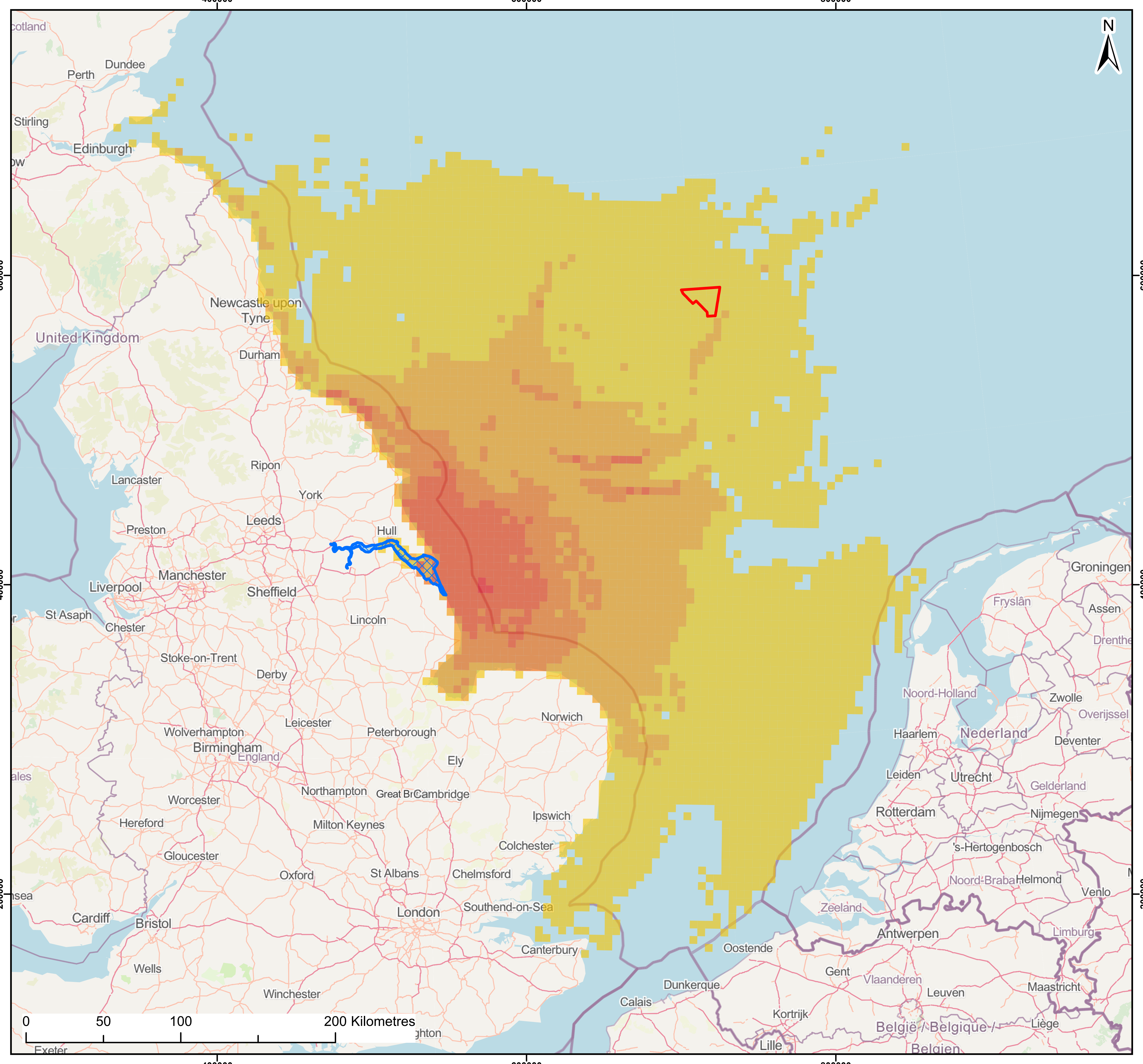


Plate 4-4: Density Map of at-sea Grey Seals from Haul-outs in the UK and Ireland (Carter *et al.*, 2022)



Legend:

Dogger Bank D Array Area

Humber Estuary Special Area of Conservation (SAC)

Relative Seal Densities - % of grey seal population in each 5x5km grid square (Carter *et al*., 2002)

- <0.001
- 0.0011 - 0.01
- 0.011 - 0.05
- 0.051 - 0.1
- 0.11 - 0.5
- >0.5

Client:	Project:
Dogger Bank D Offshore Wind Farm	DOGGER BANK WIND FARM

Title:

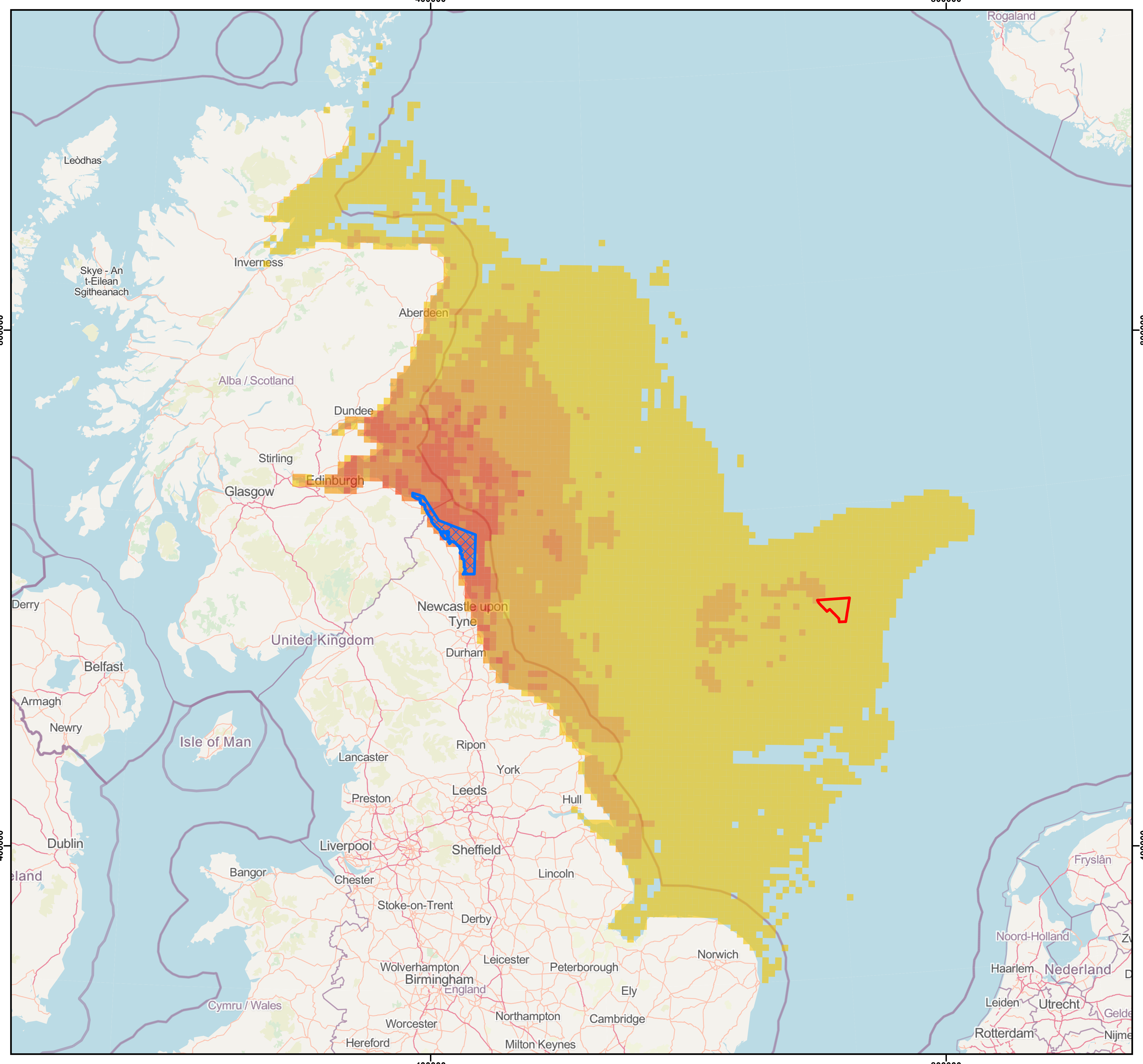
Grey seal Relative Densities for Individuals Associated with the Humber Estuary SAC

Figure:	Drawing No:
4.6	PC3991-RHD-OF-ZZ-DR-Z-0003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:2,500,000

Co-ordinate system: British National Grid

sse Renewables equinor



Legend:

Dogger Bank D Array Area

Berwickshire and North Northumberland Coast Special Area of Conservation (SAC)

Relative Seal Densities - % of grey seal population in each 5x5km grid square (Carter *et al.*, 2002)

- < 0.001
- 0.0011 - 0.01
- 0.011 - 0.05
- 0.051 - 0.1
- 0.11 - 0.5
- 0.51 - 1.0
- >1.0

Client: Dogger Bank D Offshore Wind Farm

Project: DOGGER BANK WIND FARM

Title: Grey seal Relative Densities for Individuals Associated with the Berwickshire and North Northumberland Coast SAC

Figure: 4.7

Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0004

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:3,000,000

Co-ordinate system: British National Grid

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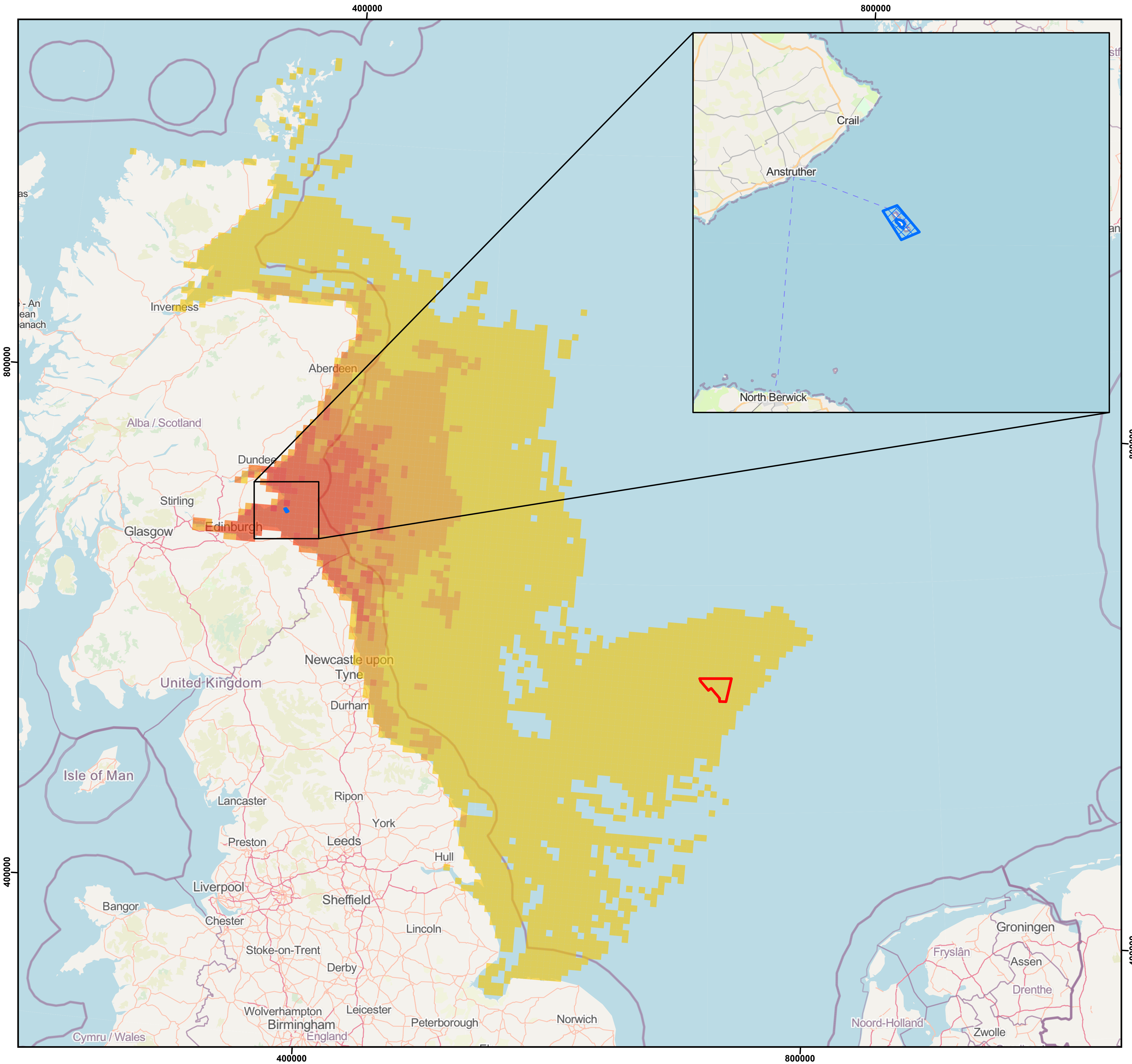

Legend:

Dogger Bank D Array Area

Isle of May Special Area of Conservation (SAC)

Relative Seal Densities - % of grey seal population in each 5x5km grid square (Carter *et al.*, 2002)

<0.001

0.0011 - 0.01

0.011 - 0.05

0.051 - 0.1

0.11 - 0.5

0.51 - 1

>1

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Contains OS data © Crown copyright and database right, 2021.
OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Client: Dogger Bank D Offshore Wind Farm

Project: DOGGER BANK WIND FARM

Title: Grey seal Relative Densities for Individuals Associated with the Isle of May SAC

Figure: 4.8

Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0005

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:3,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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4.4.3.3 Harbour Seal

330. Harbour seals are utilising the North Sea along the north-east coast of England, with a few haul-out sites situated along the coast. Harbour seals are more localised to their specific haul-out site and concentrate in coastal and inshore waters. Particularly high abundances are in The Wash, from which they can forage up to 273km (Carter *et al*., 2022).

331. The Sea Mammal Research Unit (SMRU), in collaboration with others, deployed around 344 telemetry tags on harbour seals around the UK between 2001 and 2012. The spatial distributions indicate harbour seals persist in discrete regional populations, display heterogeneous usage, and generally stay within 50km of the coast (Russell and McConnell, 2014).

332. Other tracking studies have shown that harbour seals travel 50-100km offshore and can travel 200km between haul-out sites (Lowry *et al*., 2001; Sharples *et al*., 2012). The range of these trips varies depending on the location and surrounding marine habitat. The typical and average foraging range for harbour seal is 50-80km (SCOS, 2017). However, new information from Carter *et al.* 2022 details how harbour seal foraging ranges could reach up to 273km (see tracking data in **Plate 4-5**).

333. No harbour seals were recorded in the 12-month aerial surveys of the Project, nor in surveys carried out for Creyke Beck (now known as Dogger Bank A & B) (Forewind, 2013). Nine harbour seals were identified in surveys carried out for Teesside A&B (now known as DBC and Sofia) between January 2010 and January 2012 (Forewind, 2014). North of the Humber estuary lies the Holderness coast where a survey was carried out for the Humber Offshore OWF recorded 8 harbour seals (RPS Planning Transport & Environment, 2005).

334. The Wash SAC, 77km south of the landfall site, provides breeding and haul-out habitat for the largest colony of harbour seals, totalling 7% of the UK population (JNCC, 2023a) (see **Plate 4-6**).

335. The SAC-specific relative density maps show that within the HRA Offshore Project Area, there is the potential for harbour seal to be present from The Wash and North Norfolk Coast SAC, with significantly increased relative densities close to landfall, and a limited presence within the offshore array area; as in **Figure 4-9**. Therefore, within the UK, for harbour seal, only The Wash and North Norfolk Coast SAC will be screened in for further assessment. All assessments will utilise the SAC-specific density data when quantitative assessments are possible.

336. To take the wide range and movements of harbour seal into account, all European sites where harbour seal is a qualifying feature within the recorded harbour seal foraging range have been considered.

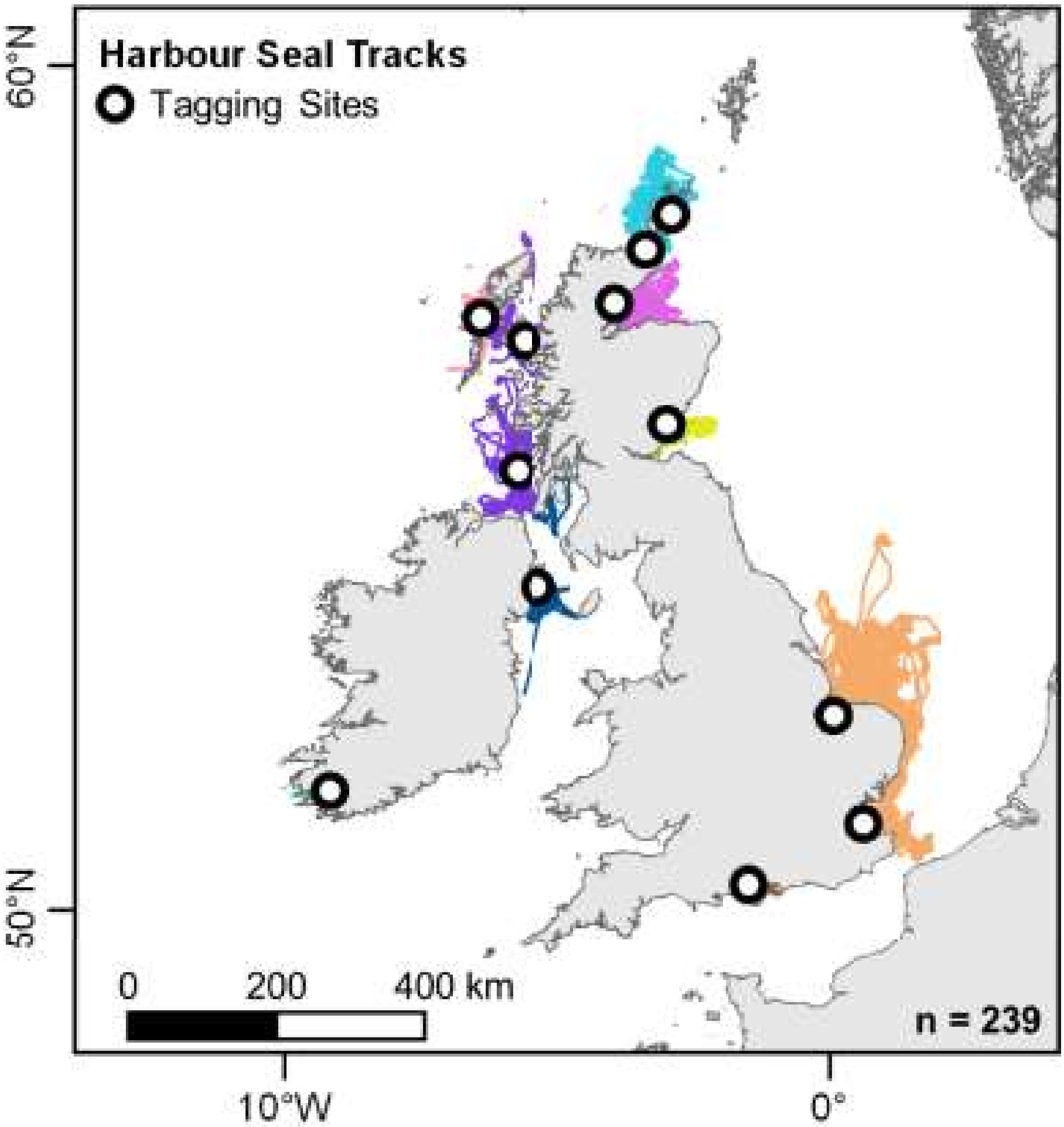


Plate 4-5: Satellite Tracking Data for Harbour Seals Available for Habitat Preference Models (Carter *et al.,* 2022)

337. Harbour seals are considered to move little between haul-out sites and exchange between populations in the three Wadden Sea countries (Germany, Denmark and the Netherlands). A Danish tagging study by Tougaard *et al*. (2003) confirmed this, as some tagged seals remained more local in the area just west of the Wadden Sea. However, there was substantial variation between individuals, in particular the pups which explored areas of more than 10,000km^2 (max. 72,000km^2). A French telemetry study equally stated that harbour seals did not move to other known colonies and remained highly coastal (max. 100km radius from haul-out site) (Vincent *et al.,* 2017). Based on the unlikely connectivity between harbour seals from Germany, Denmark, Belgium, the Netherlands, France and the Project, it is suggested that the relevant SACs for harbour seals are screened out from further assessment. The exception to this would only be the Doggersbank SAC, Doggerbank SAC and Klaverbank SAC due to the immediate vicinity of the DBD Development Area. Designated sites screened in for harbour seal are listed in **Table 4-14**.

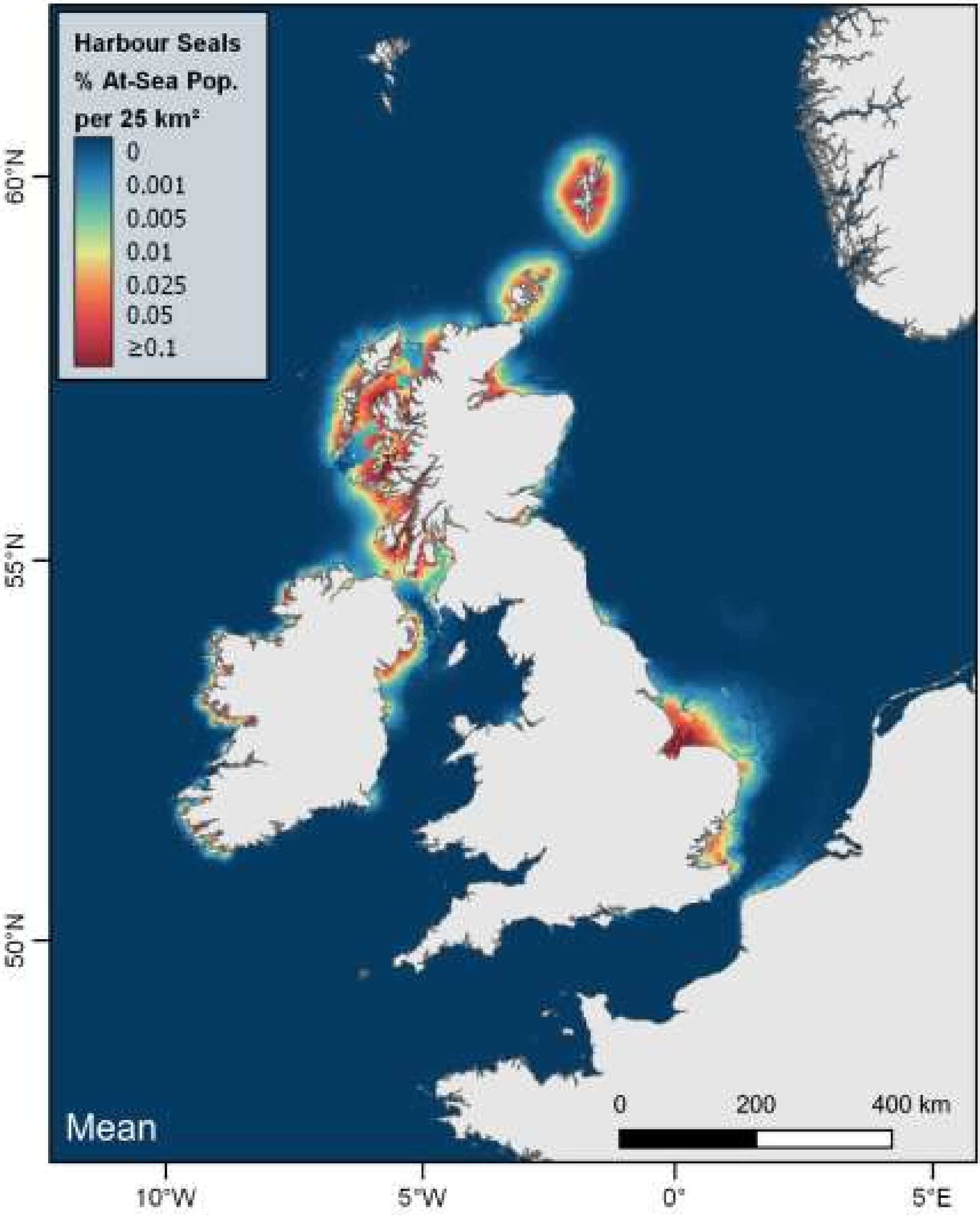
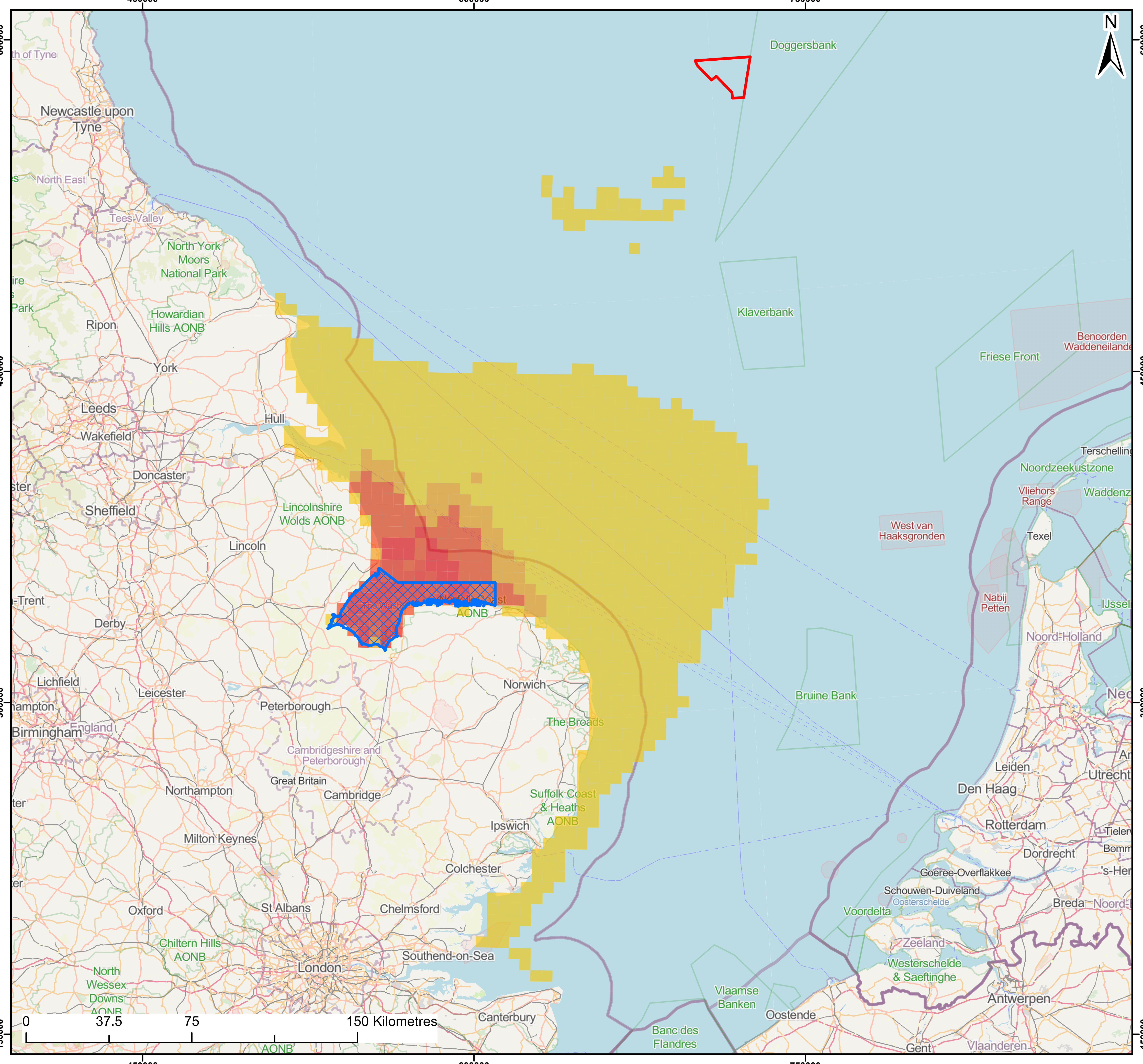


Plate 4-6: Density Map of at-sea Harbour Seals from Haul-outs in the UK and Ireland (Carter *et al.*, 2022)



Legend:

- Dogger Bank D Array Area
- The Wash and North Norfolk Coast Special Area of Conservation (SAC)

Relative Seal Densities - % of grey seal population in each 5x5km grid square (Carter *et al.*, 2002)

- <0.001
- 0.0011 - 0.1
- 0.11 - 0.2
- 0.21 - 0.5
- 0.51 - 1.0
- 1.1 - 1.5
- >1.5

Client: Dogger Bank D Offshore Wind Farm

Project: DOGGER BANK WIND FARM

Title: Harbour seal Relative Densities for Individuals Associated with The Wash and North Norfolk Coast SAC

Figure: 4.9

Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0007

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:1,750,000

Co-ordinate system: British National Grid

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4.4.3.4 Bottlenose dolphin

338. A large-scale survey of the presence and abundance of cetacean species around the north-east Atlantic undertaken in the summer of 2016 (the SCANS-III survey; Hammond *et al*., 2021) shows bottlenose dolphins to be present in the survey block adjacent (block R) to the survey block in which the Offshore Project Area is located (block O). Density models in the Joint Cetacean Protocol Phase III report (Paxton *et al.* 2016) validate the observations of small numbers of bottlenose dolphins concentrated in the Moray Firth.

339. The Moray Firth SAC in Northeast Scotland supports the only known resident population of bottlenose dolphins in the North Sea (JNCC, 2023) ranging from 68 to 114 individuals, as identified between the survey years 2002 and 2010 (Chenney *et al*., 2012). The population is estimated to be around 130 individuals, with individuals being present within the site year-round (JNCC, 2023).

340. In recent years an increase in bottlenose dolphins along the coastline of north-east England has been reported (Aynsley, 2017; Hacket, 2022). They have been recorded approximately 300 miles outside of what would be considered their 'normal' home range (Cheney *et al*. 2018), with one individual from the Moray Firth population being recorded as far south and east as The Netherlands (Aynsley, 2017).

341. The bottlenose dolphins sighted in north-east England appear to be a coastal population at present (Hacket, 2022), and thus have the potential to be affected by activities taking place in the nearshore area, such as the export cable corridor and at landfall.

342. Bottlenose dolphins have not been sighted in the most recent site-specific survey for the Project, nor in other OWF surveys in the Dogger Bank area such as Teesside A&B (now known as DBC and Sofia) (Forewind, 2014) or Creyke Beck (now known as DBA and DBB) (Forewind, 2013). Albeit the distance of nearly 500km between the SAC and the Offshore Project Area, it is assumed that all bottlenose dolphins affected would be from the Coastal East Scotland MU (CES MU) (**Plate 4-7**), with a reference population of 224 animals ((IAMMWG, 2022).

343. The Moray Firth SAC is the only designated site screened in for bottlenose dolphin (see **Table 4-14**).

4.4.3.5 Summary of all SACs within the marine mammal screening areas

344. **Table 4-14** summarises the designated sites within the harbour porpoise, bottlenose dolphin, grey seal and harbour seal screening areas.

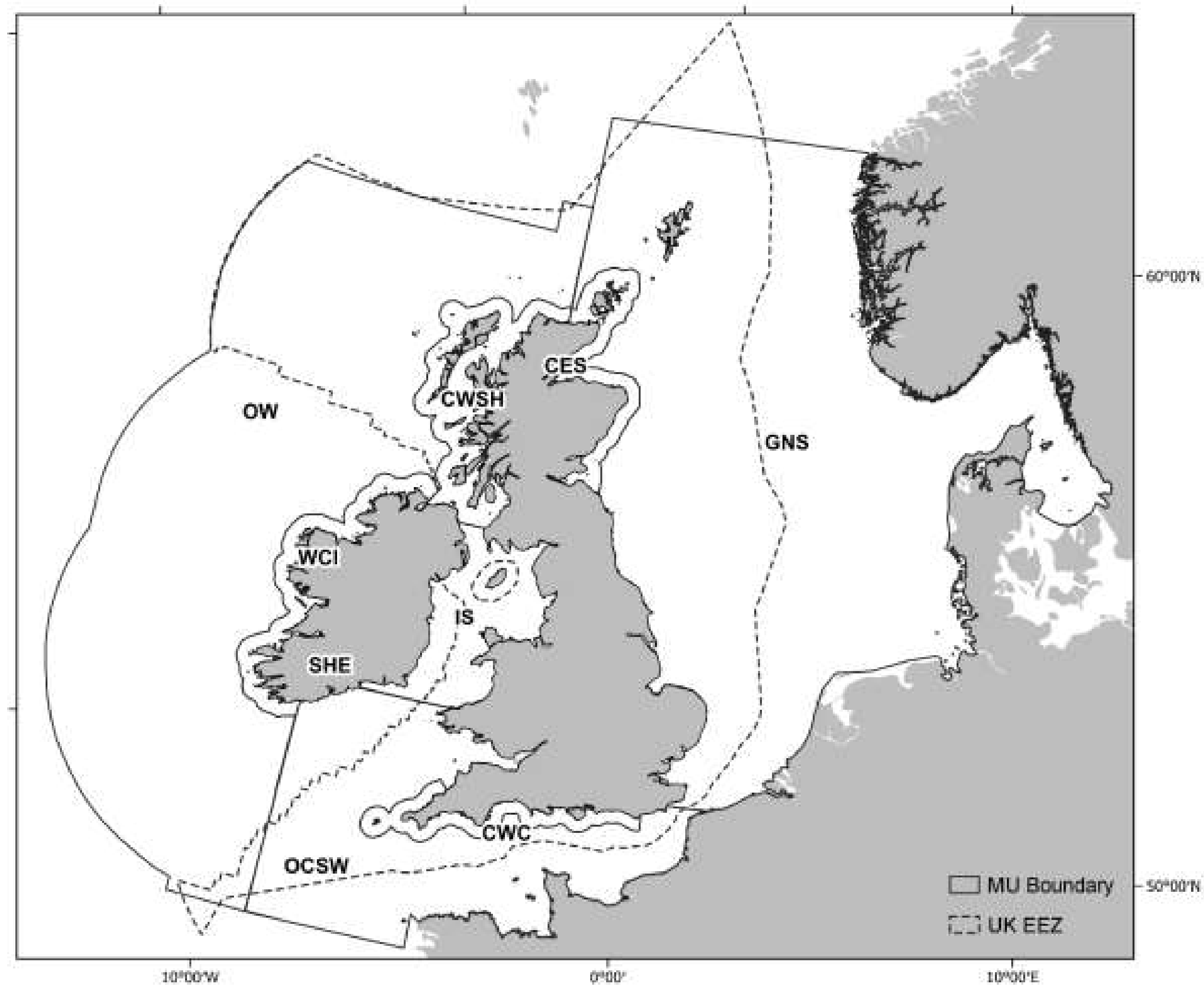


Plate 4-7: Management Units for Bottlenose Dolphin (IAMMWG, 2023)

Table 4-14: Screening of European Sites for Marine Mammal Features

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
BEMNZ0001	Belgium	**Vlaamse Banken SAC**	Harbour porpoise Harbour seal Grey Seal	309	North Sea MU and within grey seal foraging ranges	✓ for grey seal **x** for harbour seal and harbour porpoise	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that where there would be any potential for direct or indirect effects, alone or in-combination, for harbour seal and harbour porpoise.
BEMNZ0002	Belgium	**SBZ 1 / ZPS 1 SPA**	Harbour seal	344	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that where there would be any potential for direct or indirect effects, alone or in-combination.
BEMNZ0005	Belgium	**Vlakte van de Raan SCI**	Harbour porpoise Grey seal Harbour seal	326	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour seal and harbour porpoise	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that where there would be any potential for direct or indirect effects, alone or in-combination for harbour seal and harbour porpoise.
DK00EY133	Denmark	**Agger Tange, Nissum Bredning, Skibsted Fjord Og Agerø SAC**	Harbour seal	366	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DK00FX122	Denmark	**Ålborg Bugt, Randers Fjord Og Mariager Fjord SAC**	Harbour seal	612	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00DX146	Denmark	**Anholt Og Havet Nord For SAC**	Harbour seal Grey seal	670	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
DK00EX026	Denmark	**Dråby Vig SAC**	Harbour seal	417	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00VA259	Denmark	**Gule Rev SAC**	Harbour porpoise	379	North Sea MU	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00FX257	Denmark	**Havet Omkring Nordre Rønner SAC**	Harbour seal Grey seal	595	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
DK003X202	Denmark	**Hesselø Med Omliggende Stenrev SAC**	Harbour seal Grey seal	736	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DK00FX113	Denmark	**Hirsholmene, Havet Vest Herfor Og Ellinge Å's Udløb SAC**	Harbour seal Grey seal	576	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species
DK00EY124	Denmark	**Løgstør Bredning, Vejlerne Og Bulbjerg SAC**	Harbour seal	414	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00EY134	Denmark	**Lovns Bredning, Hjarbæk Fjord Og Skals, Simested Og Nørre Ådal, Samt Skravad Bæk SAC**	Harbour seal	456	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00FX123	Denmark	**Nibe Bredning, Halkær Ådal Og Sønderup Ådal SAC**	Harbour seal	452	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00FX112	Denmark	**Skagens Gren og Skagerrak SAC**	Harbour porpoise	505	North Sea MU	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00FX010	Denmark	**Strandenge På Læsø Og Havet Syd Herfor SAC**	Harbour seal Grey seal	605	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DK00VA258	Denmark	**Store Rev SAC**	Harbour porpoise	471	North Sea MU	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DK00VA347	Denmark	**Sydlige Nordsø SAC**	Harbour porpoise Grey seal Harbour seal	242	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Grey seal will therefore be considered further in the HRA assessments, harbour seals however are screened out, alone or in-combination, as discussed in **Section 4.4.3.** The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise
DK00AY176	Denmark	**Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC**	Harbour porpoise Grey seal Harbour seal	314	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise
DK00CY040	Denmark	**Venø, Venø Sund SAC**	Harbour seal	395	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
FR5300017	France	**Abers – Côtes Des Legendes SAC**	Grey seal Bottlenose dolphin	914	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
FR3102005	France	**Baie de Canche et couloir des trois estuaires SAC**	Harbour porpoise Grey seal Harbour seal	414	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
FR5300015	France	**Baie De Morlaix SAC**	Grey seal	849	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR2502020	France	**Baie de Seine occidentale SAC**	Harbour porpoise Harbour seal Bottlenose dolphin	600	North Sea MU and OSPAR Region II	**x** for all species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for all species.
FR2502021	France	**Baie de Seine orientale SAC**	Harbour porpoise Harbour seal	572	North Sea MU and OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
FR2500077	France	**Baie Du Mont Saint-Michel SAC**	Harbour seal Grey seal Bottlenose dolphin	772	North Sea MU and OSPAR Region II	**x** for all species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
FR3102002	France	**Bancs des Flandres SAC**	Harbour porpoise Grey seal Harbour seal	331	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
FR2502018	France	**Banc et Récifs de Surtainville**	Bottlenose dolphin	719	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR5300020	France	**Cap Sizun SAC**	Grey seal	974	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR2500079	France	**Chausey SAC**	Grey seal Bottlenose dolphin	744	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
FR5302007	France	**Chaussée de Sein SAC**	Grey seal Bottlenose dolphin	967	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
FR5300009	France	**Cote De Granit Rose-Sept-Iles SAC**	Grey seal Bottlenose dolphin	809	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
FR5302006	France	**Cotes de Crozon SAC**	Grey seal	955	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR3100482	France	**Dunes de l'Authie et Mollieres de Berck SAC**	Harbour seal	435	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR3100474	France	**Dunes De La Plaine Maritime Flamande SAC**	Harbour seal	356	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR3100480	France	**Estuaire De La Canche, Dunes Picardes Plaquees Sur L'ancienne Falaise, Foret D'hardelot Et Falaise D'equihen SAC**	Harbour seal	410	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
FR2300121	France	**Estuaire de la Seine SAC**	Harbour seal	573	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR2200346	France	**Estuaires et littoral picards (baies de Somme et d'Authie) SAC**	Grey seal Harbour seal	435	OSPAR Region II	✓ for grey seal **x** for harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour seal.
FR3100478	France	**Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC**	Harbour porpoise Grey seal Harbour seal	380	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
FR5300018	France	**Ouessant-Molene SAC**	Grey seal	920	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR2500088	France	**Marais du Cotentin et du Bessin - Baie Des Veys SAC**	Grey seal Harbour seal	639	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
FR5300019	France	**Presqu'ile De Crozon SAC**	Grey seal	953	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
FR2500085	France	**Récifs et Marais Arrière-Littoraux du Cap Lévi À la Pointe de Saire SAC**	Grey seal Harbour seal Bottlenose dolphin	625	OSPAR Region II	**x** for all species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
FR3102003	France	**Recifs Gris-Nez Blanc-Nez SAC**	Harbour porpoise Grey seal Harbour seal	367	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
FR3102004	France	**Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC**	Harbour porpoise Harbour seal Grey seal	374	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
FR5300010	France	**Tregor Goëlo SAC**	Grey seal	811	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DE2104301	Germany	**Borkum-Riffgrund SCI**	Harbour porpoise	230	North Sea MU and OSPAR Region II	**x** for all species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for all species.
			Grey seal				
			Harbour seal				
DE1003301	Germany	**Doggerbank SCI**	Harbour porpoise	67	North Sea MU and OSPAR Region II	✓	This site is within the harbour seal foraging distance (273km) of DBD. Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
			Harbour seal				
DE1115391	Germany	**Dünenlandschaft Süd-Sylt SAC**	Grey seal	333	North Sea MU and OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
DE2016301	Germany	**Hamburgisches Wattenmeer SAC**	Harbour porpoise	355	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
			Grey seal				
			Harbour seal				
DE1813391	Germany	**Helgoland mit Helgolander Felssockel SAC**	Harbour porpoise	321	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
			Grey seal				
			Harbour seal				

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DE2507301	Germany	**Hund und Paapsand SCI**	Harbour seal	311	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DE1315391	Germany	**Küsten- und Dünenlandschaften Amrums SAC**	Grey seal	337	OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
DE2424302	Germany	**Muhlenberger Loch / Nesssand SAC**	Harbour seal	474	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DE2306301	Germany	**Nationalpark Niedersachsisches Wattenmeer SAC**	Harbour porpoise Grey seal Harbour seal	272	North Sea MU and OSPAR Region II	✓ for grey seal x for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that where there would be any potential for direct or indirect effects, alone or in-combination, for harbour seal.
DE0916391	Germany	**NTP S-H Wattenmeer und angrenzende Kustengebiete SAC**	Harbour porpoise Grey seal Harbour seal	311	North Sea MU and OSPAR Region II	✓ for grey seal x for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DE2323392	Germany	**Schleswig-Holsteinisches Elbastuar und angrenzende Flachen SAC**	Harbour seal	385	North Sea MU and OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
DE1011401	Germany	**SPA Ostliche Deutsche Bucht SPA**	Harbour porpoise Grey seal Harbour seal	262	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Harbour seals however are screened out, as discussed in **Section 4.4.3.** The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
DE1714391	Germany	**Steingrund SAC**	Harbour porpoise Grey seal Harbour seal	328	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
DE1209301	Germany	**Sylter Außenriff SCI**	Harbour porpoise Grey seal Harbour seal	207	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Harbour seals however are screened out, as discussed in **Section 4.4.3**. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
DE2018331	Germany	**Unterelbe SAC**	Harbour porpoise Harbour seal	387	North Sea MU and OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
DE2507331	Germany	**Unterems und Aussenems SAC**	Harbour seal	311	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
NL2008001	Netherlands	**Doggersbank SAC**	Harbour porpoise Grey seal Harbour seal	0 (adjacent to array area)	North Sea MU and OSPAR Region II	✓	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
NL3009005	Netherlands	**Duinen Ameland SAC**	Grey seal	237	OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
NL2003060	Netherlands	**Duinen en Lage Land Texel SAC**	Grey seal	228	OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
NL9801079	Netherlands	**Duinen Goeree & Kwade Hoek SAC**	Grey seal Harbour seal	300	OSPAR Region II	✓ for grey seal **x** for harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour seal.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
NL2003059	Netherlands	**Duinen Terschelling SAC**	Grey seal	223	OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
NL2003061	Netherlands	**Duinen Vlieland SAC**	Grey seal	226	OSPAR Region II	✓	This site is within the grey seal foraging distance (448km) of DBD.
NL4000021	Netherlands	**Grevelingen SAC**	Grey seal Harbour seal	306	OSPAR Region II	✓ for grey seal **x** for harbour seal	This site is within the grey seal foraging distance (448km) of DBD. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
NL2008002	Netherlands	**Klaverbank SAC**	Harbour porpoise Grey seal Harbour seal	40	North Sea MU and OSPAR Region II	✓	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
NL9802001	Netherlands	**Noordzeekustzone SAC**	Harbour porpoise Grey seal Harbour seal	215	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
NL3009016	Netherlands	**Oosterschelde SPA and SAC**	Harbour porpoise Grey seal Harbour seal	319	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
NL2008003	Netherlands	**Vlakte van de Raan SAC**	Harbour porpoise Grey seal Harbour seal	314	North Sea MU and OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
NL4000017	Netherlands	**Voordelta SAC and SPA**	Harbour porpoise Grey seal Harbour seal	295	OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
NL1000001	Netherlands	**Waddenzee SAC**	Harbour porpoise Grey seal Harbour seal	231	OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey and harbour seal foraging distance (448km and 273km, respectively) of DBD. Harbour seals however are screened out, as discussed in **Section 4.4.3**. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise
NL9803061	Netherlands	**Westerschelde & Saeftinghe SAC**	Harbour porpoise Grey seal Harbour seal	323	OSPAR Region II	✓ for grey seal **x** for harbour porpoise and harbour seal	This site is within the grey seal foraging distance (448km) of DBD and will therefore be considered further in the HRA assessments. The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for harbour porpoise and harbour seal.
SE0510050	Sweden	**Balgö SAC**	Harbour seal	676	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520171	Sweden	**Gullmarsfjorden SAC**	Harbour seal	608	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0420002	Sweden	**Hallands Vadero SAC**	Harbour seal	755	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
SE0520170	Sweden	**Kosterfjorden-Väderöfjorden SAC**	Harbour porpoise Harbour seal	632	North Sea MU and OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
SE0510058	Sweden	**Kungsbackafjorden 2011**	Harbour seal	651	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0510084	Sweden	**Nidingen 2011**	Harbour seal	655	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520057	Sweden	**Malmöfjord SAC**	Harbour seal	617	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520058	Sweden	**Måseskär SAC**	Harbour seal	602	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520043	Sweden	**Nordre Älvs Estuarium SAC**	Harbour seal	616	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
SE0420360	Sweden	**Nordvästra Skånes havsområde SCI**	Harbour seal Grey seal	728	OSPAR Region II	**x** for both species	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination for both species.
SE0520176	Sweden	**Pater Noster-Skärgården SAC**	Harbour seal	603	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520036	Sweden	**Sälöfjorden SAC**	Harbour seal	609	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520188	Sweden	**Soteskär SAC**	Harbour seal	623	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
SE0520001	Sweden	**Vrångöskärgården SAC**	Harbour seal	628	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
UK0017072	UK	**Berwickshire and North Northumberland Coast SAC**	Grey seal	192	OSPAR Region II	✓	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density data.
UK0019806	UK	**Dornoch Firth and Morrich More SAC**	Harbour seal	538	OSPAR Region II	**x**	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
UK0017096	UK	**Faray and Holm of Faray SAC**	Grey seal	565	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
UK0030311	UK	**Firth of Tay & Eden Estuary SAC**	Harbour seal	329	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
UK0030170	UK	**Humber Estuary SAC**	Grey seal	22	OSPAR Region II	✓	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density data.
UK0030172	UK	**Isle of May SAC**	Grey seal	306	OSPAR Region II	✓	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density data.
UK9002361	UK	**Mousa SAC**	Harbour seal	580	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.
UK0019808	UK	**Moray Firth SAC**	Bottlenose dolphin	500	Coastal East Scotland (CES) MU	✓	There is potential connectivity between construction activities at DBD and the coastal bottlenose dolphin population of the Moray Firth.
UK0030069	UK	**Sanday SAC**	Harbour seal	555	OSPAR Region II	x	The distance between the potential effect range of DBD and this designated site is beyond that of any potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation name	Qualifying Feature	Distance (km)	Screening area	Screened In?	Rationale
UK0030395	UK	**Southern North Sea SAC**	Harbour porpoise	EEC within SAC	North Sea MU	✓	Nearest European site for harbour porpoise. It is assumed that all harbour porpoise in the DBD project area, or areas of potential effect, are from this European site.
UK0017075	UK	**The Wash and North Norfolk Coast SAC**	Harbour seal	77	North Sea MU and OSPAR Region II	✓	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density data.

4.4.3.6 Sites directly overlapping with the Project's boundaries

345. The location of the export cable corridor is yet to be confirmed but is expected to be situated within the designated summer area of the Southern North Sea SAC. The location of the offshore collector platform is not yet known, however there is the potential for it to be located within the summer area of the Southern North Sea SAC. The potential effects on marine mammals from cable laying and reburial for the cable corridor that falls within the area of the Southern North Sea SAC are likely to be small-scale and temporary. As noted above, there is also the potential for an offshore platform to be required within the summer area of the Southern North Sea SAC, which may include impact piling. The array site lies approximately 45km west of the Southern North Sea SAC, thus reducing the potential effects, such as underwater noise through pile driving, on harbour porpoise protected by this site. In addition, there is the potential for works to be required off the Holderness coast if an outfall associated with the Hydrogen Opportunity is required. This would be in the vicinity of the winter SAC area, which lies approximately 15km from the Holderness coastline at the closest point. There is the potential for small pin-piles to be required as part of any outfall construction.

4.4.3.7 Sites within the ZOI of the Project's Effects

346. The site-specific underwater noise modelling will produce results for the predicted effect ranges and areas for potential underwater noise impacts. Any designated sites within the effect range will be assessed. However, marine mammals are wide-ranging, screening has been based on the potential connectivity for each species. The probability that animals associated with the SAC will be present within the effect range will also be assessed for any LSE.

4.4.4 Determination of LSE for Annex II Marine Mammals

347. For harbour porpoise, grey seal, harbour seal and bottlenose dolphin, a number of potential effects (**Section 4.3.2**) have been screened in for further assessment, to determine the potential for any adverse effects on the integrity of the designated sites.

348. Determination of the potential for Adverse Effects on Site Integrity for Annex II marine mammals will be in relation to the conservation objectives for the SAC, taking into account the number of individuals that could be affected in relation to the relevant MU. The potential for Adverse Effects on Site Integrity will also consider the Conservation Status of the species.

349. Determination of Adverse Effects on Site Integrity will also be based on any direct impacts on the SACs, including areas that could be affected in relation to the area of the SAC.

350. For the Southern North Sea SAC designated for harbour porpoise, the current SNCB guidance for the assessment of significant noise disturbance on harbour porpoise in the Southern North Sea SAC (JNCC, 2020) is that:

"*Noise disturbance within an SAC from a plan / project individually or in-combination is considered to be significant if it excludes harbour porpoise from more than:*

1. *20% of the relevant area[5] of the site in any given day[6], or*
2. *An average of 10% of the relevant area of the site over a season[7][8].*"

351. **Table 4-14**: Screening of European Sites for Marine Mammal Features provides the screening assessment for all designated sites, with either harbour porpoise, grey seal, harbour seal or bottlenose dolphin listed as a qualifying feature within the Project Area.

4.4.4.1 In-combination and transboundary effects

4.4.4.1.1 In-combination effects

352. The in-combination assessment will identify where the predicted effects of the construction, operation and maintenance and decommissioning of the Project could interact with effects from different activities, plans or projects within the same region and affect marine mammals.

353. The types of plans and projects to be taken into consideration are listed in **Section 3.3.1**. Screening of the plans and projects will be considered based on the following key points:

- They are located in the relevant marine mammal MU; and,
- There is the potential for in-combination effects during the construction, operational or decommissioning of the proposed Project.

354. The marine mammal in-combination assessment will consider projects, plans and activities which have sufficient information available to undertake the assessment, and will include the potential effects of:

- Underwater noise;
- Disturbance at seal haul-out sites;

[5] The relevant area is defined as that part of the SAC that was designated on the basis of higher persistent densities for that season (summer defined as April to September inclusive, winter as October to March inclusive).
[6] To be considered within the Habitats Regulations Assessment and, if needed, licence conditions should ensure that daily thresholds are not exceeded. Day to day monitoring of compliance is not practicable and therefore retrospective compliance monitoring is required to test whether the licence conditions are being adhered to.
[7] Summer defined as April to September inclusive, winter as October to March inclusive.
[8] For example, a daily footprint of 19% for 95 days would result in an average of 19x95 / 183 days (summer) =9.86%

- Vessel interaction; and
- Changes to prey resources (including habitat loss).

4.4.4.1.2 Transboundary effects

355. There is a significant level of marine development being undertaken or planned in the North Sea. Populations of marine mammals are highly mobile and there is potential for transboundary effects especially when considering underwater noise impacts.

356. Transboundary effects will be assessed, where possible, in consultation with developers in other Member States to obtain up-to-date project information to feed into the assessment.

357. The potential for transboundary effects will be addressed by considering the reference populations (MUs) and potential linkages to internationally designated sites as identified through telemetry studies for seals and ranges and movements of cetacean species.

358. The assessment of the effect on the integrity of the transboundary European sites as a result of effects on the designated marine mammal populations will be undertaken and presented in the information for the HRA.

359. Transboundary effects will also be considered within the in-combination assessment.

4.4.5 Summary for Sites Designated for Annex II Marine Mammals

360. There are a number of European sites, with either harbour seal or grey seal or both as a qualifying feature, that are within the typical foraging ranges of 448km and 273km, respectively (Carter *et al*., 2022). Given the clear evidence for long foraging distances of grey seals, it was assumed that animals could travel from all European sites to the North Sea and / or British Isles (see details in **Section 4.4.3.2**). Thus, all European sites where grey seal is a qualifying feature were screened in.

361. On the contrary, and based on satellite tracking studies, harbour seal has been screened out for most European sites due to lack of connectivity (see details in **Section 4.4.3**). It was assumed that all harbour seals could be from the nearest designated sites.

362. There is only one site that overlaps with the Project, the Southern North Sea SAC and is further discussed in **Section 4.4.3.6**, along with the potential effects on the site. The Humber Estuary SAC is nearby the proposed landfalls and is designated for grey seal and will be screened in.

363. Given the close proximity to the Project, Doggersbank SAC (directly adjacent to the array area), Klaverbank SAC (40km from the array area) and Doggerbank SAC (67km from array area) are the only transboundary European sites screened in for harbour porpoise and harbour seal.

364. The summary of the initial screening process has identified the designated sites and effect pathways to be taken forward for the determination of LSE, as listed in **Table 4-15**.

365. The sites screened in for harbour porpoise are shown in **Figure 4-10**, and the sites screened in for bottlenose dolphin are shown in **Figure 4-11**, alongside their relevant MUs.

366. The European sites screened in for grey seal are shown in **Figure 4-12** and for harbour seal in **Figure 4-13**. The UK sites screened in for both seal species are shown in **Figures 4-6** to **4-9**, as discussed in the relevant sections above.

Table 4-15: Summary of sites and Effect pathways, in order of distance from the Offshore Project Area, screened in with the potential for LSE

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Southern North Sea SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Doggersbank SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal and grey seal	As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Humber Estuary SAC	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Klaverbank SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal and grey seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal and grey seal	As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
The Wash and North Norfolk Coast SAC	Harbour seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

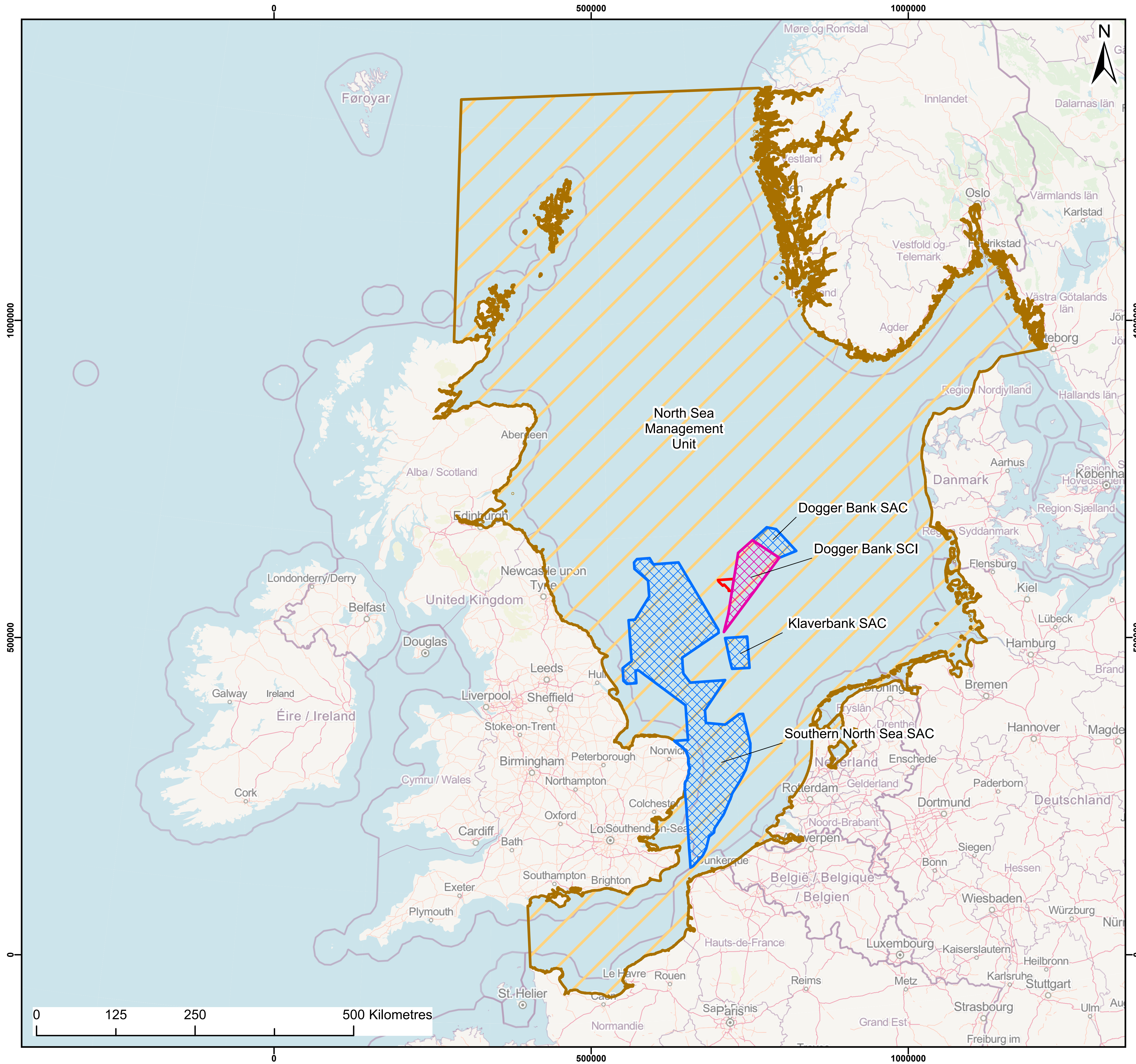
Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Doggerbank SCI Berwickshire and North Northumberland Coast SAC	Harbour porpoise	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
	Harbour seal	As above, with the addition of: – Disturbance at seal haul-out sites	✓	x	x	
	Harbour porpoise	– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
	Harbour seal	As above, with the addition of: – Disturbance at seal haul-out sites	x	✓	x	
	Harbour porpoise	As for construction.	x	x	✓	
	Harbour seal	As for construction.	x	x	✓	
	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction	✓	x	x	Individuals from this Designated site may be at risk of potential

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
		– Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects				effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects – Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
Isle of May SAC	Grey Seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
European sites for grey seal: – Sylter Außenriff SCI – Noordzeekustzone SAC – Duinen Terschelling SAC – Duinen Vlieland SAC – Nationalpark Niedersachsisches Wattenmeer SAC – Duinen en Lage Land Texel SAC – Waddenzee SAC – Duinen Ameland SAC – Sydlige Nordsø SAC – SPA Ostliche Deutsche Bucht SPA – Nationalpark Niedersächsisches Wattenmeer SAC – Voordelta SAC and SPA – Duinen Goeree & Kwade Hoek SAC – Grevelingen SAC – Vlaamse Banken SAC – NTP S-H Wattenmeer und angrenzende Kustengebiete SAC – Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC – Vlakte van de Raan SAC – Oosterschelde SPA and SAC – Helgoland mit Helgolander Felssockel SAC – Westerschelde & Saeftinghe SAC – Vlakte van de Raan SCI – Steingrund SAC – Bancs des Flandres SAC – Dünenlandschaft Süd-Sylt SAC – Küsten- und Dünenlandschaften Amrums SAC – Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC – Hamburgisches Wattenmeer SAC – Recifs Gris-Nez Blanc-Nez SAC	Grey seal	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Disturbance at seal haul-out sites – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	

Designated site	Relevant Annex II marine mammal feature	Effect pathways	C	O&M	D	Rationale
– Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC – Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC – Baie de Canche et couloir des trois estuaires SAC Estuaires et littoral picards (baies de Somme et d'Authie) SAC						
Moray Firth SAC	Bottlenose dolphin	– Underwater noise: impact piling – Underwater noise: other construction activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – In-combination effects – Transboundary effects	✓	x	x	Individuals from this Designated site may be at risk of potential effects from the Project.
		– Underwater noise: operational wind turbine noise – Underwater noise: maintenance activities, and vessel noise – Underwater noise: barrier effects – Vessel interaction – Changes to prey resource – Changes to water quality – Barrier effects from the physical presence of the wind farm – In-combination effects Transboundary effects	x	✓	x	
		As for construction.	x	x	✓	



Legend:

- Dogger Bank D Array Area
- Harbour Porpoise Management Units
- Special Area of Conservation (SAC)
- Site of Community Importance (SCI)

Client: Dogger Bank D Offshore Wind Farm

Project: DOGGER BANK WIND FARM

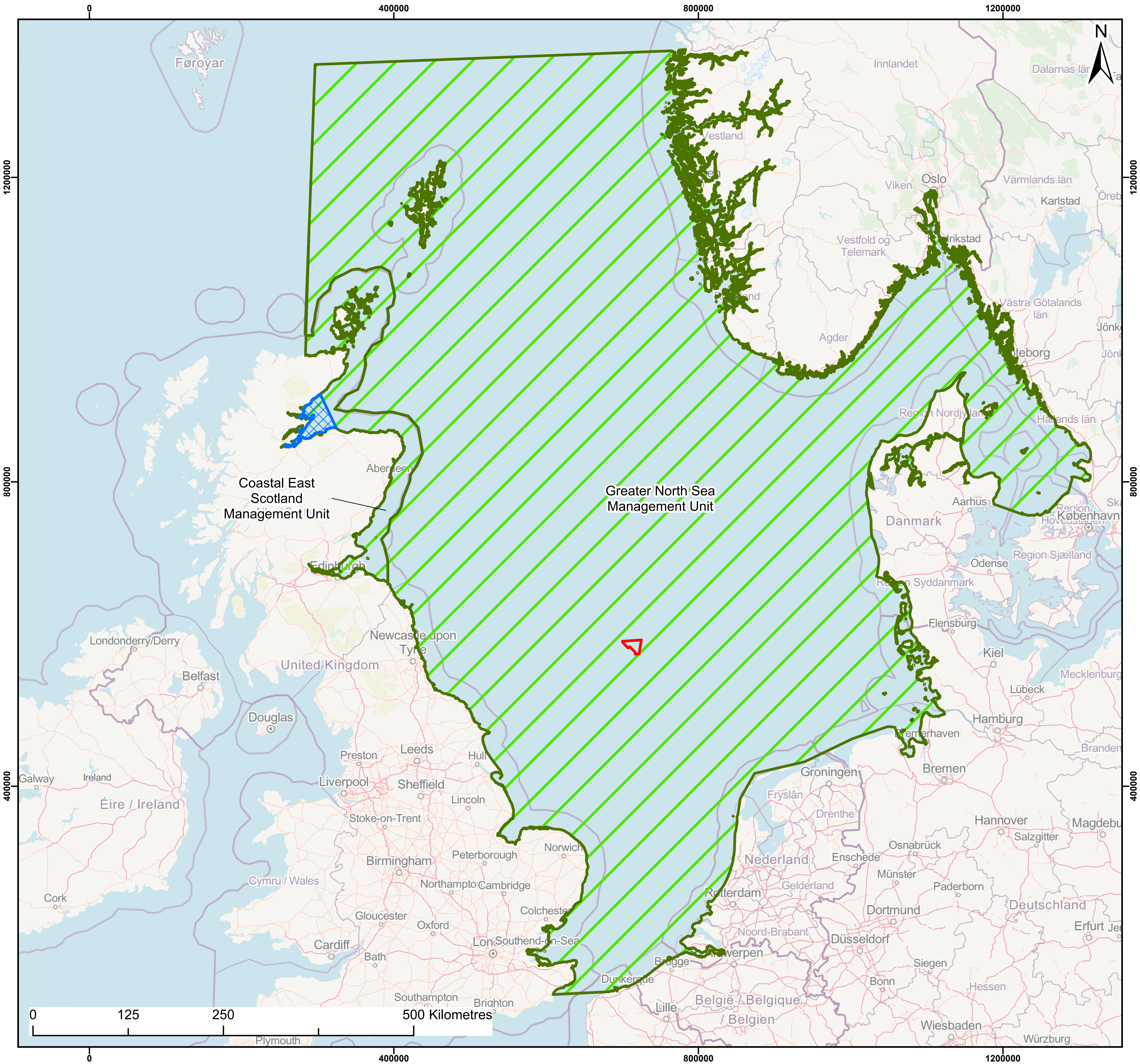
Title: Harbour Porpoise Management Units and SACs Screened In

Figure: 4.10

Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:6,000,000

Co-ordinate system: British National Grid



Legend:

- Dogger Bank D Array Area
- Moray Firth Special Area of Conservation (SAC)
- Bottlenose dolphin Management Units

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Management Units Source: Management Units Source: IAMMWG, 2023

Client: Dogger Bank D Offshore Wind Farm

Project: DOGGER BANK WIND FARM

Title: Bottlenose dolphin Management Units and SACs Screened In

Figure:	4.11	Drawing No:	PC3991-RHD-OF-ZZ-DR-Z-0002		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:5,000,000

Co-ordinate system: British National Grid

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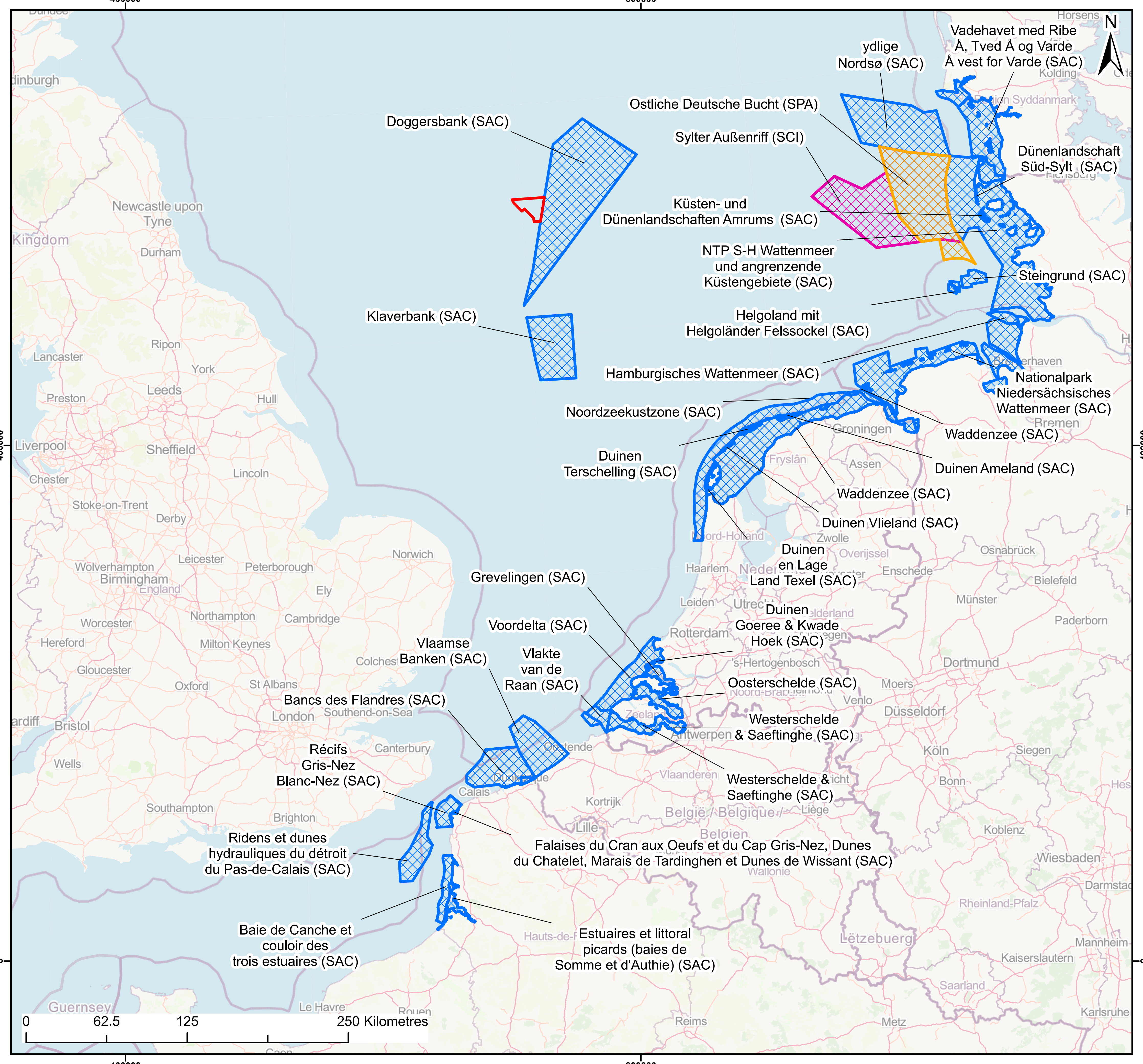

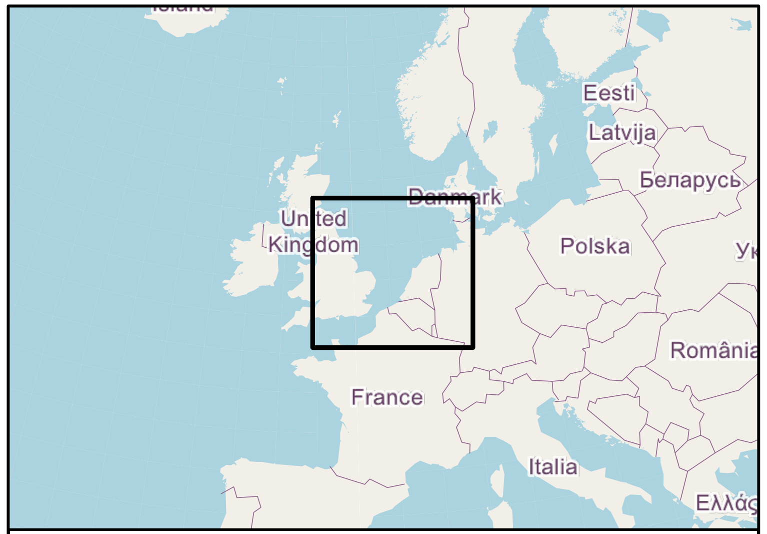

Legend:

- Dogger Bank D Array Area
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Community Importance (SCI)

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Client:	Project:
Dogger Bank D Offshore Wind Farm	DOGGER BANK WIND FARM

Title:

Grey seal European SACs Screened In

Figure:	4.12	Drawing No:	PC3991-RHD-OF-ZZ-DR-Z-0006		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:3,000,000

Co-ordinate system: British National Grid

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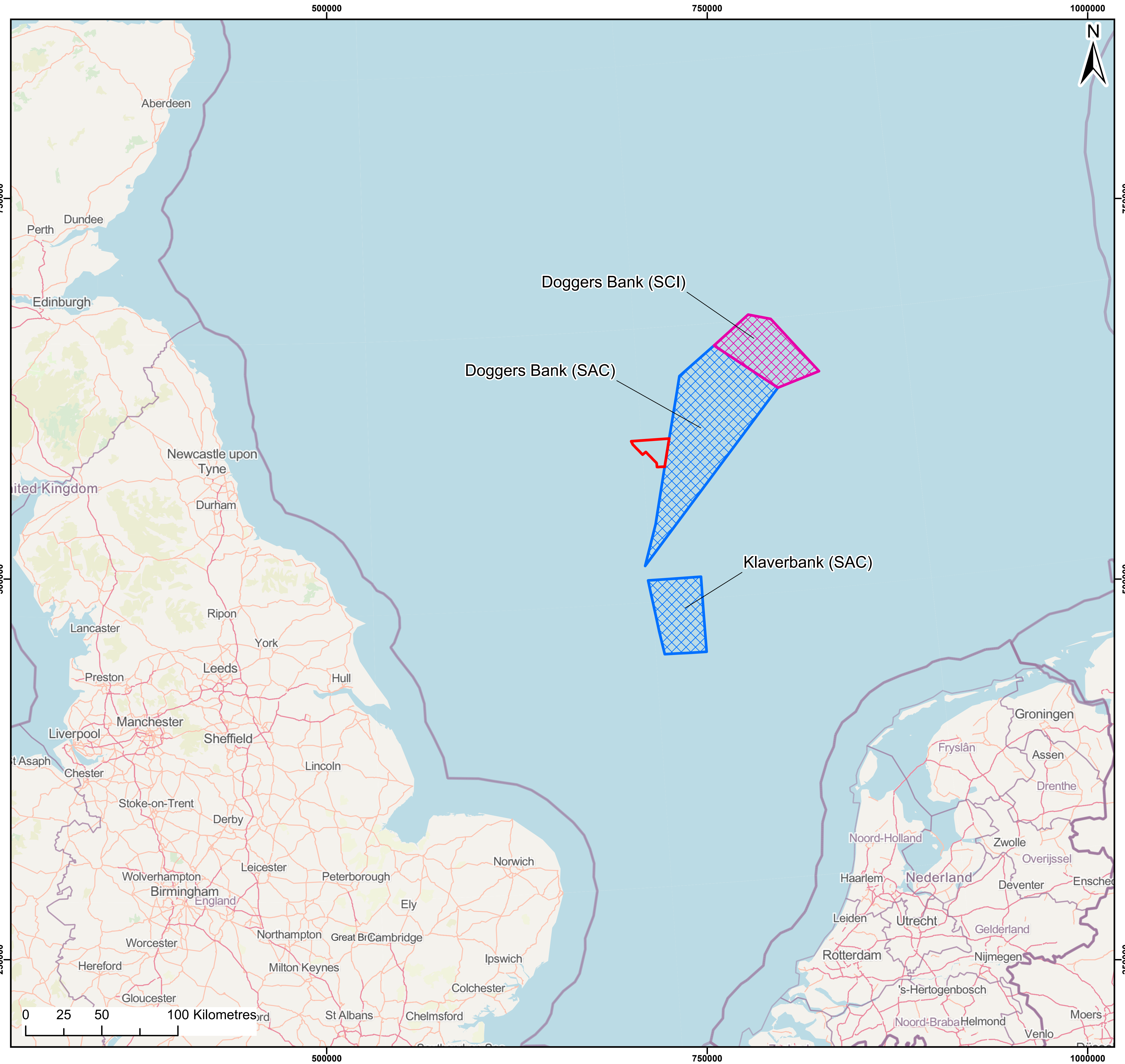

Legend:

- Dogger Bank D Array Area
- Special Area of Conservation (SAC)
- Site of Community Importance (SCI)

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OpenStreetMap: Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Client:	Project:
Dogger Bank D Offshore Wind Farm	DOGGER BANK WIND FARM

Title:

Harbour seal European SACs Screened In

Figure: 4.13	Drawing No: PC3991-RHD-OF-ZZ-DR-Z-0008

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	02/10/2023	GC	SM	A3	1:2,500,000

Co-ordinate system: British National Grid

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4.5 Sites Designated for Marine Ornithology

367. The scope of this screening is to identify and screen sites designated for intertidal and offshore ornithological features, for potential LSEs due to intertidal and offshore aspects of the Project. 'Intertidal and offshore ornithological features' include seabirds and waterbirds (both of which groups contain migratory species which may occur offshore during sea crossings), plus a small number of migratory species outside these groups which may occur offshore during sea crossings (e.g., raptors, owls, and other 'landbirds' including songbirds). Intertidal and offshore aspects of the Project include the Array Area, the offshore ECC to landfall locations, and any other infrastructure below the MHWS.

4.5.1 Approach to Screening

368. As detailed in **Section 3.3**, this stepwise pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the Project along with listing potential effects on designated sites.

369. Birds present in offshore waters and potentially affected by the construction, operation and decommissioning within the ZOI of DBD[9] (**Section 4.5.3.2**) are predominantly seabirds (defined for this report as auks, gulls, terns, gannets, skuas, shearwaters, petrels and divers). These species have the potential to be present during the breeding season and non-breeding season (including spring/autumn migration/passage periods). Other bird species that may be affected by the Project include waterfowl (e.g. swans, geese, ducks and waders) and other bird species which may undertake foraging or roosting close to inshore and intertidal infrastructure of the Project (such as cable landfall) and potentially experience disturbance and displacement during construction, maintenance or decommissioning works; or may fly through the operational Array area during spring and/or autumn migration/passage periods. A summary of the baseline information to date is provided here to inform the HRA screening.

370. Two years of baseline digital aerial surveys of the Array Area and surrounding buffer zone were completed in September 2023 (APEM 2023). As outlined in the **Environmental Impact Assessment Scoping Report** (SSE Renewables and Equinor, 2023), baseline surveys conducted for the Project to September 2022indicate that the key species observed in the offshore survey area are:

- Seabirds present during the breeding season: (Northern) fulmar *Fulmarus glacialis*, (northern) gannet *Morus bassanus*, (black-legged) kittiwake *Rissa tridactyla*, great black-backed gull *Larus marinus*, common gull *Larus canus*, (common) guillemot *Uria aalge*, razorbill *Alca torda*, (Atlantic) puffin *Fratercula*

[9] *Varies per species (mean maximum foraging range + 1 standard deviation during the breeding season and the Biologically Defined Minimum Population Size (BDMPS) region (Furness 2015) surrounding the Array area, during the non-breeding season).*

arctica, Arctic tern *Sterna paradisaea* and common tern *Sterna hirundo*;

- Seabirds present during the non-breeding season (or wintering period when delineated from migration / passage periods) (Furness, 2015): Fulmar, gannet, great northern diver *Gavia immer*, kittiwake, great black-backed gull, herring gull *Larus argentatus*, common gull, guillemot, razorbill, puffin and velvet scoter *Melanitta fusca*; and

- Seabirds present during passage periods but not during biologically defined migration-free breeding or wintering periods (Furness, 2015): Red-throated diver *Gavia stellata*, Manx shearwater *Puffinus puffinus*, great skua *Stercorarius skua*, Arctic skua *Stercorarius parasiticus* and lesser black-backed gull *Larus fuscus*.

371. Land-based surveys of the intertidal area are ongoing and will be completed in summer 2024. As outlined in the **Environmental Impact Assessment Scoping Report** (SSE Renewables and Equinor, 2023), baseline surveys conducted for the Project to date indicate that the key species observed in the intertidal survey area are:

- Resting coastal birds: Cormorant *Phalacrocorax carbo* plus gulls including great black-backed gull, herring gull and common gull, generally flying in the intertidal area with some resting ('loafing') behaviour;

- Red-throated diver;

- Waterfowl flying through inshore waters: common eider *Somateria mollissima*, teal *Anas crecca*, mallard *Anas platyrhynchos*, goosander *Mergus merganser*, wigeon *Mareca penelope*, and brent goose *Branta bernicla*; and

- Wading birds: dunlin *Calidris alpina*, flying in the intertidal area.

372. The HRA screening for offshore ornithology considers European sites (SPAs and Ramsar sites) which meet at least one of the following criteria in relation to the offshore project area:

- A component part of the Project overlaps directly with a European site with bird species as qualifying features, or is located in close proximity to the boundary such that there may be an effect on one or more qualifying species within the SPA;

- The distance between the Project and a European site with a qualifying bird feature is within the range for which there could be an interaction (i.e. the pathway is not too long), discussed in further detail in **Section 4.5.3.2.**

  - For seabirds during the breeding season this element of the screening process is informed by published information on foraging ranges from breeding colonies (mean maximum foraging range plus one standard deviation (SD); Woodward *et al*., 2019);

  - For seabirds outside the breeding season, Biologically Defined Minimum

Population Scales (BDMPS; Furness, 2015) have been used to identify potential connectivity with DBD;

- For migratory birds other than seabirds, SPAs whose qualifying features are determined likely to migrate through the sea area occupied by the Project Array Area are considered for potential LSE from collision mortality; and

- The distance between the Project(s) and resources on which the qualifying feature depends (i.e. an indirect effect acting through prey or access to habitat) is within the range for which there could be an interaction (i.e. the pathway is not too long), applying professional judgment.

373. The approach taken was informed by Natural England (2022) Best Practice Advice for Evidence and Data Standards Phase III (in particular section 5.3.3 of this advice), as well as other recent HRA screening reports and stakeholder screening opinion for OWFs (e.g. Dogger Bank Teesside A and B (Forewind 2014, Planning Inspectorate 2015); East Anglia One North (ScottishPower Renewables, 2019); Dudgeon and Sheringham Shoal Extensions (Royal HaskoningDHV, 2021, 2022); and North Falls.

374. Assessment of species-specific risk to potential effects of OWFs is informed by industry standard advice and guidance, and relevant scientific papers, as well as assessments for recently proposed OWFs in the southern North Sea, and representations from stakeholders during DCO examinations.

375. Information on SPAs, Ramsar sites and their qualifying features is taken from SPA citations/Natura 2000 forms, conservation objectives, departmental briefs and Ramsar site lists and Information Sheets as published by the SNCBs, including Natural England's Designated Sites viewer (https://designatedsites.naturalengland.org.uk/SiteSearch.aspx), NatureScot's Sitelink and JNCC links to Ramsar Information Sheets. Advice on operations for Marine Protected Areas were not considered necessary for screening but will be referred to as required for Appropriate Assessment.

376. Distances between DBD and European sites were measured in GIS using SPA and Ramsar shapefiles downloaded from SNCB websites. The following were measured:

- The shortest straight-line distance to the Project Area (either the Array area or the ECC);

- The shortest oversea distance (i.e. avoiding land) to the DBD Array Area; and

- The shortest oversea distance to the DBD offshore ECC.

4.5.2 Pathways for LSE

377. Screening of European sites and Ramsar sites for offshore ornithology took account of the potential effect(s) of the Project on each qualifying feature. Direct or indirect effects to offshore ornithology receptors in offshore waters may arise from temporary and permanent infrastructure and activities associated with the construction, operation and decommissioning of the Project, as identified in **Table 4-16**. Thus, where an SPA and

qualifying species are screened in for LSE, the potential effect(s) that are relevant (e.g. where a species is considered vulnerable to collision) are also stated.

Table 4-16: Summary of the Key Potential Effects of the Intertidal and Offshore DBD Project on Intertidal and Offshore Ornithology Receptors Considered in HRA Screening

Potential Impact	Type of Ornithology Receptor	Construction	Operation and Maintenance	Decommissioning
Direct habitat loss	Offshore ornithology receptors	x	x	x
	Intertidal ornithology receptors	✓	✓	✓
Direct disturbance and displacement due to work activity in the Array Area (e.g. presence and movements of vessels and other plant, lighting of work activity)	Offshore ornithology receptors only	✓	✓	✓
Direct disturbance and displacement due to work activity in the offshore ECC	Offshore ornithology receptors only	✓	x	✓
Direct disturbance and displacement due to nearshore vessel movements	Intertidal ornithology receptors only (Offshore receptors considered within work activity in offshore areas above)	x	x	x
Direct disturbance and displacement due to work activity at landfall and within the intertidal area	Intertidal ornithology receptors and offshore ornithology receptors such as red-throated diver	✓	✓	✓
Displacement due to presence of wind turbines and other offshore infrastructure	Offshore ornithology receptors only (red-throated diver, gannet, auks)	x	✓	x

Potential Impact	Type of Ornithology Receptor	Construction	Operation and Maintenance	Decommissioning
Barrier effect due to presence of wind turbines and other offshore infrastructure	Offshore and intertidal ornithology receptors (including migratory waterbirds)	x	x	x
Accidental pollution	Offshore and intertidal receptors	x	x	x
Changes to prey availability (including entrapment and/or entrainment of prey at marine outfall / intake locations for HPF	Offshore and intertidal receptors	✓	✓	✓
Collision risk with wind turbine blades	Offshore ornithology receptors (gulls, skuas, gannet) and intertidal ornithology receptors (including migratory waterbirds)	x	✓	x

4.5.2.1 Potential effects during construction

4.5.2.1.1 Direct habitat loss

378. Direct habitat loss as a result of construction is screened out as an effect pathway for LSE on offshore ornithology receptors, as no direct habitat loss for offshore receptors is predicted. (Indirect) habitat loss affecting offshore ornithology receptors during construction is considered within: displacement (separately for construction in the Array area, the ECC and at the landfall and intertidal areas) and indirect habitat loss for prey species (within ‘changes to prey availability’).

379. Direct habitat loss as a result of construction is screened in as an effect pathway for LSE on intertidal ornithology receptors, as works during construction of the export cable or intakes / outfalls have the potential to alter, occupy or disturb intertidal foraging, roosting or nesting habitats for intertidal ornithology receptors.

4.5.2.1.2 Disturbance and Displacement

380. Disturbance and displacement of some offshore ornithology receptors such as divers, scoters and auks could occur due to construction activities in i) the Array Area and/or

ii) the offshore ECC, as they produce noise above water (i.e., airborne noise), underwater noise, and visual imposition which could directly disturb or displace these bird species from otherwise suitable habitat. This effect pathway is screened in for these offshore receptors for construction of the respective offshore components of the Project.

381. Disturbance and displacement due to construction at the landfall and intertidal areas is screened in for intertidal ornithology receptors, which may be disturbed from roosting or foraging in these areas by presence of plant or workers, or noise and vibrations from construction. This effect pathway is also screened in for specific offshore ornithology receptors: red-throated diver and species of similar foraging ecology such as scoters, which may forage close to shore and are considered sensitive to noise and visual disturbance.

382. All construction below MHWS is considered regarding potential for disturbance and displacement of features of European sites. The ZOI for such effects is up to a few kilometres over which noise or visual disturbance can have effects on birds within European sites or functionally linked habitat.

383. Construction vessel movements within the Array Area and offshore ECC are considered within overall construction disturbance and displacement in these Project areas. At the landfall, vessel movements for construction are more limited in number and proximity to birds, therefore vessel movements are not considered a source of disturbance and displacement of birds during landfall construction. Direct disturbance and displacement due to nearshore vessel movements is therefore screened out as an effect pathway for LSE on intertidal ornithology receptors (and is considered within the above effect pathways of ‘disturbance and displacement in the Array’ and ‘…ECC’ for LSE on offshore ornithology receptors).

384. Landfall and intertidal construction disturbance and displacement due to activities above MHWS is considered within **Section 4.1**.

4.5.2.1.3 Changes to prey availability

385. Changes to prey availability is considered in the screening exercise. This effect pathway includes direct impacts on prey species, or changes to habitat affecting the availability or accessibility of prey (for example sub-optimal foraging conditions due to changes to water quality, sediment suspension and reduced visibility).

386. All other effect pathways identified in **Table 4-16** are screened out of potential for LSE on offshore or intertidal ornithology receptors during the construction phase. Accidental pollution is screened out as an effect pathway given that a pollution prevention plan will be prepared as designed-in mitigation. Displacement, barrier or collision effects due to the presence of wind turbines or other offshore infrastructure are screened out as the infrastructure underlying the effect pathway is not yet present.

4.5.2.2 Potential effects during operation and maintenance

4.5.2.2.1 Direct habitat loss

387. Temporary habitat disturbance, as a result of maintenance activities during the operational phase, is screened in as an effect pathway for LSE on intertidal ornithology receptors, as works during maintenance have the potential to alter or damage intertidal foraging, roosting or nesting habitats for intertidal ornithology receptors. No offshore activities during the operation and maintenance phase are expected to cause direct offshore habitat loss, therefore this effect pathway is screened out for offshore ornithology receptors. (Indirect) habitat loss affecting offshore ornithology receptors during operation and maintenance is considered within displacement due to works in, or presence of, the Array area; and for some receptors due to work activity at the landfall and intertidal areas).

4.5.2.2.2 Displacement

388. Displacement is screened in for offshore ornithology features of European sites, both as a result of the presence of the turbine array during operation and maintenance of the DBD Project, and as a result of disturbance from work activities within the Array. (These two elements will be considered together in a quantitative assessment for relevant ornithology receptors following HRA screening).

389. Disturbance and displacement due to operation and maintenance of the offshore cable(s) within the offshore ECC is screened out for LSE on offshore ornithology features of European sites due to the infrequent, temporary and localised nature of maintenance works. This effect pathway is also screened out for intertidal ornithology receptors as the offshore ECC will be separate or distant from intertidal habitats.

390. Disturbance and displacement as a result of works at the landfall and intertidal area is screened in for intertidal ornithology features of European sites, as intertidal birds can be vulnerable to effects of individual disturbance and displacement events (particularly in winter temperature and foraging conditions) when present within European sites or functionally-linked habitat in proximity to the operation and maintenance activity. This effect pathway is also screened in for specific offshore ornithology receptors: red-throated diver and species of similar foraging ecology such as scoters, which may forage close to shore and are considered sensitive to noise and visual disturbance.

391. Operation and maintenance vessel movements within the Array Area are considered within overall disturbance and displacement in these Project areas, and vessel movements during maintenance of the ECC are screened out within ‘disturbance and displacement from maintenance of the ECC’ above. At the landfall, vessel movements for maintenance are more limited in number and proximity to birds, therefore vessel movements are not considered a source of disturbance and displacement of birds during landfall operation and maintenance. Disturbance and displacement due to nearshore vessel movements is therefore screened out as an effect pathway for LSE on intertidal ornithology receptors.

392. Direct habitat loss, and disturbance and displacement due to operation and maintenance above the intertidal area (above MHWS) is considered within **Section 4.1**.

4.5.2.2.3 Barrier effects

393. As outlined in the EIA Scoping Report for Dogger Bank D (SSE Renewables and Equinor 2023) section 7.7.3.2.5, barrier effects are scoped out of the EIA and therefore screened out as a specific potential effect pathway for LSE on offshore and intertidal ornithology receptors, on the basis that the Array Area occupies the same array area assessed for the Dogger Bank Teesside A & B Environmental Statement, and no changes have been made to the shape or area of the proposed Array following conclusion of that assessment of no LSE for marine ornithological features of European sites.

4.5.2.2.4 Changes to prey availability

394. Changes to prey availability are screened in as a potential pathway for LSE on offshore and intertidal ornithology features of European sites during operation and maintenance, only on the basis of entrapment and/or entrainment of prey at marine outfall or intake locations for the HPF. During operation and maintenance, other activities underlying the effect pathway for changing prey availability, such as disturbance to marine sediments, will be negligible compared to during construction or decommissioning, and are not considered to occur.

4.5.2.2.5 Collision risk

395. Collision effects are screened in for offshore ornithology receptors. Where potential connectivity is identified during the breeding season (through breeding season foraging range data) or the non-breeding season(s) (through the SPA population's linkage to the relevant North Sea BDMPS), offshore ornithology receptors are considered to be potentially flying through/within the Array Area, and gulls, terns, skuas and gannet in particular are screened in for collision risk based on their typical flight heights and behaviour.

396. Collision is also screened in as a potential effect for migratory bird features of European sites which may fly through the Array Area during passage flights to and from areas used during the breeding and non-breeding seasons. Migratory species would therefore only be likely to encounter an OWF a limited number of times per year, depending on the location of breeding and passage/wintering areas and the routes taken during migration flights.

397. All other effect pathways identified in **Table 4-16** are screened out of potential for LSE on offshore or intertidal ornithology receptors during the operation and maintenance phase. Accidental pollution is screened out as an effect pathway given that a pollution prevention plan will be prepared as designed-in mitigation.

4.5.2.3 Potential effects during decommissioning

398. It is anticipated that any decommissioning impacts would be similar in nature to those of construction (although the magnitude of impact is likely to be lower due to the smaller scale of activities). The same potential for LSE identified for DBD construction are therefore expected to apply for decommissioning.

4.5.2.4 In-combination effects

399. For the purpose of the screening assessment, the conclusions discussed in **Section 4.5.4** apply to the 'project alone' and the in-combination effects with other plans and projects.

400. All of the features screened in for further assessment will be subject to in-combination assessment for the effect pathways for which the features were screened in. For example, for an SPA breeding seabird species screened in for LSE in relation to collision risk during the breeding season, an in-combination assessment will be carried out considering combined collision risk for all OWFs and other projects and plans that may contribute to the effect under consideration. The scope of the in-combination assessment would be limited to the key quantifiable impact pathways of displacement (inclusive of barrier effects) and collision, and other qualitative pathways where agreed, although based upon the experience of many previous UK OWF assessments it is considered highly likely that the focus of the in-combination assessment will be concerned with the potential impacts predicted to result from the collisions and displacement.

4.5.2.5 Transboundary effects

401. As well as UK SPAs and Ramsar sites, screening considers transboundary European sites designated by other European countries for birds, where the distance between the transboundary site and DBD is such that an effect might be possible based on the criteria identified above.

4.5.3 Identification of Sites and Features

4.5.3.1 Sites directly overlapping with the Project's boundaries

4.5.3.1.1 Greater Wash SPA

402. The Project Area overlaps with the Greater Wash SPA, designated for offshore bird species. Qualifying features include breeding common tern, little tern *Sternula albifrons* and Sandwich tern *Thalasseus sandvicensis*, and non-breeding red-throated diver, common scoter *Melanitta nigra* and little gull *Hydrocoloeus minutus*. The overlap between the SPA and the Project Area is shown in **Figure 4-14** but the actual footprint of the construction, operation and decommissioning area would occupy only a fraction of this area. The screening considers potential for disturbance and displacement effects, and changes to prey availability, due to construction, operation and

maintenance or decommissioning of the landfall and ECC, on qualifying feature species of Greater Wash SPA.

4.5.3.1.2 Humber Estuary SPA and Ramsar site

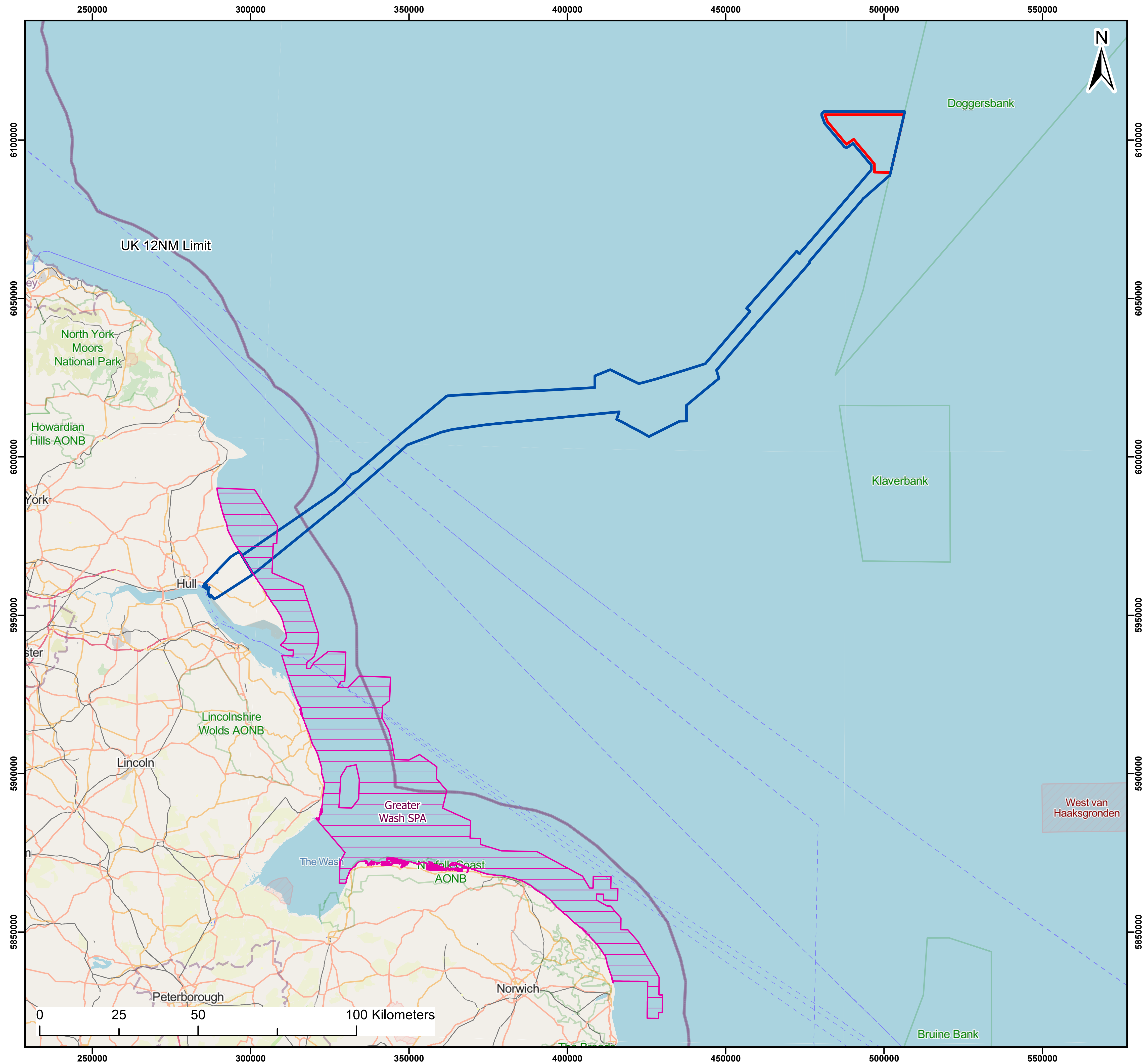
403. The Project Area overlaps with the Humber Estuary SPA and Ramsar site at Saltend. SPA qualifying features are breeding avocet *Recurvirostra avosetta*, bittern *Botaurus stellaris*, little tern, marsh harrier *Circus aeruginosus*, plus non-breeding avocet, bar-tailed godwit *Limosa lapponica*, bittern, black-tailed godwit *Limosa limosa islandica*, dunlin *Calidris alpina*, golden plover *Pluvialis apricaria*, hen harrier *Circus cyaneus*, knot *Calidris canutus*, redshank *Tringa totanus*, ruff *Philomachus pugnax*, shelduck *Tadorna tadorna* and the non-breeding waterbird assemblage.The overlap between the sited and the Project Area is shown in **Figure 4-15.** Ramsar qualifying features are the non-breeding waterbird assemblage under Ramsar criterion 5, and wintering shelduck, golden plover, knot, dunlin, black-tailed godwit, bar-tailed godwit, and redshank under Ramsar criterion 6.

404. The screening considers potential for disturbance and displacement to ornithology receptors and changes to prey availability due to construction, operation and maintenance or decommissioning of DBD infrastructure; and for migration-period collision due to operation of the turbine array, on qualifying feature species of Humber Estuary SPA.

4.5.3.2 Sites within the ZOI of the Project's Effects

405. Sites within the ZOI of the Project's effects are identified, based on factors which vary between biological seasons of feature seabird species' annual cycles as outlined in the following sections. The ZOI for seabird breeding colony SPAs and their qualifying feature seabird species and assemblages can be summarised to be each species' published mean maximum foraging range + 1 standard deviation (**Table 4-18**) during the breeding season; and the Biologically Defined Minimum Population Size (BDMPS) region (Furness 2015) surrounding the Array area, during the non-breeding season (in both cases aligned with Natural England (2022) Best Practice Advice for Evidence and Data Standards Phase III). The ZOI for waterbird SPAs and their qualifying feature waterbird species and assemblages can be summarised to be approximately 1km from the Project Area for direct effects. For potential LSE as a result of collision with the turbine array when operational, the ZOI can be summarised as the England North Sea coast between Northumberland and Norfolk, as this region contains European sites whose qualifying features are considered likely to migrate through the sea area occupied by the Project Array Area. **All sites for migratory non-seabirds considered for LSE in Table 4-19 are within this ZOI.**

406. Biologically relevant seasons for each seabird species recorded during baseline surveys of DBD are given in **Table 4-17**. Depending on evidence for patterns of movement, the non-breeding season for some species is subdivided into spring and autumn migration and winter periods.



Legend:

- Dogger Bank D Array Area
- Project Area
- Greater Wash Special Protection Area (SPA)

Source: © Haskoning DHV UK Ltd, 2023; © Natural England, 2022; © OpenStreetMap (and) contributors, CC-BY-SA

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

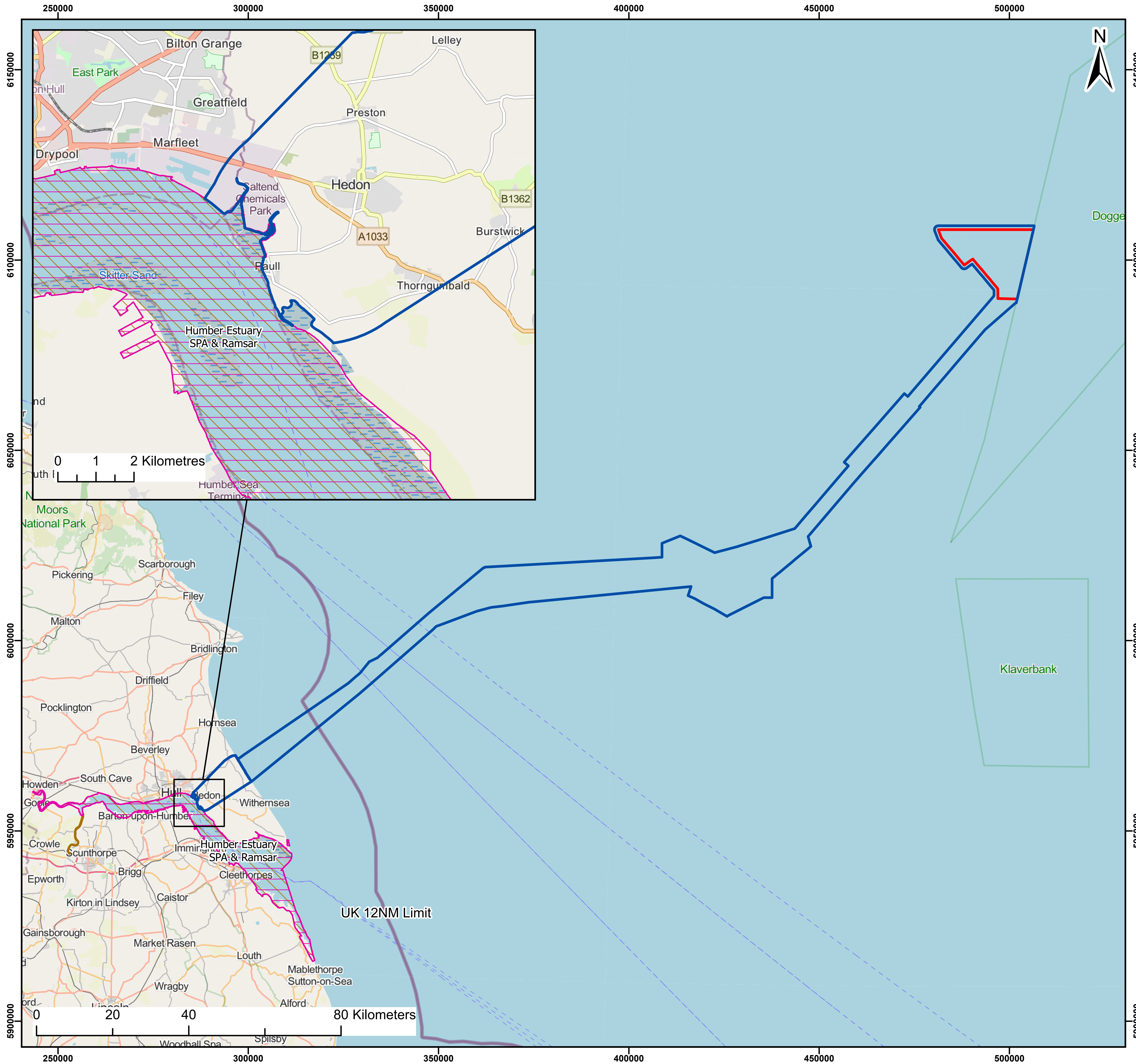
Overlap between the worst-case Project Area and the Greater Wash SPA

Figure:	4-14	Drawing No:	PC3991-RHD-ZZ-ZZ-DR-Z-0095		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/11/2023	GC	EB	A3	1:1,200,000

Co-ordinate system: WGS 1984 UTM Zone 31N

sse Renewables

equinor



Legend:

- Dogger Bank D Array Area
- Project Area
- Humber Estuary Ramsar
- Humber Estuary Special Protection Area (SPA)

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Overlap between the worst-case Project Area and the Humber Estuary SPA/Ramsar site

Figure:	4-15	Drawing No:	PC3991-RHD-ZZ-ZZ-DR-Z-0096		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	03/11/2023	GC	EB	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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Table 4-17: Biologically Relevant Seasons for Seabird Species

Species	Season*				
	Breeding	Migration-free breeding	Autumn migration	Winter / non-breeding	Spring migration
Arctic skua	May-Jul	Jun-Jul	Aug-Oct	n/a	Apr-May
Arctic tern	May-e Aug	Jun	Jul-e Sep	n/a	l Apr-May
Black-headed gull	Apr-Jul	n/a	n/a	Aug-Mar	n/a
Common gull	May-Jul	n/a	n/a	Aug-Apr	n/a
Common tern	May-Aug	Jun-m.Jul	l.Jul-e.Sep	n/a	Apr-May
Cormorant	Apr-Aug	n/a	n/a	Sep-Mar	n/a
Fulmar	Jan-Aug	Apr-Aug	Sep-Oct	Nov	Dec-Mar
Gannet	Mar-Sep	Apr-Aug	Sep-Nov	n/a	Dec-Mar
Great black-backed gull	l.Mar-Aug	May-Jul	n/a	Sep-Mar	n/a
Great skua	May-Aug	May-Jul	Aug-Oct	Nov-Feb	Mar-Apr
Guillemot	Mar-Jul	Mar-Jun	n/a	Aug-Feb	n/a
Herring gull	Mar-Aug	May-Jul	n/a	Sep-Feb	n/a
Kittiwake	Mar-Aug	May-Jul	Aug-Dec	n/a	Jan-Apr
Lesser black-backed gull	Apr-Aug	May-Jul	Aug-Oct	Nov-Feb	Mar-Apr
Little gull	Apr-Jul	May-Jul	n/a	Aug-Apr	n/a
Puffin	Apr-e.Aug	May-Jun	n/a	m.Aug-Mar	n/a
Razorbill	Apr-Jul	Apr-Jun	Aug-Oct	Nov-Dec	Jan-Mar
Red-throated diver	Mar-Aug	May-Aug	Sep-Nov	Dec-Jan	Feb-Apr
Sandwich tern	Apr-Aug	Jun	Jul-Sep	n/a	Mar-May
*Prefixes: e. = early in month, m. = mid-month and l. = late month.					

407. Species-specific seasons are from Furness (2015) except for black-headed gull *Chroicocephalus ridibundus*, common gull and little gull, which are based on Cramp and Simmons (1983). As seasonal timings for a given species can vary geographically, Natural England (2022) advises that the seasonal definitions in Furness (2015) can be refined with local and colony-specific information. This has not been considered at screening stage, but will be considered, if and where relevant, for qualifying features and sites screened in, in the shadow appropriate assessment.

4.5.3.2.1 Seabird breeding colony SPAs – connectivity in the breeding *season*

408. The breeding season is the time when breeding seabirds are constrained in their foraging ranges by requirements to attend nests to incubate eggs and feed chicks. At this time they are considered most likely to be susceptible to effects due to the

construction, operation and decommissioning of OWFs. For SPAs for breeding seabirds, published information on foraging ranges of seabirds during the breeding season (Woodward *et al.*, 2019) was used to establish the likelihood of connectivity between the qualifying features of the SPA and the DBD offshore project area.

409. The mean maximum foraging range for a species (the mean of the maximum foraging ranges recorded from each breeding colony for which foraging range data are available, Woodward *et al*. 2019) is generally considered to be the most appropriate measure in identifying spatial overlap between an OWF and the probable foraging grounds of a breeding seabird colony, and therefore connectivity between the colony and the habitat where the OWF is located. As a precautionary measure, and based on advice from Natural England, the mean maximum foraging range plus one standard deviation (SD) is used (**Table 4-18**). Breeding seabird species which are qualifying features of SPAs and Ramsar sites within the species-specific mean maximum foraging range (+ 1SD) of the Project, and which were recorded in the survey area during the breeding season, are screened in.

Table 4-18: Mean Maximum Foraging Ranges and Standard Deviation (SD) where available (Woodward *et al.*, 2019) from Breeding Colonies for Seabird Species. On a Precautionary Basis, Screening Considered Mean Maximum Foraging Range + 1 SD

Species	Mean maximum foraging range (km ± standard deviation SD)[1]	Mean maximum foraging range + 1SD (km)
Arctic skua	2 (± 0.7) (mean and S.D.)	2.7 (mean + S.D.)
Arctic tern	25.7 (± 14.8)	40.5
Black-headed gull	18.5 (no S.D.)	18.5
Common gull	50 (no S.D.)	50
Common tern	18.0 (± 8.9)	26.9
Cormorant	25.6 (± 8.3)	33.9
Fulmar	542.3 (± 657.9)	1,200.2
Gannet	315.2 (± 194.2)	509.4
Great black-backed gull	73 (no S.D.)	73
Great skua	443.3 (± 487.9)	931.2
Guillemot	55.5 (± 39.7)*	95.2*
Herring gull	58.8 (± 26.8)	85.6
Kittiwake	156.1 (± 144.5)	300.6
Leach's petrel	657 (mean)	-
Lesser black-backed gull	127.0 (± 109)	236
Little tern	5 (no S.D.)	5
Manx shearwater	1346.8 (± 1018.7)	2365.5
Mediterranean gull	20 (no S.D.)	20

Species	Mean maximum foraging range (km ± standard deviation SD)[1]	Mean maximum foraging range + 1SD (km)
Puffin	137.1 (± 128.3)	265.4
Razorbill	73.8 (± 48.4)*	122.2*
Red-throated diver	9 (no S.D.)	9
Roseate tern	12.6 (± 10.6)	23.2
Sandwich tern	34.3 (± 23.2)	57.5
Shag	13.2 (± 10.5)	23.7
Storm petrel	336 (no SD)	336
*Foraging range data for guillemot and razorbill are presented with the tracking data from Fair excluded. Natural England have previously indicated their acceptance to exclude the extreme values from Fair Isle in estimating the foraging ranges of these two species at the Flamborough and Filey Coast SPA (Natural England 2022), whilst NatureScot guidance advises exclusion of the Fair Isla data for colonies south of Pentland Firth (NatureScot 2023).		

4.5.3.2.2 Seabird breeding colony SPAs – connectivity in the non-breeding season

410. Outside the breeding season, seabirds are no longer constrained by requirements to attend nests and disperse over greater distances than breeding season foraging ranges from their colonies. During this time, individuals which form part of SPA breeding populations during the breeding season, may encounter OWFs from which they are at risk of displacement or collision, which would not have presented such a risk during the breeding season. These breeding adults are assumed to mix evenly with non-breeding birds which may be immature or sub-adults (most seabirds take several years to reach breeding age so that large proportions of the populations are sub-adult). In turn, this population is then assumed to mix evenly with seabirds from other colonies. Biologically Defined Minimum Population Scales (BDMPS) and total population estimates for UK seabirds outside the breeding season are described by Furness (2015), along with approximate seasonal movement patterns. BDMPS areas are extensive and overall population sizes for individual species are generally large, consisting of the combined populations of many seabird colonies from both the UK and overseas.

411. For seabird species covered by Furness (2015), the non-breeding season BDMPS was used to identify the area of search for UK SPAs and Ramsar sites with potential connectivity with the Project. For a given seabird species, breeding colony SPAs were identified for screening in the non-breeding season only if they were in the same BDMPS as DBD for that species (in most cases the UK North Sea, for some species extending to the Channel). On a precautionary basis, seabird qualifying features of breeding colony SPAs were screened in for LSE where there was overlap between one or more non-breeding season BDMPS (passage and/or winter periods depending on species) and DBD. This coarse sift was employed on the basis that seabirds from breeding colony SPAs within the BDMPS could potentially occur at or pass through DBD during the non-breeding season.

4.5.3.2.3 Migratory birds other than seabirds

412. In addition to seabirds, other offshore ornithology receptors that migrate across areas of open sea may encounter OWFs and be at risk of collision if they fly through a turbine array. As with surveys at all OWFs in UK waters, the design of the baseline surveys is such that the numbers of a given migratory species passing through a site may be underestimated. This is because non-seabird species may migrate across offshore areas in large numbers over relatively restricted time periods (a few days or weeks), and sometimes at high altitudes and/or at night. Thus, it is likely that the majority of migratory species passing through an offshore area will not be captured by monthly surveys during daylight hours.

413. Screening considered qualifying features of coastal SPAs and Ramsar sites for migratory species along the English North Sea coast between Northumberland and Norfolk. This was considered to represent a reasonable ZoI for this effect pathway, based on migratory corridors and fronts for each qualifying feature of European sites as mapped in Wright *et al*. (2012). In additional to coastal sites, some inland wetland sites and terrestrial sites for migratory ‘landbird' species such as nightjar *Caprimulgus europaeus* were also considered. The screening was checked against migration corridor maps in Wright *et al*. (2012).

414. The Wright *et al*. (2012) report and collision assessment tool consider the risk for species in the context of i) sea crossing sections of their migration only, and ii) their migratory or biogeographic populations of each species with no apportioning to SPA populations. Where additional species were highlighted as potentially migrating through the DBD Array Area, the list of UK SPAs for which the species is a qualifying feature (breeding and/or non-breeding features) was reviewed to identify if there were any qualifying species which might be considered from SPAs outside the ZoI.

4.5.4 Determination of Offshore LSE

415. The list of SPAs and Ramsar sites considered in screening for LSE is provided in **Table 4-19** for UK sites **Table 4-20** for Transboundary sites. These SPAs and Ramsar sites are listed in order of increasing distance from the Project. In these tables, SPAs and Ramsar sites are screened in where LSE cannot be ruled out for one or more qualifying features and screened out where LSE can be ruled out for all qualifying features. A rationale is given for each SPA or Ramsar site and qualifying feature to explain the screening decision and identify seasons for which connectivity has been identified, with reference to the relevant components of the Project Area (Array Area and/or Export Cable Corridor).

416. For the qualifying features of SPAs and Ramsar sites screened in (**Table 4-19** and **Table 4-20**), the relevant effect pathways are detailed in **Table 4-21**.

Table 4-19: DBD Offshore Screening Outcome for UK SPA and Ramsar Sites with Intertidal and Offshore Ornithology Features. Sites where LSE cannot be Ruled Out for at Least One Qualifying Feature are Shaded in Blue. *Effect Pathways on which Features are Screened In are detailed in Table 4-20*

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
UK9020329	Greater Wash SPA	Overlaps	220.7	0	Little tern, breeding	IN	Potential connectivity during the breeding season. Greater Wash SPA protects nearshore/offshore foraging areas for little terns breeding within the region (SPA population at citation is derived from breeding populations of: Humber Estuary SPA, Gibraltar Point SPA, North Norfolk Coast SPA and Great Yarmouth North Denes SPA) (Natural England 2018). The DBD Project Area (ECC, landfall) overlaps with the SPA.
					Common tern, breeding	IN	Potential connectivity during the breeding season. The Project Area (ECC, landfall) overlaps with the SPA, which is designated for terns undertaking central-place foraging from breeding sites in the region (SPA population at citation cites colony size data from North Norfolk Coast SPA and Breydon Water SPA) (Natural England 2018).
					Sandwich tern, breeding	IN	Potential connectivity during the breeding season. The Project Area (ECC, landfall) overlaps with the SPA. Greater Wash SPA is designated for terns undertaking central-place foraging from breeding sites in the region (SPA population at citation cites colony size data from North Norfolk Coast SPA) (Natural England 2018).
					Common scoter, non-breeding	IN	Potential connectivity during the non-breeding season. The Project Area (ECC, landfall) overlaps with the SPA.
					Little gull, non-breeding	OUT	The Project Area (ECC, landfall) overlaps with the SPA. During the non-breeding period, there is potential connectivity and risk of disturbance and displacement due to offshore construction or decommissioning of the cable(s) but little gull are expected to be mobile and transient through the area and studies indicate gulls are resilient to offshore disturbance sources such as vessels (Fliessbach

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							et al. 2019), therefore no effects are expected and the feature is screened out.
					Red-throated diver, non-breeding	IN	The Project Area (ECC, landfall) overlaps with the SPA, and red-throated diver has been recorded in land-based intertidal baseline surveys during the first year of surveys. Potential connectivity during migration and wintering periods (i.e. non-breeding seasons).
UK9006111 and UK11031	Humber Estuary SPA and Ramsar	Overlaps	235.7	0	Little tern, breeding S	IN	Potential connectivity during the breeding season. The Project Area (HPF) overlaps the Humber Estuary SPA, and the Project Area is also specifically within mean-maximum little tern foraging range (5km) of the Humber Estuary SPA colony (Beacon Ponds, Easington) (Natural England 2019a).
					Marsh harrier, breeding[S]	OUT	No potential for connectivity. The Project Area is more than 10km from all sites within the SPA reported by Natural England to hold breeding populations of marsh harrier (Natural England 2019a) and marsh harriers are documented to generally forage less than 10km from their nest during the breeding season (Cardador & Mañosa 2011, Hardey *et al*. 2013). Migration of breeding marsh harrier to and from the SPA are likely to result in negligible numbers passing through DBD array area due to the distance from SPA (>200km).
					Avocet, breeding[S]	OUT	The Project Area is more than 10km from all sites within the SPA reported by Natural England to hold breeding populations of avocet (Natural England 2019a), and breeding avocet are not predicted to travel this distance from their breeding site during the breeding season as they attend to the nest and mobile chicks. The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential collision, on breeding avocet migrating to or from the SPA.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Avocet, non-breeding[S]	IN	Potential connectivity during non-breeding period. The Project Area (HPF) overlaps with intertidal habitat of the SPA potentially used by non-breeding waders. The DBD array does not lie within the migratory front of avocet crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between Spurn Point, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential collision, on avocet migrating to or from the SPA.
					Bittern, breeding[S]	OUT	The Project Area is more than 10km from all sites within the SPA reported by Natural England to hold breeding populations of bittern (Natural England 2019a), and breeding bittern are not predicted to travel this distance from their breeding site during the breeding season as they attend to the nest and undertake central place foraging largely within the breeding site. Bitterns breeding in the UK are relatively sedentary (Wright *et al*. 2012) therefore there is not considered a potential for connectivity during migration.
					Bittern, non-breeding[S]	OUT	Migration of non-breeding bittern to and from the SPA carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Bar-tailed godwit, wintering	IN	Potential connectivity during wintering period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering bar-tailed godwit to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Black-tailed godwit *islandica*, wintering, passage	IN	Potential connectivity during wintering period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering black-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and the largely north-westerly migratory front of islandica subspecies black-tailed godwit (from Iceland to England).
					Dunlin *alpina*, wintering, passage	IN	Potential connectivity during wintering/passage period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering dunlin to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Golden plover, wintering, passage	IN	Potential connectivity during wintering/passage period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering golden plover to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Hen harrier, non-breeding[S]	IN	Potential connectivity during wintering period. The Project Area (HPF) overlaps with intertidal habitat of the SPA potentially used for hunting by wintering hen harrier. Migration of non-breeding hen harrier to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							and the breadth of migratory front of hen harrier crossing the North Sea (Wright *et al*. 2012).
					Knot, wintering, passage	IN	Potential connectivity during wintering/passage period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering knot to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Redshank, wintering, passage	IN	Potential connectivity during wintering/passage period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering waders. Migration of wintering redshank to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Ruff, non-breeding (passage)[S]	IN	Potential connectivity during passage period. The Project Area (HPF) overlaps with intertidal habitat of the SPA potentially used by passage waders. Migration of passage ruff to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Shelduck, wintering	IN	Potential connectivity during wintering period. The Project Area (HPF)_overlaps with intertidal habitat of the SPA/Ramsar potentially used by wintering shelduck. Migration of wintering shelduck to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							breadth of migratory front of waders crossing the North Sea.
					Waterbird assemblage (dark-bellied brent goose *Branta bernicla bernicla*, wigeon, teal, mallard, pochard *Aythya ferina*, scaup *Aythya marila*, goldeneye *Bucephala clangula*, oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, grey plover *Pluvialis squatarola*, lapwing *Vanellus vanellus*, sanderling *Calidris alba*, whimbrel *Numenius phaeopus*, curlew *Numenius arquata*, greenshank *Tringa nebularia*, turnstone *Arenaria interpres*)	IN	Potential connectivity during non-breeding period. The Project Area (HPF) overlaps with intertidal habitat of the SPA/Ramsar potentially used by passage or wintering waterbirds. Migration of wintering waterbirds to the SPA/Ramsar carries a negligible risk of collision due to the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory fronts of waterfowl and waders crossing the North Sea.
UK9006171	Hornsea Mere SPA	8.8	228	11	Gadwall *Mareca strepera*, non-breeding	OUT	Migration of non-breeding gadwall to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea. At 8.8km nearest distance from the Project Area, there is no potential connectivity for noise or visual

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							disturbance to gadwall of Hornsea Mere SPA due to DBD Project offshore activities.
					Mute swan *Cygnus olor*, non-breeding	OUT	Migration of non-breeding mute swan to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea. At 8.8km nearest distance from the Project Area, there is no potential connectivity for noise or visual disturbance to mute swan of Hornsea Mere SPA due to DBD Project offshore activities.
UK9006101	Flamborough and Filey Coast SPA	22.6	220.3	22.9	Gannet, breeding	IN	Potential connectivity during the breeding and non-breeding seasons. The Project Area lies within the mean maximum + 1SD foraging range from the SPA, and there is connectivity during the migration (non-breeding) periods (Furness 2015, UK North Sea and Channel BDMPS). Gannet was recorded in both the breeding and non-breeding periods during baseline surveys of the Array Area during the first year of surveys.
					Guillemot, breeding	IN	Potential connectivity during the breeding and non-breeding seasons. The DBD array area is beyond the mean maximum + 1SD breeding season foraging range for the species, so connectivity with the array during the breeding season is screened out on this basis, but there is breeding season connectivity with the Export Cable Corridor which lies within foraging range. Guillemot was recorded in the DBD Array Area in all months in the first year of baseline surveys.
					Kittiwake, breeding	IN	Potential connectivity during the breeding and non-breeding periods. Kittiwake was recorded in the DBD Array Area in all months but one in the first year of baseline surveys. The Project Area lies within the mean maximum + 1SD foraging range from the SPA, and there is connectivity during the migration (non-breeding) periods (Furness 2015, UK North Sea BDMPS).

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					Razorbill, breeding	IN	Potential connectivity during the breeding and non-breeding (migration and wintering) periods (UK North Sea and Channel BDMPS). The DBD array area is beyond the mean maximum +1SD breeding season foraging range for the species, so connectivity with the array during the breeding season is screened out on this basis, but there is breeding season connectivity with the Export Cable Corridor which lies within foraging range. Razorbill was recorded in the DBD Array Area in all months but one in the first year of baseline surveys.
					Seabird assemblage, breeding	IN	The assemblage is screened in on the basis that LSE during the breeding and non-breeding season cannot be ruled out for some named component species. In addition to seabird species listed as qualifying features in their own right, (above) named components of the assemblage are: fulmar, puffin, herring gull, shag and cormorant (Natural England, 2014), considered below:
					Fulmar	OUT	Screened out for all effect pathways. Displacement effects or changes to prey availability are screened out for fulmar due to the species' extremely large foraging range. Collision risk is screened out due to the species' low flight height distribution which results in birds generally flying below the rotor swept area.
					Puffin	IN	Potential connectivity in the breeding and non-breeding season. The Project Area (ECC, array) is within the mean maximum + 1SD foraging range from the SPA.
					Herring gull	IN	Potential connectivity in the non-breeding season. The Project Array Area is beyond the mean maximum + 1SD foraging range from the SPA. The Project ECC is within the mean maximum + 1SD foraging range from the SPA but effect pathways relating to the ECC are screened out for the species.
					Shag *Gulosus aristotelis*	IN	Potential connectivity in the breeding and non-breeding season. The Project Array Area is beyond the mean maximum + 1SD foraging range from the SPA but the

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							Project ECC is within the mean maximum + 1SD foraging range from the SPA.
					Cormorant	IN	Potential connectivity in the breeding and non-breeding season. The Project Array Area is beyond the mean maximum + 1SD foraging range from the SPA but the Project ECC is within the mean maximum + 1SD foraging range from the SPA.
UK9006092 and UK11037	Lower Derwent Valley SPA and Ramsar	41.2	266	50	Shoveler *Spatula clypeata*, breeding[S]	OUT	Migration of breeding shoveler to and from the SPA carries a negligible risk of collisiondue to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Bewick's swan *Cygnus columbianus bewickii*, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of Bewick's swan crossing the North Sea, whose northern limit is mapped to be a longitudinal line between Flamborough Head, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on Bewick's swan migrating to or from the SPA/Ramsar.
					Golden plover, non-breeding[S]	OUT	Migration of non-breeding golden plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Ruff, non-breeding[S]	OUT	Migration of non-breeding ruff to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Teal, wintering	OUT	Migration of non-breeding teal to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array

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							(>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Wigeon, wintering	OUT	Migration of non-breeding wigeon to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Assemblage of migratory waders - passage [R]	OUT	Migration of waders to and from the Ramsar site carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Waterbird assemblage	OUT	Migration of waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9008022 and UK11027	Gibraltar Point SPA and Ramsar	59.3	280	68.7	Little tern, breeding[S]	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 50km south of the Project Area and at this distance there is no expected connectivity between DBD and the SPA during migration periods as the vast majority of movements between from Gibraltar Point and equatorial wintering grounds will take place south of DBD.
					Bar-tailed godwit, wintering	OUT	Migration of non-breeding bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.

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					Grey plover, wintering	OUT	Migration of non-breeding grey plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Sanderling, wintering	OUT	Migration of non-breeding sanderling to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Dark-bellied brent goose, wintering[R]	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on dark-bellied brent geese migrating to or from the Ramsar site.
UK9008021 and UK11072	The Wash SPA and Ramsar	61.7	284.4	73.1	Common tern, breeding[S]	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 50km south of the Project Area and at this distance there is no expected connectivity during migration periods as the vast majority of movements between The Wash and equatorial wintering grounds will take place south of DBD.
					Little tern, breeding[S]	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 50km south of the Project Area and at this distance there is no expected connectivity during migration periods as the vast majority of movements between The Wash and equatorial wintering grounds will take place south of DBD.
					Bar-tailed godwit, wintering	OUT	Migration of non-breeding bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the

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							distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Bewick's swan, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of Bewick's swan crossing the North Sea, whose northern limit is mapped to be a longitudinal line between Flamborough Head, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on Bewick's swan migrating to or from the SPA/Ramsar.
					Black-tailed godwit *islandica*, non-breeding[S]	OUT	Migration of non-breeding black-tailed godwit to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and the largely north-westerly migratory front of *islandica* subspecies black-tailed godwit (from Iceland to England).
					Common scoter, non-breeding[S]	OUT	Migration of non-breeding common scoter to and from the SPA carries a negligible risk of collision due to the presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year, and the overland nature of spring migration (Metcalf *et al*. 2022).
					Curlew, wintering	OUT	Migration of non-breeding curlew to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Dark-bellied brent goose, wintering	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on

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							dark-bellied brent geese migrating to or from the SPA/Ramsar.
					Dunlin *alpina*, wintering	OUT	Migration of non-breeding dunlin to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Gadwall, non-breeding[S]	OUT	Migration of non-breeding gadwall to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Goldeneye, non-breeding[S]	OUT	Migration of non-breeding goldeneye to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Grey plover, wintering	OUT	Migration of non-breeding grey plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Knot, wintering	OUT	Migration of non-breeding knot to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Oystercatcher, wintering	OUT	Migration of non-breeding oystercatcher to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the

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							distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Pink-footed goose *Anser brachyrhynchus*, wintering	OUT	The DBD array does not lie within the migratory front of pink-footed geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering pink-footed geese migrating to or from the SPA/Ramsar.
					Pintail *Anas acuta*, wintering	OUT	Migration of non-breeding pintail to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Redshank, wintering	OUT	Migration of non-breeding redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Sanderling, wintering	OUT	Migration of non-breeding sanderling to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Shelduck, wintering	OUT	Migration of non-breeding shelduck to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Turnstone, wintering	OUT	Migration of non-breeding turnstone to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the

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							distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Wigeon, non-breeding[S]	OUT	Migration of non-breeding wigeon to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Waterbird assemblage	OUT	Migration of non-breeding waterbirds to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9006161	North York Moors SPA	65.2	220	68	Merlin *Falco columbarius*, breeding	OUT	Merlin breeding in Britain are of the *aesalon* subspecies which breeds from Ireland to SW Siberia and is considered sedentary (Wernham *et al*. 2002, Wright *et al*. 2012). Therefore, no connectivity is expected between offshore aspects of DBD and the merlin feature of the SPA.
					Golden plover, breeding	OUT	With nearest distance of 65.2km between the Project Area and the SPA, there is considered to be negligible risk of golden plover from the SPA forming a substantial portion of the population using the intertidal part of the Development Area during the non-breeding period. I.e., there is no functional linkage. Migration of breeding golden plover to and from the SPA offshore carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of golden plover crossing the North Sea (Wright *et al*. 2012).
UK9009031 and UK11048	North Norfolk Coast SPA and Ramsar	78.5	274.3	89.3	Avocet, breeding[S]	OUT	The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is

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							narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding avocet migrating to or from the SPA.
					Bittern, breeding[S]	OUT	Bitterns breeding in the UK are relatively sedentary (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding bittern migrating to or from the SPA.
					Common tern, breeding	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 50km south of the Project Area (and more than 250km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements from the North Norfolk Coast will be orientated southwards towards equatorial wintering grounds.
					Little tern, breeding	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA/Ramsar. This SPA/Ramsar is located more than 75km south of the Project Area (and more than 250km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements between the North Norfolk Coast and equatorial wintering grounds will take place south of DBD.
					Marsh harrier, breeding[S]	OUT	No potential connectivity. Migration of breeding marsh harrier to and from the SPA carries zero or negligible probability of collision with the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the narrowly coastal migratory front of marsh harriers breeding in the UK (Wright *et al*. 2012).
					Montagu’s harrier *Circus pygargus*, breeding[S]	OUT	The DBD array does not lie within the migratory front of Montagu's harrier breeding in the UK, which comprises the south-east (as far north as The Wash) and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is zero or negligible potential for connectivity or impact of collision on breeding Montagu's harrier migrating to or from the SPA.

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					Sandwich tern, breeding	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 50km south of the Project Area (and more than 250km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements from the North Norfolk Coast will be orientated southwards towards equatorial wintering grounds.
					Dark-bellied brent goose, wintering	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on dark-bellied brent geese migrating to or from the SPA/Ramsar.
					Knot, wintering	OUT	Migration of wintering knot to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Pink-footed goose, wintering	OUT	The DBD array does not lie within the migratory front of pink-footed geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering pink-footed geese migrating to or from the SPA/Ramsar.
					Wigeon, wintering	OUT	Migration of wintering wigeon to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Pintail, wintering[R]	OUT	Migration of wintering pintail to and from the Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array

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							(>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
					Waterbird assemblage (European white-fronted goose *Anser albifrons*, shelduck, grey plover, ringed plover, oystercatcher, redshank)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waterfowl crossing the North Sea.
UK9006061 and UK11068	Teesmouth and Cleveland Coast SPA and Ramsar	103.5	262.8	112	Avocet, breeding[S]	OUT	The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding avocet migrating to or from the SPA.
					Common tern, breeding[S]	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population is likely to use the UK North Sea and Channel BDMPS, in which the Project Area is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Little tern, breeding[S]	OUT	Little tern are reported to migrate close inshore. There is limited potential for disturbance / displacement of birds from this SPA if passing through the offshore export cable corridor during construction, operation and maintenance, or decommissioning (but the DBD array is more than 200km from shore). Therefore, probability of impact is extremely low, and the feature is screened out.
					Knot, wintering	OUT	Migration of wintering knot to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the

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							turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Redshank, wintering	OUT	Migration of wintering redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Ruff, passage[S]	OUT	Migration of passage ruff to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of waders crossing the North Sea.
					Sandwich tern, passage[S]	OUT	The SPA population is designated primarily for aggregations of individuals during passage period are expected to occur within the intertidal habitats of the SPA. Migration of Sandwich tern to and from the SPA carries extremely low risk of collision when considering the distance from the array (>200km), the number of passages per individual per year and the coastal nature of tern migration (e.g. WWT & MacArthur Green 2014).
					Waterbird assemblage (gadwall, shoveler, sanderling, wigeon, lapwing, herring gull, black-headed gull)	OUT	Migration of waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9006131 and UK11049	Northumbria Coast SPA and Ramsar	124.4	269.9	133.3	Arctic tern, breeding[S]	IN	Potential connectivity during migration (i.e., non-breeding) periods. DBD is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Little tern, breeding	OUT	Little tern are reported to migrate close inshore. There is limited potential for disturbance / displacement of birds from this SPA if passing through the offshore export cable corridor during construction, operation and maintenance, or decommissioning (but the DBD array is more than 200km from shore). Therefore, probability of impact is extremely low, and the feature is screened out.
					Purple sandpiper *Calidris maritima*, wintering	OUT	Migration of wintering purple sandpiper to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and the number of passages per individual per year.
					Turnstone, wintering	OUT	Migration of wintering turnstone to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9009271	Great Yarmouth North Denes SPA	140.9	277.9	145.8	Little tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 100km south of the Project Area (and more than 250km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements between Great Yarmouth North Denes and equatorial wintering grounds will take place south of DBD.
UK9009181 and UK11008	Breydon Water SPA and Ramsar	152.3	275	184	Common tern, breeding[S]	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 150km south of the Project Area (and more than 250km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of

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							movements between Breydon Water and equatorial wintering grounds will take place south of DBD.
					Avocet, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of avocet crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between Spurn Point, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on avocet migrating to or from the SPA.
					Bewick's swan, wintering	OUT	The DBD array does not lie within the migratory front of Bewick's swan crossing the North Sea, whose northern limit is mapped to be a longitudinal line between Flamborough Head, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on Bewick's swan migrating to or from the SPA/Ramsar.
					Golden plover, non-breeding[S]	OUT	Migration of non-breeding golden plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Lapwing, wintering	OUT	Migration of wintering lapwing to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Ruff, passage[S]	OUT	Migration of passage ruff to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Waterbird assemblage	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9020325	Northumberland Marine SPA	166.6	261.9	168.6	Arctic tern, breeding	OUT	Marine SPA protects offshore foraging areas for Arctic tern breeding at the Farne Islands, Northumbria Coast and Coquet Island SPAs (Natural England 2015). DBD is beyond the mean maximum +1SD foraging range from the SPA. Arctic tern has been screened in for LSE at the three associated breeding colony SPAs.
					Common tern, breeding	OUT	Marine SPA protects offshore foraging areas for common tern breeding at the Farne Islands and Coquet Island SPAs (Natural England 2015). DBD is beyond the mean maximum foraging range +1SD from the SPA. Common tern has been screened in for LSE at the two associated breeding colony SPAs.
					Guillemot, breeding	OUT	Marine SPA protects offshore foraging areas for guillemot breeding at the Farne Islands SPA, DBD is beyond the mean maximum foraging range +1SD from the SPA. Guillemot has been screened in for LSE at the associated breeding colony SPA.
					Little tern, breeding	OUT	Marine SPA protects offshore foraging areas for little tern breeding at the Northumbria Coast and Lindisfarne SPAs. DBD is beyond the mean maximum foraging range 1SD from the SPA. Little tern has been screened out for LSE for the associated breeding population SPAs.
					Puffin, breeding	OUT	Marine SPA protects offshore foraging areas for puffins breeding at the Farne Islands and Coquet Islands SPAs (assemblage component). DBD is beyond the mean maximum foraging range + 1SD from the SPA. Puffin has been considered for LSE for the associated breeding population SPAs.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Roseate tern *Sterna dougallii*, breeding	OUT	Marine SPA protects offshore foraging areas for puffins breeding at the Coquet Islands SPA (the species is also a qualifying feature of the Lindisfarne and Farne Islands SPAs but has not been recorded breeding since respectively 1991 and 2009) (Natural England 2015). DBD is beyond the mean maximum +1SD foraging range from the SPA. Roseate tern has been screened in for LSE for the associated breeding population SPAs.
					Sandwich tern, breeding	OUT	Marine SPA protects offshore foraging areas for Sandwich tern breeding at the Farne Islands SPA, DBD is beyond the mean maximum foraging range +1SD from the SPA. Sandwich tern has been screened in for LSE at the associated breeding colony SPAs.
					Seabird assemblage	OUT	Marine SPA protects offshore foraging areas for SPA assemblage species breeding at the Farne Islands and Coquet Islands SPA, Assemblage species have been considered for LSE at the associated breeding colony SPAs.
UK9009112 and UK11002	Alde-Ore Estuary SPA and Ramsar	188.5	346.5	222.6	Sandwich tern, breeding[S]	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 150km south of the Project Area (and more than 300km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements between the Alde-Ore Estuary SPA and equatorial wintering grounds will take place south of DBD.
					Little tern, breeding[S]	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 150km south of the Project Area (and more than 300km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the Alde-Ore Estuary SPA and equatorial wintering grounds will take place south of DBD.
					Lesser black-backed gull, breeding	OUT	Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 150km south of the Project Area (and more than 300km from the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							Array) and at this distance there is no expected connectivity during migration periods as the vast majority of movements from the Alde-Ore Estuary SPA will be orientated south towards the wintering grounds.
					Avocet, breeding[S]	OUT	The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding avocet migrating to or from the SPA.
					Avocet, wintering	OUT	The DBD array does not lie within the migratory front of avocet crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between Spurn Point, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on avocet migrating to or from the SPA/Ramsar.
					Marsh harrier, breeding[S]	OUT	Migration of breeding marsh harrier to and from the SPA carries zero or negligible probability of collision with the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the narrowly coastal migratory front of marsh harriers breeding in the UK (Wright *et al*. 2012).
					Redshank, wintering	OUT	Migration of wintering redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Ruff, non-breeding[S]	OUT	Migration of non-breeding ruff to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Bird assemblage, breeding[R]	OUT	The assemblage of breeding birds is screened out on the basis that the constituent feature species of the assemblage are screened out.
					Bird assemblage, wintering[R]	OUT	The assemblage of wintering birds is screened out on the basis that the constituent feature species of the assemblage are screened out.
UK9006031	Coquet Island SPA	189.6	274.7	189.8	Arctic tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Common tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Roseate tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK East Coast and Channel BDMPS, Furness 2015). Project Area is beyond the mean maximum + 1SD foraging range from the SPA.
					Sandwich tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK North Sea and Channel BDMPS, Furness 2015). The Project Area is beyond the mean maximum + 1SD foraging range from the SPA. Sandwich tern has not been recorded in the first 12 months of baseline surveys of the DBD Array.
					Seabird assemblage, breeding. Includes	IN	The assemblage is screened in, as LSE cannot be ruled out for one or more component species during the breeding or non-breeding season.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					the additional component species:		
					Puffin	IN	Potential connectivity in the non-breeding season (Furness 2015). The Project Area is beyond the mean maximum + 1SD foraging range from the SPA.
					Black-headed gull	OUT	Screened out on the basis of no potential connectivity during the breeding or non-breeding seasons. The Project Area is beyond the mean maximum foraging range from the SPA. The species is considered to have relatively inshore or terrestrial ecology during the non-breeding season, therefore there is no potential connectivity to the Array and offshore components of the Project in the non-breeding season.
					Fulmar	OUT	Screened out for all effect pathways. Displacement effects or changes to prey availability are screened out for fulmar due to the species' extremely large foraging range. Collision risk is screened out due to the species' low flight height distribution which results in birds generally flying below the rotor swept area.
					Herring gull	IN	Potential connectivity during the non-breeding season. The Project Area is beyond the mean maximum + 1SD foraging range from the SPA.
					Lesser black-backed gull	IN	Potential connectivity during the non-breeding season. The Project Area is beyond the mean maximum + 1SD foraging range from the SPA.
					Kittiwake	IN	Potential connectivity during the breeding and non-breeding season. The Project Area is within the mean maximum + 1SD foraging range from the SPA.
UK9006021	Farne Islands SPA	215.7	292.6	215.8	Arctic tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							(associated with breeding or migration, Furness 2015) during baseline surveys.
					Common tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Roseate tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK East Coast and Channel BDMPS, Furness 2015). DBD is beyond the mean maximum + 1SD foraging range from the SPA.
					Sandwich tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK North Sea and Channel BDMPS, Furness 2015). Project Area is beyond the mean maximum + 1SD foraging range from the SPA. Sandwich tern has not been recorded in the first 12 months of baseline surveys of the DBD Array.
					Seabird assemblage including the additional component species	IN	The assemblage is screened in on the basis that LSE from in combination collision / displacement cannot be ruled out for one or more component species during the breeding or non-breeding season.
					Kittiwake	IN	Potential connectivity during the breeding and non-breeding seasons. The Project Area is within the mean maximum + 1SD foraging range from the SPA.
					Shag	IN	Potential connectivity during the non-breeding season. The Project Area is beyond the mean maximum + 1SD foraging range from the SPA.

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					Cormorant	IN	Potential connectivity during the non-breeding season. The Project Area is beyond the mean maximum + 1SD foraging range from the SPA.
					Puffin	IN	Potential connectivity during the non-breeding season. The Array Area is beyond the mean maximum + 1SD foraging range from the SPA.
UK9006011 and UK11036	Lindisfarne SPA and Ramsar	221.3	301.3	222.1	Bar-tailed godwit, wintering	OUT	Migration of wintering bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Common scoter, non-breeding[S]	OUT	Migration of non-breeding common scoter to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea. The SPA boundary encompasses core areas used during the non-breeding season. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity during the remainder of the non-breeding season.
					Dunlin, non-breeding[S]	OUT	Migration of non-breeding dunlin to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Eider, non-breeding[S]	OUT	Migration of non-breeding eider to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea. The SPA boundary encompasses core areas used during the non-breeding season. Given

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							the extensive distance between the SPA and DBD it is considered that there is no connectivity during the remainder of the non-breeding season.
					Golden plover, non-breeding[S]	OUT	Migration of non-breeding golden plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Grey plover, non-breeding[S]	OUT	Migration of non-breeding grey plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Greylag goose *Anser anser*, wintering	OUT	The DBD array does not lie within the migratory front of (Icelandic) greylag geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering greylag geese migrating to or from the SPA/Ramsar.
					Light-bellied brent goose *Branta bernicla hrota*, wintering[S]	OUT	The DBD array lies within the main or traditional migratory route of Svalbard light-bellied brent geese crossing the North Sea to winter in Britain as mapped by Wright *et al*. (2012). Wright *et al*. (2012) also details that more recently, there has been diversification of routes taken by this population with some migrating directly from Svalbard and some crossing via the Wadden Sea, such that a smaller proportion of the population now use the route in proximity to the DBD Array Area. There is predicted to be a negligible risk of collision due to the turbine array, when considering the broad nature of the sea-crossing corridor and the number of passages per individual per year.
					Little tern, breeding[S]	OUT	Little tern are reported to migrate close inshore. There is limited potential for disturbance / displacement of birds from this SPA if passing through the offshore export cable

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							corridor during construction, operation and maintenance, or decommissioning (but the DBD array is more than 200km from shore). Therefore, probability of impact is extremely low, and the feature is screened out.
					Long-tailed duck *Clangula hyemalis*, non-breeding[S]	OUT	Migration of non-breeding long-tailed duck to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year, and that the DBD Array lies within an area of the North Sea considered to be used by a minority of migrating long-tailed duck (Wright *et al*. 2012).
					Red-breasted merganser *Mergus serrator*, non-breeding[S]	OUT	Migration of non-breeding red-breasted merganser to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year, and that the DBD Array lies within an area of the North Sea considered to be used by a minority of migrating red-breasted merganser (Wright *et al*. 2012).
					Redshank, wintering	OUT	Migration of wintering redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Ringed plover, wintering	OUT	Migration of wintering ringed plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Roseate tern, breeding[S]	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK East Coast and Channel BDMPS, Furness 2015). DBD is beyond the mean maximum + 1SD foraging range from the SPA.

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					Sanderling, non-breeding[S]	OUT	Migration of non-breeding sanderling to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Shelduck, non-breeding[S]	OUT	Migration of non-breeding shelduck to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Whooper swan *Cygnus cygnus*, non-breeding[S]	OUT	Migration of wintering whooper swan to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and that a minority of whooper swans occurring in Britain in winter will continue migration to and from continental Europe via the North Sea (Wright *et al*. 2012).
					Wigeon, wintering	OUT	Migration of wintering wigeon to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9009246 and UK11026	Foulness SPA and Ramsar	229.3	416.3	292.4	Little tern, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 400km from the Array) and at this distance there is no expected connectivity during migration periods as the vast

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							majority of migratory movements between Foulness and equatorial wintering grounds will take place south of DBD.
					Sandwich tern, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 400km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between Foulness and equatorial wintering grounds will take place south of DBD.
					Common tern, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 400km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between Foulness and equatorial wintering grounds will take place south of DBD.
					Avocet, breeding[S]	OUT	The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding avocet migrating to or from the SPA.
					Ringed plover, breeding[S]	OUT	Migration of breeding ringed plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Bar-tailed godwit, wintering	OUT	Migration of wintering bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Dark-bellied brent goose, wintering	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on dark-bellied brent geese migrating to or from the SPA/Ramsar.
					Grey plover, wintering	OUT	Migration of wintering grey plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Hen harrier, non-breeding[S]	OUT	Migration of non-breeding hen harrier to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of hen harrier crossing the North Sea (Wright *et al*. 2012).
					Knot, wintering	OUT	Migration of wintering knot to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Oystercatcher, wintering	OUT	Migration of wintering oystercatcher to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Redshank, non-breeding[S], passage[R]	OUT	Migration of non-breeding or passage redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering (shelduck, dunlin, curlew)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9004271	St Abb's Head to Fast Castle SPA	260.0	338.1	260.2	Seabird assemblage, breeding (guillemot, razorbill, kittiwake, herring gull, shag)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except kittiwake. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9020316	Outer Firth of Forth and St Andrews Bay Complex SPA	261.1	325.0	261.4	Arctic tern, breeding	OUT	This marine SPA protects offshore foraging areas for Arctic tern breeding at the Forth islands SPA. Arctic tern has been screened in for LSE at the associated breeding colony SPA.
					Common tern, breeding	OUT	This marine SPA protects offshore foraging areas for common tern breeding at the Forth islands SPA. Common tern has been screened in for LSE at the associated breeding colony SPA.
					Gannet, breeding	OUT	This marine SPA protects offshore foraging areas for gannet breeding at the Forth Islands SPA (Bass Rock). DBD is within the mean maximum +1SD foraging range of gannets from the breeding SPA. Gannet has been screened in for LSE at the associated breeding colony SPA.
					Shag, breeding	OUT	This marine SPA protects offshore foraging areas for shag breeding at the Forth Islands SPA. Shag has been considered for LSE at the associated breeding colony SPA.
					Eider, non-breeding	OUT	This marine SPA boundary encompasses core areas used during the non-breeding season. Given the extensive

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							distance between the SPA and DBD it is considered that there is no connectivity.
					Little gull, non-breeding	OUT	This marine SPA boundary encompasses core areas used during the non-breeding season. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
					Red-throated diver, non-breeding	OUT	This marine SPA boundary encompasses core areas used during the non-breeding season. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
					Slavonian grebe *Podiceps auritus*, non-breeding	OUT	This marine SPA boundary encompasses core areas used during the non-breeding season. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
					Seabird assemblage, breeding (puffin, kittiwake, herring gull, Manx shearwater, guillemot)	OUT	This SPA is designated in part to support the assemblage of foraging seabirds originating from breeding colonies in the region, therefore the breeding seabird assemblage of the SPA is expected to be confined in the breeding season between foraging waters of the SPA and their breeding colonies.
					Seabird assemblage, non-breeding (black-headed gull, common gull, herring gull, kittiwake, guillemot, shag, razorbill)	OUT	The marine SPA boundary encompasses core areas used during the non-breeding season. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
					Waterfowl assemblage, wintering (long-tailed duck, common scoter, velvet scoter,	OUT	Migration of all assemblage wintering species to and from the site are likely to result in negligible numbers passing through DBD due to the distance from the SPA.

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					goldeneye, red-breasted merganser)		
UK9004171	Forth Islands SPA	294.2	375.1	298.4	Arctic tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Common tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Gannet, breeding	IN	Potential connectivity during the breeding and non-breeding periods. The Project Area lies within the mean maximum + 1SD foraging range from the SPA, and there is connectivity during the migration (non-breeding) periods (Furness 2015, UK North Sea and Channel BDMPS). Gannet was recorded in both the breeding and non-breeding periods during baseline surveys of the Array Area during the first year of surveys.
					Lesser black-backed gull, breeding	IN	Potential connectivity in the non-breeding season (UK North Sea and Channel BDMPS, Furness 2015). DBD array is beyond the mean maximum +1SD breeding season foraging range.
					Puffin, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Roseate tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK East Coast and Channel BDMPS, Furness 2015). DBD is beyond the mean maximum + 1SD foraging range from the SPA.
					Sandwich tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK North Sea and Channel BDMPS, Furness 2015). Project Area is beyond the mean maximum + 1SD foraging range from the SPA. Sandwich tern has not been recorded in the first 12 months of baseline surveys of the DBD Array.
					Shag, breeding	OUT	No potential connectivity. Project Area is beyond the mean maximum foraging range from the SPA. DBD is outside the non-breeding season BDMPS (NW North Sea) for the SPA population.
					Seabird assemblage, breeding (razorbill, guillemot, kittiwake, herring gull, cormorant)	OUT	Project Area is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except gannet. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9012091 and UK11023	Dungeness, Romney Marsh and Rye Bay SPA and Ramsar	294.2	488.8	364.9	Avocet, breeding[S]	OUT	The DBD array does not lie within the migratory front of avocets breeding in the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on breeding avocet migrating to or from the SPA.
					Common tern, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 450km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Little tern, breeding[S]	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 250km south

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							of the Project Area (and more than 450km from the Array) and at this distance there is no expected connectivity between DBD and the SPA during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Marsh harrier, breeding[S]	OUT	No potential connectivity. Migration of breeding marsh harrier to and from the SPA carries zero or negligible probability of collision with the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the narrowly coastal migratory front of marsh harriers breeding in the UK (Wright *et al*. 2012).
					Mediterranean gull *Ichthyaetus melanocephalus*, breeding[S]	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range. There is potential connectivity during the non-breeding (migration) period but migrations to and from the site are likely to result in negligible numbers of birds of this species passing through DBD due to the distance from the SPA.
					Sandwich tern, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 450km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Aquatic warbler *Acrocephalus paludicola*, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of aquatic warbler to and from the UK, which comprises the south-east and Channel coast where the sea crossing is narrowest (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on non-breeding aquatic warbler migrating to or from the SPA.
					Bewick's swan, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of Bewick's swan crossing the North Sea, whose northern limit is mapped to be a longitudinal line between

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							Flamborough Head, UK and Heligoland, Germany (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on Bewick's swan migrating to or from the SPA/Ramsar.
					Bittern, non-breeding[S]	OUT	Migration of non-breeding bittern to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Golden plover, non-breeding[S]	OUT	Migration of non-breeding golden plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Hen harrier, non-breeding[S]	OUT	Migration of non-breeding hen harrier to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of hen harrier crossing the North Sea (Wright *et al*. 2012).
					Ruff, non-breeding[S]	OUT	Migration of non-breeding ruff to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Shoveler, wintering	OUT	Migration of wintering shoveler to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.

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					Mute swan, wintering[R]	OUT	Migration of wintering mute swan to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering (European white-fronted goose, wigeon, gadwall, pochard, little grebe *Tachybaptus ruficollis*, great crested grebe, cormorant, coot, sanderling, whimbrel, common sandpiper *Actitis hypoleucos*, lapwing)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9004451	Imperial Dock Lock, Leith SPA	309.3	386	332	Common tern, breeding	IN	Potential connectivity during migration (i.e., non-breeding) period. The Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
UK9011061 and UK11063	Solent & Southampton Water SPA and Ramsar	317.3	656.1	532.2	Sandwich tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 650km from the Array) and at this distance there is no expected connectivity during migration periods as the vast

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Common tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 650km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Roseate tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 650km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Little tern, breeding	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA/Ramsar. This SPA/Ramsar is located more than 300km south of the Project Area (and more than 650km from the Array) and at this distance there is no expected connectivity between DBD and the SPA/Ramsar during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Mediterranean gull, breeding [S]	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range. There is potential connectivity during the non-breeding (migration) period but migrations to and from the site are likely to result in negligible numbers of birds of this species passing through DBD due to the distance from the SPA.
					Black-tailed godwit, wintering	OUT	Migration of non-breeding black-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and the largely north-

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							westerly migratory front of *islandica* subspecies black-tailed godwit (from Iceland to England).
					Dark-bellied brent goose, wintering	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on dark-bellied brent geese migrating to or from the SPA/Ramsar.
					Ringed plover, wintering	OUT	Migration of wintering ringed plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Teal, wintering	OUT	Migration of wintering teal to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9011011	Chichester and Langstone Harbours SPA	317.8	645.7	521.8	Sandwich tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 600 km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Common tern, breeding	OUT	The Project Area is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 200km south of the Project Area (and more than 600km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Little tern, breeding	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. This SPA is located more than 300km south of the Project Area (and more than 600km from the Array) and at this distance there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD.
					Bar-tailed godwit, wintering	OUT	Migration of wintering bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Curlew, wintering	OUT	Migration of wintering curlew to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Dark-bellied brent goose, wintering	OUT	The DBD array does not lie within the migratory front of dark-bellied brent geese crossing the North Sea to winter in Britain, whose northern limit is mapped to be a longitudinal line between the Holderness coast, UK and Blåvand, Denmark (Wright *et al*. 2012). Therefore, there is no potential for connectivity or potential impact of collision, on dark-bellied brent geese migrating to or from the SPA/Ramsar.

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					Dunlin, wintering	OUT	Migration of wintering dunlin to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Grey plover, wintering	OUT	Migration of wintering grey plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Pintail, wintering	OUT	Migration of wintering pintail to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Red-breasted merganser, wintering	OUT	Migration of wintering red-breasted merganser to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year, and that the DBD Array lies within an area of the North Sea considered to be used by a minority of migrating red-breasted merganser (Wright *et al*. 2012).
					Redshank, wintering	OUT	Migration of wintering redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Ringed plover, wintering	OUT	Migration of wintering ringed plover to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Sanderling, wintering	OUT	Migration of wintering sanderling to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Shelduck, wintering	OUT	Migration of wintering shelduck to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Shoveler, wintering	OUT	Migration of wintering shoveler to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Teal, wintering	OUT	Migration of wintering teal to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Turnstone, wintering	OUT	Migration of wintering turnstone to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Wigeon, wintering	OUT	Migration of wintering wigeon to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the

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							turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9002271	Fowlsheugh SPA	346.2	388.2	365.1	Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Kittiwake, breeding	IN	Potential connectivity during the non-breeding (migration) period (UK North Sea Waters). DBD is beyond the mean maximum +1SD breeding season foraging range.
					Seabird assemblage, breeding (fulmar, herring gull, razorbill)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002221 and UK13061	Ythan Estuary, Sands of Forvie and Meikle Loch (extension) SPA and Ramsar	366.6	392.5	391.4	Common tern, breeding[S]	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Little tern, breeding[S]	OUT	Little tern are reported to migrate close inshore. There is limited potential for disturbance / displacement of birds from this SPA if passing through the offshore export cable corridor during construction, operation and maintenance, or

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							decommissioning (but the DBD array is more than 200 km from shore). Therefore, probability of impact is extremely low, and the feature is screened out.
					Sandwich tern, breeding	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK North Sea and Channel BDMPS, Furness 2015). Project Area is beyond the mean maximum + 1SD foraging range from the SPA. Sandwich tern has not been recorded in the first 12 months of baseline surveys of the DBD Array.
					Pink-footed goose, wintering	OUT	The DBD array does not lie within the migratory front of pink-footed geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering pink-footed geese migrating to or from the SPA/Ramsar.
					Waterfowl assemblage, wintering (eider, lapwing, redshank)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9002491	Buchan Ness to Collieston Coast SPA	375.4	390.1	404.1	Seabird assemblage, breeding (fulmar, guillemot, herring gull, kittiwake, shag)	OUT	Project Area is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002211 and UK13041	Loch of Strathbeg SPA and Ramsar	393.9	395	419	Sandwich tern, breeding[S]	IN	Potential connectivity during the migration (i.e. non-breeding) period (UK North Sea and Channel BDMPS, Furness 2015). Project Area is beyond the mean maximum + 1SD foraging range from the SPA. Sandwich tern has not been recorded in the first 12 months of baseline surveys of the DBD Array.
					Greylag goose, non-breeding[S]	OUT	The DBD array does not lie within the migratory front of (Icelandic) greylag geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							impact of collision on wintering greylag geese migrating to or from the SPA.
					Pink-footed goose, wintering	OUT	The DBD array does not lie within the migratory front of pink-footed geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering pink-footed geese migrating to or from the SPA/Ramsar.
					Svalbard barnacle goose *Branta leucopsis*, wintering	OUT	The DBD array lies in proximity to the migratory corridor of Svalbard barnacle geese crossing the North Sea to winter in Britain as mapped by Wright *et al*. (2012). Wright *et al*. (2012) also details that arrival on the east coast occurs, "on a broad front from the Northern Isles to Yorkshire" before proceeding to SPA sites in Scotland and the Solway Firth. There is predicted to be a negligible risk of collision due to the turbine array, when considering the broad nature of the sea-crossing corridor and the number of passages per individual per year.
					Whooper swan, wintering	OUT	Migration of wintering whooper swan to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and that a minority of whooper swans occurring in Britain in winter will continue migration to and from continental Europe via the North Sea (Wright *et al*. 2012).
					Waterbird assemblage, wintering (teal, goldeneye)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9002471	Troup, Pennan and Lion's Heads SPA	413.0	427.4	445.3	Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Seabird assemblage, breeding (fulmar, herring gull, kittiwake, razorbill)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9001624 and UK13025	Inner Moray Firth SPA and Ramsar	473.2	539.7	557.7	Common tern, breeding[S]	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Osprey *Pandion haliaetus*, breeding[S]	OUT	Migration of breeding osprey to and from the SPA carries zero or negligible probability of collision with the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the narrowly coastal migratory front of osprey breeding in the UK (Wright *et al*. 2012).
					Bar-tailed godwit, wintering	OUT	Migration of wintering bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Greylag goose, wintering	OUT	The DBD array does not lie within the migratory front of (Icelandic) greylag geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering greylag geese migrating to or from the SPA/Ramsar.
					Red-breasted merganser, wintering	OUT	Migration of wintering red-breasted merganser to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages

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							per individual per year, and that the DBD Array lies within an area of the North Sea considered to be used by a minority of migrating red-breasted merganser (Wright *et al*. 2012).
					Redshank, wintering	OUT	Migration of wintering redshank to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Waterbird assemblage, wintering (cormorant, wigeon, teal, goldeneye, goosander, curlew, scaup, oystercatcher)	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9001623 and UK13009	Cromarty Firth SPA and Ramsar	485.0	541.1	559.0	Common tern, breeding[S]	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Common tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Osprey, breeding[S]	OUT	Migration of breeding osprey to and from the SPA carries zero or negligible probability of collision with the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the narrowly coastal migratory front of osprey breeding in the UK (Wright *et al*. 2012).
					Whooper swan, non-breeding[S]	OUT	Migration of non-breeding whooper swan to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							array (>200km), and that a minority of whooper swans occurring in Britain in winter will continue migration to and from continental Europe via the North Sea (Wright *et al*. 2012).
					Bar-tailed godwit, wintering	OUT	Migration of wintering bar-tailed godwit to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
					Greylag goose, wintering	OUT	The DBD array does not lie within the migratory front of (Icelandic) greylag geese wintering in the UK (Wright *et al*. 2012). Therefore, there is no potential for connectivity or impact of collision on wintering greylag geese migrating to or from the SPA/Ramsar.
					Waterbird assemblage, wintering	OUT	Migration of wintering waterbirds to and from the SPA/Ramsar carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of these waterbirds crossing the North Sea.
UK9001182	East Caithness Cliffs SPA	503.7	511.2	530.5	Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Herring gull, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS, Furness 2015). DBD array is beyond the mean maximum +1SD breeding season foraging range.
					Kittiwake, breeding	IN	Potential connectivity during the non-breeding (migration) periods (UK North Sea BDMPS). DBD is beyond the mean maximum +1SD breeding season foraging range.
					Peregrine *Falco peregrinus*, breeding	OUT	Movements of breeding peregrine to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							(>200km) and the limited occurrence of North Sea crossings within ranging and movement of peregrine as understood from ringing recoveries (Wernham *et al*. 2002).
					Razorbill, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Shag, breeding	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. DBD is outside the non-breeding season BDMPS (NW North Sea) for the SPA population.
					Seabird assemblage, breeding (cormorant, fulmar, great black-backed gull)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9001181	North Caithness Cliffs SPA	517.9	521.0	544.2	Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Peregrine, breeding	OUT	Movements of breeding peregrine to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km) and the limited occurrence of North Sea crossings within ranging and movement of peregrine as understood from ringing recoveries (Wernham *et al*. 2002).
					Seabird assemblage, breeding (fulmar, kittiwake, puffin, razorbill)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9001131	Pentland Firth Islands SPA	522.9	530.9	554.1	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
UK9002151	Copinsay SPA	527.4	544.9	568.2	Seabird assemblage, breeding (fulmar, great black-backed gull, kittiwake, guillemot)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002381	Auskerry SPA	538.4	560.4	583.7	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Storm petrel *Hydrobates pelagicus*, breeding	OUT	The Project Area is beyond mean breeding season foraging range. The available distributional data show an absence or scarcity of this species from the waters in the region of the Project Area during the non-breeding period, and an apparent absence (or near absence) from UK waters between December and April (Stone *et al*. 1995, Waggit *et al*. 2019). Therefore, it is considered that there is also no potential for connectivity during the non-breeding period.
UK9002141	Hoy SPA	542.2	548.0	571.2	Great skua, breeding	IN	Potential connectivity during the breeding and non-breeding period (UK North Sea and Channel BDMPS). DBD is within the mean maximum +1SD breeding season foraging range of great skua, although it is considered unlikely that breeding birds would regularly range as far. The species was recorded at the DBD Array Area during

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							one baseline survey within the first 12 months, coinciding with autumn migration for the species in UK waters.
					Peregrine, breeding	OUT	Movements of breeding peregrine to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km) and the limited occurrence of North Sea crossings within ranging and movement of peregrine as understood from ringing recoveries (Wernham *et al.* 2002).
					Red-throated diver, breeding	OUT	The Project Area is beyond the mean maximum +1SD breeding season foraging range. While connectivity in non-breeding periods is suggested by Furness (2015) (UK North Sea waters BDMPS during migration and SW North Sea BDMPS during wintering period), more recent studies of movements of Scottish breeding red-throated divers indicate that the majority spend the non-breeding periods in Scottish waters (JNCC 2023). Therefore, there is also considered to be no potential connectivity in the non-breeding season.
					Seabird assemblage, breeding (Arctic skua, fulmar, great black-backed gull, kittiwake, guillemot, puffin)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002091	Fair Isle SPA	549.0	589.4	612.6	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Fair Isle wren *Troglodytes*	OUT	Fair Isle wren breeding at UK SPAs are categorised by Wright *et al.* (2012) as a species whose population is

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					troglodytes fridariensis, breeding		"sedentary or largely resident". Therefore, there is considered to be no connectivity between DBD and the SPA.
					Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Seabird assemblage, breeding (Arctic skua, great skua, fulmar, gannet, kittiwake, puffin, razorbill, shag)	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range of all named assemblage species except fulmar and great skua. However, great skua has been recorded at DBD during only one baseline survey within the first 12 months of coverage, coinciding with autumn migration for the species in UK waters. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore the assemblage is screened out.
UK9002431	Calf of Eday SPA	559.3	584.3	607.5	Seabird assemblage, breeding (cormorant, fulmar, great black-backed gull, kittiwake, guillemot)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002371	Rousay SPA	564.1	585.6	608.9	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Seabird assemblage, breeding (Arctic	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					skua, fulmar, guillemot, kittiwake)		of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002121	Marwick Head SPA	572.9	587.1	610.3	Guillemot, breeding	IN	Potential connectivity and risk of disturbance / displacement (construction, decommissioning) from the export cable corridor and disturbance / barrier effects from the turbine array (operation) during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Seabird assemblage, breeding (kittiwake)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002101	West Westray SPA	573.9	596.3	619.5	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Seabird assemblage, breeding (Arctic skua, fulmar, kittiwake, razorbill)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
UK9002511	Sumburgh Head SPA	574.4	620.9	644.2	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
UK9002111	Papa Westray (North Hill and Holm) SPA	576.8	603.2	626.4	Arctic skua, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). DBD is beyond the mean breeding season foraging range of Arctic skua. The species was recorded at the DBD Array Area during one baseline survey within the first 12 months, coinciding with autumn migration for the species in UK waters.
					Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Seabird assemblage, breeding (fulmar, guillemot, kittiwake)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002361	Mousa SPA	588.7	637.4	660.6	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							(associated with breeding or migration, Furness 2015) during baseline surveys.
					Storm petrel, breeding	OUT	The Project Area is beyond mean breeding season foraging range. The available distributional data show an absence or scarcity of this species from the waters in the region of the Project Area during the non-breeding period, and an apparent absence (or near absence) from UK waters between December and April (Stone *et al*. 1995, Waggit *et al*. 2019). Therefore, it is considered that there is also no potential for connectivity during the non-breeding period.
UK9002081	Noss SPA	596.7	646.8	670.0	Gannet, breeding	IN	Potential connectivity during non-breeding period. Project Area is beyond the mean maximum +1SD breeding season foraging range from the SPA. There is connectivity during the migration (non-breeding) periods (Furness 2015, UK North Sea and Channel BDMPS).
					Great skua, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). The mean maximum + 1SD breeding season foraging range of great skua from Woodward *et al*. (2019) is based on studies from Foula and Hoy, Shetland (Thaxter *et al*.2014), and Bjørnøya, Svalbard, Norway (Jakubas *et al*. 2018). The maximum foraging range recorded for the Shetland colonies was 219km, whereas for the Norway colony it was 1003km (values from Woodward *et al*. 2019. Seabird Foraging Ranges dataset) The mean maximum foraging range + 1SD in Woodward *et al*. (2019) is therefore strongly influenced by the Norwegian study, whereas studies from Shetland colonies indicated much shorter maximum foraging trip durations. Thus, it is considered unlikely that the species would travel as far as the DBD Array Area during the breeding season. The species was recorded at the DBD Array Area during one baseline survey within the first 12 months of coverage, coinciding with autumn migration for the species in UK waters (Furness 2015).

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Seabird assemblage, breeding (fulmar, kittiwake, puffin)	OUT	DBD is beyond the breeding season mean-maximum + 1 SD foraging range for all assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.
UK9002061	Foula SPA	619.7	666.9	690.1	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Great skua, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). The mean maximum + 1SD breeding season foraging range of great skua from Woodward *et al*. (2019) is based on studies from Foula and Hoy, Shetland (Thaxter *et al*. 2014), and Bjørnøya, Svalbard, Norway (Jacubus *et al*.2018). The maximum foraging range recorded for the Shetland colonies was 219km, whereas for the Norway colony it was 1003km (values from Woodward *et al*. 2019 Seabird Foraging Ranges dataset). The mean maximum foraging range in Woodward *et al*. (2019) is therefore strongly influenced by the Norwegian study, whereas studies from Shetland colonies indicated much shorter maximum foraging trip durations. Thus it is considered unlikely that the species would travel as far as the DBD array area during the breeding season. The species was recorded at the DBD Array Area during one baseline survey within the first 12

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							months of coverage, coinciding with autumn migration for the species in UK waters (Furness 2015).
					Guillemot, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Leach's petrel *Hydrobates leucorhous*, breeding	OUT	Offshore components of the Project Area (Array, ECC) are beyond mean breeding season foraging range. The available distributional data show an absence or scarcity of this species from the waters in the region of the Project Area during the non-breeding period (Hall *et al*. 1987, Stone *et al*. 1995, Deakin *et al*. 2022). Therefore, it is considered that there is also no potential for connectivity during the non-breeding period.
					Puffin, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Red-throated diver, breeding	OUT	The Project Area is beyond the mean maximum +1SD breeding season foraging range. While connectivity in non-breeding periods is suggested by Furness (2015) (UK North Sea waters BDMPS during migration and SW North Sea BDMPS during wintering period), more recent studies of movements of Scottish breeding red-throated divers indicate that the majority spend the non-breeding periods in Scottish waters (JNCC 2023). Therefore, there is also considered to be no potential connectivity in the non-breeding season.
					Shag, breeding	OUT	DBD is beyond the mean maximum +1SD foraging range from the SPA. The species was not recorded in the survey area during the baseline surveys. DBD is outside the non-breeding season BDMPS (NW North Sea) for the SPA population.
					Seabird assemblage,	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range of all named assemblage species except

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					breeding (kittiwake, razorbill, fulmar, Arctic skua)		fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore the assemblage is screened out.
UK9002051	Papa Stour SPA	634.8	686.1	709.3	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Ringed plover, breeding	OUT	Migration of breeding ringed plover to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of ringed plover which breed in Britain crossing the North Sea (Wright *et al*. 2012).
UK9002031	Fetlar SPA	636.5	690.4	713.6	Arctic tern, breeding	IN	Potential connectivity during non-breeding (i.e., migration) periods. Project Area is beyond the mean maximum + 1SD foraging range from the SPA. This SPA population uses the UK North Sea and Channel BDMPS, in which DBD is located, during migration periods (Furness 2015). Arctic tern has been recorded in the Array Area in May (associated with breeding or migration, Furness 2015) during baseline surveys.
					Dunlin, breeding	OUT	Migration of breeding *schinzii* dunlin to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year, and that the DBD Array lies within an area of the North Sea considered to be used by "Baltic-breeding *schinzii*" birds not associated with the SPA (Wright *et al*. 2012).
					Great skua, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). The mean maximum +

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
							1SD breeding season foraging range of great skua from Woodward *et al*. (2019) is based on studies from Foula and Hoy, Shetland (Thaxter *et al*. 2014), and Bjørnøya, Svalbard, Norway (Jacubus *et al*.2018). The maximum foraging range recorded for the Shetland colonies was 219km, whereas for the Norway colony it was 1003km (values from Woodward *et al*. 2019 Seabird Foraging Ranges dataset). The mean maximum foraging range in Woodward *et al*. (2019) is therefore strongly influenced by the Norwegian study, whereas studies from Shetland colonies indicated much shorter maximum foraging trip durations. Thus, it is considered unlikely that the species would travel as far as the DBD Array Area during the breeding season. The species was recorded at the DBD Array Area during one baseline survey within the first 12 months of coverage, coinciding with autumn migration for the species in UK waters (Furness 2015).
					Red-necked phalarope *Phalaropus lobatus*, breeding	OUT	Migration of breeding red-necked phalarope to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), and the largely south-westerly migratory front of red-necked phalarope (from the south-west Atlantic wintering areas to England).
					Whimbrel, breeding	OUT	Migration of breeding whimbrel to and from the SPA carries a negligible risk of collision due to presence of the turbine array when considering the distance from the array (>200km), the number of passages per individual per year and the breadth of migratory front of whimbrel crossing the North Sea (Wright *et al*. 2012).
					Seabird assemblage, breeding (Arctic skua, fulmar)	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range of all named assemblage species except fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore the assemblage is screened out.

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
UK9002041 and UK13054	Ronas Hill – North Roe and Tingon SPA and Ramsar	647.1	716.5	739.7	Great skua, breeding[S]	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). The mean maximum + 1SD breeding season foraging range of great skua from Woodward *et al*. (2019) is based on studies from Foula and Hoy, Shetland (Thaxter *et al*. 2014), and Bjørnøya, Svalbard, Norway (Jacubas *et al*. 2018). The maximum foraging range recorded for the Shetland colonies was 219km, whereas for the Norway colony it was 1003km (values from Woodward *et al*. 2019. Seabird Foraging Ranges dataset). The mean maximum foraging range in Woodward *et al*. (2019) is therefore strongly influenced by the Norwegian study, whereas studies from Shetland colonies indicated much shorter foraging trip durations. Thus, it is considered unlikely that the species would travel as far as the DBD Array Area during the breeding season. The species was recorded at the DBD Array Area during one baseline survey within the first 12 months of coverage, coinciding with autumn migration for the species in UK waters (Furness 2015).
					Red-throated diver, breeding[S]	OUT	The Project Area is beyond the mean maximum +1SD breeding season foraging range. While connectivity in non-breeding periods is suggested by Furness (2015) (UK North Sea waters BDMPS during migration and SW North Sea BDMPS during wintering period), more recent studies of movements of Scottish breeding red-throated divers indicate that the majority spend the non-breeding periods in Scottish waters (JNCC 2023). Therefore, there is also considered to be no potential connectivity in the non-breeding season.
UK9002011	Hermaness, Saxa Vord and Valla Field SPA	658.6	722.1	745.3	Gannet, breeding	IN	Potential connectivity during non-breeding periods. Project Area is beyond the mean maximum +1SD breeding season foraging range from the SPA. There is connectivity during the migration (non-breeding) periods (Furness 2015, UK North Sea and Channel BDMPS).

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					Great skua, breeding	IN	Potential connectivity during the non-breeding period (UK North Sea and Channel BDMPS). The mean maximum + 1SD breeding season foraging range of great skua from Woodward *et al*. 2019) is based on studies from Foula and Hoy, Shetland (Thaxter *et al*. 2014), and Bjørnøya, Svalbard, Norway (Jacubus *et al*.2018). The maximum foraging range recorded for the Shetland colonies was 219km, whereas for the Norway colony it was 1003km (values from Woodward *et al*. 2019 Seabird Foraging Ranges dataset). The mean maximum foraging range in Woodward *et al*. (2019) is therefore strongly influenced by the Norwegian study, whereas studies from Shetland colonies indicated much shorter maximum foraging trip durations. Thus it is considered unlikely that the species would travel as far as the DBD Array Area during the breeding season. The species was recorded at the DBD Array Area during one baseline survey within the first 12 months of coverage, coinciding with autumn migration for the species in UK waters (Furness 2015).
					Puffin, breeding	IN	Potential connectivity during the non-breeding period ('UK North Sea and Channel waters' BDMPS). The Project Area is beyond the mean maximum + 1SD breeding season foraging range for the species.
					Red-throated diver, breeding	OUT	The Project Area is beyond the mean maximum +1SD breeding season foraging range. While connectivity in non-breeding periods is suggested by Furness (2015) (UK North Sea waters BDMPS during migration and SW North Sea BDMPS during wintering period), more recent studies of movements of Scottish breeding red-throated divers indicate that the majority spend the non-breeding periods in Scottish waters (JNCC 2023). Therefore, there is also considered to be no potential connectivity in the non-breeding season.
					Seabird assemblage,	OUT	DBD is beyond the mean maximum +1SD breeding season foraging range of all named assemblage species except

Site code	Site	Nearest distance from Project Area (km)	Sea distance to Array Area (km)	Sea distance to Offshore Export Cable Corridor (km)	Qualifying feature[1]	Screening decision	Rationale
					breeding (fulmar, shag, guillemot, kittiwake)		fulmar. It is considered very unlikely that sufficient numbers of the seabird assemblage would be present at DBD during the non-breeding season for LSE to occur. Therefore, the assemblage is screened out.

1. Based on SPA citations / conservation objectives and Ramsar Information sheets from the relevant Statutory Nature Conservation Body (e.g. Natural England designated sites view). Where a site is both a SPA and a Ramsar site, no superscript indicates species is a qualifying feature of both; superscript[R] qualifying species of Ramsar site but not SPA, superscript[S] qualifying species of SPA but not Ramsar site. For bird assemblages, species identified as key components of the assemblage are listed in brackets if they are not qualifying features in their own right.

Table 4-20: DBD Intertidal and Offshore screening outcome for Transboundary Sites with Intertidal and Offshore ornithology features

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
NL2016166	Friese Front SPA	Netherlands	149	Marine SPA for concentrations of guillemot	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
DE1209301	Sylter Außenriff SPA	Germany	206	Marine SPA for seabirds: Arctic tern Common tern Sandwich tern Lesser black-backed gull Non-breeding seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
NL9802001	Noordzeekustzone SPA	Netherlands	219.6	Marine SPA for: Breeding little tern Non-breeding seabirds Breeding and non-breeding waterfowl	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging distance of breeding little tern, from the SPA. Given the distance and location south of the Project Area there is no expected connectivity during migration periods as the vast majority of migratory movements of little tern between the SPA and equatorial wintering grounds will take place south of DBD. Where the marine SPA protects offshore foraging areas for seabirds at sea the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity. The SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity for migratory birds other than seabirds Thus, migrations of waterfowl from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
NL9801001	Waddenzee SPA	Netherlands	227.4	Breeding seabirds: Lesser black-backed gull Little tern Common tern Arctic tern Sandwich tern Non-breeding seabirds	OUT	The DBD Array Area is within mean maximum +1SD foraging distance of lesser black-backed gull from the SPA. Lesser black-backed gull was recorded in one visit within the first 12 months of baseline surveys of the Array Area, coinciding with migration period of the species in UK waters (Furness 2015). However, colour-ringing and tracking of lesser black-backed gulls from multiple colonies in the Netherlands highlight remarkably low levels of

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
				Breeding and non-breeding waterfowl Breeding and non-breeding raptors		migration of birds from these colonies through UK waters (Camphuysen 2013, Scottish Power Renewables 2019). The same study has also demonstrated that 95% of foraging trips are less than 135km from these colonies (Camphuysen 2013), so individuals from Netherlands colonies are overall very unlikely to account for records of lesser black-backed gull in the Array Area. There is therefore considered to be no potential connectivity during the breeding or non-breeding) seasons. The DBD array is beyond the mean maximum foraging range +1SD for all breeding tern species and at this distance and southerly location there is no expected connectivity during migration periods as the vast majority of movements between the SPA and tern wintering areas to the south will take place south of DBD. Where the marine SPA (99% of area) protects offshore foraging areas for seabirds at sea the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity. The SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity for migratory birds other than seabirds Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
NL3009009 and NL2216	Duinen Vlieland SPA and Ramsar	Netherlands	232.1	Breeding seabirds: Lesser black-backed gull Cormorant Non-breeding cormorant Breeding waterfowl Non-breeding waterfowl Breeding raptors Non-breeding raptors	OUT	The DBD Array Area is within mean maximum +1SD foraging distance of lesser black-backed gull from the SPA. Lesser black-backed gull was recorded in one visit within the first 12 months of baseline surveys of the Array Area, coinciding with migration period of the species in UK waters (Furness 2015). However, colour-ringing and tracking of lesser black-backed gulls from multiple colonies in the Netherlands highlight remarkably low levels of migration of birds from these colonies through UK waters (Camphuysen 2013, Scottish Power Renewables 2019). The same study has also demonstrated that 95% of foraging trips are less than 135km from these colonies (Camphuysen 2013), so individuals from Netherlands colonies are overall very unlikely to account for records of lesser black-backed gull in the Array Area. There is therefore not considered to be potential connectivity during the breeding or non-breeding) seasons. The DBD array area is beyond mean maximum foraging range + 1SD for cormorant. Breeding adult cormorants tend to overwinter close to breeding colonies (median distance based on ring recovery data of 179km, Wernham *et al*. 2002), and cormorants at sea are mostly restricted to shallow inshore waters (Stone *et al*. 1995, Kober *et al*. 2010); therefore it is highly unlikely that birds from this SPA would occur at the DBD array. The SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity for migratory birds other than seabirds Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant Biogeographic populations.

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
NL3009008 and NL2213	Duinen en Lage Land Texel SPA and Ramsar	Netherlands	242.3	Breeding seabirds: Lesser black-backed gull Little tern Breeding waterfowl Non-breeding waterfowl Breeding raptors Non-breeding raptors Breeding songbirds	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging distance of all breeding seabird species, from the SPA. colour-ringing and tracking of lesser black-backed gulls from multiple colonies in the Netherlands highlight remarkably low levels of migration of birds from these colonies through UK waters (Camphuysen 2013, Scottish Power Renewables 2019). For little tern, there is no expected connectivity during migration periods as the vast majority of migratory movements between the SPA and equatorial wintering grounds will take place south of DBD. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3)** for possible connectivity Thus, migrations of birds from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
DE2104301	Borkum-Riffgrund SPA	Germany	243.5	Marine SPA for concentrations of seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
NL2021168	Bruine Bank SPA	Netherlands	253.8	Marine SPA for concentrations of seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
DE0916491	Ramsar-Gebiet S-H Wattenmeer und angrenzende Küstengebiete SPA	Germany	313.1	Marine area 95%. Breeding seabirds: Herring gull Common gull Lesser black-backed gull Great black-backed gull Mediterranean gull Black-headed gull Little tern Arctic tern Common tern Sandwich tern	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging distance of all breeding seabird species, from the SPA. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations; in particular for tern species, the vast majority of movements between the SPA and southern wintering areas will take place south of DBD. Where the marine SPA protects offshore foraging areas for seabirds at sea the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
				Non-breeding seabirds Breeding waterfowl Non-breeding waterfowl Breeding raptors Non-breeding raptors		between the SPA and DBD it is considered that there is no connectivity. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of birds from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
DE1813491	Seevogelschutz-gebiet Helgoland SPA	Germany	324.5	Breeding seabirds: Razorbill Fulmar Kittiwake Gannet Guillemot Non-breeding seabirds	OUT	The Natura 2000 dataform identifies the SPA as 99.99% marine area. It is not clear whether it protects seabird breeding colonies per se or foraging areas used by breeding and non-breeding seabirds. On a precautionary basis the rationale considers that the SPA may protect breeding colonies as well as foraging areas. The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar and gannet from the SPA. These species were also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014) and at least weak avoidance of offshore wind farms (Dierschke *et al.* 2016). Gannet colonies are indicated by Wakefield *et al.* (2013) to use foraging areas partitioned from those of other colonies, and tracking data of foraging gannets breeding at the Heligoland colony show that the sea area used for foraging does not overlap or enter proximity with the DBD Array Area location (Garthe *et al.* 2017a, 2017b). Gannets present within the DBD Array Area are indicated to originate from other colonies such as that of Flamborough and Filey Coast SPA. For both species, there is therefore not considered to be potential connectivity during the breeding season. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
						negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
NL4000017	Voordelta SPA	Netherlands	359.9	Marine SPA for concentrations of seabirds: Common tern Sandwich tern Little gull Non-breeding red-throated diver Non-breeding waterfowl	OUT	This marine SPA (99% marine area) protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of birds from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
NL9802025 NL1251	Veerse Meer SPA and Ramsar site	Netherlands	400.8	Breeding seabirds: Lesser black-backed gull Cormorant Breeding and non-breeding waterfowl	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging distance of all breeding seabird species, from the SPA. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of birds from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
BEMNZ0003	SBZ 2 / ZPS 2 SPA	Belgium	409.0	Marine SPA for concentrations of seabirds / non-breeding seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
FR3112006	Banc des Flandres SPA	France	410.6	Marine SPA for concentrations of seabirds / non-breeding seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
BEMNZ0004	SBZ 3 / ZPS 3 SPA	Belgium	412.2	Marine SPA for concentrations of seabirds / non-breeding seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
						distance between the SPA and DBD it is considered that there is no connectivity.
BEMNZ0002	SBZ 1 / ZPS 1 SPA	Belgium	418.6	Marine SPA for concentrations of seabirds / non-breeding seabirds	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
FR3110085	Cap Gris-Nez SPA	France	468.8	Marine SPA for concentrations of seabirds and waterfowl / non-breeding seabirds and waterfowl	OUT	This marine SPA protects offshore foraging areas for seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
FR3110038	Estuaire de la Canche SPA	France	517.1	SPA for concentrations of terns, waterfowl and raptors / Non-breeding waterfowl and raptors	OUT	The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (Section 4.5.3.2.3) for possible connectivity Thus, migrations of birds from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
FR2310045	Littoral Seino-Marin SPA	France	553	Breeding seabirds: Fulmar Herring gull Great black-backed gull Cormorant Shag Kittiwake Non-breeding seabirds Non-breeding waterfowl Breeding and non-breeding raptors	OUT	The Natura 2000 dataform identifies the SPA as 99% marine area. It is not clear whether it protects seabird breeding colonies per se or foraging areas used by breeding and non-breeding seabirds. On a precautionary basis the rationale considers that the SPA may protect breeding colonies as well as foraging areas. The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar from the SPA. This species was also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014). and at least weak avoidance of offshore wind farms (Dierschke *et al*. 2016). There is therefore not considered to be potential connectivity during the

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
						breeding and non-breeding seasons. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
FR2510099	Falaises du Bessin Occidental SPA	France	693	Breeding seabirds: Fulmar Herring gull Lesser black-backed gull Kittiwake Non-breeding seabirds Non-breeding raptors	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar from the SPA. This species was also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014). and at least weak avoidance of offshore wind farms (Dierschke *et al.* 2016). There is therefore not considered to be potential connectivity during the breeding and non-breeding seasons. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
FR2512005	Nord Bretagne DO SPA	France	840.6	Marine SPA for concentrations of seabirds at sea	OUT	This marine SPA protects offshore foraging areas for breeding and non-breeding seabirds at sea and therefore the SPA populations as defined are predicted to be present only within the SPA boundaries. Given the extensive distance between the SPA and DBD it is considered that there is no connectivity.
FR5310095	Cap d'Erquy-Cap Fréhel SPA	France	872.0	Breeding seabirds: Razorbill Fulmar Herring gull Lesser black-backed gull Great black-backed gull Shag Kittiwake Guillemot Non-breeding seabirds Breeding and non-breeding waterfowl	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar from the SPA. This species was also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014). and at least weak avoidance of offshore wind farms (Dierschke *et al.* 2016). There is therefore not considered to be potential connectivity during the breeding and non-breeding seasons. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
FR5310070	Tregor Goëlo SPA	France	877.8	Breeding seabirds: Fulmar Herring gull Lesser black-backed gull Great black-backed gull Cormorant Shag Little tern Common tern Sandwich tern Non-breeding seabirds	OUT	The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar from the SPA. This species was also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014). and at least weak avoidance of offshore wind farms (Dierschke *et al.* 2016). There is therefore not considered to be potential connectivity during the breeding and non-breeding seasons. The SPA is outside the BDMPS areas for non-breeding seabirds defined by Furness (2015). Outside the breeding season, migrations of breeding

Site code	Site	Country	Sea distance to Array Area (km)	Qualifying feature[1]	Screening decision	Rationale
				Breeding and non-breeding waterfowl		seabirds from the SPA are likely to result in negligible numbers passing through the DBD array relative to the size of the relevant biogeographic populations. In particular for breeding tern species, given the distance and location south of the Project Area there is no expected connectivity during migration periods as the vast majority of migratory movements of terns between the SPA and equatorial wintering grounds will take place south of DBD. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.
FR5310011	Côte de Granit Rose Sept Iles SPA	France	893.7	Breeding seabirds: Razorbill Puffin Fulmar Storm petrel Herring gull Lesser black-backed gull Great black-backed gull Gannet	OUT	The Natura 2000 dataform identifies the SPA as 100% marine area. It is not clear whether it protects seabird breeding colonies per se or foraging areas used by breeding and non-breeding seabirds. On a precautionary basis the rationale considers that the SPA may protect breeding colonies as well as foraging areas. The DBD Array Area is beyond the mean maximum +1SD foraging range of all breeding seabirds except fulmar from the SPA. This species was also recorded in all survey visits in the first year of baseline surveys of the Array Area. Fulmar is not considered at risk of effects from offshore wind farms due to its wide ranging foraging behaviour and very low frequency of flying at turbine swept height (>1% in calmer sea/wind conditions, Johnston *et al.* 2014). and at least weak avoidance of offshore wind farms (Dierschke *et al*. 2016). There is therefore not considered to be potential connectivity during the breeding and non-breeding seasons. For migratory birds other than seabirds, the SPA is outside the ZoI identified for DBD (**Section 4.5.3.2.3**) for possible connectivity Thus, migrations of other bird features from this SPA are likely to result in negligible numbers passing through the DBD Array Area relative to the size of the relevant biogeographic populations.

1. Based on Natura 2000 Standard Data Forms and Ramsar Information sheets.

4.5.5 Summary and effect pathways for Sites Designated for Marine Ornithology

417. The effect pathways screened in and screened out for each Project phase for all offshore and intertidal ornithology qualifying features and assemblages of SPAs and Ramsar sites screened in for further assessment, are detailed in **Table 4-21**. The locations of SPAs designated for ornithological features screened in for further assessment are shown in **Figure 4-16**. The SPAs and features screened in for further assessment are summarised in **Table 5-1**.

Table 4-21 Effect pathways screened In (✓) and Out (×), for each project phase (C = Construction, O&M = Operation & Maintenance, D = Decommissioning), for each marine ornithology Qualifying Feature screened in for further assessment.

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9020329	Greater Wash SPA	Little tern, breeding [1]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	✓	×	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Common tern, breeding [1]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	✓	×	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Sandwich tern, breeding [1]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	✓	×	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Common scoter, non-breeding	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Changes to prey availability [e]	✓	×	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Red-throated diver, non-breeding	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	✓	×	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9006111 and UK11031	Humber Estuary SPA and Ramsar	Little tern, breeding[S 1]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			Direct habitat loss [h]	✓	✓	✓
			In-combination effects [g]	✓	✓	✓
		Avocet, non-breeding[S]	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Bar-tailed godwit, wintering	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			In-combination effects [g]	✓	✓	✓
		Black-tailed godwit *islandica*, wintering, passage	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Dunlin *alpina*, wintering, passage	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Golden plover, wintering, passage	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Hen harrier, non-breeding[S]	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Knot, wintering, passage	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
			Direct habitat loss [h]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
		Redshank, wintering, passage	Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Ruff, non-breeding (passage)[S]	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Shelduck, wintering	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Waterbird assemblage, non-breeding	Direct habitat loss [h]	✓	✓	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	✓	✓	✓
			Changes to prey availability [e]	✓	✓	✓
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9006101	Flamborough and Filey Coast SPA	Gannet, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Guillemot, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Kittiwake, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Razorbill, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Seabird assemblage, breeding, including the additional component species:	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Puffin [2]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			In-combination effects [g]	✓	✓	✓
		Herring gull [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Shag [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Cormorant [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
UK9006061 and UK11068	Teesmouth and Cleveland Coast SPA	Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9006131 and UK11049	Northumbria Coast SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9006031	Coquet Island SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Roseate tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			In-combination effects [g]	✓	✓	✓
		Sandwich tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Seabird assemblage, breeding, including the additional component species:	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Puffin [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Herring gull [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
		Lesser black-backed gull [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Kittiwake [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9006021	Farne Islands SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Roseate tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Sandwich tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Seabird assemblage, breeding, including the additional component species:	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Kittiwake [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Shag [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Cormorant [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	×	✓
		Puffin [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9006011	Lindisfarne SPA	Roseate tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9004171	Forth Islands SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Gannet, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
		Lesser black-backed gull, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Puffin, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Roseate tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Sandwich tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9004451	Imperial Dock Lock, Leith SPA	Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002271	Fowlsheugh SPA	Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Kittiwake, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002221 and UK13061	Ythan Estuary, Sands of Forvie and Meikle Loch (extension) SPA and Ramsar	Common tern, breeding[S 3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Sandwich tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002211	Loch of Strathbeg SPA	Sandwich tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002471	Troup, Pennan and Lion's Heads SPA	Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9001624	Inner Moray Firth SPA	Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9001623	Cromarty Firth SPA	Common tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9001182	East Caithness Cliffs SPA	Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Herring gull, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Kittiwake, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Razorbill, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9001181	North Caithness Cliffs SPA	Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9001131	Pentland Firth Islands SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002381	Auskerry SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9002141	Hoy SPA	Great skua, breeding [2]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
UK9002091	Fair Isle SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9002371	Rousay SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9002121	Marwick Head SPA	Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9002101	West Westray SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9002511	Sumburgh Head SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
UK9002111	Papa Westray (North Hill and Holm) SPA	Arctic skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002361	Mousa SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002081	Noss SPA	Gannet, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Great skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
		Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9002061	Foula SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Great skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
		Guillemot, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
		Puffin, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓
UK9002051	Papa Stour SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
UK9002031	Fetlar SPA	Arctic tern, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct disturbance and displacement due to work activity at landfall/intertidal [c]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Great skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×

Site code	Site	Qualifying feature	Effect pathway	C	O&M	D
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
UK9002041	Ronas Hill – North Roe and Tingon SPA	Great skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
UK9002011	Hermaness, Saxa Vord and Valla Field SPA	Gannet, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	✓	✓	✓
		Great skua, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	×	×	×
			Direct disturbance and displacement due to work activity in ECC [b]	×	×	×
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	×	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	✓	×
			In-combination effects [g]	×	✓	×
		Puffin, breeding [3]	Direct disturbance and displacement due to work activity in Array [a]	✓	✓	✓
			Direct disturbance and displacement due to work activity in ECC [b]	✓	×	✓
			Direct displacement due to presence of wind turbines and other offshore infrastructure [d]	×	✓	×
			Changes to prey availability [e]	×	×	×
			Collision risk [f]	×	×	×
			In-combination effects [g]	✓	✓	✓

Notes:
S. Feature of SPA only (in cases where both the SPA and Ramsar site are screened in)
1. Seabird feature with potential connectivity for effects in the breeding season only
2. Seabird feature with potential connectivity for effects in the breeding season and non-breeding season
3. Seabird feature with potential connectivity for effects in the non-breeding season only

a. As detailed in **Section 4.5.2**, some offshore ornithology features of European sites with connectivity to the Array Area may be affected by disturbance and displacement by works within the Project Array during any project phase. These species include auks (guillemot, razorbill, puffin), divers and scoters; which are most sensitive to noise and visual disturbance such as from vessel movements and piling (Garthe & Huppop 2004, Fliessbach *et al*. 2019). This effect pathway is screened out for all other offshore ornithology features of European sites (gannet, fulmar, gulls, terns, skuas) due to low sensitivity to this activity (i.e., vessel movements, visual imposition at sea – but note some of these species are considered sensitive to displacement by the rotating turbines of the array once operational, see **d.**); cormorant and shag due to low sensitivity and relatively inshore ecology; and features of marine SPAs with no overlap with the Project Array (on the basis that features of marine SPAs remain within the SPA during the relevant season for which they are designated features, and so have no potential connectivity). Potential connectivity has been identified for guillemot, razorbill and puffin qualifying or assemblage features of European sites – all during the non-breeding season except for puffin of Flamborough and Filey Coast SPA which also has potential connectivity during the breeding season – and the effect pathway is screened in for these qualifying or assemblage features.

b. As detailed in **Section 4.5.2**, some offshore ornithology features of European sites with connectivity to the ECC may be affected by disturbance and displacement by works within the Project ECC during construction or decommissioning. These species include auks (guillemot, razorbill, puffin), cormorant, shag, divers and scoters; which are most sensitive to noise and visual disturbance such as from vessel movements and drilling (Garthe & Huppop 2004, Fliessbach *et al*. 2019). This effect pathway is screened out for all other offshore ornithology features of European sites (gannet, fulmar, gulls, terns, skuas) due to low sensitivity to this activity. Potential connectivity has been identified for guillemot, razorbill, puffin, cormorant, shag, diver and scoter qualifying or assemblage features of European sites (variously during the breeding and/or non-breeding season) and the effect pathway is screened in for these qualifying or assemblage features.

c. As detailed in **Section 4.5.2**, intertidal ornithology features and some offshore ornithology features of European sites with connectivity to the landfall and intertidal areas of the Project Area may be affected by disturbance and displacement by works within the Project landfall and intertidal areas during any project phase. These species include estuarine birds (waders, waterfowl, raptors), divers and scoters, plus tern features of European sites when there is potential connectivity to the landfall and intertidal area (e.g. where individuals may aggregate or forage within mean max foraging range of a breeding site). This effect pathway is screened out for all other offshore ornithology features of European sites (gannet, gulls, skuas, auks, cormorant, shag, plus tern features of more distant breeding colony SPAs or Marine SPAs) on the basis of no potential connectivity with the landfall or intertidal areas of the Project. Potential connectivity has been identified for diver and scoter features of Greater Wash SPA; breeding little tern and non-breeding estuarine bird features of Humber Estuary SPA/Ramsar site – all during the non-breeding season except for breeding little tern – and the effect pathway is screened in for these qualifying or assemblage features.

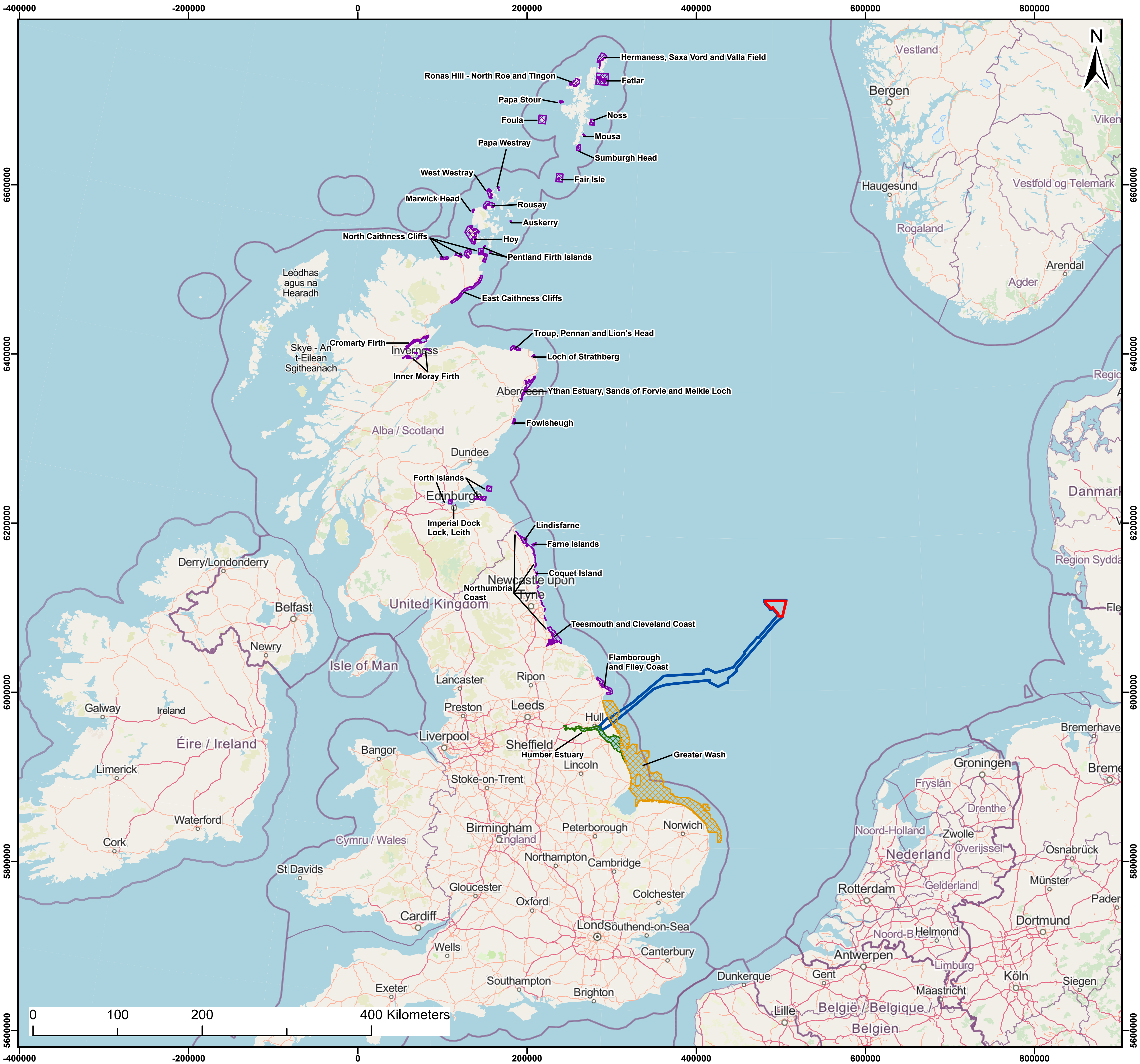
d. As detailed **Section 4.5.2**, some offshore ornithology features with connectivity to the Array Area may be affected by direct displacement due to presence of the operational turbine array (and other offshore infrastructure) during the operation and maintenance phase. These species include gannet, auks (guillemot, razorbill, puffin), terns and divers which are considered sensitive to the presence of operational turbines (Garthe & Huppop 2004). This effect pathway is screened out for fulmar, gulls and skuas due to low sensitivity to presence of operational turbines; cormorant and shag due to low sensitivity and relatively inshore ecology; and features of marine SPAs with no overlap with the Project Array (on the basis that features of marine SPAs remain within the SPA during the relevant season for which they are designated features, and so have no potential connectivity). Potential connectivity has been identified for gannet, auk, and tern qualifying or assemblage features of European sites and the effect pathway is screened in for these qualifying or assemblage features. Potential connectivity is largely during the non-breeding season, except for puffin (in case of Flamborough and Filey Coast SPA), kittiwake (in case of Flamborough and Filey Coast SPA, Coquet Island SPA and Farne Islands SPA), and gannet (in case of Flamborough and Filey Coast SPA, Forth Islands SPA).

e. For all offshore and intertidal ornithology receptors which are qualifying species of SPAs which overlap with the Project Area, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species during the construction and decommissioning phases. Effects on prey species, for example from underwater noise or generation of suspended sediment from construction activities, would occur only over restricted areas and over relatively short timescales, and therefore effects on offshore ornithology receptors from SPAs more distant from the Project Area are not predicted.

f. As detailed in **Section 4.5.2**, some offshore ornithology features with connectivity to the Array Area may be at risk of collision with turbines during the operation and maintenance phase. These species include kittiwake, gannet, gulls, skuas, and terns (except little tern) which are considered at risk due to their typical flight height at sea (Johnston *et al*. 2014a, 2014b). This effect pathway is screened out for fulmar, auks (guillemot, razorbill and puffin), cormorant and shag due to low risk of collision, similarly based on flight height distributions (Johnston *et al*. 2014a, 2014b); and features of marine SPAs with no overlap with the Project Array (on the basis that features of marine SPAs remain within the SPA during the relevant season for which they are designated features, and so have no potential connectivity). Potential connectivity has been identified for kittiwake, gannet, gull, skua and tern qualifying features or assemblage features of European sites, and the effect pathway is screened in for these qualifying or assemblage features. Potential connectivity is largely during the non-breeding season, except for kittiwake (in case of Flamborough and Filey Coast SPA, Coquet Island SPA and Farne Islands SPA), and gannet (in case of Flamborough and Filey Coast SPA, Forth Islands SPA). As detailed in **Section 4.5.2**, non-seabird migratory features of European sites are also considered for potential LSE with regard to risk of collision with turbines during migratory flights. After examination of migratory corridors of features of European sites (Wright *et al*. 2012), this effect pathway is screened out for all non-seabird migratory species. This is on the basis that the number of passages per individual per year (two, or one if return route differs from outbound), the distance from the array (>200km) and the breadth of migratory front of all examined species crossing the North Sea, result in wide distribution of individuals and extremely low probability of collision – therefore there is no potential for LSE to migratory non-seabirds from collision with the Project Array.

g. Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Project Area, so that the potential for LSE cannot be excluded in relation to in-combination effects.

h. As detailed in **Section 4.5.2**, the potential for LSE cannot be excluded in relation to direct habitat loss (during construction, maintenance (during O&M) or decommissioning phases) for intertidal ornithology features of European sites with connectivity to the landfall and intertidal areas of the Project Area. These species include estuarine birds (waders, waterfowl, raptors). It is also considered for LSE on tern features of European sites when there is potential connectivity to the landfall and intertidal area (e.g. where individuals may aggregate or forage within mean max foraging range of a breeding site). This effect pathway is screened out for other offshore ornithology features of European sites (gannet, gulls, skuas, auks, cormorant, shag, divers, scoters, plus tern features of more distant breeding colony SPAs or Marine SPAs) on the basis of no potential connectivity with habitats potentially lost at the landfall or intertidal areas of the Project. Potential connectivity has been identified for breeding little tern and non-breeding estuarine bird features of Humber Estuary SPA/Ramsar site – all during the non-breeding season except for breeding little tern – and the effect pathway is screened in for these qualifying or assemblage features.



Legend:

- Dogger Bank D Array Area
- Project Area
- Marine SPA
- Migratory Non-Seabird SPAs
- Seabird Colony SPA

Source: © Haskoning DHV UK Ltd, 2023; © JNCC, 2023; © OpenStreetMap (and) contributors, CC-BY-SA

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: SPAs for Ornithological Features (Seabirds and Migratory Non-seabirds) Screened In for Further Assessment

Figure: 4-16

Drawing No: PC3991-RHD-ZZ-ZZ-DR-Z-0091

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	03/11/2023	GC	LMF	A3	1:4,500,000
01	23/08/2023	JR	LMF	A3	1:4,500,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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5 Summary of LSE

418. **Table 5-1** summarises each European site and feature screened in per topic, along with the rationale.

Table 5-1: Summary of all European Sites Screened in for the HRA

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Annex I Habitats			
Dogger Bank SAC (Site Code: UK0030352)	Sandbanks which are slightly covered by seawater all the time	Within Offshore Project Area.	The site is directly within the DBD proposed Array Area.
Humber Estuary SAC (Site code: UK00300170)	Estuaries Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Coastal lagoons* Dunes with *Hippophae rhamnoides* Embryonic shifting dunes Fixed dunes with herbaceous vegetation (`grey dunes`)* *Salicornia* and other annuals colonising mud and sand	Within ZOI as the designated site is located 0m from the Onshore Project Area.	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.

[10] Distance is measured to either the array areas or export cable corridor, where relevant for each topic.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
	Sandbanks which are slightly covered by sea water all the time Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes')		
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	Dune systems and humid dune slacks Estuarine waters Intertidal mud and sand flats Saltmarshes Coastal brackish / saline lagoons	Within ZOI as the designated site is located 0m from the Onshore Project Area.	The site is within the ZOI for pollution to habitats via water and air through connecting habitats and hydrological connectivity.
Terrestrial Ecology and Ornithology			
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	Bar-tailed godwit – wintering Black-tailed godwit – passage Black-tailed godwit – wintering Dunlin – passage Dunlin – wintering Golden plover – passage Golden plover – wintering Knot – passage Knot – wintering	Within ZOI as the designated site is located 0m from the Onshore Project Area.	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light will occur. Additionally, the loss or degradation of supporting and functionally linked habitats may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked habitats. As such, LSEs may occur to ornithological terrestrial ecology features of the Humber Estuary Ramsar.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
	Redshank – passage Redshank – wintering Shelduck – wintering Waterbird assemblage – wintering		
Humber Estuary SPA (Site code: UK9006111)	Avocet – breeding Avocet – non-breeding Bar-tailed godwit – breeding Black-tailed godwit – non-breeding Dunlin – non-breeding Golden plover – non-breeding Hen harrier – non-breeding Knot – non-breeding Little tern – breeding Marsh harrier – breeding Redshank – non-breeding Ruff – non-breeding Shelduck – non-breeding Waterbird assemblage	Within ZOI as the designated site is located 0m from the Onshore Project Area.	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked habitats may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked habitats. As such, LSEs may occur to ornithological terrestrial ecology features of the Humber Estuary SPA.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
The Greater Wash SPA (Site code: UK9020329)	Little tern - breeding Common tern - breeding Sandwich tern - breeding Little gull – breeding and non-breeding Common scoter - non-breeding Red-throated diver - non-breeding	Within ZOI as the designated site is adjacent to areas of onshore activity and potential discharge zone.	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked habitats may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked habitats. As such, LSEs may occur to ornithological terrestrial ecology features of the Greater Wash SPA.
Hornsea Mere SPA (Site code: UK9006171)	Gadwall Mute Swan	Within ZOI as the designated site is located 8.6km from the Onshore Project Area.	It is considered unlikely that any direct impacts may occur as a result of the Onshore Project Area. Indirect impacts relating to disturbance from noise, visual and light may occur. Additionally, the loss or degradation of supporting and functionally linked habitats may occur. Water and air pollution may occur as a result of the Onshore Project Area which could affect prey species or supporting and functionally linked habitats. As such, LSEs may occur to ornithological terrestrial ecology features of the Hornsea Mere SPA.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Annex II Migratory Fish			
River Derwent SAC (Site code: UK0030253)	Annex II species that are a primary reason for selection of this site: **River lamprey** Annex II species present as a qualifying feature, but not a primary reason for site selection: **Sea lamprey**	56km west of the landfall area (inland)	Individuals from the site may be disturbed/subject to mortality by potential UXO clearance in coastal waters. For other effect pathways, the features are beyond the range of potential direct impact from the Offshore Project Area, interaction with individuals outside of the site with the Offshore Project Area's activities unlikely. 1km ZOI effects from the Onshore Project Area will not overlap with this site, but will overlap with the shores of the Humber Estuary downstream of this site, and will be considered further at Stage 2.
Humber Estuary SAC (Site code: UK0030170)	Annex II species present as a qualifying feature, but not a primary reason for site selection: **Sea lamprey** **River lamprey**	22km south east of the Offshore Project Area Within ZOI as the designated site is located 0m from the Onshore Project Area.	Individuals from the site may be disturbed/subject to mortality by potential UXO clearance in coastal waters. For other effect pathways, the features are beyond the range of potential direct impact from the Offshore Project Area, interaction with individuals outside of the site with the Offshore Project Area's activities unlikely. 1km ZOI effects from the Onshore Project Area cannot be ruled out at this stage and will be considered further at Stage 2.
Humber Estuary Ramsar (Site code: UK11031; RSIS code: 663)	River lamprey Sea lamprey	Within ZOI as the designated site is located 0m from the Onshore Project Area.	As for Humber Estuary SAC.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Annex II Marine Mammals			
Vlaamse Banken SAC (Site code: BEMNZ0001)	Grey Seal	309km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Vlakte van de Raan SCI (Site code: BEMNZ0005)	Grey Seal	326km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Sydlige Nordsø SAC (Site code: DK00VA347)	Grey Seal	242km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC (Site code: DK00AY176)	Grey Seal	314km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Baie de Canche et couloir des trois estuaires SAC (Site code: FR3102005)	Grey Seal	414km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Bancs des Flandres SAC (Site code: FR3102002)	Grey Seal	331km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Estuaires et littoral picards (baies de Somme et d'Authie) SAC (Site code: FR2200346)	Grey Seal	435km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC (Site code: FR3100478)	Grey Seal	367km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Recifs Gris-Nez Blanc-Nez SAC (Site code: FR3102003)	Grey Seal	374km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC (Site code : FR3102004)	Grey Seal	380km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Doggerbank SCI (Site code: DE1003301)	Harbour Porpoise Harbour Seal	67km	This site is within the harbour seal foraging distance (of 273km) of DBD. Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
Dünenlandschaft Süd-Sylt SAC (Site code: DE1115391)	Grey Seal	333km	This site is within the grey seal foraging distance (of 448km) of DBD.
Hamburgisches Wattenmeer SAC (Site code: DE2016301)	Grey Seal	355km	This site is within the grey seal foraging distance (of 448km) of DBD.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Helgoland mit Helgolander Felssockel SAC (Site code: DE1813391)	Grey Seal	321km	This site is within the grey seal foraging distance (of 448km) of DBD.
Küsten- und Dünenlandschaften Amrums SAC (Site code: DE1315391)	Grey Seal	337km	This site is within the grey seal foraging distance (of 448km) of DBD.
National park Niedersachsisches Wattenmeer SAC (Site code: DE2306301)	Grey Seal	272km	This site is within the grey seal foraging distance (of 448km) of DBD.
NTP S-H Wattenmeer und angrenzende Kustengebiete SAC (Site code: DE0916391)	Grey Seal	311km	This site is within the grey seal foraging distance (of 448km) of DBD.
SPA Ostliche Deutsche Bucht SPA (Site code: DE1011401)	Grey Seal	262km	This site is within the grey seal foraging distance (of 448km) of DBD.
Steingrund SAC (Site code: DE1714391)	Grey Seal	328km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Sylter Außenriff SCI (Site code: DE1209301)	Grey Seal	207km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Doggersbank SAC (Site code: NL2008001)	Harbour Seal Grey Seal	0m (adjacent to array area).	This site is within the grey and harbour seal foraging distance (of 448km and 273km, respectively) of DBD.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
	Harbour Porpoise		Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
Duinen Ameland SAC (Site code: NL3009005)	Grey Seal	237km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Duinen en Lage Land Texel SAC (Site code: NL2003060)	Grey Seal	228km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Duinen Goeree & Kwade Hoek SAC (Site code: NL9801079)	Grey Seal	300km	This site is within the grey seal foraging distance (of 448km) of DBD and will therefore be considered further in the HRA assessments.
Duinen Terschelling SAC (Site code: NL2003059)	Grey Seal	223km	This site is within the grey seal foraging distance (of 448km) of DBD.
Duinen Vlieland SAC (Site code: NL2003061)	Grey Seal	226km	This site is within the grey seal foraging distance (of 448km) of DBD.
Grevelingen SAC (Site code: NL4000021)	Grey Seal	306km	This site is within the grey seal foraging distance (of 448km) of DBD.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Klaverbank SAC (Site code: NL2008002)	Grey Seal Harbour Seal Harbour Porpoise	40km	This site is within the grey and harbour seal foraging distance (of 448km and 273km, respectively) of DBD. Harbour porpoise from this site are assumed to be utilising the Project area and will also be considered in the HRA.
Noordzeekustzone SAC (Site code: NL9802001)	Grey Seal	215km	This site is within the grey seal foraging distance (of 448km) of DBD.
Oosterschelde SPA and SAC (Site code: NL3009016)	Grey Seal	319km	This site is within the grey seal foraging distance (of 448km) of DBD.
Vlakte van de Raan SAC (Site code: NL2008003)	Grey Seal	314km	This site is within the grey seal foraging distance (of 448km) of DBD.
Voordelta SAC and SPA (Site code: NL4000017)	Grey Seal	295km	This site is within the grey seal foraging distance (of 448km) of DBD.
Waddenzee SAC (Site code: NL1000001)	Grey Seal	231km	This site is within the grey seal foraging distance (of 448km) of DBD.
Westerschelde & Saeftinghe SAC (Site code: NL9803061)	Grey Seal	323km	This site is within the grey seal foraging distance (of 448km) of DBD.

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Berwickshire and North Northumberland Coast SAC (Site code: UK0017072)	Grey Seal	192km	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density.
Humber Estuary SAC (Site code: UK0030170)	Grey Seal	Within ZOI as the designated site is located 0m from the Onshore Project Area.	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density.
Isle of May SAC (Site code: UK0030172)	Grey Seal	306km	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density.
Moray Firth SAC (Site code: UK0019808)	Bottlenose dolphin	500km	There is potential connectivity between construction activities at DBD and the coastal bottlenose dolphin population of the Moray Firth
Southern North Sea SAC (Site code: UK0030395)	Harbour porpoise	EEC within SAC	Nearest European site for harbour porpoise. It is assumed that all harbour porpoise in the DBD project area, or areas of potential effect, are from this European site.
The Wash and North Norfolk Coast SAC (Site code: UK0017075)	Harbour seal	63km	This site has been identified as having connectivity with DBD through the Carter *et al*. (2022) SAC relative density data

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Marine Ornithological Features			
Greater Wash SPA (Site code: UK9020329)	Little tern, breeding Common tern, breeding Sandwich tern, breeding Common scoter, non-breeding Red-throated diver, non-breeding	0km from the Offshore Export Cable Corridor 220.7km from the Array Area	See **Table 4-18 to Table 4-21.**
Humber Estuary SPA and Ramsar (Site codes: UK9006111 and UK11031)	Little tern, breeding[S] Avocet, non-breeding[S] Bar-tailed godwit, wintering Black-tailed godwit *islandica*, wintering Black-tailed godwit, passage Dunlin alpina, wintering Dunlin, passage Golden plover, wintering Golden plover, passage Hen harrier, non-breeding[S] Knot, wintering Knot, passage	0km Offshore Export Cable Corridor 235.7km Array Area	See **Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
	Redshank, wintering Redshank, passage Ruff, non-breeding (passage)[S] Shelduck, wintering Waterbird assemblage, wintering		
Flamborough and Filey Coast SPA (Site code: UK9006101)	Gannet, breeding Guillemot, breeding Kittiwake, breeding Razorbill, breeding Seabird assemblage, breeding Puffin Herring Gull Shag Cormorant	22.9km Offshore Export Cable Corridor 220.3km Array Area	See **Table 4-18 to Table 4-21.**
Teesmouth and Cleveland Coast SPA (Site codes: UK9006061)	Common tern, breeding	112km Offshore Export Cable Corridor 262.8km Array Area	See **Table 4-18 to Table 4-21.**
Northumbria Coast SPA (Site codes: UK9006131)	Arctic tern, breeding	133.3km Offshore Export Cable Corridor 269.9km Array Area	See **Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Coquet Island SPA (Site code: UK9006031)	Arctic tern, breeding Common tern, breeding Roseate tern, breeding Sandwich tern, breeding Seabird assemblage, breeding Puffin Herring Gull Lesser black-backed gull Kittiwake	189.8km Offshore Export Cable Corridor 274.7km Array Area	See **Table 4-18 to Table 4-21.**
Farne Islands SPA (Site code: UK9006021)	Arctic tern, breeding Common tern, breeding Guillemot, breeding Roseate tern, breeding Sandwich tern, breeding Seabird assemblage, breeding Kittiwake Shag Cormorant	215.8km Offshore Export Cable Corridor 292.6km Array Area	See **Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
	Puffin		
Lindisfarne SPA (Site codes: UK9006011)	Roseate tern, breeding	222.1km Offshore Export Cable Corridor 301.3km Array Area	See **Table 4-18 to Table 4-21.**
Forth Islands SPA (Site code: UK9004171)	Arctic tern, breeding Common tern, breeding Gannet, breeding Lesser black-backed gull, breeding Puffin, breeding Roseate tern, breeding Sandwich tern, breeding	298.4km Offshore Export Cable Corridor 375.1km Array Area	See **Table 4-18 to Table 4-21.**
Imperial Dock Lock, Leith SPA (Site codes: UK9004451)	Common tern, breeding	332km Offshore Export Cable Corridor 386km Array Area	See **Table 4-18 to Table 4-21.**
Fowlsheugh SPA (Site code: UK9002271)	Guillemot, breeding Kittiwake, breeding	365.1km Offshore Export Cable Corridor 388.2km Array Area	See **Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Ythan Estuary, Sands of Forvie and Meikle Loch (extension) SPA and Ramsar (Site codes: UK9002221 and UK13061)	Common tern, breeding[S] Sandwich tern, breeding	391.4km Offshore Export Cable Corridor 392.5km Array Area	See **Table 4-18 to Table 4-21.**
Loch of Strathbeg SPA (Site codes: UK9002211)	Sandwich tern, breeding	419km Offshore Export Cable Corridor 395km Array Area	See **Table 4-18 to Table 4-21.**
Troup, Pennan and Lion's Heads SPA (Site code: UK9002471)	Guillemot, breeding	445.3km Offshore Export Cable Corridor 427.4km Array Area	See **Table 4-18 to Table 4-21.**
Inner Moray Firth SPA (Site codes: UK9001624)	Common tern, breeding	555.7km Offshore Export Cable Corridor 539.7km Array Area	**See Table 4-18 to Table 4-21.**
Cromarty Firth SPA (Site codes: UK9001623)	Common tern, breeding	559km Offshore Export Cable Corridor 541.1km Array Area	**See Table 4-18 to Table 4-21.**
East Caithness Cliffs SPA (Site code: UK9001182)	Guillemot, breeding Herring gull, breeding Kittiwake, breeding Razorbill, breeding	530.5km Offshore Export Cable Corridor 511.2km Array Area	**See Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
North Caithness Cliffs SPA (Site code: UK9001181)	Guillemot, breeding	544.2km Offshore Export Cable Corridor 521km Array Area	**See Table 4-18 to Table 4-21.**
Pentland Firth Islands SPA (Site code: UK9001131)	Arctic tern, breeding	554.1km Offshore Export Cable Corridor 530.9km Array Area	See **Table 4-18 to Table 4-21.**
Auskerry SPA (Site code: UK9002381)	Arctic tern, breeding	583.7km Offshore Export Cable Corridor 560.4km Array Area	See **Table 4-18 to Table 4-21.**
Hoy SPA (Site code: UK9002141)	Great skua, breeding	571.2km Offshore Export Cable Corridor 548km Array Area	See **Table 4-18 to Table 4-21.**
Fair Isle SPA (Site code: UK9002091)	Arctic tern, breeding Guillemot, breeding	612.6km Offshore Export Cable Corridor 589.4km Array Area	See **Table 4-18 to Table 4-21.**
Rousay SPA (Site code: UK9002371)	Arctic tern, breeding	608.9km Offshore Export Cable Corridor 585.6km Array Area	See **Table 4-18 to Table 4-21.**
Marwick Head SPA (Site code: UK9002121)	Guillemot, breeding	610.3km Offshore Export Cable Corridor 587.1km Array Area	See **Table 4-18 to Table 4-21.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
West Westray SPA (Site code: UK9002101)	Arctic tern, breeding Guillemot, breeding	619.5km Offshore Export Cable Corridor 596.3km Array Area	See **Table 4-18 to Table** 4-21**.**
Sumburgh Head SPA (Site code: UK9002511)	Arctic tern, breeding	644.2km Offshore Export Cable Corridor 620.9km Array Area	See **Table 4-18 to Table** 4-21**.**
Papa Westray (North Hill and Holm) SPA (Site code: UK9002111)	Arctic skua, breeding Arctic tern, breeding	626.4km Offshore Export Cable Corridor 603.2km Array Area	See **Table 4-18 to Table** 4-21**.**
Mousa SPA (Site code: UK9002361)	Arctic tern, breeding	660.6km Offshore Export Cable Corridor 637.4km Array Area	See **Table 4-18 to Table** 4-21**.**
Noss SPA (Site code: UK9002081)	Gannet, breeding Great skua, breeding Guillemot, breeding	670km Offshore Export Cable Corridor 646.8km Array Area	See **Table 4-18 to Table** 4-21**.**
Foula SPA (Site code: UK9002061)	Arctic tern, breeding Great skua, breeding Guillemot, breeding Puffin, breeding	690.1km Offshore Export Cable Corridor 666.9km Array Area	See **Table 4-18 to Table** 4-21**.**

European Site	Designated Feature Screened In	Distance from the Project[10]	Rationale for Screening In
Papa Stour SPA (Site code: UK9002051)	Arctic tern, breeding	709.3km Offshore Export Cable Corridor 686.1km Array Area	See **Table 4-18 to Table 4-21.**
Fetlar SPA (Site code: UK9002031)	Arctic tern, breeding Great skua, breeding	713.6km Offshore Export Cable Corridor 690.4km Array Area	See **Table 4-18 to Table 4-21.**
Ronas Hill – North Roe and Tingon SPA (Site codes: UK9002041)	Great skua, breeding	739.7km Offshore Export Cable Corridor 716.5km Array Area	See **Table 4-18 to Table 4-21.**
Hermaness, Saxa Vord and Valla Field SPA (Site code: UK9002011)	Gannet, breeding Great skua, breeding Puffin, breeding	745.3km Offshore Export Cable Corridor 722.1km Array Area	See **Table 4-18 to Table 4-21.**

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Appendix A: List of Figures, Tables and Plates

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Appendix B: List of Abbreviations

List of Abbreviations

Term	Definition
AA	Appropriate Assessment
AEoI	Adverse Effect on Integrity
BAS	Burial Assessment Study
BDMPS	Biologically Defined Minimum Population Size
CA	Competent Authority
CBRA	Cable Burial Risk Assessment
CIS	Celtic and Irish Sea
cSAC	Candidate Special Area of Conservation
DBA	Dogger Bank A
DBB	Dogger Bank B
DBC	Dogger Bank C
DBD	Dogger Bank D
DCO	Development Consent Order
DEP	Dudgeon Extension Project
EC	European Commission
ECC	Export Cable Corridor
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EPS	European Protected Species

Term	Definition
ES	Environmental Statement
EU	European Union
GW	Gigawatt
Ha	Hectares
HAT	Highest Astronomical Tide
HDD	Horizontal Directional Drilling
HPF	Hydrogen Production Facility
HRA	Habitats Regulations Assessment
HVDC	High Voltage Direct Current
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effect
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MNCR	Marine Nature Conservation Review
MU	Management Unit
MW	Megawatt
NPS	National Policy Statement
NS	North Sea
OSP	Offshore Substation Platform
OWFs	Offshore Wind Farms

Term	Definition
PAH	Polyaromatic Hydrocarbons
PEIR	Preliminary Environmental Information Report
pSAC	Possible Special Area of Conservation
pSPA	Potential Special Protection Area
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
RIS	Information Sheet on Ramsar Wetlands
SAC	Special Area of Conservation
SCI	Site of Community Importance
SD	Standard Deviation
SEP	Sheringham Extension Project
SMRU	Sea Mammal Research Unit
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSC	Suspended Sediment Concentrations
SSSI	Site of Special Scientific Interest
TJB	Transition Joint Bay
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
WS	West Scotland
ZOI	Zone of Influence