

DOGGER BANK D WIND FARM

Artificial Nesting Structure Compensation Measure

Preliminary Environmental Information Report

Appendix A Habitats Regulations Assessment Screening
Report and Draft Report to Inform Appropriate Assessment

Date: February 2026

Revision: V1



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HRA SCREENING REPORT AND DRAFT RIAA

Document Title:	Appendix A Habitats Regulations Assessment Screening Report and Draft Report to Inform Appropriate Assessment
Document BIM Number:	PC6250-HAS-XX-OF-RP-EV-0002
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Prepared For:	Dogger Bank D Offshore Wind Farm

Revision Number	Date	Status / Reason for Issue	Author	Checked By	Approved By
V1	10/02/2026	Final for Issue	LA / KF / LMF	GA / RR / LT	RH

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Glossary

Term	Definition
Area(s) of Search	Broad geographical areas considered during the site selection process for the ANS.
Artificial Nesting Structure	A structure designed to provide safe and secure large scale nesting compartments for targeted 'by design' bird species, in this case black-legged kittiwake.
Associated Development	Associated development is infrastructure that supports the development or operation of the principal development (the Project) or improve its sustainability given wider development or environmental needs. This supportive function extends to the mitigation (and compensation) of impacts of the development or operation of the principal development.
Baseline	The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Project.
Commitment	Refers to any embedded and additional mitigation, enhancement or monitoring measures identified through the Environmental Impact Assessment process and any commitments outside the Environmental Impact Assessment process.
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Development Consent Order	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.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity, defined in terms of significance.
Embedded Mitigation	<p>Embedded mitigation includes:</p> <ul style="list-style-type: none"> Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); and Measures that will occur regardless of the Environmental Impact Assessment process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). <p>All embedded mitigation measures adopted by the Project are provided in the Appendix C Commitments Register of the DBD ANS Preliminary Environmental Information Report.</p>
Environmental Impact Assessment	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.

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Term	Definition
Environmental Statement	A document reporting the findings of the Environmental Impact Assessment which describes the measures proposed to mitigate any likely significant effects.
Habitats Regulations	<p>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).</p> <p>Such regulations set out the requirement for Competent Authorities to consider whether a development will have a likely significant effect on a European site (now known as National Network Sites). Where likely significant effects are likely and a project is not directly connected with or necessary to the management of that site(s), an appropriate assessment is required of the implications of the plan or project for that site(s) in view of its conservation objectives.</p>
Habitats Regulations Assessment Screening Area	The area on which the Habitats Regulations Assessment Screening exercise is based. This encompasses the broadest spatial area for the Artificial Nesting Structures and the Areas of Search plus the Zones of Influence specific to each receptor / qualifying feature.
Impact	An impact is a change resulting from an activity associated with the Project, defined in terms of magnitude.
Mitigation Hierarchy	A systematic approach to guide decision-making and prioritise mitigation design. The hierarchy comprises four stages in order of preference and effectiveness: avoid, prevent, reduce and offset.
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.
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 Environmental Impact Assessment process.
Scour Protection	Protective materials used to avoid sediment erosion from the base of the offshore Artificial Nesting Structure foundation due to water flow.
Study Area	A geographical area and / or temporal limit defined for each topic within the Environmental Impact Assessment to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor acting through ‘Doggerbank Offshore Wind Farm Project 4 Projco Limited’.
The Project	Dogger Bank D (DBD) Offshore Wind Farm Project, also referred to as DBD in this document.

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Term	Definition
Topside	The section of the Artificial Nesting Structure on which the nesting ledges will be situated.
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.

1 Introduction

1. As part of its third offshore wind leasing 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 DBD Project’.

1.1 Habitats Regulations Assessment

4. The Applicant has produced a draft Report to Inform the Appropriate Assessment (RIAA) on the sites and features designated under the European Council Directive 009/147/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’) for the DBD Project. The draft RIAA (Dogger Bank D, 2025a) was submitted for statutory consultation as part of the Preliminary Environmental Information Report (PEIR) for the DBD Project (Dogger Bank D, 2025b). It provided information for the assessment of the Project with respect to its potential to have an Adverse Effect on Integrity (AEol) on those features and sites designated under the Birds Directive and the Habitats Directive. The draft RIAA concluded that the potential AEol on the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (SPA) could not be ruled out when considered in-combination with other plans and projects. Whilst further Project refinement (mitigation through design) is being undertaken, the Applicant is progressing a compensation package to support a derogation case for the Project, the element of pertinence to this document being the Artificial Nesting Structure (ANS). A Kittiwake Compensation Roadmap and Evidence document (Dogger Bank D,

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2025c) was prepared and submitted with the PEIR for the Project (Dogger Bank D, 2025b) setting out plans to secure this compensation measure.

5. This document comprises both the screening stage (Stage 1) and information to inform an Appropriate Assessment (Stage 2) of the Habitats Regulations Assessment (HRA) process for the ANS which is deemed an Associated Development of the DBD Project. An ANS is a purpose-built structure installed at sea and fixed to the seabed, designed to provide optimal nesting spaces for seabirds (specifically kittiwake).
6. This document provides information to enable the screening of the ANS with respect to its potential to have a likely significant effect (LSE) on those features and European Sites designated under the Birds Directive and the Habitats Directive. The scope of this document covers all relevant offshore European sites and relevant qualifying interest features alongside any potential effects from ANS. European sites are proposed to be 'screened out' where no LSE from the ANS is predicted. Where LSE cannot be ruled out at this stage the European sites are 'screened in' for further assessment. Subsequently, this document then provides a concise RIAA on whether the LSEs on the protected sites that are screened in have the potential to cause an AEoI, either from the ANS alone or in-combination with the DBD Project, and other plans and projects.
7. The 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)) require that an 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), 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.
8. The Project is seeking consultation responses on this document to confirm that the approach taken at the Environmental Statement (ES) stage is both appropriate and proportionate to the scale of the proposed ANS development. The outcome of this screening stage and RIAA will be submitted as an appendix to the PEIR which has also been prepared for the ANS. Both documents will be issued for consultation pursuant to Section 42 of the Planning Act 2008. Where required, this document will be updated and submitted alongside the DBD Project RIAA, which will accompany the Environmental Impact Assessment (EIA) as part of the Development Consent Order (DCO) application in 2027.

2 Description of the Artificial Nesting Structure

2.1 Project Design Envelope Approach

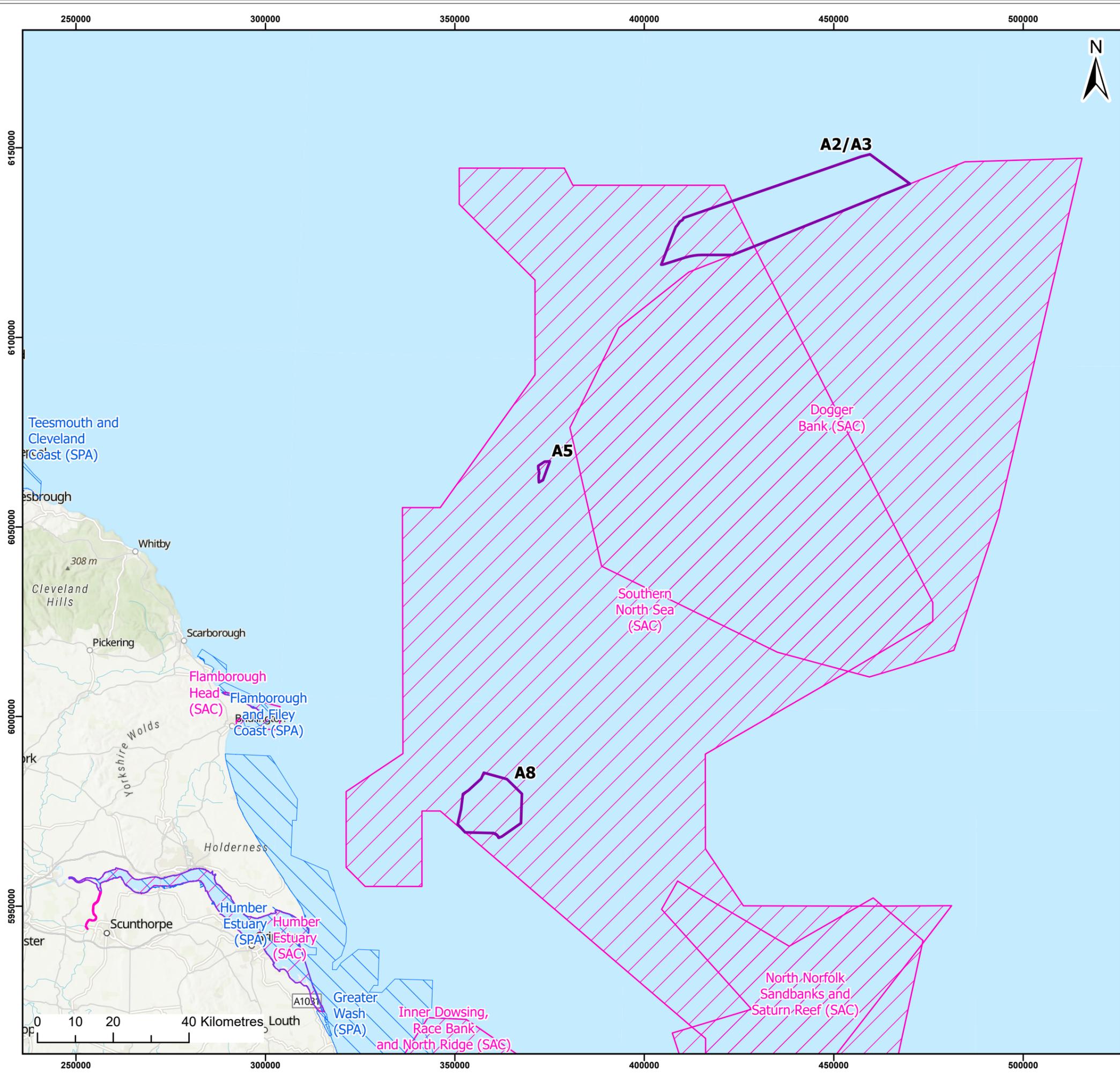
9. The Applicant is currently appraising three Areas of Search (AoS) for a single offshore ANS. The final area(s) within which the ANS would be located will be confirmed following the latter stages of the site selection process, after the Section 42 consultation. The worst-case parameters across these AoS have been used in the development of this Report. The worst-case scenario covers the maximum design parameters within the three AoS (A2/3, A5, and A8), see **Figure 2-1**.

2.2 Design Commitments

10. The Project has made a number of design commitments to avoid, prevent and minimise potential adverse environmental effects. Key design commitments are provided through the Commitments Register (**Appendix C** in the **DBD ANS PEIR**) submitted with this report. The commitment identification in this register has been developed in line with the Commitments Register submitted with the PEIR for the DBD Project (Dogger Bank D, 2025b).
11. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the ANS Project Design Envelope and stakeholder feedback. The final commitments, including all design commitments, will be confirmed in the Commitments Register which will be submitted with the DCO application.

2.3 ANS Design Envelope Approach

12. At this stage, the ANS description is indicative and based on a concept design. The ANS design will continue to evolve as the EIA and site selection work progress. Worst case design parameters will therefore be provided in the ES, which will form part of the DCO application. **Table 2.1** describes the AoS considered for the ANS. The worst-case scenario presented in **Section 2.4** covers the maximum design parameters for the proposed ANS within the three identified AoS.



Legend:

- ANS AoS
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

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Project:
Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
ANS Areas of Search

Figure: 2-1 **Drawing No:** PC6250-HAS-XX-OF-DR-GS-0001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	02/09/2025	AB	PT	A3	1:1,000,000
02	23/01/2026	JH	PT	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N

sse Renewables **equinor**

Table 2.1 Key AoS parameters

Feature	Indicative Parameter
AoS Locations	
Distance to shore (at its closest point)	A2/3 - 155km
	A5 - 95km
	A8 - 46km
AoS Area	A2/3 - 699km ²
	A5 - 9km ²
	A8 - 298km ²
AoS water depths	A2/3 - 33m to 49m at Lowest Astronomical Tide (LAT)
	A5 - 35m to 50m at LAT
	A8 - 26m to 49m at LAT

13. The ANS HRA (in line with that of the Project) will be based on a design envelope approach in accordance with the National Policy Statement (NPS) EN-1 (paragraph 4.3.11 and paragraph 4.3.12) (Department for Energy Security & Net Zero (DESNZ), 2025) which recognises that: *“In some instances, it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail”* and *“Where some details are still to be finalised, the ES should, to the best of the applicant’s knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed”*. It also refers to the Rochdale Envelope in its footnote 86 to paragraph 4.3.12.
14. The following sections provide an overview of the current understanding of the potential infrastructure and activities required for the ANS, including indicative parameters.

2.4 The Proposed ANS

15. The ANS will be primarily designed to provide nesting spaces for breeding kittiwake, but the Project is retaining flexibility for the structure to support guillemot and razorbill if required. It will comprise a foundation that anchors the structure to the seabed, and the ANS topside which hosts the nesting spaces. The ANS topside will have individual nesting ledges on the exterior of the topside and each successive nesting ledge is offset, resulting in a wall that is inclined away from the main deck. Internal staircases and walkways will provide access to nesting spaces and allow researchers to make observations and ring chicks if required.

16. The ANS topside will measure a maximum of 30m in width and length, 40m in height, and extend up to 65m above LAT after accounting for required sea level clearance (or 80m above LAT inclusive of lightning protection). Dimensions are primarily driven by the number of nesting spaces required as well as design features to maximise ANS success such as inclined walls.
17. Foundation designs will be informed by several factors including environmental characteristics such as ground conditions, water depths, metocean conditions, economic parameters, and supply chain constraints. The findings of this assessment will also be used to refine the foundation design. The following foundation design options for the ANS are currently being considered:
 - Monopile; and
 - Gravity base.

2.5 ANS Foundation Design

2.5.1 Monopile

18. A monopile foundation typically consists of a single tubular piece, formed out of a number of rolled steel plates welded together, that is driven into the seabed by impact piling or vibro-piling. The assessment of effects from piling for the ANS foundation will be undertaken both with and without the use of noise reduction technology at the ES stage, assuming that monopiles remain within the project design, and a significant adverse effect is predicted on receptor species. The Applicant has committed to applying best endeavours to the use of primary and/or secondary noise reduction measures for the DBD Project, and that commitment also applies for the installation of the ANS, in line with the latest policy from stakeholders. In areas of firmer ground conditions drilling of the seabed may be required prior to piling. This is only considered for the installation of a monopile foundation in the assessment as it provides the worst-case assessment in terms of drill arisings. The drill arisings (spoil) would be disposed of adjacent to the foundation location, from a vessel pipe that would be above or slightly below the sea surface. At the point of disposal, the spoil will be expected to settle onto the seabed in the immediate vicinity of the foundation.

2.5.2 Gravity Base

19. A gravity base foundation is a concrete or steel structure that is floated or transported by barge to the ANS site and then ballasted when in the correct location and deposited onto the seabed or lifted and set down onto the installation location by use of a heavy lift crane vessel. This foundation type is stable by way of its sheer weight. They vary in shape but typically consist of a wide base footprint to provide stability, with a number of columns rising through the water column and splash zone to provide support to the topside at the defined interface level.

2.5.3 Foundation Design Envelope

20. The design envelope for both the monopile and gravity base foundation types for the ANS are presented in **Table 2.2**.

Table 2.2 Project Design Envelope - ANS Foundation

Parameter	Value
Monopile Foundation	
Number of monopiles	1
Maximum pile diameter at seabed (m)	8
Maximum pile diameter above sea surface (m)	9
Scour protection area (m ²)	1,520
Seabed preparation area (m ²)	1,520
Seabed preparation volume (m ³)	3,040
Maximum hammer energy required for piling (kJ)	6,000
Pile penetration depth below seabed (m)	40
Drill diameter (m) (if required)	9
Volume of drill arisings (m ³) (if required)	2,545
Gravity Base Foundation	
Shaft diameter (m)	12
Diameter of base on seabed (m)	50
Scour protection area (m ²)	8,495

Parameter	Value
Seabed preparation area (m ²)	11,400
Seabed preparation volume (m ³)	39,820

2.5.4 Pre-Installation Foundation Works

21. Prior to the commencement of installation, surveys will be undertaken to confirm that the seabed is clear of any obstructions (including archaeological, benthic, geotechnical and unexploded ordnance (UXO)) in order to inform micro-siting of the ANS foundation, clearance operations, and seabed preparation to avoid potentially sensitive (or dangerous) receptors.
22. Depending on the type of foundation selected for the ANS, some degree of seabed preparation (e.g. UXO, boulder and sandwave clearance) may be required to provide a level surface upon which the ANS foundation will be installed, or to deposit scour protection to protect the structural integrity of the ANS foundation. The following sections describe these ancillary works to the ANS foundation in more detail.

2.5.4.1 Unexploded Ordnance

23. It is not possible at this stage to determine if any UXO would be present in the AoS. The results of the geophysical surveys will be analysed by an appropriate UXO contractor or consultant to determine a list of potential UXO targets for investigation. A UXO identification survey (often combined with an archaeological Remotely Operated Vehicle (ROV) survey) will then be undertaken prior to construction to ascertain whether any of the potential UXOs can be confirmed as such. Micro-siting around any UXOs that are confirmed will be the preferred option for the development, but if clearance is deemed necessary a separate marine licence application will be made at the time.

2.5.4.2 Dredging

24. Both foundation types may require levelling and dredging of the soft mobile sediments to ensure the stability of the foundation. Vessels such as a Trailing Suction Hopper Dredger (TSHD) will be used to remove the required amount of sediment to level the seabed. The spoil will likely be side-cast adjacent to the ANS foundation location. In some cases, it may be necessary to place a layer of gravel on the seabed prior to the installation of the foundation.

2.5.4.3 Scour Protection

25. Scour is a hydrodynamic process which results in seabed erosion and subsequent 'scour hole' formation around offshore infrastructure and may compromise the structural integrity of structures over time. Scour protection is the primary mitigative measure to prevent this from occurring and involves the deposit of a material around the ANS foundation to protect the seabed around the structure (see **Table 2.2**).
26. Several types of scour protection exist, including (but not exclusively) mattress protection, sand bags, rock bags, and flow modifiers. However, the most common method is the placement of rock around the foundation base.
27. The final method of scour protection installation will be decided post-consent. However, a typical approach is to deposit a layer of small rocks (the filter layer) at the foundation location, followed by installation of the foundation on or through the filter layer. Afterwards, a layer of larger, higher graded rocks (the armour layer) is deposited on top to protect the seabed at the foundation base. The filter layer can also be laid after the foundation has been installed and it is possible to avoid multiple layers by using a heavier rock material with a wider gradation.
28. The quantity of scour protection required for the ANS will vary depending on the foundation type and hydrodynamic conditions at the selected location, with estimates presented in **Table 2.3**. Note the Gravity Base foundation represents the worst-case scenario in terms of scour protection requirements.

2.5.5 ANS Installation

29. A detailed ANS installation procedure will be provided prior to construction. The installation is expected to follow the standard practice for offshore platform installation:
 - The ANS foundation and topside will be fabricated onshore and loaded onto a suitable installation vessel or barge at an appropriate marshalling port (likely to be within the UK).
 - The installation vessel or barge will transit to the relevant ANS location where the foundation will be installed (typically pile driven for a monopile foundation or sinking a gravity base foundation using ballast).
 - The topside will then be lifted by crane onto the pre-installed foundation. The installation vessel will typically use either jack-up legs or dynamic positioning to maintain stability during the installation.

2.5.6 Aids to Navigation, Lighting and Colour Scheme

30. The ANS will comply with the requirements of the Civil Aviation Authority (CAA), the Maritime and Coastguard Agency (MCA), and Trinity House (the General Lighthouse Authority) in respect to all aids to navigation. This includes the appropriate lighting and marking of any offshore structures that extend above the sea surface. The location of the ANS infrastructure will also be submitted to the UK Hydrographic Office (UKHO) so that Admiralty Charts can be updated accordingly (see Commitment CO9 and CO16 listed in **Appendix C** of the **DBD ANS PEIR**).

2.5.7 Construction Vessels

31. During the construction of the ANS, a variety of vessels will be required to support installation activities and the transport of equipment and infrastructure. The exact number and specifications of these vessels will be confirmed when nearer the construction period but is likely to comprise the following vessels:
- Site preparation – survey vessel, dredger, boulder clearance vessel, and guard vessel(s);
 - Foundation and topside installation – support vessel, crew transfer vessel (CTV), rock placement vessel, installation vessel (jack-up vessel (JUV) or heavy lift vessel (HLV)), and guard vessel(s);
 - ANS commissioning – CTV, installation vessel (JUV / HLV), and guard vessel.
32. Due to construction sequencing, these vessels will not all be on site at the same time, but it is anticipated that a maximum of approximately five will be present at any one time. The maximum anticipated number of trips throughout the entire construction period is 40.
33. Each installation vessel or barge may be assisted by a range of support vessels. These are typically smaller vessels such as tugs, anchor handling vessels, or similar. It is assumed that these vessels will make the same general movements to and from the ANS as the installation vessels they are supporting.
34. The methodology for the construction phase may involve the use of JUV. JUVs are installation vessels that lower three or more legs onto the seabed and lift themselves out of the water to provide a stable platform to conduct works. This is particularly useful for the construction of heavy infrastructure, such as craning of the ANS foundation and topside. The legs of the JUV directly impact the seabed through the ‘jacking-up’ process. The Project Design Envelope for the use of JUVs is provided in **Table 2.3**.

Table 2.3 Project design envelope - jack-up vessels

Parameter	Value
JUV footprint (m ²)	8,400
Anchoring footprint (m ²)	2,496
Total area impacted by JUVs / HLVs and anchoring over construction period (m ²)	10,896

35. In some instances, anchoring may be necessary during construction. There are still direct impacts on the seabed as a result of the multiple anchors dropped to secure the vessel, but it is less commonly used because Dynamic Positioning (DP) is a more efficient means to position the vessel. However, the deployment of DP and thus anchoring disturbance is less than would occur for the use of JUV.

2.5.8 Helicopter Movements

36. It is not currently expected that any helicopter movements would be required for the construction of the ANS, other than under circumstances deemed force majeure.

2.5.9 Safety Zones

37. Safety zones help to ensure a safe distance is maintained between the ANS and vessels. As the ANS is not an Offshore Renewable Energy Installation (OREI) it will not qualify for a Safety Zone under the Energy Act 2004. However, the Applicant intends to propose an advisory 500m safe passing distance during the construction of the ANS to ensure the safety of construction vessels, personnel and infrastructure, as well as for other vessels navigating in the area. In addition, advance warning and location details of operations during construction and operation including the advisory Safety Zones and passing distances will be communicated through Notices to Mariners (NtM) and Kingfisher Bulletins.
38. After construction a Safety Zone is not expected to be implemented and only returning to 500m when major maintenance activities are underway.

2.5.10 Construction Programme

39. Construction of the ANS is expected to take six months and will be completed a minimum of two breeding seasons prior to operation of the first turbine.

2.5.11 Operation and Maintenance

40. The Operation and Maintenance (O&M) phase of the ANS is anticipated to be in excess of 37 years. During the O&M phase a number of routine and potentially *ad hoc* activities will be undertaken. There may also be a number of visits for ecological purposes to assess the effectiveness of the structure in achieving its aims. The O&M strategy will be finalised once the technical specification and final location of the ANS is known and will be developed post-consent with an outline schedule provided within the kittiwake compensation implementation and monitoring plan submitted with the DCO application. The strategy will ensure that all infrastructure is maintained in safe working order and to maximise operational efficiency throughout the lifetime of the ANS.
41. O&M activities are grouped into two categories:
- Preventative maintenance – planned activities such as scheduled maintenance of the ANS and its foundation, geophysical, benthic and other surveys (similar to those carried out in pre-construction phase identified in **Section 2.5.4**), modifications and retrofit campaigns; and
 - Corrective maintenance – activities such as repairs, antifouling, replacements and remedial works to the ANS and its foundation, and scour protection.
42. An estimated seven JUV / HLV visits are predicted over the lifetime of the ANS. Some jack-up vessel footprint disturbance (up to 1,200m²) would occur on each of these occasions.

2.5.11.1 Operation and Maintenance Port

43. It is likely that the existing Dogger Bank O&M facility at the Port of Tyne will be used (and expanded if necessary) as the base of operations for the ANS. However, if this is not the case, an alternative port will be selected in the north-east of England.

2.5.11.2 Vessel Operations

44. In order to perform the O&M activities, a variety of vessels will be required to transport personnel and equipment to enable the execution of the works. These can be grouped into two categories:
- Routine – CTVs, SOVs and PSVs / OSVs that are permanently assigned to the ANS or visiting in a planned, routine manner; and
 - Ad-hoc – JUVs / HLVs / Offshore Construction Vessels (OCVs), normally specialised in their nature, to perform specific tasks usually linked to corrective maintenance. An estimated seven JUV / HLV / OCV visits are predicted over the lifetime of the ANS.

45. It is likely that the Service Operation Vessels (SOV) will operate from the existing Dogger Bank O&M facility at the Port of Tyne. However, this is subject to a detailed review, and an alternative port may be selected in the north-east of England. Other vessels are unlikely to operate from the Port of Tyne. Instead, they may be deployed from any suitable port within the North Sea basin.

2.5.12 Decommissioning

46. Decommissioning will typically follow a reverse sequence of the construction methodology and will involve similar numbers of vessels and equipment. In many cases the scale of the activities during the decommissioning phase will be equivalent to, or less than, the activities during construction.
47. The submission of a decommissioning programme will be required pre-construction. This initial programme must be approved by the relevant authority and will be updated throughout the lifetime of the Project. Before decommissioning begins, a final version must be submitted and approved by the Marine Management Organisation (MMO).

3 The Habitats Regulations

3.1 Legislative Context

48. 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.
49. Unless the UK government implements further legislative changes which may affect the HRA process¹, 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)

50. 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.

¹ [Energy Security Bill factsheet: Offshore wind environmental improvement package - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/factsheets/energy-security-bill-factsheet-offshore-wind-environmental-improvement-package)

51. 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 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.
52. 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.
53. 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)

54. 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.
55. 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.
56. 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

57. 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 (2025). 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)

58. 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.

59. 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).

60. 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.

61. 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).
62. 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) (this Report)

63. For those sites where LSE cannot be excluded in Stage 1, information to inform an appropriate assessment is prepared by the Applicant, normally presented as the RIAA. The RIAA provides an assessment to 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 to produce the AA.
64. This document provides a draft of the RIAA for the ANS. Where further modelling or more detailed assessment is required, such as for marine mammals, this will be carried out and quantitatively assessed in the RIAA to be submitted with the DCO Application.

3.2.3 Stage 3 – HRA Derogation

65. In the event of it not being possible to reach an agreement with Statutory Nature Conservation Bodies (SNCBs) on the absence of 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.
66. 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-application phase, in consultation with the relevant stakeholders.

3.3 Approach to Screening

67. To facilitate the identification of the European sites and features to be considered in the LSE screening for the ANS, an initial pre-screening of effects and sites has been undertaken as part of the wider screening assessment.
68. Each topic assessed within this Report follows the same structural assessment of effects and sites which includes:
- A consideration of the pathways for LSE during each phase of the ANS;
 - 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.
69. 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 ANS, the anticipated zone of influence (Zol) of potential effects associated with the ANS, 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 Zol of effects associated with the Project (e.g. habitat loss / disturbance, noise, and risk of collision).

70. The ANS will be located offshore (see **Figure 2-1** and **Table 2.1**). European sites with qualifying features or species which are located within the Zol associated with the AoS and 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 Zol.

71. The following buffers were used for identification of LSE on designated sites:
- Annex I Offshore Sites: 2km. Based on the seabed sediment type, activity type, and distance of deposition recorded by various sources (see **Section 4.1.3.2** for further information);
 - Annex II Migratory Fish: 40km. This acts as a precautionary buffer distance based on the maximum effect range from worst-case piling noise for a single monopile (see **Section 2.5** for ANS foundation options). The worst-case impact range (using Popper *et al* (2014) thresholds) from monopiling for the DBD Project was 34km (SubAcoustech, 2024), noting that this was for two sequentially installed monopiles, whereas the ANS will only include a single monopile. It is expected that site-specific noise modelling will be undertaken for the AoS, which will verify and validate the appropriateness of a 40km screening buffer for Annex II Migratory Fish;
 - Annex II Marine Mammals: All European Sites for certain wide-ranging species, screening has been based on the potential connectivity for each species, as detailed in **Section 6.1.2.5**; and
 - Marine Ornithology: For breeding seabird colony SPAs, buffers vary per species as defined in **Section 7.1.2** (mean maximum foraging range + 1 standard deviation during the breeding season). For other SPAs, 2km (maximum effect range for displacement of marine birds in response to ship-based disturbance or cable laying (MMO, 2018; Outer Dowsing Offshore Wind, 2023; DESNZ, 2024)).
72. The types of effects associated with the ANS will vary in their magnitude and significance, depending on a range of factors including the scale and design of the foundation, the installation process, and the location and timing of activity. With respect to designated habitats and species populations, these effects may be direct (e.g. impact of underwater noise on marine mammal features) or indirect (e.g. via changes in water quality or sediment resuspension and deposition).
73. 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.
74. This approach identifies potential effects resulting from the proposed construction, operation, maintenance, and decommissioning of the ANS.
75. 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.
76. 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.
77. As described above, mitigation is not considered at Stage 1 but will be considered where relevant in the Stage 2 assessment.
78. The approach to screening for each receptor is outlined in **Chapter 4 European Sites Designated for Annex I Habitats to Chapter 7 European Sites Designated for Annex II Marine Ornithology** and is based on the known distribution, ecology and sensitivities of each receptor group and therefore the potential for being affected by the project.
79. 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

80. 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. Offshore plans or projects that may be considered include (but are not limited to):
- Other offshore artificial nesting projects;
 - Offshore wind farms;
 - Other renewables developments;
 - Aquaculture;
 - Aggregate extraction and dredging;
 - Licenced disposal sites;

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- Shipping and navigation;
- Planned construction of sub-sea cables and pipelines;
- Potential port / harbour development;
- Oil and gas development and operation, including seismic surveys;
- UXO clearance; and
- Carbon capture developments.

81. 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 (Parker *et al.*, 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**.

Table 3.2 In-Combination effects tiered approach (Parker et al., 2022)

Tier	Consenting or Construction Stage	Data Availability
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	Tier 1 + projects under construction.	As for Tier 1 but not including post-construction survey data.
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.

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.

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Tier	Consenting or Construction Stage	Data Availability
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).
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.
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).
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.

82. All plans and projects are considered in the HRA Screening, including the DBD Project. 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.

3.4 Approach to Stage 2 Assessment

83. The Stage 2 assessment involves the detailed assessment of the implications of the proposal for the qualifying features of the National Site Network site(s), in view of the site(s)'s conservation objectives, and identify ways to avoid or minimise any effects, i.e. through the identification and description of mitigation measures. This is to determine whether there is objective evidence that adverse effects on the integrity (AEol) of the site can be excluded. Each relevant topic will present the worst-case scenario used in the assessment and provide clarification of the nature of the sources and pathway for potential effects and then assess qualitatively whether an adverse effect can be excluded or cannot be concluded. In the latter case, further assessment (for example supported by modelling) will be undertaken for the RIAA and DCO Application submission to further quantify and assess and identify whether specific mitigation measures are required.

84. Where mitigation measures are required, these will follow a hierarchy whereby measures to avoid impacts should be considered first, then measures to minimise the effects through changes in design or construction and/or operational methodology. Under the Habitats Regulations the cost of such measures is not a supportive argument, though health and safety and technical feasibility are.

3.4.1 Assessment of In-Combination Effects

85. Where in-combination effects could not be screened out in the Screening Stage, the assessment will use the approach detailed in **Section 3.3.1** to determine which projects have the potential to effect relevant sites and species in-combination with ANS. This will be based on temporal and spatial Zol for the ANS, which is detailed in each relevant topic. Further qualitative assessment has then been undertaken for the ANS in-combination with other projects, and where screened in due to spatial / temporal / receptor overlap the DBD Project.

4 European Sites Designated for Annex I Habitats

4.1 Stage 1 Screening

4.1.1 Sites Designated for Annex I Habitats

86. This section provides a list of European sites (and Ramsar Sites) and their features for which there is the potential for connectivity with the ANS, using the criteria outlined in **Table 3.1**, and therefore those which should be taken forward for consideration of LSE.
87. The scope of this section covers all relevant European sites and relevant qualifying interest features and potential direct impacts of infrastructure on sites seaward of Mean Low Water Springs (MLWS) for offshore features. Specific locations for offshore infrastructure have not been determined.
88. As there are no onshore aspects relating to the ANS, with the nearest AoS to the shore being approximately 46km away, all onshore Annex I Habitats are screened out due to no pathway of effect.

4.1.2 Approach to Screening

89. 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 ANS along with listing potential effects on designated sites.
90. Direct or indirect effects on designated sites in the North Sea that have benthic habitats (Habitats Directive Annex I) as a qualifying feature have been considered in this HRA screening.
91. 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 the ANS.
92. This HRA Screening only assesses pathways of effect for individual features. Stage 2 would consider the effect of the ANS on the integrity of the European Site(s) as a whole.

93. This HRA screening exercise considers sites which meet the following criteria:
- A component of the ANS directly overlaps a site whose qualifying features include a habitat; and / or
 - The distance between the ANS and the habitat qualifying feature is within the range for which there could be an interaction (i.e. within a Zol for a physical process change resulting from the ANS).
94. 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 AoS and SAC sites were measured in Geographical Information Systems (GIS) (the shortest straight-line distance) using shapefiles downloaded from SNCB websites.

4.1.3 Identification of Sites and Features for Annex I Habitats

4.1.3.1 Sites directly overlapping with the AoS boundaries

95. There are no European sites that directly overlap with the AoS boundaries; therefore, no direct effects would occur, and no sites will not be taken forward as a result.

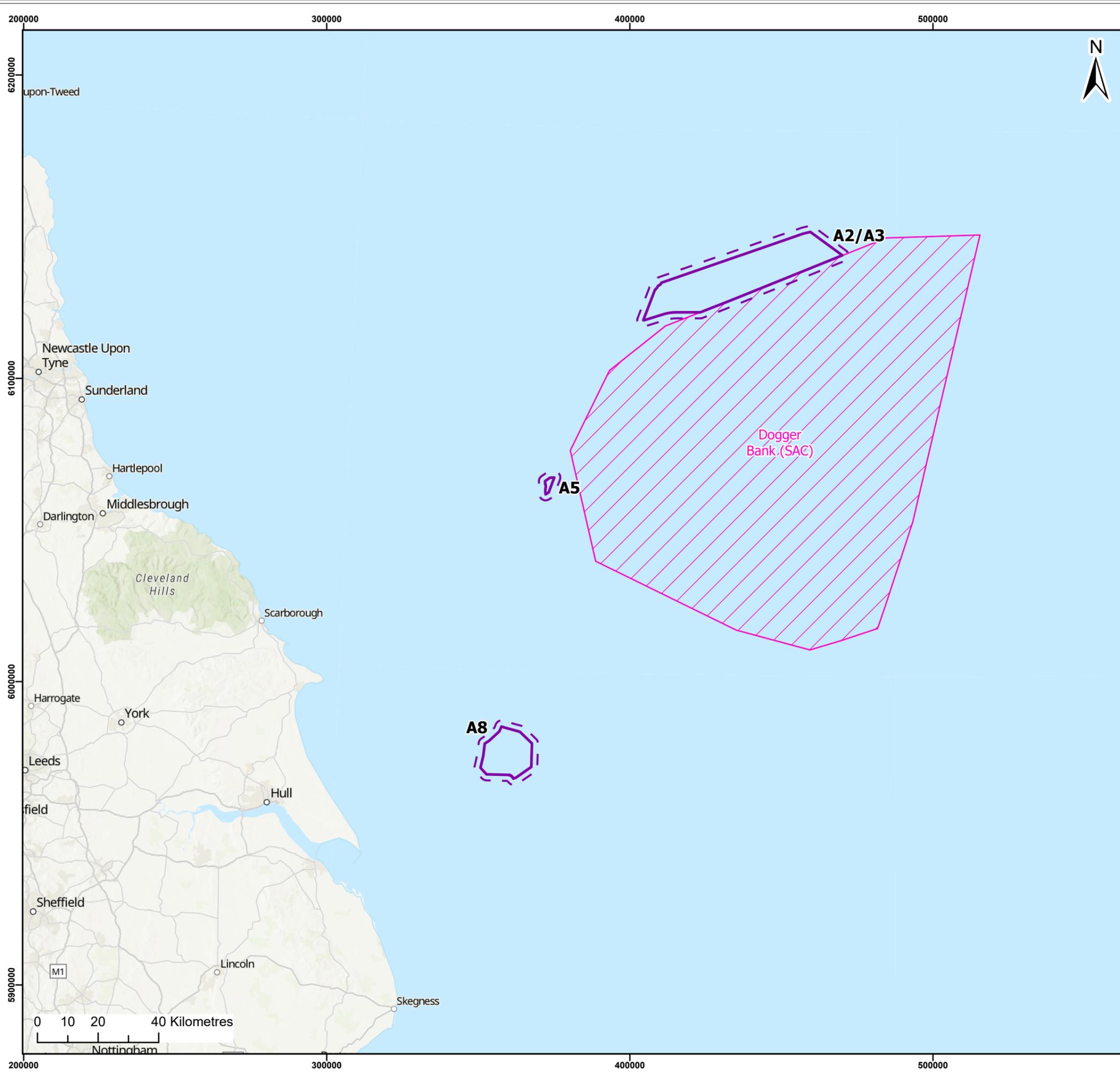
4.1.3.2 Sites within the Zol of the ANS' effects

96. European sites with qualifying features / species which are located within the potential Zol of the ANS activities will be taken forward for consideration of LSE. Construction, O&M, and decommissioning activities for the ANS may result in the disturbance of sediment. This can have an indirect effect on receptors away from the source of the disturbance.
97. Based on evidence from modelling carried out for the DBD Project PEIR (Dogger Bank D, 2025b) and DBD Project draft RIAA (Dogger Bank D, 2025a), sediment disturbance (the most far reaching of marine physical process modelled outputs) from the array area installation activities (comparable in a conservative sense to an ANS) will be localised. Given the activity for the ANS includes one structure being installed, further modelling has not been deemed necessary and the tidal ellipse at each ANS is presented below:
- A2/3: approximately 6km extending from the AoS in a north west – south east orientation;
 - A5: approximately 7km extending from the AoS in a north-north west – south-southeast orientation; and

- A8: approximately 11km extending from the AoS in a north east – south west orientation.
98. Though tidal ellipses determine the dispersal of sediment and the potential distance of travel, the range of excursion does not equate with the distance over which this impact may be exerted. This is determined by a combination of factors including sediment particle size, mass, and local hydrology.
99. For the Inner Dowsing Offshore Wind Farm in the southern North Sea, it was predicted that 90% of sediments re-suspended during installation re-settled within 1km of the construction corridor (OSPAR, 2023). The amount of re-suspended material was regarded insignificant compared to baseline conditions.
100. The findings of a separate study on the environmental impact of subsea trenching operation (Gooding *et al.*, 2012) suggested that the impacts on sediment disturbance vary depending on sediment particle size. Coarser sediments are likely to settle back in the very near-field (~ 100m) with finer particles deposited further afield (1km to 2km). This conceptual evidence-based assessment is supported by the findings of a review of the evidence base into the physical impacts of marine aggregate dredging on sediment plumes and seabed deposits (Whiteside *et al.*, 1995; John *et al.*, 2000; Hiscock and Bell, 2004; Newell *et al.*, 2004; Tillin *et al.*, 2011; Cooper and Brew, 2013). Although aggregate dredging is slightly different, the findings are deemed to be similar with the impacts arising from the ANS.
101. The Benthic Characterisation Survey for the main Project (Fugro, 2024) indicated that ‘the seafloor across the Dogger Bank D survey area generally comprised sand, with varying degrees of mud, gravel and shell fragments identified at most stations’. This survey included samples within A2/3. As per the Dogger Bank D Benthic Survey of A5 and A8 (Fugro, 2025), ‘sediments within the A8 area mainly comprised gravelly sand sediment whereas the A5 stations comprised fine sand’. Consequently, at all AoS, the sediments contain low levels of fine sediment and therefore a maximum deposition distance of 2km as per Gooding *et al* (2012) is considered appropriate for a screening Zol for possible sediment deposition impacts.

4.1.3.3 Screening of Sites within the Zol of the ANS Effects

102. Noting the information presented in **Section 4.1.3.2**, the Zol for the AoS has therefore been defined as 2km around each AoS. On this basis, and as shown on **Figure 4-1**, the following European sites within the Zol are to be assessed for LSE:
- Dogger Bank SAC.
103. Dogger Bank SAC is designated for the Annex I habitat Sandbanks which are slightly covered by sea water all the time.



Legend:

- ANS AoS
- ANS AoS 2km Buffer
- Special Area of Conservation (SAC)

Source: © Haskoning UK Ltd, 2025. © JNCC, 2025.
© OpenStreetMap (and) contributors, CC-BY-SA

Project:
Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
ANS Areas of Search Zol and sites designated for Annex I habitats taken forward for further assessment

Figure: 4-1 **Drawing No:** PC6250-HAS-XX-OF-DR-GS-0045

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/10/2025	JH	PT	A3	1:1,250,000
02	23/01/2026	JH	PT	A3	1:1,250,000

Co-ordinate system: WGS 1984 UTM Zone 31N

The bottom right corner features the logos for SSE Renewables and Equinor.

4.1.4 Pathways for LSE

104. Within the AoS Zol (see **Figure 4-1** and **Section 3.3**), construction activities (see **Section 2.4**) would cause indirect disturbance through the elevation of suspended sediment (Joint Nature Conservation Committee (JNCC), 2022b).
105. The operation of the ANS has the potential to create long term effects through the loss of existing habitat and introduction of new substrate, such as rock or concrete mattresses used as foundation scour protection as well as the foundation. However, given the AoS falls outside of the Dogger Bank SAC, these effects would not adversely effect any designated features of the SAC. There would be intermittent disturbance through the elevation of suspended sediment (e.g. from scour or from maintenance activities) which could result in indirect effects on the Dogger Bank SAC.
106. Decommissioning effects will be primarily caused by the removal of structure from the seabed. Decommissioning would be expected to cause similar effects to those identified during construction, with the magnitude of those effects comparable to or less than the construction and operation phases.
107. The potential effects of the ANS on offshore habitats are identified and shown in **Table 4.1** and considered in the following sub-sections.

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Table 4.1 Potential effects identified for Annex I habitats to be considered at the Screening Stage

Potential effect	Potential pressure as described in JNCC (JNCC, 2022b)	Screening conclusion		
		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)	x	x	x
Long term habitat loss	Physical change (to another seabed type) Physical change (to another sediment type)	x	✓	x
	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	x	x	x
	Transition elements & organo-metal (e.g. TBT) contamination	x	x	x

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Potential effect	Potential pressure as described in JNCC (JNCC, 2022b)	Screening conclusion		
		Construction	Operation and Maintenance	Decommissioning
Pollution events resulting from the accidental release of pollutants	Hydrocarbon & PAH contamination	✓	✓	✓
	Transition elements & organo-metal (e.g. TBT) contamination	✓	✓	✓
	Synthetic compound contamination	✓	✓	✓
	Introduction of other substances (solid, liquid or gas)	✓	✓	✓
Underwater noise and vibration	Underwater noise changes Vibration	✓	x	✓
Introduction of marine Invasive Non-Native Species (INNS) from vessel traffic	Introduction or spread of INNS	✓	✓	✓
Colonisation of introduced substrate	Introduction or spread of INNS	x	✓	x
Changes to longshore sediment processes	Water flow (tidal current) changes, including sediment transport considerations	✓	✓	x
In-combination effects	N/A	✓	✓	✓
Transboundary effects	N/A	x	x	x

4.1.4.1 Potential Effects during Construction

108. The potential effects during construction are based on the standardised pressure names outlined in JNCC's Dogger Bank MPA Conservation Advice (JNCC, 2022b).
109. **Table 4.1** presents the potential construction-phase effects on Annex I habitats and associated species that have been considered for LSE assessment explicitly related to the Dogger Bank SAC. It is noted that no LSE has been concluded for effects that result in direct disturbance (such as temporary physical disturbance / physical disturbance and long term habitat loss (see **Section 4.1.3.3**).
110. The potential construction-phase effects on Annex I habitats and associated species that have been considered for LSE assessment are set out in **Table 4.1** and have been screened below in **Section 4.1.4.1.1** to **Section 4.1.4.1.8**.

4.1.4.1.1 Temporary Physical Disturbance / Physical Disturbance

111. Given that the ANS zones are all outside of designated areas for Annex I Habitats there is no potential from direct effects relating to temporary physical disturbance / physical disturbance. Therefore, it is considered that there is no pathway for LSE to occur and as a result, it is proposed that this impact is screened out of the HRA for further consideration.

4.1.4.1.2 Increased Suspended Sediment Concentrations (SSC)

112. Installation of the ANS foundation could lead to the suspension of sediments, which in turn could be deposited in another location within the Zol. 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 for the assessment of effects.

4.1.4.1.3 Remobilisation of Contaminated Sediments

113. Contaminated sediment effects have been screened out due to the absence of any exceedance of the Cefas Action Level 1 in the surveys undertaken to date (see **ANS PEIR Chapter 8 Marine Water and Sediment Quality**), therefore no source for these potential effects would be present.

4.1.4.1.4 Pollution Events Resulting from the Accidental Release of Pollutants

114. The accidental release of pollutants could result in an increase in contaminants in the water column and subsequently on the seabed within the Zol. As such, the pressure of pollution events resulting from the accidental release of pollutants has been screened in for the assessment of effects.

4.1.4.1.5 Underwater Noise Changes and Vibration

115. Underwater noise changes and vibration through construction activities could have an 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.
116. 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 is screened in for the assessment of effects.

4.1.4.1.6 Introduction of Marine INNS from Vessel Traffic

117. The introduction of marine INNS and vessels relating to the ANS from locations outside of the project area could lead to the introduction or spread of INNS within the Zol. As such, the pressure of the introduction or spread of INNS has been screened in for the assessment of effects.

4.1.4.1.7 Changes to Longshore Sediment Processes

118. During construction, there is potential for changes to longshore sediment processes due to seabed preparation (levelling) for foundations (and associated scour protection). However, given only one foundation is to be installed and the ANS zones fall outside of sites designated for Annex I Habitats, the likelihood of LSE is considered to be minimal. Therefore, it is proposed to screen this effect out of the assessment.

4.1.4.1.8 In-Combination Effects

119. All construction effects screened in will have an indirect effect on the Dogger Bank SAC in relation to A2/3, considering the zone is outside of the SAC. These effects (see **Table 4.1**) will be assessed in-combination with other projects that have a similar impact on the SAC.

4.1.4.2 Potential Effects during Operation and Maintenance

120. The potential effects during O&M 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 O&M considered for LSE assessment are set out in **Table 4.1** and described below in further detail in **Section 4.1.4.2.1** to **Section 4.1.4.2.8**.

4.1.4.2.1 Temporary Physical Disturbance / Physical Disturbance

121. As noted in **Section 4.1.4.1**, given that the AoS are all outside of designated areas for Annex I Habitats there is no potential from direct effects relating to temporary physical disturbance / physical disturbance. Therefore, it is considered that there is no pathway for LSE to occur and it is proposed that this impact is screened out of the assessment.

4.1.4.2.2 Long Term Habitat Loss

122. Given that the AoS are all outside of designated areas for Annex I Habitats there is no potential from direct effects relating to long term habitat loss. Natural England noted their concern for 'ecological halo effects' in their response to the DBD Project PEIR. The Project considers the evidence base for this potential effect to be limited, however such evidence as there is suggests that any such effect would be highly localised around the ANS footprint. Given that only one structure is being deployed and the AoS are all outside of sites designated for Annex I Habitats, this is not deemed to be significant. It is therefore proposed that this impact is to be screened out of the assessment.

4.1.4.2.3 Increased Suspended Sediment Concentrations (SSC)

123. There is potential for sediment to be disturbed during maintenance activities for the ANS. Such activities could in turn result in heavy / light smothering of the seabed. Although the majority of increases in suspended sediments would be limited to the immediate vicinity of disturbance, a potential pathway for LSE could not be ruled out given the distance of the closest AoS (A2/3) from the Dogger Bank SAC is 20m. As such, the pressures of smothering and siltation rate changes (heavy / light) which are associated with increased SSCs have a potential pathway for LSE and therefore have been screened in for further consideration.

4.1.4.2.4 Remobilisation of Contaminated Sediments

124. As noted in **Section 4.1.4.1.3**, contaminated sediment effects have been screened out due to no contaminant levels being exceeded in site specific surveys (see **ANS PEIR Chapter 8 Marine Water and Sediment Quality**), therefore no source for these potential effects would be present.

4.1.4.2.5 Pollution Events Resulting from the Accidental Release of Pollutants

125. The information presented in **Section 4.1.4.1.4** would be the same for this effect. Therefore, the pressure of pollution events resulting from the accidental release of pollutants has been screened in for the assessment of effects.

4.1.4.2.6 Introduction of Marine INNS from Vessel Traffic

126. The introduction of marine INNS and O&M vessels relating to the ANS 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 for the assessment of effects.

4.1.4.2.7 Colonisation of Introduced Substrate

127. The sub-sea structures are expected to be colonised by a range of species leading to a localised increase in biodiversity. The presence of the structures would also provide habitat for mobile species and serve as a refuge for fish. This represents a change from the baseline ecology. Overall, the area available for colonisation would be low and to date, there is no evidence of significant changes of the seabed beyond the immediate vicinity of the foundation structures of wind farms (Dogger Bank South, 2025). As set out in **Section 4.1.4.2.2**, the Project does not consider there to be the potential for significant ecological halo effects. Such evidence as there is suggests that any such effect would be highly localised around the single ANS footprint. It is therefore proposed that this impact is to be screened out of the assessment.

4.1.4.2.8 Changes to Longshore Sediment Processes

128. Previous studies have concluded that minimal impacts can be expected on the prevailing longshore sediment processes, provided that the foundations are adequately spaced (Cooper and Beiboer, 2022). Given there is only one foundation for the ANS, impacts on sediment transport are likely to be localised to the area immediately surrounding the individual foundation in the form of seabed scour where the sediment is soft enough to be mobilised.
129. Therefore, it is not expected for there to be a pathway to cause LSE on designated sites for Annex I Habitats given the distances from the ANS to these sites. It is therefore proposed that this impact is to be screened out of the HRA for further consideration.

4.1.4.3 Potential Effects during Decommissioning

130. 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 set out in **Table 4.1**.
131. Decommissioning may require the removal of the foundation causing potential disturbance and displacement of impacts associated with suspended sediment and smothering and siltation rate changes. Effects caused during decommissioning would be similar to or less than those during the construction phase.

4.1.4.4 In-combination Effects

132. In-combination effects will consider the indirect effects of the ANS infrastructure in conjunction with potential effects of other plans and projects on Annex I habitats. This is noting the distance of the ANS from the Dogger Bank SAC, which falls outside the SAC (20m at the closest distance).
133. All offshore wind farms under planning or under construction within the Dogger Bank SAC (DBA, DBB, DBC, Dogger Bank South, and Sofia as well as the DBD Project) will be considered in the in-combination assessment, due to the potential in-combination effects upon the Dogger Bank SAC. The in-combination effects to be assessed are those that have been screened in as relevant to the ANS, which is increased SSCs, underwater noise and vibration, and introduction of INNS.
134. Projects that are operational are considered baseline and in-combination effects arising are considered in **Section 4.1.4.3**. 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.

4.1.5 Determination of LSE for Annex I Habitats

135. The designated sites screened in for further assessment can be seen in **Figure 4-1** and are provided in **Table 4.2**.
136. 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.

Table 4.2 Screening of European Sites designated for Annex I habitats

European Site	Annex I Habitat Features	Distance from the AoS	Screened In?	Rationale
Dogger Bank SAC (Site Code: UK0030352)	Sandbanks which are slightly covered by seawater all the time	Adjacent to A2/3	✓	The site is 20m from the A2/3 AoS.

137. As A2/3 is located approximately 20m from the Dogger Bank SAC, there is potential for indirect impacts on its designated feature, ‘Sandbanks which are slightly covered by sea water all the time’ during construction of the Project.
138. The A5 AoS is located approximately 7km from the Dogger Bank SAC, with the A8 AoS being >60km from the SAC. Both of these AoS are therefore screened out from further assessment due to no LSE being anticipated at these distances on the features of the Dogger Bank SAC.

4.1.5.1 Offshore In-combination and Transboundary Effects

139. All offshore wind farms under planning or under construction within the Dogger Bank SAC (DBA, DBB, DBC, Dogger Bank South (DBS), and Sofia) will be considered in the in-combination assessment for the A2/3 AoS, due to the potential in-combination effects upon the Dogger Bank SAC.
140. There is no potential for transboundary effects on Annex I benthic habitats, as the closest ANS construction, O&M, and decommissioning activities at A2/3 are located more than 42km from the European Economic Zone (EEZ) border.
141. It is therefore proposed that transboundary impacts are screened out and do not require assessment in Stage 2.

4.1.6 Summary of Screening for Sites Designated for Annex I Habitats

142. Relevant effects listed for each individual site are presented in **Table 4.3**.

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Table 4.3 The effect pathways screened in for potential LSE for Annex I designated features

Designated site	Relevant Annex I Feature	Closest distance to an AoS	Effect pathways	C	O&M	D	Rationale
Dogger Bank SAC	Sandbanks which are slightly covered by seawater all the time	Within 20m of A2/3 – screened in. 7km from A5 – screened out. >60km from A8 – screened out.	Increased SSCs	✓	✓	✓	The SAC is in close proximity to the A2/3 AoS.
			Pollution events resulting from the accidental release of pollutants	✓	✓	✓	
			Underwater noise and vibration changes	✓	x	✓	
			Introduction of marine INNS from vessel traffic	✓	✓	✓	
			In-combination effects	✓	✓	✓	

4.2 Stage 2 Assessment of Effects

4.2.1 Embedded Mitigation

143. This section outlines the embedded mitigation relevant to the Annex I Marine habitats assessment, which has been incorporated into the design of the ANS (Table 4.4).

Table 4.4 Embedded mitigation

Parameter	ID	Commitments	How the Commitment Will be Secured?
Pollution events resulting from the accidental release of pollutants. Introduction of marine INNS from vessel traffic	CO115	A Project Environmental Management Plan (PEMP) will be provided in accordance with the Outline PEMP.	DML Condition - Project Environmental Management Plan

4.2.2 Worst Case Scenario

144. Table 4.5 outlines the worst-case scenario for effects which are of relevance to this assessment which will be subject to review if further assessment is necessary for the DCO submission.

Table 4.5 Worst-case scenario for potential effects on Annex I marine habitats

Impact	Worst-case scenario
Construction phase	
Increased suspended sediment concentrations (SSC)	<ul style="list-style-type: none"> Seabed preparation volume: 39,820m³. Volume of drill arising (if required): 2,545m³. Total SSCs from construction activities: 42,365m³.
Pollution events resulting from the accidental release of pollutants	<p>Vessels:</p> <ul style="list-style-type: none"> Site preparation – survey vessel, dredger, boulder clearance vessel, and guard vessel(s); Foundation and topside installation – support vessel, crew transfer vessel (CTV), rock placement vessel, installation vessel (jack-up vessel (JUV) or heavy lift vessel (HLV)), and guard vessel(s); and ANS commissioning – CTV, installation vessel (JUV / HLV), and guard vessel.

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Impact	Worst-case scenario
	Maximum on site at any one time: <ul style="list-style-type: none"> • 5 vessels. Maximum number of trips throughout construction: <ul style="list-style-type: none"> • 40 trips.
Underwater noise and vibration	Maximum hammer energy: 6,000kJ
Introduction of marine INNS from vessel traffic	See vessel traffic scenarios in “ <i>pollution events resulting from the accidental release of pollutant</i> ” above that relate to this.

Operation and Maintenance phase

Increased suspended sediment concentrations (SSC)	There is not expected to be any seabed preparation required during the O&M phase, with the main events causing increased SSCs coming from vessel anchoring during maintenance activities. Therefore, it is expected that the volume of SSCs will be significantly lower than that of the construction phase throughout the O&M phase overall.
Pollution events resulting from the accidental release of pollutants	<ul style="list-style-type: none"> • Operational lifetime of ANS = 37 years; • Other maintenance activities would require vessels. See below for more details on vessel presence;
Introduction of marine INNS from vessel traffic	<ul style="list-style-type: none"> • Maximum of O&M vessels at site at any one time: 5; and • Vessel types: JUV / HLV / CTV / support vessels / survey vessel.

Decommissioning

Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of smaller magnitude. Decommissioning may require the removal of the foundation, however, there will be no piling during decommissioning.

4.2.3 Dogger Bank SAC

4.2.3.1 Site Description

4.2.3.1.1 Qualifying Features

145. Dogger Bank SAC has been designated for Annex I habitat: ‘Sandbanks which are slightly covered by seawater all the time’. The SAC is 12,331km² and the entirety of the designated site is covered by Annex I habitat. The sediment is characterised predominantly by gravelly sand and sand and possesses no vegetation. The SAC, at its crest, sits 20m below the surface and gradually extends in to deeper water (Diesing *et al.*, 2009; JNCC, 2011).

146. Characteristic communities of the SAC are not explicitly defined by JNCC (2022). However, key macrofaunal communities and fish have been identified. In terms of macrofaunal communities, evidence from surveys in 2008 and 2014 (Diesing *et al.*, 2009; Eggleton *et al.*, 2017) supported the existence of the four related biological communities previously identified by Wieking and Kröncke (2003):

- the “Bank” community was the predominant community and straddled across the bank from north to southeast. It is characterised by a *Bathyporeia Tellina* community of amphipods and small bivalves;
- the “North-Eastern” community had lower densities but the highest number of species. The tube-inhabiting velvet anemone *Cerianthus lloydii* and the small sea urchin *Echinocyamus pusillus* occurred at high densities in the shallower part. The brittlestar *Amphiura filiformis*, the bivalve *Abra prismatica* and the polychaete *Scoloplos armiger* were more common in the deeper part;
- the “South-West Patch” community was a sub-group of the Bank community in the shallow western side. The amphipod *Bathyporeia elegans* is the most abundant species with the bivalve *Donax vittatus* and the polychaete *Nephtys cirrosa* at their highest abundances in this sub area of the Bank community; and
- the “Southern Amphiura” community in the deeper southern part of the bank. The polychaete *Spiophanes bombyx* was abundant, but here the brittlestar *Amphiura filiformis* and its commensal bivalve *Kurtiella bidentata* dominated in numbers.

4.2.3.1.2 Conservation Objectives

147. The conservation objectives set for ‘Sandbanks which are slightly covered by sea water all the time’ of Dogger Bank SAC are (JNCC, 2022):

- For the feature to be in favourable condition thus ensuring site integrity in the long term and contribution to Favourable Conservation Status of Annex I Sandbanks which are slightly covered by seawater all the time.

148. 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.

4.2.3.1.3 Condition Assessment

149. The most recent condition assessment determined that the Annex I sandbank feature of the Dogger Bank SAC is currently in unfavourable condition (JNCC, 2022). A restore objective is advised for two of the above conservation objective attributes:

- The extent and distribution of the qualifying habitat in the site; and
- The structure and function of the qualifying habitat in the site.

4.2.3.1.3.1 *Extent, distribution and structure*

150. With regard to ‘physical change to another seabed/sediment type’, the restore objective for ‘Attribute: Extent and Distribution’ in the Supplementary Advice on Conservation Objectives (SACO) for Dogger Bank Special Area of Conservation (JNCC, 2022) states that: “*JNCC understands that the site continues to be subjected to activities that have resulted in a change to the extent and distribution of the feature within the site, noting bottom trawling no longer occurs within the site. Installation and/or removal of infrastructure will have a continuing effect on extent and distribution. As such, JNCC continues to advise a restore objective which is based on expert judgement; specifically, our understanding of the feature’s sensitivity to pressures which can be exerted by ongoing activities i.e. offshore wind farms, cabling and oil and gas industry activities....*

...These industries [offshore wind farms, cabling and oil and gas industry] have placed infrastructure i.e. gas platforms, pipelines, wind turbines, cables and protective materials (e.g. rock dump and mattresses), in or on the seabed throughout the site; although it is not possible to quantify the amount of material introduced.... Whilst JNCC does not consider it likely that the human activities taking place within the site have the potential to permanently impact on the large scale topography of the sandbank feature, JNCC continues to advise that the extent of the sandbank feature in terms of its sedimentary composition and biological assemblages has been reduced and it continues to be reduced by ongoing activities; albeit by an unquantifiable amount.”

151. The restore objective for ‘Attribute: Structure and Function’ (JNCC, 2022) states that: “*JNCC understands that the site continues to be subjected to some activities that have resulted in a change to the finer topography, sediment composition and distribution, and characteristic communities of the feature within the site, noting bottom trawling no longer occurs within the site....As such, JNCC continues to advise a restore objective, which is based on expert judgement; specifically, our understanding of the feature’s sensitivity to pressures which can be exerted by ongoing activities i.e. offshore wind farms, cabling and oil and gas industry activities.”*

152. JNCC (2022) states that with regard to the physical structure the restore objectives relates to finer scale topography and sediment composition and distribution. With regard to biological structure the restore objective relates to the key and influential species and characteristic communities present.
153. Additionally, JNCC state that it is not possible to quantify the amount of material introduced (and does not quantify the extent of historic fishing activity) and therefore by extension it is also not possible from the above statements to understand at what magnitude/footprint the effects on Extent and Distribution and Structure and Function led to unfavourable condition. It should be noted though that, referring to the original draft conservation objectives for the candidate SAC (JNCC, 2012 cited in DECC, 2015) the sandbank feature was already considered to be in unfavourable condition (i.e. previous to any offshore wind farm development).
154. The Dogger Bank SAC (Specified Area) Bottom Towed Fishing Gear Byelaw 2022 is in place came into force on the 13th June 2022. This byelaw was enacted to protect the entirety of the Dogger Bank SAC from the impacts of bottom-towed fishing gear. Even more recently, in January 2024 Defra announced that the UK government had decided to prohibit the fishing of sandeel within English waters of ICES Area 4 (North Sea) effective from March 2024 (Defra, 2024). This includes the Dogger Bank SAC. These measures will aid in the recovery of the extent, distribution and structure of the Dogger Bank SAC.

4.2.3.1.3.2 *Function*

155. The SACO (JNCC, 2002) lists three ecosystem services which “may be provided by the sandbank feature”, namely;
- Nutrition – the site provides a feeding ground where prey is made available for a variety of species of commercial importance;
 - Bird and whale watching – the site provides some supporting function provision for wider marine bird and mammal populations; and
 - Climate regulation – the range of sedimentary habitats and associated communities in the site perform ecological processes common to sandbanks such as deposition and burial of carbon in seabed sediments through bioturbation, living biomass and calcification of benthic organisms.

156. The SACO states: “...*there is evidence to indicate that the biological communities within the site would continue to be impacted by activities associated with the oil and gas industry, cabling and historic bottom trawling and historic aggregate dredging. Effects from historic activities, including aggregates and bottom trawling, may continue to impact the carbon storage function of Dogger Bank through their disturbances to subsurface peat (Diesing et al., 2009). The significance of any impact on the health of the sandbank feature and/or its provision of ecosystem services to the wider marine environment is unclear, but it is likely impacted. A restore objective continues to be advised for function within the site based on impacts to the characterising communities and peat deposits from ongoing and historical activities i.e., wind farm, demersal fishing, aggregates, cabling and oil and gas industry activities.*”
157. Practical advice from the SACO (JNCC, 2022) is that: “*Activities must look to minimise, as far as is practicable, disturbance and changes to the biological communities and the abiotic component of the Dogger Bank to conserve the functions that it provides to the wider marine environment.*”
158. The Applicant notes that although peat deposits are discussed in the SACO (JNCC, 2022) in relation to climate regulation, such deposits are geological (not ecological) features and do not feature within the SAC selection documentation (JNCC, 2011). The geology underlying sandbanks is not considered within the Interpretation Manual of European Union Habitats (EC, 2013).

4.2.4 Assessment of Potential Effects of the Project Alone

4.2.4.1 Increased Suspended Sediment Concentration

4.2.4.1.1 Construction

159. Increased SSC and subsequent sediment deposition will occur as a result of seabed preparation for the installation of the ANS. There is a potential to affect benthic ecology receptors by causing physical damage or injury, blocking feeding apparatus and by smothering sessile species upon redeposition. Construction works will not occur within the Dogger Bank SAC and so do not have the potential to directly affect benthic ecology receptors.
160. **Chapter 9 Benthic Ecology** of the **DBD ANS PEIR** provides details of increased SSC and subsequent sediment deposition, and changes to bedload sediment transport as a result of the Project.
161. The impact of increased SSC has been defined using the pressures identified in **Section 4.2.3**, which are as follows:
- Smothering and siltation rate changes (light);
 - Smothering and siltation rate changes (heavy); and

- Changes in suspended solids (water clarity).
162. **Chapter 7 Marine Physical Processes** of the **DBD ANS PEIR** describes the expected movement of sediment suspended during the construction phase for the ANS.
163. The worst-case volume of sediment contributing to increased SSC is 42,365m³, of which only 39,820m³ arises from seabed preparation, with the remainder a single, discrete drilling event associated with the use of a monopile for the ANS foundation (see **Table 4.5**). This material will predominantly be made up of sand as this comprises the majority of sediments at A2/3. Any mobilised fine material will form a plume which would become affected by tidal currents. It is expected that the maximum predicted deposition resulting from a sediment plume will be 10mm to 50mm in localised areas immediately adjacent to the foundation installation area based on previous project experience in the area.
164. It is expected, as demonstrated in Chapter 8 Marine Physical Processes of the DBD Project PEIR (Dogger Bank D, 2025b), that any suspended sediment deposited on the seabed in the Dogger Bank will become reworked by tidal currents and transported as bedload becoming integrated in the prevailing sediment transport regime with no net change to seabed morphology.
165. JNCC and Natural England (2013) note that communities associated with sandbank habitats are adapted to high levels of sediment disturbance and have a high recoverability due to these habitats high-energy nature (see the biotopes listed in **Section 4.2.3**). Dynamic sand communities experience strong tidal currents and consequently there is high sediment mobility. In turn, infaunal communities are adapted to suspended sediment and deposition, for example, by rapidly re-burying themselves following disturbance.
166. Given the low sensitivity of the biotopes within the SAC (in particular due to their high recoverability and the episodic nature of the effect) it is considered that increased SSC and subsequent deposition would not significantly affect:
- The extent of the sandbank feature in terms of its biological assemblages;
 - The biological structure and function in terms of the key and influential species and characteristic communities present; and
 - The function of the feature within the site.
167. Therefore, there is expected to be **no potential for an AEol** of the Dogger Bank SAC in relation to changes to increased SSC and subsequent deposition from the Project alone.

4.2.4.1.2 Operation and Maintenance

168. Increases in SSC within the water column and subsequent deposition onto the seabed may occur as a result of operational activities. This includes the need for jack-up vessels, and potential scour replacement activities.
169. Each O&M activity would be relatively short-term, and it is likely that the requirements for maintenance would be spread over the lifetime, with suspended sediments becoming rapidly deposited.
170. Effects of increased suspended sediment concentrations have been assessed in **Chapter 7 Marine Physical Processes** of the **DBD ANS PEIR**. The assessment found that the worst-case volumes of sediment released following operation activities are considerably less than in the construction phase.
171. Based on the low sensitivity of benthic communities (see **Section 4.2.4.1.1**) and the effects from SSC causing indistinguishable change to background levels, it can be concluded that there is **no potential for an AEol** of this attribute due to increased SSC and subsequent deposition during the O&M phase.

4.2.4.1.3 Decommissioning

172. A decision regarding the final decommissioning policy is yet to be decided as it is recognised that rules and legislation change over time in line with the best industry practice. The decommissioning methodology and programme would need to be finalised nearer to the end of the lifetime of the ANS to ensure it is in line with the most recent guidance, policy and legislation.
173. Increased SSC effects on the features of the Dogger Bank SAC would be no greater than, and are expected to be less than, those of the construction phase (**Section 4.2.4.1**). Therefore, there is **no potential for an AEol** of the Dogger Bank SAC in relation to increased SSC during decommissioning from the ANS.

4.2.4.2 Pollution Events Resulting from the Accidental Release of Pollutants

174. Any coatings and treatments to be used will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency Pollution Prevention Control Guidelines. A Chemical Risk Assessment (CRA) would be required as set out as part of the Project Environmental Management Plan (PEMP) or similar if this is not the case. The PEMP would be secured via a condition in the deemed Marine Licence of the DCO.

175. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). A PEMP or similar will also be put in place to ensure all works are undertaken in line with best practice for working in the marine environment and inclusive of a Marine Pollution Contingency Plan (MPCP), which will include emergency plans and mitigation for a range of potential marine pollution incidents. Also, best practice measures for the storage, use and disposal of lubricant and chemicals will be undertaken throughout construction, O&M and decommissioning phases.
176. As a result of these embedded mitigation measures and the commitments that would be secured in the PEMP (see Design Commitment CO115 listed in **Appendix C** of the **DBD ANS PEIR**), it is considered that the risk of a spill occurring is low and with the appropriate management measures in place. Should a spill occur, the risk to the marine environment is effectively mitigated. The PEMP will be agreed with the relevant stakeholders prior to the start of construction.
177. It is considered that there is no pathway for LSE to occur and as a result of these mitigation measures. Therefore, there is **no potential for an AEol** of the Dogger Bank SAC in relation to pollution events from the accidental release of pollutants from the construction, O&M and decommissioning of the ANS.

4.2.4.3 Underwater Noise and Vibration

4.2.4.3.1 Construction

178. Underwater noise and vibration will occur, primarily as a result of foundation installation and UXO clearance. Construction works will not occur within the Dogger Bank SAC and so do not have the potential to directly affect benthic ecology receptors. However, the propagation of noise and the nearby nature of the Dogger Bank SAC (20m at closest distance) means that underwater noise and vibration could have an effect.
179. The impact of underwater noise and vibration has been defined using the following pressures identified by JNCC's Advice on Operations (AoO) for the Dogger Bank SAC (JNCC, 2021):
- Underwater noise changes; and
 - Vibration.
180. There is evidence to suggest some benthic species respond to increased levels of underwater noise and vibration (Dannheim *et al.*, 2020). However, studies have been focused on the response of crustaceans and the results of these studies are inconclusive as many found conflicting results (Horridge, 1966; Briffa and Elwood, 2000; Lovell *et al.*, 2005; Dannheim *et al.*, 2020). Dannheim *et al.* (2020) suggest that the effects of noise and vibration is a priority area for future research.

181. However, as detailed within the JNCC AoO (2021) and MarESA (MarLIN, 2026), the biotopes (see **Section 4.2.3**) identified and associated with the features of the SAC are not considered to be sensitive.
182. In line with the JNCC AoO (2021), it is considered that underwater noise and vibration would not significantly affect the biotopes present within the Dogger Bank SAC:
- The extent of the sandbank feature in terms of its biological assemblages;
 - The biological structure and function in terms of the key and influential species and characteristic communities present; and
 - The function of the feature within the site.
183. Therefore, there is **no potential for an AEol** of the Dogger Bank SAC in relation to underwater noise and vibration from the construction of the ANS.

4.2.4.3.2 Decommissioning

184. A decision regarding the final decommissioning policy is yet to be decided as it is recognised that rules and legislation change over time in line with the best industry practice. The decommissioning methodology and programme would need to be finalised nearer to the end of the lifetime of the ANS to ensure it is in line with the most recent guidance, policy and legislation.
185. Underwater noise and vibration effects on the features of the Dogger Bank SAC would be no greater than, and are expected to be less than, those of the construction phase (**Section 4.2.4.3.1**). Therefore, there is **no potential for an AEol** of the SAC in relation to underwater noise and vibration from the ANS.

4.2.4.4 Introduction of Marine INNS from Vessel Traffic

186. The potential risk of spreading or introducing INNS will be mitigated by employing biosecurity measures in accordance with the following relevant regulations and guidance:
- International Convention for the Prevention of Pollution from Ships (MARPOL). The MARPOL sets out appropriate vessel maintenance;
 - The Environmental Damage (Prevention and Remediation (England) (Amendment) Regulations 2019, which set out a 'polluter pays principle' where the operators who cause a risk of significant damage or cause significant damage to land, water or biodiversity will have the responsibility to prevent damage occurring, or if the damage does occur will have the duty to reinstate the environment to the original condition; and
 - The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention 2004), which provide global regulations to control the transfer of potentially invasive species.

187. These commitments would be secured in the PEMP (see Design Commitment CO115 listed in **Appendix C** of the **DBD ANS PEIR**) via a condition in the deemed Marine Licence of the DCO. The PEMP will be agreed with relevant stakeholders prior to the start of construction.
188. With the appropriate mitigations in place through commitments secured in the PEMP, it is not anticipated that INNS will have a pathway for LSE to occur. Taking the above into account, it is considered that there would be **no pathway** for any significant effects upon Annex I Habitats to occur during all stages of the ANS.

4.2.4.5 Assessment of Potential Effects of the Project In-Combination with Other Plans and Projects

189. The in-combination effects to be assessed are those that have been screened in as relevant to the ANS, namely: increased SSCs, pollution events resulting from the accidental release of pollutants, underwater noise and vibration, and the introduction of INNS.
190. The plans or projects listed in **Table 4.6** have been identified within the Dogger Bank SAC and are assessed to determine whether they could contribute to an AEoI in-combination with the ANS.

Table 4.6 Potential for AEoI on the Dogger Bank SAC in-combination with other plans and projects

Project	Distance from A2/3 (km)	Potential for AEoI In-Combination with ANS?	Rationale
DBA	45	No	These projects will be fully operational prior to ANS construction taking place. Due to the temporary and localised nature of the construction impacts of the ANS, there is no potential for an AEoI in-combination with these projects. Potential operational impacts of the ANS will also not contribute in-combination effects given the small scale of the ANS development and respective distances to each project
DBB	15		
DBC	31		
DBD	36	No	The construction period of the DBD Project may overlap with the construction of the ANS. However, due to the temporary and localised nature (due to the negligible volume of sediment to be disturbed) of the construction impacts of the ANS, there is no potential for an AEoI in-combination with this project. Potential operational impacts of the ANS will also not contribute in-combination effects given the small scale of the ANS development and respective distances to each project.

Project	Distance from A2/3 (km)	Potential for AEol In-Combination with ANS?	Rationale
Sofia	20	No	<p>This project will be fully operational prior to ANS construction taking place. Due to the temporary and localised nature of the construction impacts of the ANS, there is no potential for an AEol in-combination with this project.</p> <p>Potential operational impacts of the ANS will also not contribute in-combination effects given the small scale of the ANS development and respective distances to each project</p>
DBS	53	No	<p>The construction period of this project may overlap with the construction of the ANS. However, due to the temporary and localised nature of the construction impacts of the ANS, there is no potential for an AEol in-combination with this project.</p> <p>Potential operational impacts of the ANS will also not contribute in-combination effects given the small scale of the ANS development and respective distances to each project</p>

191. Given the highly limited scale of works for installation and operation of a single ANS, and the temporary and localised nature of any effects, it is considered that there is no meaningful potential for the ANS works to contribute to an in-combination effect with other plans or projects.
192. Taking the above into account, it is considered that there would be **no pathway** for any significant impacts upon Annex I Habitats.

4.3 Conclusions and Next Steps

193. During all phases of the ANS, there is expected to be **no potential for an AEol** of the Annex I sandbank habitat, either by the ANS alone or in-combination. Therefore, an AEol of the Dogger Bank SAC is proposed to be ruled out.

5 European Sites Designated for Annex II Migratory Fish

5.1 Stage 1 Screening

5.1.1 Approach to Screening

194. Direct or indirect effects on Annex II migratory fish species may arise from the activities relating to the construction, operation and maintenance, or decommissioning of the ANS.
195. Potential effects include changes in suspended sediment, loss of habitat, underwater noise impacts, INNS, and accidental release of pollutants.
196. As detailed in **Section 3.3**, this stepwise screening exercise considers the pathways for LSE both alone and in-combination during each phase of the ANS. The potential for LSE on designated sites within the Zol of the ANS is then considered.
197. This HRA screening exercise considers sites which meet the following criteria:
 - An AoS directly overlaps a site with interest features including an Annex II migratory fish species;
 - An AoS and a site with an Annex II fish feature are at a distance of less than 40km (the worst-case Zol based on underwater noise impacts from pile driving a single monopile). At this distance there could be a noise impact (e.g. TTS or disturbance) on the features of the site; and
 - Expert judgement that there is a likelihood that a foraging area or a migratory route will occur within the ANS with enough frequency to consider there to be meaningful connectivity between an AoS and a site.
198. 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.
199. Given that there are multiple AoS, with significant distances between them (see **Figure 2-1**), the screening for LSE may be applied at the level of individual AoS, where relevant.

5.1.2 Pathways for LSE

200. **Table 5.1** details the potential effect pathways for LSE in relation to the construction, operation and maintenance and decommissioning phases of the Project. The effects, where possible, are identified 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). Identified effects are those where theoretically a pathway for effect exists from the Project to an Annex II fish feature of a site.

Table 5.1 Potential effects identified for Annex II migratory fish to be considered at the Screening Stage

Potential Effect	Construction	Operation and Maintenance	Decommissioning
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)	✓	✓	✓
Underwater Noise	✓	X	X
Introduction or Spread of Invasive Non-Native Species (INNS)	✓	✓	X
Introduction of other substances (such as pollutants or sediments)	✓	✓	✓

5.1.2.1 Potential Effects during Construction

201. The potential effect pathways on Annex II migratory fish during operation and maintenance that are considered for the potential to give rise to LSE are:

- 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);
- Underwater Noise;
- Introduction or Spread of Invasive Non-Native Species (INNS); and

- Introduction of other substances (such as pollutants or sediments)

5.1.2.1.1 Changes in suspended solids (water clarity)

202. Foundation installation work for the ANS (including seabed preparation) will physically disturb the seabed. This in turn will cause the suspension of sediment into the water column. **The relevant works include seabed sweeping, dredging, interaction of jack up vessel feet with the seabed, lowering the foundation onto the seabed, and physical disturbance associated with piling.** Given the scope and scale of installation works associated with a single ANS structure, the magnitude of increased suspended solids will be highly limited and temporary. At all AoS, the sediments contain low levels of fine sediment (see **Section 4.1.3.3** for further detail of sediment dispersion and suspension Zol) and therefore a maximum deposition distance of 2km as per Gooding *et al.* (2012) is considered appropriate for a screening Zol for possible suspension impacts. There is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.1.2 Physical change (to another seabed or sediment type)

203. Foundation installation work for the ANS (including seabed preparation) will physically disturb the seabed. **The relevant works include seabed sweeping, dredging, interaction of jack up vessel feet with the seabed, lowering the foundation onto the seabed, and physical disturbance associated with piling.** Given the scope and scale of installation works associated with a single ANS structure, the magnitude of physical change (to another seabed or sediment type) will be highly limited and temporary. There is only a pathway for effect for sites that overlap with an AoS.

5.1.2.1.3 Smothering and siltation rate changes (Heavy)

204. Any sediment suspended into the water column due to construction activities will be re-deposited on the seabed over time. Sediment deposition can alter seabed habitats or smother certain species that are immobile on the seabed. Given the scope and scale of installation works associated with a single ANS structure, the magnitude of smothering and siltation rate changes (Heavy) will be highly limited and temporary. With a maximum sediment dispersion Zol of 2km, there is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.1.4 Smothering and siltation rate changes (Light)

205. Any sediment suspended into the water column due to construction activities will be re-deposited on the seabed over time. Sediment deposition can alter seabed habitats or smother certain species that are immobile on the seabed. Given the scope and scale of installation works associated with a single ANS structure, the magnitude of smothering and siltation rate changes (Light) will be highly limited and temporary. With a maximum sediment dispersion Zol of 2km, there is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.1.5 Underwater Noise

206. Underwater noise generated by piling a monopile for the ANS has the potential to displace fish from supporting habitats or migratory routes by acting as a barrier. Underwater noise modelling undertaken presented in Chapter 11 Fish and Shellfish Ecology of the DBD Project PEIR (Dogger Bank D, 2025b) shows that the maximum effect range from worst-case piling noise for a monopile is 33km (based on cumulative SEL causing temporary threshold shift (TTS) in hearing sensitivity for a stationary fish receptor).
207. 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 ANS, a separate Marine Licence Application process will be undertaken which will provide a full assessment of effects on fish (and will include site-specific underwater noise modelling). Given that a single ANS is being installed, it is considered unlikely that UXO clearance will be required. Detailed pre-construction surveys will identify the presence of any potential UXO, and the Project's preference is to microsite around these to avoid the need for any clearance activity. **UXO clearance for the ANS will not be considered further in this report.**

5.1.2.1.6 Introduction or Spread of Invasive Non-Native Species (INNS)

208. The introduction of marine INNS and vessels relating to the ANS construction 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 for the determination of LSE.

5.1.2.1.7 Introduction of other substances (such as pollutants or sediments)

209. The accidental release of pollutants could result in an increase in contaminants in the water column and subsequently on the seabed within the ZoI. As such, the pressure of pollution events resulting from the accidental release of pollutants has been screened in for the determination of LSE.

5.1.2.2 Potential Effects during Operation and Maintenance

210. The potential effect pathways on Annex II migratory fish during operation and maintenance that are considered for the potential to give rise to LSE are:
- 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);
 - Introduction or Spread of Invasive Non-Native Species (INNS); and

- Introduction of other substances (such as pollutants or sediments).

5.1.2.2.1 Changes in suspended solids (water clarity)

211. Preventative and corrective maintenance of the ANS foundation and associated scour may cause seabed sediments to be suspended into the water column. Given the scope of maintenance works associated with a single ANS structure, the magnitude of increased suspended solids will be highly limited and temporary. With a maximum sediment dispersion Zol of 2km, there is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.2.2 Physical change (to another seabed or sediment type)

212. Preventative and corrective maintenance of the ANS foundation and associated scour may interact directly with the seabed, causes temporary disturbance and physical changes. Given the scope of maintenance works associated with a single ANS structure, the magnitude of physical change (to another seabed or sediment type) will be highly limited and temporary. There is only a pathway for effect for sites that overlap an AoS.

5.1.2.2.3 Smothering and siltation rate changes (Heavy)

213. Preventative and corrective maintenance of the ANS foundation and associated scour may cause seabed sediments to be suspended into the water column, which will be re-deposited on the seabed over time. Sediment deposition can alter seabed habitats or smother certain species that are immobile on the seabed. Given the scope of maintenance works associated with a single ANS structure, the magnitude of smothering and siltation rate changes (Heavy) will be highly limited and temporary. With a maximum sediment dispersion Zol of 2km, there is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.2.4 Smothering and siltation rate changes (Light)

214. Preventative and corrective maintenance of the ANS foundation and associated scour may cause seabed sediments to be suspended into the water column, which will be re-deposited on the seabed over time. Sediment deposition can alter seabed habitats or smother certain species that are immobile on the seabed. Given the scope of maintenance works associated with a single ANS structure, the magnitude of smothering and siltation rate changes (Light) will be highly limited and temporary. With a maximum sediment dispersion Zol of 2km, there is no pathway for effect for sites that are beyond 2km from the AoS.

5.1.2.2.5 Introduction or Spread of Invasive Non-Native Species (INNS)

215. The introduction of marine INNS and vessels relating to the O&M phase of the ANS from locations outside of the project area could lead to the introduction or spread of INNS within the Zol. As such, the pressure of the introduction or spread of INNS has been screened in for the determination of LSE.

5.1.2.2.6 Introduction of other substances (such as pollutants or sediments)

216. The accidental release of pollutants could result in an increase in contaminants in the water column and subsequently on the seabed within the ZoI. As such, the pressure of pollution events resulting from the accidental release of pollutants has been screened in for the determination of LSE.

5.1.2.3 Potential Effects during Decommissioning

217. 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:

- 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);
- Introduction or Spread of Invasive Non-Native Species (INNS); and
- Introduction of other substances (such as pollutants or sediments).

218. Decommissioning may require the removal of the ANS foundation structure 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.

219. Potential effects during decommissioning would be similar to those during the construction phase, with the exception that the underwater noise produced would be greatly reduced.

5.1.3 Identification of Sites and Features

5.1.3.1 Sites Directly Overlapping with the AoS Boundaries

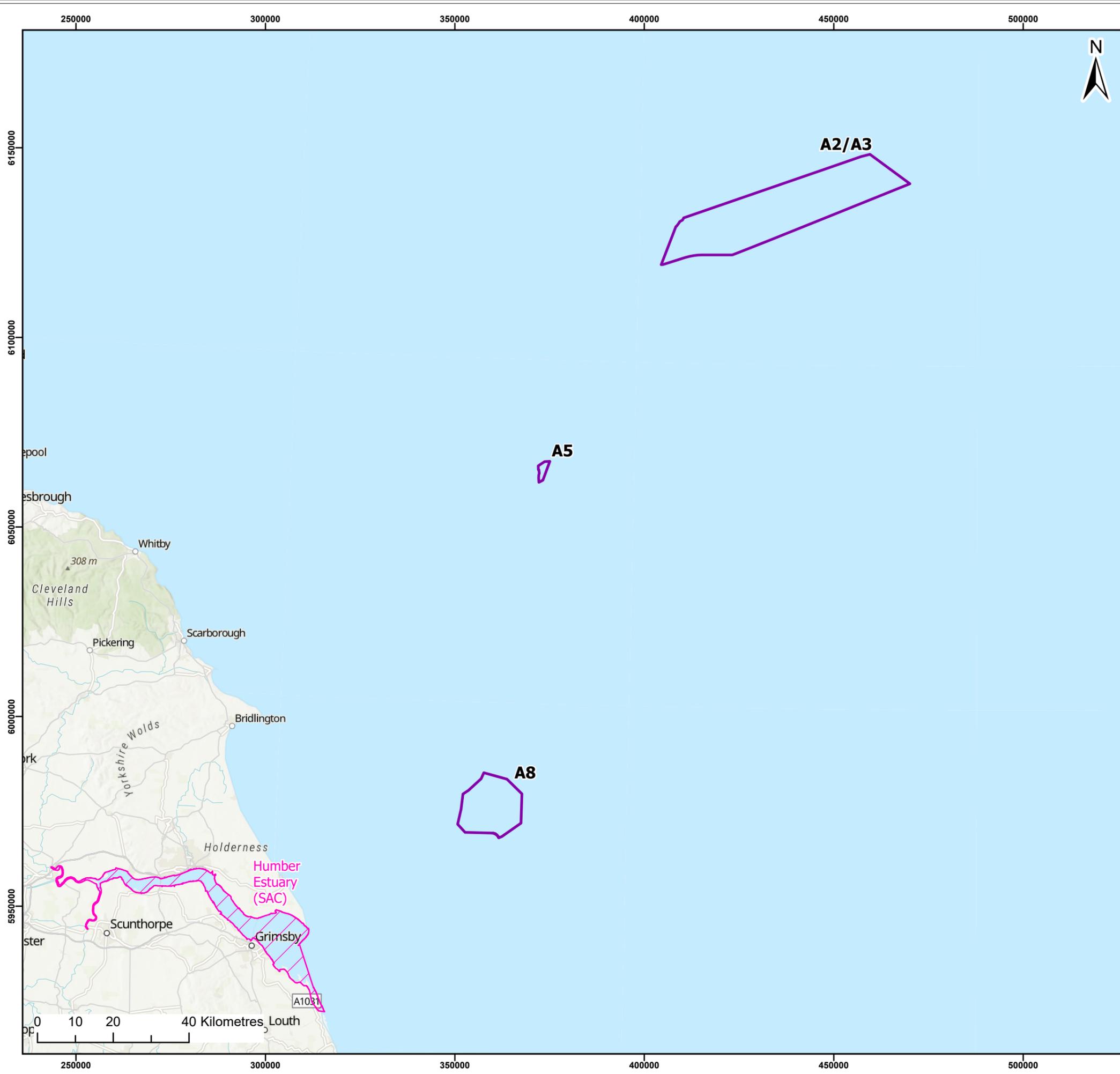
220. European sites which overlap with the boundaries of the AoS will be taken forward for consideration of LSE. There are no sites that meet this criterion (see **Figure 5-1**).

5.1.3.2 Sites within the ZoI of the Project's Effects

221. European sites within the potential ZoI of the ANS, which is 40km will be taken forward for consideration of LSE. There are no sites that meet this criterion.

5.1.3.3 Sites containing species whose range overlaps with the Project's effects

222. Given the long distance at-sea migrations of diadromous fish species, there is theoretically a potential connectivity between most UK east coast SACs designated for Annex II fish species and areas of development within the North Sea. Given that no sites designated for Annex II fish species are within the ZoI of the AoS, expert judgement has been applied to determine whether any UK SAC has the potential to have meaningful connectivity between its Annex II fish features and the AoS. The closest SAC to the AoS is the Humber Estuary SAC, at a distance of 48km for A8. The Humber Estuary SAC has sea lamprey *Petromyzon marinus* and river lamprey *Lampetra fluviatilis* as qualifying features, but these species are not a primary reason for site selection.



Legend:
 ANS AoS
 Special Area of Conservation (SAC)

Source: © Haskoning UK Ltd, 2025. © Natural England, 2025.
 © OpenStreetMap (and) contributors, CC-BY-SA

Project:
 Dogger Bank D Offshore Wind Farm



Title:
 SACs for Annex II Migratory Fish
 (Screened out for Further Assessment)

Figure: 5-1 Drawing No: PC6250-HAS-XX-OF-DR-GS-0031

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/10/2025	JH	PT	A3	1:1,000,000
02	23/01/2026	JH	PT	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N



223. 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. Unlike some other diadromous species, there is no evidence that sea lamprey associate with particular migratory pathways at sea. For this reason, they are thought to be widely distributed at relatively low densities. Most adults are recorded in freshwater, with spawning and larval life history stages occurring 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). River lamprey do not move out beyond estuaries into the open seas during their adult phases.
224. It should be noted that river lamprey are not expected to be found outside of rivers and estuaries, whilst sea lamprey are very widely distributed when at sea, at low densities.
225. In order to undertake a conservative screening process, with consideration of potential indirect interactions with Annex II fish features during at sea migrations, the following sites are considered for determination of LSE:
- 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); and
 - 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.

5.1.4 Determination of LSE for Annex II Migratory Fish

226. Disturbance to supporting habitats due to the installation of infrastructure or due to temporary works will be localised within the AoS. Sediment plumes and changes to seabed characteristics are expected to be restricted to within a 2km ZoI (see **Section 4.1.3.3** for detailed rationale underpinning this distance). All relevant sites are beyond the ZoI for these effects.
227. Underwater noise, particularly from piling activity may cause effects over multiple kilometres. The closest site to any AoS is the Humber Estuary SAC at a distance of 48km from A8 (**Table 5.2**).
228. River lamprey are not expected to be found outside of rivers and estuaries, so there is no pathway for effect on river lamprey unless the ZoI overlaps with a river or estuary that contains a river lamprey feature.

229. 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 the lowest noise sensitivity of fish (Group 1) (Popper *et al.*, 2014), meaning that the 45km Zol (based on stationary receptors) can be considered conservative. As such, ANS activities do not have a potential to cause LSE for the sea lamprey or river lamprey features of the Humber Estuary SAC. Whilst a small number of adult sea lamprey could theoretically be present within the Zol, the expected number of individuals is very low, with no established connectivity to any particular site, and there is therefore no meaningful pathway for effect on a given SAC.
230. The introduction of marine INNS relating to the ANS and construction or maintenance vessels from locations outside of the project area could lead to the introduction or spread of INNS. However, the Zol of spread is linked to structures presence and tidal ellipse from the site to which vessels would be anchoring. The maximum tidal ellipse is 11km as a conservative margin (see **Section 4.1.3.2**) which is a significant distance from the nearest site for migratory fish is the Humber Estuary SAC and Humber Estuary Ramsar (see **Table 5.2**), which are 48km from A8 and much further from the other AoS. Given the distance and singular nature of the ANS and the small number of vessel movements across the lifetime of the ANS, it is concluded that no LSE is expected.
231. It is also noted that pathways for spreading or introducing invasive non-native species (INNS) will be mitigated are avoided by embedded biosecurity measures in the project design due to the following relevant regulations and guidance:
- International Convention for the Prevention of Pollution from Ships (MARPOL). The MARPOL sets out appropriate vessel maintenance;
 - The Environmental Damage (Prevention and Remediation (England) (Amendment) Regulations 2019, which set out a 'polluter pays principle' where the operators who cause a risk of significant damage or cause significant damage to land, water or biodiversity will have the responsibility to prevent damage occurring, or if the damage does occur will have the duty to reinstate the environment to the original condition; and
 - The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention 2004), which provide global regulations to control the transfer of potentially invasive species.
232. Any coatings and treatments to be used on the ANS will be suitable for use in the marine environment and will be used in accordance with guidelines approved by the Health and Safety Executive and the Environment Agency Pollution Prevention Control Guidelines.

233. All vessels and the carriage and use of chemicals must comply with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). Furthermore, emergency plans and mitigation for a range of potential marine pollution incidents are a legal requirement.
234. Given the scale of the ANS (a singular structure) and the limited magnitude of any potential accidental or incidental discharges (and subsequent dilution and dispersion), the distance over which any discharge would extend would be limited by the tidal ellipse which is less than 11km for any of the AoS, with the nearest being 48km from the nearest AoS (see **Table 5.2**) it is concluded there is no potential for an LSE from accidental or incidental discharges on migratory fish and the sites for which they are designated.
235. All other sites are more distant than the Humber Estuary SAC and therefore screened out of further assessment.

Table 5.2 Screening of European Sites designated for Annex II Migratory Fish

European Site	Annex II Migratory Fish Features	Distance to closest AoS	Screened In?	Rationale
Humber Estuary SAC	River lamprey Sea lamprey	48km	No	This site is beyond the Zol for all effects associated with the ANS. There is no pathway for LSE.
Humber Estuary Ramsar	River lamprey Sea lamprey	48km	No	This site is beyond the Zol for all effects associated with the ANS. There is no pathway for LSE.

5.1.4.1 In-combination and transboundary effects

236. Given the highly limited scope of works for installation of a single ANS, and the temporary nature of any localised impacts, it is considered that there is no potential for the ANS works to contribute to an in-combination effect with other plans or projects.
237. **Table 5.3** details the closest distances between the ANS' 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 5.3 The distance between the AoS 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	300
Sea Lamprey	Noordzeekustzone SAC	287
Twaite Shad		
River Lamprey		
Allis Shad		

5.1.5 Summary for Sites Designated for Annex II Migratory Fish

238. Due to the distance of the AoS from relevant sites designated for Annex II fish species, all sites are beyond the Zol of the ANS works and there is no pathway for effect on any site. All sites designated for Annex II fish species are screened out of further assessment.

5.2 Conclusions and Next Steps

239. During all phases of the ANS, there is expected to be **no Likely Significant Effects** for Annex II Migratory Fish features and therefore their designated SACs and Ramsar Sites, either by the ANS alone or in-combination.

240. Given the conclusion of no LSE at the screening stage on any migratory fish features, no assessment is considered necessary at this stage or for the RIAA to be submitted with the DCO application.

6 European Sites Designated for Annex II Marine Mammals

6.1 Stage 1 Screening

6.1.1 Approach to Screening

241. For marine mammals, the approach to HRA screening primarily focuses on the potential for connectivity between individual marine mammals from designated populations and the AoS (i.e. demonstration of a clear source-pathway-receptor relationship). This is based on the distance of the AoS 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.
242. The pre-screening exercise considers the pathways for LSE both alone and in-combination during each phase of the ANS along with listing potential effects on designated sites.
243. The HRA screening exercise therefore considers European sites (SCIs and SACs) which meet the following criteria:
- The distance between the potential effect of the ANS and a European site with marine mammals as a qualifying feature is within the range for which there could be an interaction. 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 AoS 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 AoS (applies to mobile interest features when outside the designated site).
244. Designated European sites that did not meet these criteria have been screened out from further assessment.
245. 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.

246. 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.
247. Distances between the AoS and SAC sites were measured in GIS (the shortest straight-line distance) using shapefiles downloaded from SNCB websites.

6.1.2 Pathways for LSE

6.1.2.1 Potential Effects Considered in Screening

248. Direct or indirect effects on marine mammals may arise from permanent or temporary physical presence of the ANS and / or activities relating to the construction, operation and maintenance, or decommissioning of the ANS and associated offshore infrastructure.
249. 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).
250. Table 6.1 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 6.1 Potential Effects identified for Marine Mammals to be Considered at the Screening Stage

Potential Impact	Construction	Operation & Maintenance	Decommissioning	Rationale
Underwater noise: physical and auditory injury resulting from impact piling during construction	✓	x	x	Impact piling only occurring during construction phase, so other phases have been screened out.
Underwater noise: behavioural impacts resulting from impact piling during construction	✓	x	x	

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Potential Impact	Construction	Operation & Maintenance	Decommissioning	Rationale
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	✓	x	x	Majority of underwater noise from other activities or vessel presence likely to occur during construction, underwater noise considered to be less than construction during other phases. Therefore, only construction phase is screened in.
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)	✓	✓*	x	
Disturbance at seal haul-out sites	✓	x	x	Majority of underwater noise likely to occur during construction piling and other activities or construction vessel presence. Underwater noise during other phases considered to be less. Therefore, only construction phase is screened in.
Vessel interaction (increase in risk of collision)	✓	✓	x	Different levels of vessel presence anticipated for construction and operation. However, decommissioning is considered to be less than construction vessel presence so has been screened out.

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Potential Impact	Construction	Operation & Maintenance	Decommissioning	Rationale
In-combination effects	✓	✓	x	Potential effects during all phases so all screened in, with the exception of decommissioning as individual effects are screened out due to temporary and negligible activity.

*Only assessing disturbance from O&M vessels.

6.1.2.2 Potential Effects during Construction

251. The potential effects for marine mammals during construction that are screened in for consideration of LSE are:

- Underwater noise;
- Disturbance at seal haul-out sites; and
- Vessel interaction.

6.1.2.2.1 Underwater noise

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

- Piling for the ANS;
- Other construction activities such as seabed preparation and rock placement; and
- Vessel presence.

253. 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 (Temporary Threshold Shift (TTS));
- Disturbance and behavioural effects; and
- Disturbance to seals foraging at sea.

254. 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})) 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). This is considered unlikely to be of significant risk to any marine mammal species, therefore, further assessment will not be undertaken, and therefore this has been screened out.
255. Site-specific underwater noise modelling will be undertaken for potential impact piling. The assessments for piling will take into account soft-start and ramp-up procedures and piling parameters.
256. There is potential for LSE associated with underwater noise, and this will be assessed in the final RIAA (to be submitted with the DCO application), taking into account the final AoS selected for the ANS and the most recent and robust research, guidance and information available. A preliminary assessment has been provided in **Section 6.2**.
257. UXO clearance works are not included in the envelope of the Project, or as Associated Development and will not be included with the DCO application. In the event that UXO clearance is required prior to construction, 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 Licensing 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.
258. 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, 2025; 2017).

6.1.2.2.2 Disturbance at seal haul-out sites

259. Disturbance from ANS works and vessel transits to and from the ANS 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. 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.
260. 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.

6.1.2.2.3 Vessel interaction

261. 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 and is considered further.

6.1.2.3 Potential Effects during Operation and Maintenance

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

- Underwater noise; and
- Vessel interaction.

6.1.2.3.1 Underwater Noise

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

- Operation and maintenance vessel activity.

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

- Disturbance and behavioural effects; and
- Vessel interaction.

265. The potential disturbance and behavioural effects associated with underwater noise during operation and maintenance have the potential for LSE and will be considered further.

6.1.2.3.2 Vessel Interactions

266. 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, as there is the potential for LSE.

6.1.2.4 Potential Effects during Decommissioning

267. It is anticipated that the decommissioning impacts would be similar in nature to those of construction, although the magnitude of impact is likely to be lower. Note that the magnitude of impact for underwater noise would be reduced in decommissioning due to the lack of piling.

268. Therefore, the impacts during the decommissioning phase are screened out as they will be less than the impacts during construction.

6.1.2.5 Identification of Sites and Features

269. 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.

270. 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 ANS. 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.

271. 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;
- Bottlenose dolphin *Tursiops truncatus*;
- Grey seal *Halichoerus grypus*; and
- Harbour seal *Phoca vitulina*.

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272. 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, maximum foraging ranges recorded for grey and harbour seal are up to 448km and 273km respectively (Carter *et al.*, 2022). Following the consideration of foraging ranges, connectivity was then determined by consideration of known movements as provided by tagging studies (Russell *et al.*, 2017; Carter *et al.*, 2022).
273. **Table 6.2** provides the initial screening list for all designated sites, with either harbour porpoise, bottlenose dolphin, grey seal and harbour seal listed as a qualifying feature within the identified screening areas for each species.

Table 6.2 Screening of European Sites designated for Annex II Marine Mammals

Designated site	Relevant Annex II marine mammal feature	Closest distance to an AoS	Screened in?	Rationale
Southern North Sea SAC	Harbour porpoise	Within the summer area of the SAC (A8 and A5 lie fully within; A2/3 partially overlaps with SAC)	Yes	The AoS being considered overlap with this SAC, individuals from this designated site may be at risk of potential effects from the ANS works.
Humber Estuary SAC	Grey seal	50km (from A8)	Yes	Potential connectivity between this SAC and the ANS, individuals from this designated site may be at risk of potential effects from the ANS works.
Berwickshire and North Northumberland Coast SAC	Grey seal	207km (from A2/3)	No	Unlikely to have potential connectivity between the SAC and ANS and due to distance the SAC population is not at risk of potential effects from the ANS works.
The Wash and North Norfolk Coast SAC	Harbour seal	85km (from A8)	No	Due to distance the SAC population is not at risk of potential effects from the ANS works.
Doggersbank SAC (Netherlands)	Harbour porpoise, grey and harbour seal	33km (from A2/3)	No	Worst-case assessment will be undertaken for harbour porpoise, grey seal and harbour seal through the UK SAC sites screened in.

Designated site	Relevant Annex II marine mammal feature	Closest distance to an AoS	Screened in?	Rationale
Doggerbank SAC (Germany)	Harbour porpoise and harbour seal	64km (from A2/3)	No	Worst-case assessment will be undertaken for harbour porpoise and harbour seal through the UK SAC sites screened in.
Klaverbank SAC (Netherlands)	Harbour porpoise, grey and harbour seal	128km (from A8)	No	Worst-case assessment will be undertaken for harbour porpoise, grey seal and harbour seal through the UK SAC sites screened in.
Moray Firth SAC	Bottlenose dolphin	500km (from A2/3)	No	Due to distance, the SAC population is not at risk of potential effects from the ANS works (see Section 6.1.2.9 for further discussion).

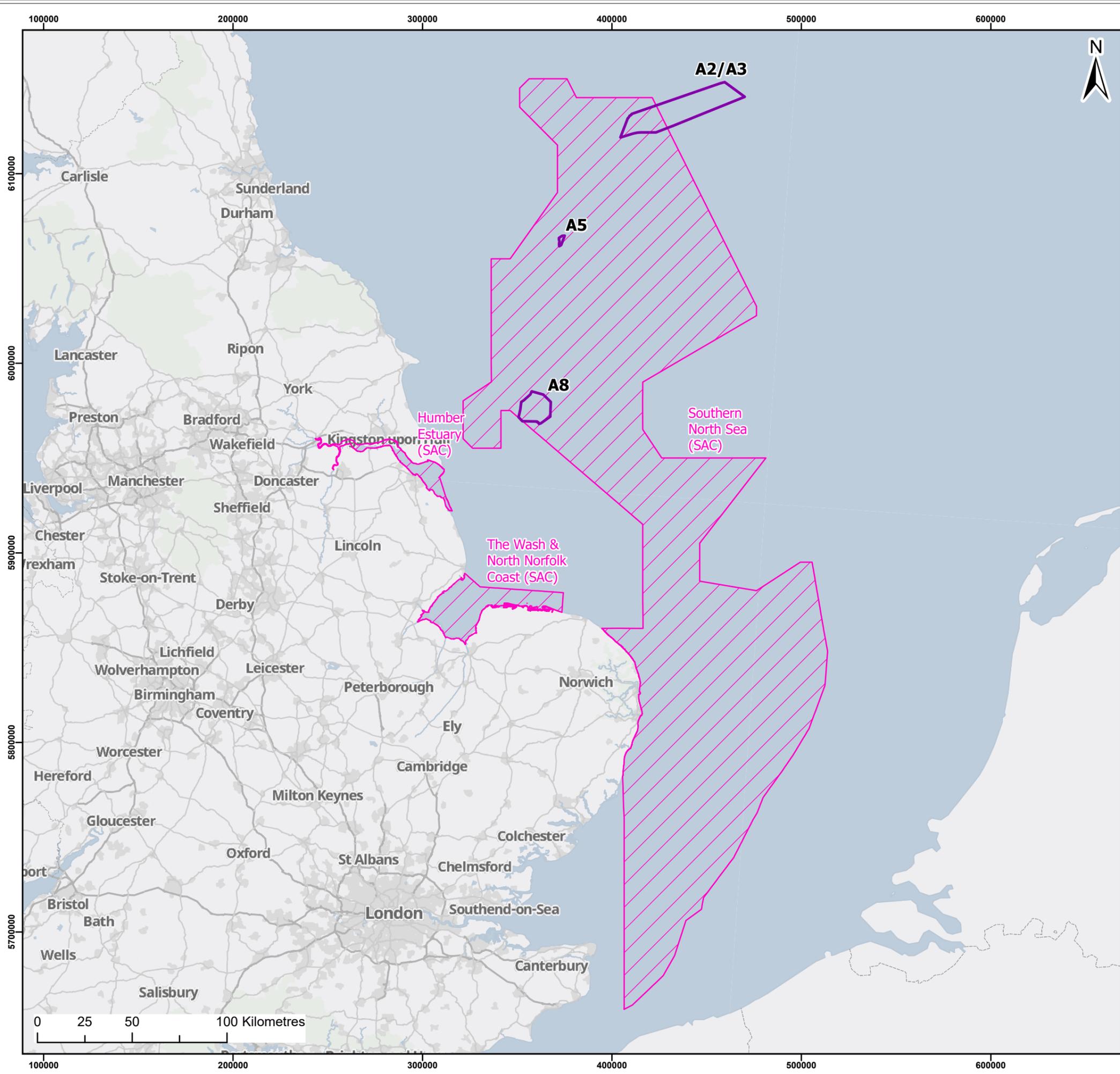
6.1.2.6 Harbour Porpoise

274. In the summer of 2022, a large-scale survey of marine mammals studied their distribution and abundance in the North-East Atlantic (Small Cetacean Abundance in the North Sea (SCANS) IV) (Gilles *et al.*, 2023). The ANS Area will be potentially situated within survey block NS-H or NS-C, where harbour porpoise was the most sighted species. Within these survey blocks, the highest harbour porpoise abundance was estimated to be at 55,691 (Confidence Limit (CL): 33,863 – 87,685). 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.
275. 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, 2023). However, for conservation and management purposes, it is necessary to consider this population as smaller, discrete MUs.

276. The AoS being considered for ANS lie within the summer area of the Southern North Sea SAC (see **Figure 6-1**). There is potential connectivity for harbour porpoise from the Doggersbank SAC, Doggerbank SAC and Klaverbank SAC, however, as the AoS overlap with the Southern North Sea SAC this is going to be assessed as worst-case (i.e. that all harbour porpoise are from the Southern North Sea SAC), therefore, the other SAC sites will be screened out from further assessment.
277. For harbour porpoise, the Southern North Sea SAC will be screened in for further assessment.

6.1.2.7 Grey Seal

278. 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 off the east coast of England but modelled hotspots are extending all the way to the fringes of Dogger Bank (Russell *et al.*, 2017; Carter *et al.*, 2022).
279. 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 (Natural England, 2022a), provides an important area for grey seal pup production (Carter *et al.*, 2022) and breeding (SCOS, 2024).
280. The SAC-specific relative density maps show that within the ANS Areas, there is the potential for grey seal to be present from the Humber Estuary SAC, with significantly increased relative densities close to the coast (see **Figure 6-2**). The Humber Estuary SAC population will be assessed further due to the potential connectivity of grey seals between the SAC and AoS works. SAC specific density maps indicate the Berwickshire and North Northumberland Coast SAC grey seal population is unlikely to have connectivity with the ANS works (Carter *et al.*, 2022), particularly as the works are temporary and localised. Therefore, the Berwickshire and North Northumberland Coast SAC has been screened out from further assessment, a worst-case assessment for grey seals will be covered through the assessment of the Humber Estuary SAC.
281. 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. However, due to the distance to these sites and the localised and temporary nature of the ANS works, other European sites have been screened out.



Legend:

- ANS AoS
- Special Area of Conservation (SAC)

Source: © Haskoning UK Ltd, 2025. © Natural England, 2025.
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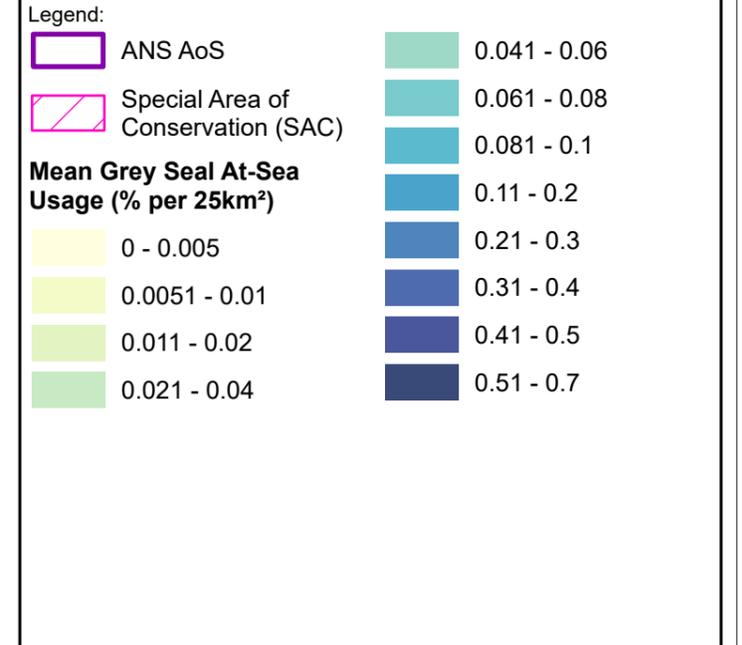
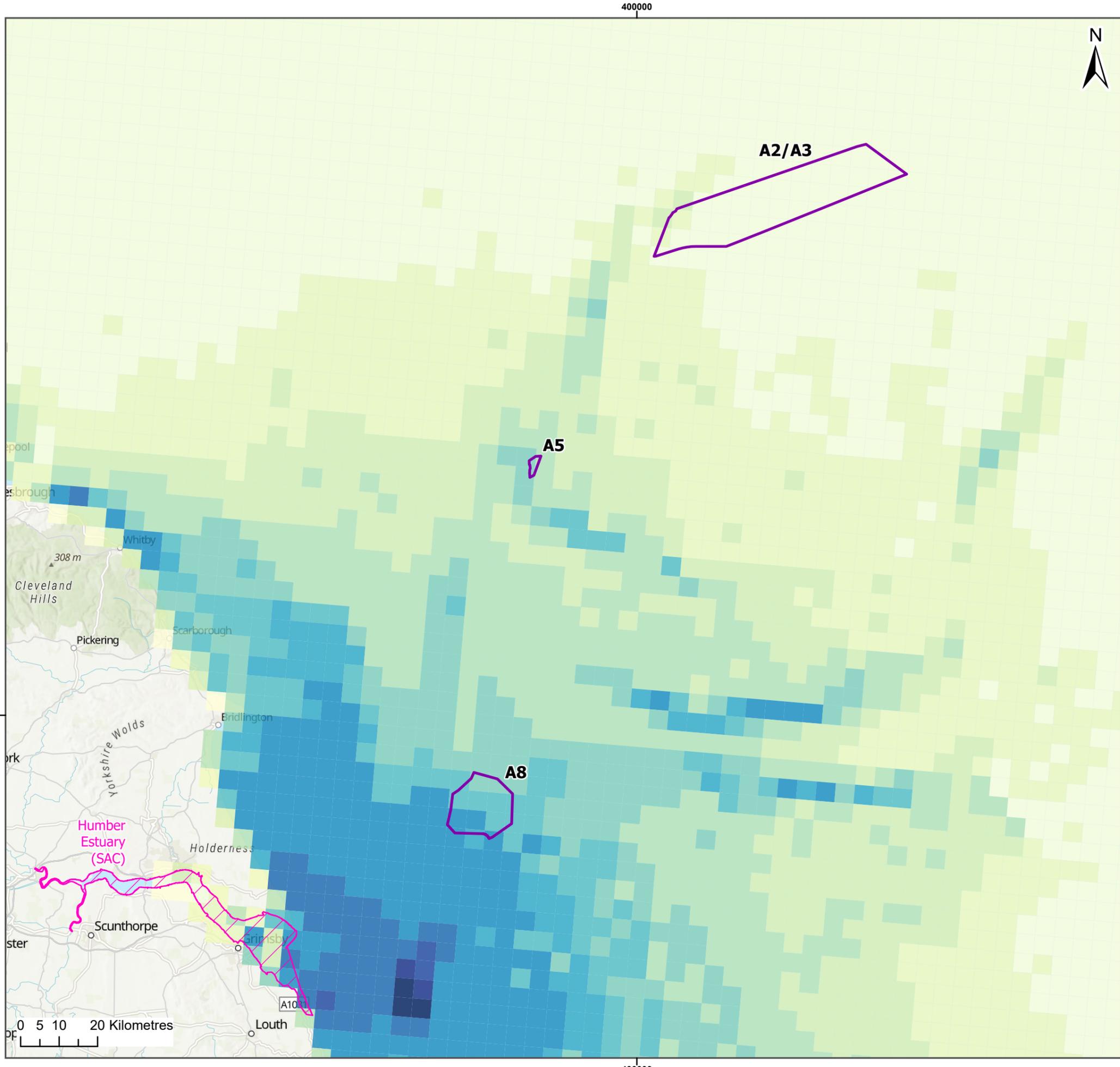
Project:	
Dogger Bank D Offshore Wind Farm	

Title:
Areas of Search Zol and sites designated for
Annex II marine mammals

Figure: 6-1 Drawing No: PC6250-HAS-XX-OF-DR-GS-0086

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	16/12/2025	FC	PT	A3	1:2,000,000
02	23/01/2025	JH	PT	A3	1:2,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N



Source: © Haskoning DHV UK Ltd, 2025; © JNCC, 2025; © Carter *et al.*, 2022
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Project: Dogger Bank D Offshore Wind Farm	
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Title:
 Humber Estuary SAC densities in relation to the Areas of Search

Figure: 6-2 Drawing No: PC6250-RHD-XX-OF-DR-GS-0087

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	16/12/2025	FC	PT	A3	1:1,000,000
02	23/01/2026	JH	PT	A3	1:1,000,000

Co-ordinate system: WGS 1984 UTM Zone 31N



282. Therefore, only the Humber Estuary SAC for grey seal has been screened in for further assessment. All assessments will utilise this SAC-specific density data when quantitative assessments are possible.

6.1.2.8 Harbour Seal

283. 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).

284. 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).

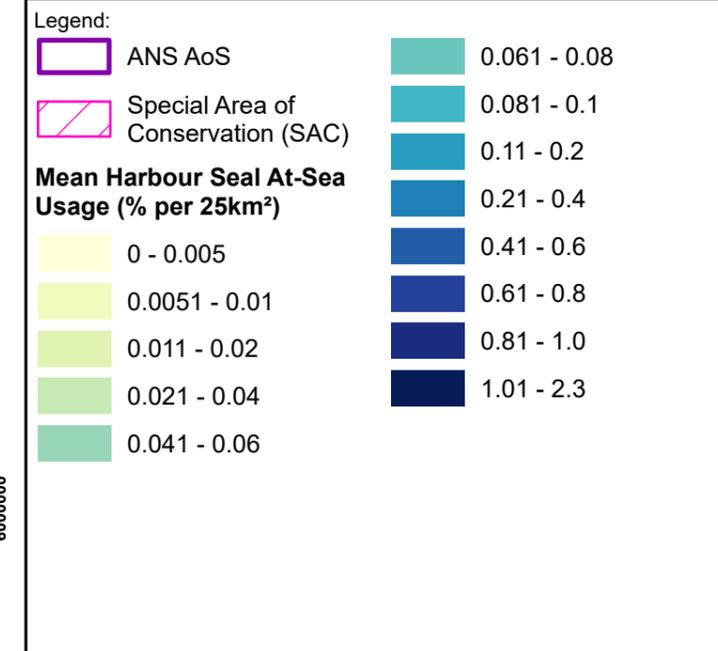
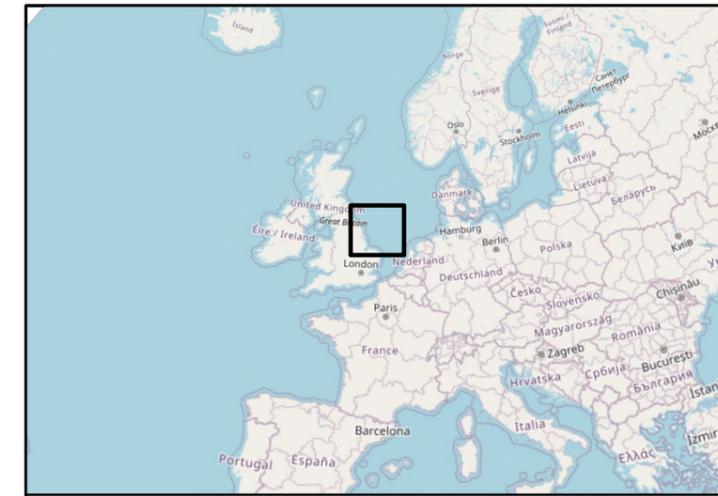
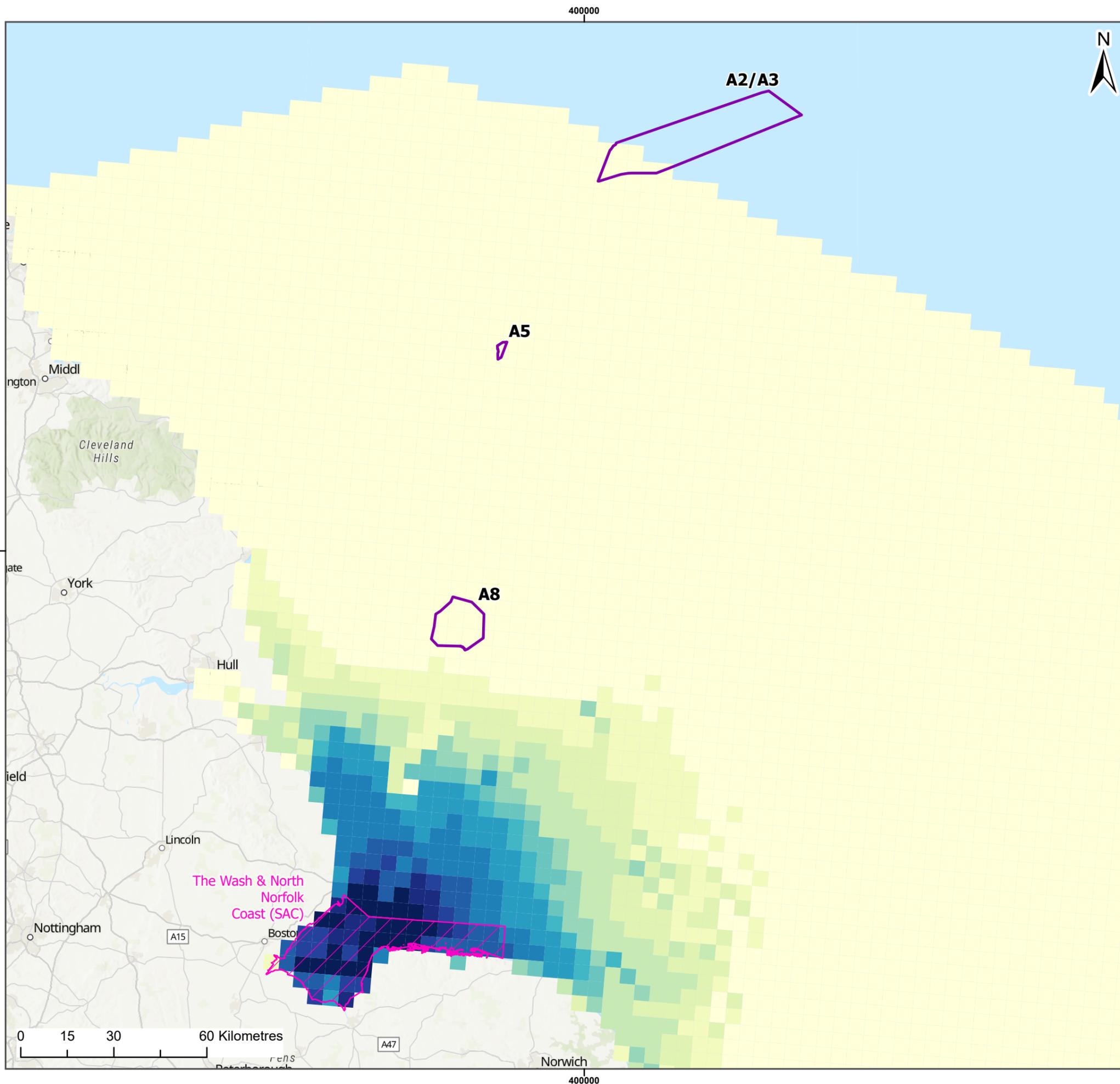
285. The Wash SAC, approximately 85km from the nearest AoS (A8), provides breeding and haul-out habitat for the largest colony of harbour seals, totalling 7% of the UK population (JNCC, 2023).

286. The SAC-specific relative density maps show that within the AoS there is the potential for harbour seal to be present from The Wash and North Norfolk Coast SAC, however, predicted densities are estimated to be low with mean estimates falling within the lowest density category; as in **Figure 6-3**. Therefore, for harbour seal, The Wash and North Norfolk Coast SAC has been screened out of further assessment.

287. 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. Based on the unlikely connectivity between harbour seals from Germany, Denmark, Belgium, the Netherlands, France and the ANS, it is suggested that the relevant SACs for harbour seals are screened out from further assessment.

6.1.2.9 Bottlenose dolphin

288. A large-scale survey of the presence and abundance of cetacean species around the north-east Atlantic undertaken in the summer of 2022 (the SCANS-IV survey; Gilles *et al.*, 2023) shows bottlenose dolphins to be present in the survey blocks where AoS are being considered (block NS-C or NS-H). 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.



Source: © Haskoning DHV UK Ltd, 2025; © JNCC, 2025; © Carter *et al.*, 2022
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Project:
Dogger Bank D Offshore Wind Farm

Title:
The Wash SAC densities in relation to the Areas of Search

Figure: 6-3 Drawing No: PC6250-RHD-XX-OF-DR-GS-0088

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	16/12/2025	FC	KF	A3	1:1,250,000
02	23/01/2026	JH	KF	A3	1:1,250,000

Co-ordinate system: WGS 1984 UTM Zone 31N

289. In recent years an increase in bottlenose dolphins along the coastline of north-east England has been reported (Aynsley, 2017; Hackett, 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).
290. The bottlenose dolphins sighted in north-east England appear to be a coastal population at present (Hackett, 2022) and thus have the potential to be affected by activities taking place in the nearshore area. However, due to the temporary and localised nature of the ANS works and the distance of nearly 500km between the SAC and the AoS, the Moray Firth SAC has been screened out from further assessment.

6.1.2.10 Sites within the Zol of the Project's Effects

291. 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.

6.1.3 Determination of LSE for Annex II Marine Mammals

292. For harbour porpoise and grey seal a number of potential effects have been screened in for further assessment, to determine the potential for any adverse effects on the integrity of the designated sites.
293. Determination of the potential for AEol 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 Integrity will also consider the Conservation Status of the species.
294. Determination of Adverse Effects on 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.
295. 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:

- *20% of the relevant area of the site in any given day, or*
- *An average of 10% of the relevant area of the site over a season.”*

6.1.3.1 In-combination and Transboundary Effects

6.1.3.1.1 In-combination effects

296. 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.

297. 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 ANS.

298. 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; and
- Vessel interaction.

6.1.4 Summary of Screening for Sites Designated for Annex II Marine Mammals

299. Due to the short duration and small amount of works required for the ANS, all non-UK sites where grey seal and harbour seal is a qualifying feature have been screened out.

300. There is only one SAC site that overlaps with the AoS, the Southern North Sea SAC and is further discussed in **Section 6.2.30**. The Humber Estuary SAC, designated for grey seal, is nearby the proposed AoS and will be screened in.

301. As the worst-case assessment will be undertaken for harbour porpoise and grey seal through the UK SACs screened in, the Doggersbank SAC, Doggerbank SAC, and Klaverbank SAC have been screened out from further assessment. **Table 6.2** details the Annex II Marine Mammal designated sites to be screened in for further assessment. **Table 6.3** summarises the sites to be screened in for further assessment and the effect pathways for each site.

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Table 6.3 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	Closest distance to an AoS	Effect pathways	C	O&M	D	Rationale
Southern North Sea SAC	Harbour porpoise	Within summer area of SAC	Underwater noise: auditory injury from impact piling	✓	✗	✗	SAC fully overlaps with A8 and A5. Partial overlap with A2/3.
			Underwater noise: disturbance from impact piling	✓	✗	✗	
			Underwater noise: auditory injury from other construction activities and vessel noise	✓	✗	✗	
			Underwater noise: disturbance from other construction activities and vessel noise	✓	✓	✗	
			Vessel interaction	✓	✓	✗	
			In-combination effects	✓	✓	✓	
Humber Estuary SAC	Grey seal	50km (from A8)	Underwater noise: impact piling	✓	✗	✗	Potential connectivity between SAC population and potential effects identified.
			Underwater noise: other construction activities and vessel noise	✓	✗	✗	
			Vessel interaction	✓	✓	✗	
			Disturbance at seal haul out sites	✓	✗	✗	
			In-combination effects	✓	✓	✓	

6.2 Stage 2 Assessment of Effects

6.2.1 Embedded Mitigation

302. This section outlines the embedded mitigation relevant to the Annex II Marine Mammals assessment, which has been incorporated into the design of the ANS (Table 6.4).

Table 6.4 Embedded Mitigation

Parameter	ID	Commitments	How the Commitment Will be Secured
Vessel collision	CO115	A Project Environmental Management Plan (PEMP) will be provided in accordance with the Outline PEMP.	DML Condition - Project Environmental Management Plan
Potential physical injury or PTS	CO114	A piling Marine Mammal Mitigation Protocol (MMMP) will be provided in accordance with the Outline MMMP and will be implemented during construction. The piling MMMP will include details of the embedded mitigation, for the soft-start and ramp-up, as well as details of the proposed mitigation zone and any additional mitigation measures required in order to minimise potential impacts of any physical injury or PTS, for example, the activation of an Acoustic Deterrent Device (ADD) prior to the soft-start, as much as is practicable.	DML Condition - Marine Mammal Mitigation Protocol

6.2.2 Worst-Case Scenario

303. Table 6.5 outlines the worst-case scenario for effects which are of relevance to this initial assessment which will be subject to review if further assessment is necessary for the DCO submission.

Table 6.5 Worst-Case Scenario for Potential Effects on Annex II Marine Mammals

Impact	Worst-case scenario
Construction phase	
Underwater noise and vibration from piling	Maximum number of foundations: 1 foundation Maximum hammer energy for monopiles: 6,000kJ. Maximum pile diameter for monopiles: 8m.

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Impact	Worst-case scenario
Underwater noise from other construction activities and vessels	Seabed clearance methods could include: <ul style="list-style-type: none"> • Boulder and sandwave clearance and dredging.
Disturbance at seal haul-out sites	Closest distance from ANS A8 location to seal haul-out site is 50km (Donna Nook). Number of vessel trips as outlined below.
Vessel collision risk	Vessels: <ul style="list-style-type: none"> • Site preparation – survey vessel, dredger, boulder clearance vessel, and guard vessel(s); • Foundation and topside installation – support vessel, crew transfer vessel (CTV), rock placement vessel, installation vessel (jack-up vessel (JUV) or heavy lift vessel (HLV)), and guard vessel(s); • ANS commissioning – CTV, installation vessel (JUV / HLV), and guard vessel Maximum on site at any one time: <ul style="list-style-type: none"> • 5 vessels Maximum number of trips throughout construction: <ul style="list-style-type: none"> • 40 trips
Operation and Maintenance phase	
Underwater noise from vessels	<ul style="list-style-type: none"> • Operational lifetime of ANS = 37 years. • Other maintenance activities would require vessels. See below for more details on vessel presence.
Vessel collision risk	<ul style="list-style-type: none"> • Maximum of O&M vessels at site at any one time: 5 • Vessel types: JUV / HLV / CTV / support vessels / survey vessel
Decommissioning phase	
<p>Impacts during decommissioning are expected to be similar in nature to those anticipated during construction but of smaller magnitude. Decommissioning may require the removal of the foundation, however, there will be no piling during decommissioning. Effects caused during decommissioning are expected to be less than those during the construction phase.</p>	

6.2.3 Southern North Sea SAC

6.2.3.1 Site Description

304. The SNS SAC has been recognised as an area with persistent high densities of harbour porpoise (JNCC, 2017; JNCC and Natural England, 2019) and is the largest designated site for harbour porpoise in UK and European waters at the time of designation.
305. The SNS SAC covers an area of 36,951km², with both winter and summer habitats of importance to harbour porpoise (JNCC, 2017). Approximately 27,028km² of the site is important in the summer period (183 days from April to September inclusive) and 12,696km² of the site is important in the winter period (182 days from October to March inclusive) (JNCC et al., 2020). The majority of the site is less than 40m in depth, reaching up to 75m in the northern most areas.
306. The summer area of the SNS SAC overlaps with the ANS locations being considered, therefore, has been assessed further. Figure 6-1 illustrates that A8 and A5 fully overlap with the SNS SAC whereas A2/3 partially overlaps. A8 is the closest AoS to the winter area of the SNS SAC approximately 8km away.

6.2.3.1.1 Qualifying Features

307. Within the Southern North Sea area, harbour porpoise is the most common marine mammal species (Hammond *et al.*, 2021). Heinänen and Skov (2015) identified that within the North Sea, water depth and hydrodynamic variables are the most important factors in harbour porpoise densities in species areas, in both winter and summer seasons. The seabed sediments also play an important role in determining areas of high harbour porpoise density, as well as the number of vessels present in the area.
308. The Inter-Agency Marine Mammal Working Group (IAMMWG, 2023) define three MUs for harbour porpoise. The ANS areas are located in the North Sea (NS) MU. The most recent abundance estimate for the NS Management Unit (MU) was published in the SCANS-IV survey, indicating that there are 338,918 harbour porpoise in the North Sea Assessment Unit (AU) (Gilles et al., 2023).

6.2.3.1.2 Conservation Objectives

309. The Conservation Objectives for the SNS SAC are designed to help ensure that the obligations of the Habitats Directive can be met. Article 6(2) of the Habitats Directive requires that there should be no deterioration or significant disturbance of the qualifying species or to the habitats upon which they rely.

310. The Conservation Objectives (JNCC and Natural England, 2019) for the SNS SAC are:

“To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for Harbour Porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that:

- 1. Harbour porpoise is a viable component of the site;*
- 2. There is no significant disturbance of the species; and*
- 3. The condition of supporting habitats and processes, and the availability of prey is maintained”.*

311. These Conservation Objectives are:

“a set of specified objectives that must be met to ensure that the site contributes in the best possible way to achieving FCS of the designated site feature(s) at the national and biogeographic level” (JNCC and Natural England, 2019)”.

312. **Conservation Objective 1: The Species is a Viable Component of the Site:** This Conservation Objective is designed to minimise the risk of injury and killing or other factors that could restrict the survivability and reproductive potential of harbour porpoise using the SAC. Specifically, this objective is primarily concerned with operations that would result in unacceptable levels of those impacts on harbour porpoise using the SAC. Unacceptable levels can be defined as those having an impact on the FCS of the population of the species in their natural range.

313. Harbour porpoise are considered to be a viable component of the SAC if they are able to live successfully within it. The SNS SAC has been selected primarily based on the long term, relatively higher densities of porpoise in contrast to other areas of the North Sea. The implication is that the SAC provides relatively good foraging habitat and may also be used for breeding and calving. However, because the number of harbour porpoise using the site naturally varies there is no exact value for the number of animals expected within the site (JNCC and Natural England, 2019).

314. The Conservation Objectives (JNCC and Natural England, 2019) state that, with regard to assessing impacts, ‘the reference population for assessments against this objective is the MU population in which the SAC is situated’.

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315. Harbour porpoise are listed as European Protected Species (EPS) under Annex IV of the Habitats Directive, and are therefore protected from the deliberate killing (or injury), capture and disturbance throughout their range. Under the Habitats Regulations, it is an offence if harbour porpoise are deliberately disturbed in such a way as to:
- Impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or
 - To affect significantly the local distribution or abundance of that species.
316. The term deliberate is defined as any action that is shown to be “*by a person who knows, in the light of the relevant legislation that applies to the species involved, and the general information delivered to the public, that his action will most likely lead to an offence against a species, but intends this offence or, if not, consciously accepts the foreseeable results of his action*”.
317. In addition, Article 12(4) of the Habitats Directive is concerned with incidental capture and killing. It states that Member States “*shall establish a system to monitor the incidental capture and killing of the species listed on Annex IV (all cetaceans). In light of the information gathered, Member States shall take further research or conservation measures as required to ensure that incidental capture and killing does not have a significant negative impact on the species concerned*”.
318. **Conservation Objective 2: There Is No Significant Disturbance of The Species:** The disturbance of harbour porpoise typically, but not exclusively, originates from operations that cause underwater noise, including activities such as seismic surveys, pile driving and sonar.
319. Disturbance is considered to be significant if it leads to the exclusion of harbour porpoise from a significant portion of the site for a significant period of time. The current SNCBs guidance for the assessment of significant noise disturbance on harbour porpoise in the SNS SAC (JNCC *et al.*, 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:*
- *20% of the relevant area of the site in any given day, or*
 - *An average of 10% of the relevant area of the site over a season.”*

320. **Conservation Objective 3: The Condition of Supporting Habitats and Processes, and The Availability of Their Prey Is Maintained:** Supporting habitats, in this context, means the characteristics of the seabed and water column. Supporting processes encompass the movements and physical properties of the habitat. The maintenance of these supporting habitats and processes contributes to ensuring prey is maintained within the site and is available to harbour porpoise using the SAC. Harbour porpoise are strongly reliant on the availability of prey species year round due to their high energy demands, and their distribution and condition may strongly reflect the availability and energy density of prey.
321. This Conservation Objective is designed to ensure that harbour porpoise are able to access food resources year round, and that activities occurring in the SNS SAC will not affect this.

6.2.3.2 Assessment of Potential Effects of the Project Alone

322. The AoS being considered are located within the summer area of the SNS SAC (see **Figure 6-1**), therefore there is potential for LSE on its designated feature, harbour porpoise, during construction, and O&M of the ANS. This resulted in the SNS SAC being screened into the assessment.
323. At this stage of the assessment, potential effects have been assessed qualitatively. Depending on outcomes of below and where required, further quantitative assessment will be undertaken within the final RIAA submitted with the DCO application.

6.2.3.2.1 Underwater noise: physical and auditory injury resulting from impact piling during construction

324. The foundation options being considered for the ANS include a monopiles or a gravity base foundation. As a worst-case scenario for underwater noise, it has been assumed that the ANS foundation could be piled.
325. Impact piling is a source of high-level underwater noise. Underwater noise can cause both physiological (e.g. lethal, physical injury and auditory injury) and behavioural (e.g. disturbance and masking of communication) impacts on marine mammals.
326. Underwater noise modelling will be undertaken to estimate the noise levels likely to arise during noisy activities and determine the potential impacts on marine mammals using a semi-empirical underwater noise propagation model. The underwater noise modelling results will be presented and used within the final assessment to support the DCO submission.

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327. The extent of the impact will be highly limited given that a single ANS is being installed, with only one monopile being piled as a worst-case. Therefore, for the ANS installation it is expected the level of effect would be less than what was assessed for the DBD Project draft RIAA (Dogger Bank D, 2025a) due to a lower hammer energy for only one monopile. In the DBD Project draft RIAA, it was assessed that there was no potential for an AEol on the SNS SAC as a result of PTS in harbour porpoise from pile installation, as less than 1% of the reference population would be at risk of the permanent effect.
328. Therefore, it is anticipated there would be **no potential for an AEol** due to PTS from pile installation on the SNS SAC in relation to the conservation objectives for harbour porpoise. However, further assessments will be taken forward to confirm these conclusions using the underwater noise modelling results.
329. Mitigation would be undertaken in line with the Outline MMMP to reduce the potential for PTS in all marine mammal species.

6.2.3.2.2 Underwater noise: behavioural impacts resulting from impact piling during construction

330. The range of possible behavioural reactions that may occur as a result of exposure to noise include orientation or attraction to a noise source, increased alertness, modification of characteristics of their own sounds, cessation of feeding or social interaction, alteration of movement / diving behaviour, temporary or permanent habitat abandonment and, in severe cases, panic, or stranding, sometimes resulting in injury or death (Southall *et al.*, 2007).
331. Due to the small scale of piling required for the ANS, it is not anticipated for there to be a potential adverse effect. Within the DBD Project draft RIAA (Dogger Bank D, 2025a) undertaken at PEIR stage, disturbance assessments indicated less than 1% of the NS MU population would be disturbed for a single piling event based on effective deterrent ranges (EDRs).
332. Therefore, it is anticipated for there to be **no potential for an AEol** due to disturbance from pile installation on the SNS SAC in relation to the conservation objectives for harbour porpoise. However, further assessments will be taken forward to confirm these conclusions using the latest EDRs (2021, 2025) and also to assess against the spatial and seasonal average thresholds set for the SNS SAC.

6.2.3.2.3 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

333. 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. Underwater 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 (SEL_{cum})) 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). This is considered unlikely to be of significant risk to any marine mammal species.

334. For the DBD Project PEIR (Dogger Bank D, 2025b), site-specific underwater noise modelling was undertaken to determine the potential risk for PTS and TTS from underwater noise from noise sources other than piling. The modelling predicted other construction activities had a potential PTS impact range of less than 100m for harbour porpoise. It can be considered for the ANS installation these impact ranges will be the less than what was assessed for the PEIR for the DBD Project.

335. Given the small number of individuals affected (<1% of the population) assessed for DBD Project at PEIR (Dogger Bank D, 2025b), it is considered there would be no LSE of auditory injury from other construction activities on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise. Therefore, it is anticipated for there to be **no potential for an AEol** due to physical and auditory injury resulting from noise associated with other construction and maintenance activities.

6.2.3.2.4 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)

6.2.3.2.4.1 *Construction*

336. Underwater noise from other construction activities (such as dredging and rock placement), along with the presence of vessels offshore, has the potential for disturbance effects.

337. Harbour porpoise within the potential disturbance area were considered to have the capacity to avoid such effects. Any disturbance would be temporary, with the expectation to return to the area once the disturbance had ceased, or they have become habituated to the sound or presence of vessels (doing activities).

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338. All related construction activities are considered to be moving sources, and therefore, once the activity / vessel moved past a certain area, harbour porpoises would return to the area. The potential for disturbance that could result from underwater noise during other construction activities, would be temporary in nature, not consistent throughout the offshore construction period, and short term.
339. Based on a 4km disturbance range for construction vessels (Benhemma-Le Gall *et al.*, 2021), the DBD Project draft RIAA (Dogger Bank D, 2025a), concluded that less than 1% of the reference population was affected.
340. Therefore, it is considered there would be **no potential for an AEol** due to disturbance from construction vessels on the SNS SAC in relation to the conservation objectives for harbour porpoise.

6.2.3.2.4.2 Operation

341. Potential behavioural impacts from O&M activities have been considered, however, they are expected to have less of an impact when compared to those during construction, due to the absence of pile driving, and fewer vessels required for O&M activities. As for construction activities and vessel presence, the potential for disturbance will be assessed following a similar approach.
342. The level of underwater noise produced from O&M activities is expected to be much lower than those expected during the construction phase. During O&M, there is the potential for vessels transiting and conducting maintenance activities, however, the number of vessels would be much less than those assessed during construction. Vessel movements to and from the O&M port (to be decided post-consent) would be incorporated within existing vessel routes where possible. The vessels conducting the maintenance work would be slow moving or stationary at times.
343. Therefore, it is considered there would be **no potential for an AEol** due to disturbance from O&M activities on the SNS SAC in relation to the conservation objectives for harbour porpoise.

6.2.3.2.5 Vessel interaction (increase in risk of collision)

6.2.3.2.5.1 Construction

344. Despite the potential for harbour porpoise to detect and avoid vessels, ship strikes are known to occur (Wilson *et al.*, 2007). An increase in vessel numbers for the ANS works could potentially lead to an increase in vessel collision risk, although marine mammals are considered likely to avoid vessels and therefore avoid collision.

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345. To ensure there is no risk of vessel collision for harbour porpoises, the Project has committed to best practice measures for all vessel movements and through all phases of the Project. These best practice measures will be secured through inclusion in the PEMP (Design Commitment CO115 in **Appendix C** of the **DBD ANS PEIR**) for all phases of the Project. These best practice measures are based on existing guidance to reduce collision risk for marine mammals such as the Marine Code of Conduct developed by the Sea Watch Foundation (SWF) and The Scottish Marine Wildlife Watching Code developed by NatureScot.
346. Measures include:
- Vessel movements, where possible, will follow set vessel routes and hence areas where marine mammals are accustomed to vessels;
 - Vessel movements will be kept to the minimum number that is required;
 - Vessels will avoid deliberately approaching marine mammals when sighted;
 - Vessels will avoid abrupt changes to course or speed should marine mammals approach the vessel or bow-ride;
 - Allowing for vessel safety concerns, vessels will maintain a steady speed, and direction, to allow any marine mammal to predict where the vessel may be headed, and to move out of the way or avoid surfacing in the path of the vessel;
 - Additionally, where possible and safe to do so, transiting vessels will maintain distances of 600m or more off the coast, particularly in areas near known seal haul-out sites during sensitive periods;
 - Operators of all vessels will be made aware of the risk and measures to avoid marine mammal collisions during mobilisation briefings;
 - A Vessel Code of Conduct will be developed prior to construction based on the latest information and guidance, and include the measures as outlined above; and
 - The Vessel Code of Conduct will include a protocol to report any collisions.
347. With the inclusion of the above embedded mitigation measures, it is considered highly unlikely that there would be any potential risk of vessel collision to marine mammals.
348. Due to the limited amount of vessels required for the ANS works and the short term nature of the works. As well as the embedded mitigation measures, it is considered there would be **no potential for AEol** due to potential risk of collision on the integrity of the SNS SAC in relation to the conservation objectives for harbour porpoise.

6.2.3.2.5.2 *Operation*

349. As outlined for construction, the increased risk of collision with marine mammals during operation is considered unlikely.
350. The commitment to best practice measures and a Vessel Code of Conduct to be secured through the Project's PEMP (see Design Commitment CO115 listed in **Appendix C** of the **DBD ANS PEIR**), as detailed in *Section 11.5.1.6*, will significantly reduce any potential for harbour porpoises to collide with vessels during O&M activities. As for construction, based on the limited number of vessels required for the ANS O&M activities and embedded mitigation measures, it is considered there would be **no potential for an AEol** due to potential risk of collision on the SNS SAC in relation to the conservation objectives for harbour porpoise.

6.2.3.3 **Assessment of Potential Effects of the Project In-Combination with Other Plans and Projects**

351. Potential cumulative effects could arise from:
- Piling at other offshore wind farms in combination with that being undertaken at the ANS location;
 - Other construction activities at other offshore wind farms in combination with that being undertaken at the ANS location (vessels presence, cable installation works, dredging, seabed preparation and rock placement);
 - Carbon capture storage projects, offshore mines, and gas storage projects;
 - Geophysical surveys;
 - Aggregate extraction and dredging, and disposal sites;
 - Oil and gas developments, decommissioning, and seismic surveys;
 - Sub-sea cable and pipelines;
 - Coastal works (such as ports and harbours); and
 - UXO clearance (other than for the Project).
352. The Zol used to identify relevant plans and projects for the marine mammals in-combination is based on the NS MU for harbour porpoise.
353. Dogger Bank South East, Dogger Bank South West, and Dogger Bank D, have construction phases that overlap with construction of the ANS works, therefore it is possible, that piling and other construction activities (such as seabed preparation) may occur at the same time.

354. Given the highly limited scope of works for installation of a single ANS, and the temporary nature of any localised impacts, it is considered that there is no meaningful potential for the ANS works to contribute to an in-combination effect with other plans or projects. Therefore, it is considered that there would be no pathway for any significant in-combination impacts upon harbour porpoises. This will be confirmed in the final RIAA where up to date information of other plans and projects will be considered. Potential disturbance effects will also be assessed against the spatial and seasonal average thresholds of the summer area of the SNS SAC.

6.2.4 Humber Estuary SAC

355. The Humber is the second largest coastal plain estuary in the UK, and the largest on the east coast of Britain. Grey seal are present as a qualifying feature of the Humber Estuary SAC (Natural England, 2009).
356. The Humber Estuary SAC is located, at closest point, 50km from the ANS location A8 being considered. Therefore, there is no potential for direct effect on the SAC as a result of the construction or operation and maintenance of the ANS. However, due to the foraging range of grey seal and the movement of grey seal along the east coast of England, there is the potential for effects on foraging grey seal from the Humber Estuary SAC in the vicinity of the ANS.
357. Note that the SAC is largely coincident with the Humber Estuary Ramsar site for which grey seal are listed under Ramsar Criterion 3. This criterion states “A wetland should be considered internationally important if it supports populations of plant and / or animal species important for maintaining the biological diversity of a particular biogeographic region.”
358. 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 (Natural England, 2022a), provides an important area for grey seal pup production (Carter *et al.*, 2022) and breeding (SCOS, 2024).

6.2.4.1.1 Conservation Objectives

359. The Conservation Objectives (Natural England, 2023a) are:

“To ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- *The extent and distribution of qualifying natural habitats and habitats of qualifying species;*
- *The structure and function (including typical species) of qualifying natural habitats;*

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- *The structure and function of the habitats of qualifying species;*
- *The supporting processes on which qualifying natural habitats and habitats of qualifying species rely;*
- *The populations of qualifying species, and,*
- *The distribution of qualifying species within the site.”*

360. For grey seal within the Humber Estuary SAC, the specific targets are to:

- Maintain the population size within the site;
- Maintain the reproductive and recruitment capability of the species;
- Maintain the presence and spatial distribution of the species and their ability to undertake key life stage and behaviours;
- Maintain connectivity of the habitat within sites and the wider environment to allow movement of migratory species;
- Restrict the introduction and spread of non-native species and pathogens, and their impacts;
- Maintain the extent and spatial distribution of the following supporting habitats; foraging and haul out sites;
- Maintain the cover / abundance of preferred food items required by the species;
- Maintain the natural physio-chemical properties of the water;
- Maintain all hydrodynamic and physical conditions such that natural water flow and sediment movement is not significantly altered or constrained;
- Restrict aqueous contaminants to levels equating to High Status according to Annex VIII and Good Status according to Annex X of the Water Framework Directive, avoiding deterioration from existing levels;
- Maintain water quality to mean winter dissolved inorganic nitrogen levels where biological indicators of eutrophication (opportunistic macroalgal and phytoplankton blooms) do not affect the integrity of the site and features avoiding deterioration from existing levels; and
- Maintain natural levels of turbidity (e.g. suspended concentrations of sediment, plankton and other material) in areas where this species is, or could be present.

361. Note that with regard to the Ramsar designation, Natural England advice states that for Ramsar sites, a decision has been made by Defra and Natural England not to produce Conservation Advice packages. As the provisions on the Habitats Regulations relating to HRA extend to Ramsar sites, Natural England considers the Conservation Advice packages for the overlapping European Marine Site designations to be, in most cases, sufficient to support the management of the Ramsar interests. Therefore, the conservation objectives listed above cover both the SAC and Ramsar Assessment of Potential Effects of the Project Alone.

6.2.4.2 Assessment of Potential Effects of the Project Alone

362. SAC-specific relative density maps show that within the ANS AoS, there is the potential for grey seal to be present from the Humber Estuary SAC (**Figure 6-2**). Therefore, there is potential for LSE during construction, and O&M of the ANS. This resulted in the Humber Estuary SAC being screened into the assessment.
363. At this stage of the assessment, potential effects have been assessed qualitatively, however a full quantitative assessment will be undertaken for the final assessment to support the DCO submission.

6.2.4.2.1 Underwater noise: physical and auditory injury resulting from impact piling during construction

364. A potential foundation type considered for the ANS infrastructure is a monopile, installed using impact piling. Therefore, key potential impacts during construction for grey seal are expected to be those from underwater noise, principally from piling activity. Potential impacts of underwater noise due to piling are auditory injury: both PTS and TTS.
365. Underwater noise modelling will be undertaken to estimate the noise levels likely to arise during noisy activities and determine the potential impacts on grey seal using a semi-empirical underwater noise propagation model. The underwater noise modelling results will be presented and used for the final assessment to support the DCO submission.
366. The extent of the impact will be highly limited given that a single ANS is being installed, with only one monopile being piled as a worst-case. Therefore, for the ANS installation it is expected the level of effect would be less than what was concluded for the DBD Project draft RIAA (Dogger Bank D, 2025a) due to a lower hammer energy for only one monopile. In the DBD Project draft RIAA, no adverse effect of PTS in grey seal from pile installation on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal was concluded, as less than 1% of the reference population would be at risk of the permanent effect.

367. Therefore, it is anticipated there would be **no potential for AEol** due to PTS from pile installation on the Humber Estuary SAC in relation to the conservation objectives for grey seal. However, further assessments will be taken forward to confirm these conclusions using the underwater noise modelling results.

368. Mitigation would be implemented in line with the Outline MMMP to reduce the potential for PTS in all marine mammal species.

6.2.4.2.2 Underwater noise: behavioural impacts resulting from impact piling during construction

369. The range of possible behavioural reactions that may occur as a result of exposure to noise include orientation or attraction to a noise source, increased alertness, modification of characteristics of their own sounds, cessation of feeding or social interaction, alteration of movement / diving behaviour, temporary or permanent habitat abandonment and, in severe cases, panic, or stranding, sometimes resulting in injury or death (Southall *et al.*, 2007).

370. Due to the small scale of piling required for the ANS, it is not anticipated for there to be a potential adverse effect. Within the DBD Project draft RIAA undertaken at PEIR stage, disturbance assessments indicated less than 1% of the Humber Estuary SAC population would be disturbed for a single piling event based on a disturbance range of 25km and the dose-response approach.

371. Therefore, it is anticipated there would be **no potential for an AEol** due to disturbance from pile installation on the Humber Estuary SAC in relation to the conservation objectives for grey seal. However, further assessments will be taken forward to confirm these conclusions.

6.2.4.2.3 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

372. 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. Underwater 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 (SEL_{cum})) 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)). This is considered unlikely to be of significant risk to grey seal.

373. For the DBD Project PEIR (Dogger Bank D, 2025a), site-specific underwater noise modelling was undertaken to determine the potential risk for PTS and TTS from underwater noise from noise sources other than piling. The modelling predicted other construction activities had a potential PTS impact range of less than 100m for grey seal. It can be considered for the ANS installation these impact ranges will be less than what was assessed for the PEIR for the DBD Project.

374. Given the small number of individuals affected (<1% of the population) assessed for the DBD Project at PEIR, it is considered there would be **no potential for AEol** of auditory injury in grey seal from other construction activities on the integrity of the Humber Estuary SAC in relation to the conservation objectives for grey seal.

6.2.4.2.4 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)

6.2.4.2.4.1 *Construction*

375. Underwater noise from other construction activities (such as dredging and rock placement), along with the presence of vessels offshore, has the potential for disturbance effects.

376. Grey seal within the potential disturbance area were considered to have the capacity to avoid such effects. Any disturbance would be temporary, with the expectation to return to the area once the disturbance had ceased, or they have become habituated to the sound or presence of vessels (doing activities).

377. All related construction activities are considered to be moving sources, and therefore, once the activity / vessel moved past a certain area, the grey seal would return to the area. The potential for disturbance that could result from underwater noise during other construction activities, would be temporary in nature, not consistent throughout the offshore construction period, and short term.

378. Based on a 4km disturbance range for construction vessels (Benhemma-Le Gall *et al.*, 2021), the DBD Project draft RIAA (Dogger Bank D, 2025a), concluded that less than 5% of the reference population was affected.

379. Therefore, it is considered there would be **no potential for an AEol** due to disturbance from other construction and maintenance activities on the Humber Estuary SAC in relation to the conservation objectives for grey seal.

6.2.4.2.4.2 *Operation*

380. Potential behavioural impacts from O&M activities have been considered, however, they are expected to have less of an impact when compared to those during construction, due to the absence of pile driving, and fewer vessels required for O&M activities. As for construction activities and vessel presence, the potential for disturbance will be assessed following a similar approach.
381. The level of underwater noise produced from O&M activities is expected to be much lower than those expected during the construction phase. During O&M, there is the potential for vessels transiting and conducting maintenance activities, however, the number of vessels would be much less than those assessed during construction. Vessel movements to and from the O&M port (to be decided post-consent) would be incorporated within existing vessel routes where possible. The vessels conducting the maintenance work would be slow moving or stationary at times.
382. Therefore, it is considered there would be **no potential for an AEol** due to disturbance from other construction activities on the Humber Estuary SAC in relation to the conservation objectives for grey seal.

6.2.4.2.5 Disturbance at seal haul-out sites

383. Seals vary in their reaction to construction disturbance depending on the type of disturbance (e.g. vessel noise / presence, piling) and proximity to haul-out sites. This assessment takes a precautionary approach, acknowledging that grey seal have some capacity to avoid, adapt to, tolerate, or recover from the anticipated impacts.
384. The loudest activity potentially required for the ANS installation is impact piling for one monopile. However, the ANS locations being considered, all are located at significant distances away from haul-out sites. The closest is the Humber Estuary SAC, approximately 50km from A8, with a major haul-out site nearby at Donna Nook. Flamborough Head SAC is located approximately 52km from the closest AoS (A8) and although not designated for any grey seal, the number of grey seals using Flamborough Head as a haul-out site have increased over the past few years. The underwater noise for piling and other construction activities will also be short term.

385. Disturbance from the ANS and the port of origin for construction vessels (location to be confirmed) has the potential to disturb grey seals at haul-out sites, for example seals hauled out near Flamborough Head. Depending on the route and proximity to the haul-out sites (note that for DBA and DBB vessel mobilisation has been largely from international ports, with UK ports being used for crew transfers). However, due to the scale of the ANS works, the number of vessels required will be limited and the presence of vessels will be temporary and short term. Therefore, it is anticipated there is **no potential for an AEol** due to disturbance at seal haul out-sites.

6.2.4.2.6 Vessel interaction (increase in risk of collision)

6.2.4.2.6.1 *Construction*

386. Despite the potential for grey seal to detect and avoid vessels, ship strikes are known to occur (Wilson *et al.*, 2007). An increase in vessel numbers for the ANS works could potentially lead to an increase in vessel collision risk, although grey seal are considered likely to avoid vessels and therefore avoid collision.

387. To ensure there is no risk of vessel collision for marine mammals, the Project has committed to best practice measures for all vessel movements and through all phases of the Project. These best practice measures will be secured through inclusion in the PEMP for all phases of the Project. These best practice measures are based on existing guidance to reduce collision risk for marine mammals such as the Marine Code of Conduct developed by the SWF and The Scottish Marine Wildlife Watching Code developed by NatureScot. These measures are listed in **Section 6.2.3.2.5**.

388. With the inclusion of the embedded mitigation measures, it is considered highly unlikely that there would be any potential risk of vessel collision to grey seal.

389. Due to the limited amount of vessels required for the ANS works and the short term nature of the works, as well as the embedded mitigation measures, it is considered there would be **no potential for an AEol** due to potential risk of collision on the Humber Estuary SAC in relation to the conservation objectives for grey seal.

6.2.4.2.6.2 *Operation*

390. As outlined for construction, the increased risk of collision with grey seal during operation is considered unlikely.

391. The commitment to best practice measures and a Vessel Code of Conduct to be secured through the Project's PEMP (see Design Commitment CO115 listed in **Appendix C** of the **DBD ANS PEIR**), as detailed in **Section 6.2.3.2.5**, will significantly reduce any potential for marine mammals to collide with vessels during O&M activities. As for construction, based on the limited amount of vessels required for the ANS O&M activities and embedded mitigation measures, it is considered there would be **no potential for an AEol** due to potential risk of collision on the Humber Estuary SAC in relation to the conservation objectives for grey seal.

6.2.4.3 Assessment of Potential Effects of the Project In-Combination with Other Plans and Projects

392. Potential cumulative effects could arise from:

- Piling at other offshore wind farms in combination with that being undertaken at the ANS location;
- Other construction activities at other offshore wind farms in combination with that being undertaken at the ANS location (vessels presence, cable installation works, dredging, seabed preparation and rock placement);
- Carbon capture storage projects, offshore mines, and gas storage projects;
- Geophysical surveys;
- Aggregate extraction and dredging, and disposal sites;
- Oil and gas developments, decommissioning, and seismic surveys;
- Sub-sea cable and pipelines;
- Coastal works (such as ports and harbours); and
- UXO clearance (other than for the Project).

393. The ZoI used to identify relevant plans and projects for the grey seal in-combination is based on the south-east and north-east England MUs for grey seal.

394. Dogger Bank South East, Dogger Bank South West, and the DBD Project, have construction phases that overlap with construction of the ANS, therefore it is possible, that piling and other construction activities may occur at the same time.

395. Given the highly limited scope of works for installation of a single ANS, and the temporary nature of any localised impacts, it is considered that there is no meaningful potential for the ANS works to contribute to an in-combination effect with other plans or projects. Therefore, it is considered that there would be no pathway for any significant in-combination impacts upon grey seal. However, this will be confirmed in the ES assessment where up to date information of other plans and projects will be considered.

6.3 Conclusions and Next Steps

396. During all phases of the ANS, there is expected to be **no potential for an AEol** for Annex II Marine Mammals, either by the ANS alone or in-combination. However, site specific underwater noise modelling for piling will be required for further assessments for each AoS being considered. The modelling will be used to inform the assessments for piling, based on the option of installing a monopile, this will also consider soft-start and ramp-up procedures for the installation.
397. Further assessment of potential effects will include:
- Underwater Noise: Physical and Auditory Injury from Impact Piling During Construction; and
 - Underwater Noise: Behavioural Impacts from Impact Piling During Construction.
398. The assessment will also undertake an in-combination assessment with other projects, based on new information available for other plans and projects.

7 European Sites Designated for Annex II Marine Ornithology

7.1 Stage 1 Screening

399. The scope of this screening is to identify and screen sites designated for marine ornithological features, for potential LSEs due to construction, operation and maintenance and/or decommissioning of the ANS.

7.1.1 Approach to Screening

400. A pre-screening exercise considers the pathways for LSE both alone and in combination during each phase of the ANS along with listing potential effects on designated sites.

401. Birds present in offshore waters and potentially affected by the construction, operation and decommissioning within the ZoI (maximum 2km as identified in the **DBD ANS PEIR**) 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 periods).

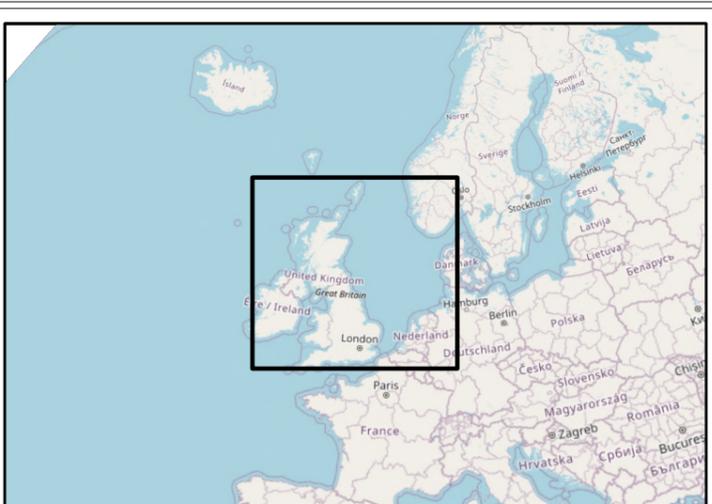
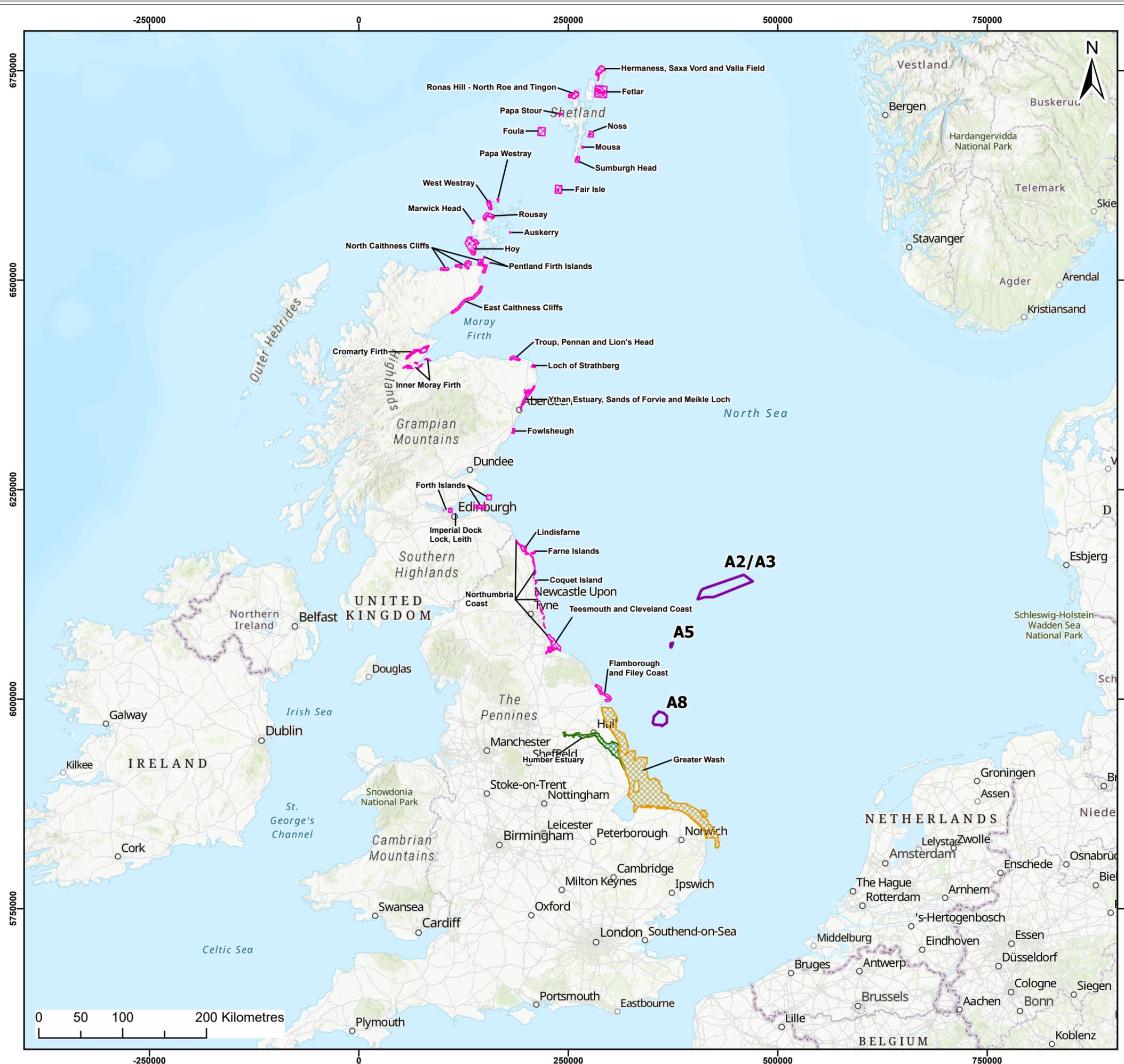
402. The HRA screening for offshore ornithology considers European sites (SPAs and Ramsar sites) which meet at least one of the following criteria in relation to the ANS:

- A component part of the AoS 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 AoS 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);
- 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), i.e. the site is considered if the AoS lies within this foraging range of the species from the SPA boundary; and
- The distance between the AoS 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.

403. The approach taken was informed by Natural England (2022b) 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 for ANS measures such as Dogger Bank South (RWE, 2024).
404. Assessment of species-specific risk to potential effects of the ANS is informed by Natural England advice and guidance for marine sites (Natural England, 2025), as well as assessments for recently constructed or proposed ANS in the southern North Sea (Hornsea Three, DBS), and representations from stakeholders during DCO examinations.
405. 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 (<https://sitelink.nature.scot/map>) 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.
406. Distances between the AoS and European sites were measured based on the shortest straight-line distance from the SPA boundary to the nearest AoS boundaries as shown on **Figure 7-1**.

7.1.2 Pathways for LSE

407. Potential impacts on offshore ornithology receptors are identified in **Section 7.6 Offshore Ornithology** of the **DBD ANS PEIR**. 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 maintenance, and decommissioning of the ANS, as identified in **Table 7.1**.
408. Screening of European sites and Ramsar sites for offshore ornithology took account of the potential effect(s) of the ANS on any one qualifying feature.



- Legend:
- ANS AoS
 - Marine SPA
 - Migratory Non-Seabird SPAs
 - Seabird Colony SPA

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Project: Dogger Bank D Offshore Wind Farm	
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Title:
 SPAs in relation to the Areas of Search

Figure:	7-1	Drawing No:	PC6250-HAS-XX-OF-DR-GS-0043		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	07/10/2025	JH	PT	A3	1:4,500,000
02	23/01/2026	JH	PT	A3	1:4,500,000

Co-ordinate system: WGS 1984 UTM Zone 31N



Table 7.1 Potential effects identified for offshore ornithology receptors to be considered at the Screening Stage

Potential Impact	Construction	Operation and Maintenance	Decommissioning
Direct disturbance and displacement	✓	✓	✓
Indirect impacts via habitat or prey availability	✓	✓	✓

7.1.2.1 Potential Effects during Construction

7.1.2.1.1 Direct disturbance and displacement

409. There is potential for movement and presence of construction-phase vessels, plus underwater and above-water noise and visual imposition from construction activities (e.g. piling), to cause direct disturbance and displacement to birds in the offshore habitats at the ANS location.
410. Disturbed birds may undertake movement in response, which expends additional energy, and if disturbed birds are displaced to different areas or habitats, these birds are additionally subject to potentially higher competition for resources, and potentially lower quality or quantity of resources.

7.1.2.1.2 Indirect impacts via habitat and prey availability

411. There is potential for seabed preparation and construction of the ANS, movement and presence of construction vessels, and underwater noise from construction activities, to indirectly impact birds in the offshore habitats at the ANS location through direct temporary impact on the habitats of their prey species (fish and invertebrates), disturbing and displacing their prey species, or lowering availability of prey by making foraging more difficult (e.g. reduced water clarity). Permanent loss of prey habitat is considered within O&M indirect impacts, **Section 7.1.2.2.2.**
412. Reduced availability of prey, via reduced prey abundance or less optimal foraging conditions, has implications for birds' food supply, food intake, daily energy budgets and subsequently survival rates.

7.1.2.2 Potential Effects during Operation and Maintenance

7.1.2.2.1 Direct disturbance and displacement

413. There is potential for movement and presence of maintenance vessels, lights as part of aids to navigation (AtN) plus underwater and above-water noise and visual imposition from maintenance activities, to cause direct disturbance and displacement to birds in the offshore habitats at the ANS location, or birds using the ANS for resting, foraging or breeding. Breeding kittiwake monitoring and research at the ANS during the breeding season (including personnel transport and landing, and the activities themselves) also have potential to cause disturbance and displacement of birds. It is expected that all other scheduled and routine activities regarding operation and maintenance of the ANS would be carried out outside the kittiwake breeding season. Unscheduled visits for operation and maintenance are expected to be rare, as these would likely only be carried out if the structure became a hazard or there was risk to safety or life.
414. Disturbed birds may undertake movement in response, which expends additional energy, and if disturbed birds are displaced to different areas or habitats, these birds are additionally subject to potentially higher competition for resources, and potentially lower quality or quantity of resources. Disturbance of birds from the nest on the ANS can lead to loss (ejection, predation) or chilling of eggs and young, and reduced breeding success.

7.1.2.2.2 Indirect impacts via habitat and prey availability

415. There is potential for presence and operation of the ANS to indirectly impact birds in the offshore habitats at the ANS location, through direct permanent conversion or loss of habitat of their prey species to the ANS footprint/structure. This could entail loss of habitat of some species and creation of habitat (the ANS structure within the water column) for other species. There is potential for maintenance activities to indirectly impact birds at the ANS location by direct removal of food and prey species from the ANS structure – however, planned maintenance works would be preceded by surveys including benthic surveys. There is potential for movement and presence of maintenance vessels, plus underwater noise from maintenance activities, to indirectly impact birds at the ANS location through direct temporary impact on the habitats of their prey species, disturbing and displacing their prey species, or lowering availability of prey by making foraging more difficult (e.g. reduced water clarity). Note that only seven JUV/HLV visits (usually linked to corrective maintenance (repairs, replacements and remedial works)) are predicted to be required over the lifetime of the ANS (average of once every five years). The scale of potential jack-up vessel footprint for a single disturbance event of the seabed is up to 1,200m². CTVs, which do not have potential for jack-up vessel footprint disturbance, are anticipated to be used for most planned maintenance activities.

416. Reduced availability of prey, via change in fish and invertebrate assemblage, reduced prey abundance or less optimal foraging conditions, has implications for birds' food supply, food intake, daily energy budgets and subsequently survival rates.

7.1.2.3 Potential Effects during Decommissioning

7.1.2.3.1 Direct disturbance and displacement

417. There is potential for movement and presence of decommissioning-phase vessels, plus underwater and above-water noise and visual imposition from decommission activities, to cause direct disturbance and displacement to birds in the offshore habitats at the ANS location.

418. Disturbed birds may undertake movement in response, which expends additional energy, and if disturbed birds are displaced to different areas or habitats, these birds are additionally subject to potentially higher competition for resources, and potentially lower quality or quantity of resources.

7.1.2.3.2 Indirect impacts via habitat and prey availability

419. There is potential for decommission of the ANS, movement and presence of vessels, and underwater noise from decommission activities, to indirectly impact birds in the offshore habitats at the ANS location through direct temporary impact on the habitats of their prey species (fish and invertebrates), disturbing and displacing their prey species, or lowering availability of prey by making foraging more difficult (e.g. reduced water clarity).

420. Reduced availability of prey, via reduced prey abundance or less optimal foraging conditions, has implications for birds' food supply, food intake, daily energy budgets and subsequently survival rates.

7.1.2.4 In-combination Effects

421. Should any of the above features be screened in for further assessment they will be subject to in-combination assessment for the effect pathways for which the features were screened in.

7.1.2.5 Transboundary Effects

422. 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 ANS is such that an effect might be possible based on the criteria identified above. However, as the EEZ is located 42km at the closest point from the northeastern extent of A2/3, no transboundary sites have been screened into this report.

7.1.3 Identification of Sites and Features

7.1.3.1 Sites directly overlapping with the Project’s boundaries

423. No SPA or Ramsar sites overlap with the AoS.

7.1.3.2 Sites within the ZOI of the Project’s Effects

424. SPA and Ramsar sites have connectivity to the Zoi of the ANS’s potential effects through breeding season foraging ranging, and non-breeding season use, of the sea area surrounding the ANS by breeding seabirds from SPA colonies.

7.1.3.2.1 Seabird breeding colony SPAs – connectivity in the breeding season

425. **Table 7.2** shows the Mean Maximum Foraging Ranges and Standard Deviation (SD) where available from Breeding Colonies for Seabird Species.

Table 7.2 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

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Species	Mean maximum foraging range (km ± standard deviation SD) ¹	Mean maximum foraging range + 1SD (km)
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)	2,365.5
Mediterranean gull	20 (no S.D.)	20
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 Isle 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, 2022c), whilst NatureScot guidance advises exclusion of the Fair Isle data for colonies south of Pentland Firth (NatureScot, 2023).

7.1.4 Determination of LSE for Offshore Ornithology

426. **Table 7.3** summarises the screening outcomes for Annex II Offshore Ornithology features in relation to the ANS. No sites have been screened in for further assessment.

7.2 Conclusions and Next Steps

427. During all phases of the ANS, there is expected to be **no Likely Significant Effects** for Annex II Offshore Ornithology features and therefore their designated SPAs, either by the ANS alone or in-combination.

428. Given the conclusion of no LSE at the screening stage on any offshore ornithology features, no assessment is considered necessary at this stage or for the RIAA to be submitted with the DCO application.

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Table 7.3 ANS Screening outcome for UK SPA and Ramsar sites with offshore ornithology features

Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
UK902 0329	Greater Wash SPA	40	Red-throated diver – non-breeding	Out	The site is designated for foraging and resting waters for all qualifying features. The site lies at such a distance from the AoS that any potential for LSE via any pathway can be confidently ruled out.
			Common scoter – non-breeding	Out	
			Little gull – non-breeding	Out	
			Little tern – breeding	Out	
			Common tern – breeding	Out	
			Sandwich tern - breeding	Out	
UK900 6101	Flamborough and Filey Coast SPA	55	Gannet	Out	The AoS lie within foraging range of the SPA population, but the number of individuals potentially occurring in the AoS is expected to be negligible given their size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Guillemot	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
UK900 6101	Flamborough and Filey Coast SPA (<i>continued</i>)	55	Kittiwake	Out	The AoS lie within foraging range of the SPA population, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out
			Razorbill	Out	The AoS lie within foraging range of the SPA population, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Seabird assemblage – breeding (additionally fulmar, puffin, herring gull, shag, cormorant)	Out	The AoS lie within foraging range of SPA assemblage component species, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
UK900 6031	Coquet Island SPA	150	Arctic tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Common tern	Out	The AoS lies beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Roseate tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Sandwich tern	Out	The AoS lies beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Seabird assemblage – breeding (additionally puffin, black-headed gull, fulmar, herring gull, lesser black-backed gull, kittiwake)	Out	The AoS lie within foraging range of SPA assemblage component species, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
UK900 6021	Farne Islands SPA	160	Arctic tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
			Common tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Guillemot	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Roseate tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Sandwich tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
UK900 6021	Farne Islands SPA (<i>continued</i>)	160	Seabird assemblage – breeding (additionally kittiwake, shag, cormorant, puffin)	Out	The AoS lie within foraging range of SPA assemblage component species, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
UK900 4271	St Abb's Head to Fast Castle SPA	175	Seabird assemblage – breeding (guillemot, razorbill, kittiwake, herring gull, shag)	Out	The AoS lie within foraging range of SPA assemblage component species, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site can be confidently ruled out.
UK900 4171	Forth Islands SPA	210	Arctic tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Common tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
UK900 4171	Forth Islands SPA (<i>continued</i>)	210	Gannet	Out	The AoS lie within foraging range of the SPA population, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Lesser black-backed gull	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Puffin	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Roseate tern	Out	The AoS lies beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
			Sandwich tern	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.
UK900 4171	Forth Islands SPA (<i>continued</i>)	210	Shag	Out	The AoS lie beyond the foraging range of the SPA population. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

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Site code	Site	Nearest distance from AoS (km)	Qualifying feature ¹	Screening decision	Rationale
			Seabird assemblage – breeding (additionally razorbill, guillemot, kittiwake, herring gull, cormorant)	Out	The AoS lie within foraging range of SPA assemblage component species, but the number of individuals potentially occurring in the AoS is expected to be negligible given its size relative to foraging range. Therefore, any potential for LSE on the feature and site via any pathway can be confidently ruled out.

8 Summary and Next Steps

8.1 Summary of Screening and Assessment

429. **Table 8.1** and **Table 8.2** presents the conclusions of the screening and assessment, notably identifying the sites and features screened in for consideration at an intermediate level of assessment.

Table 8.1 Summary of all European Sites and features screened in for the HRA of the ANS

European Site	Designated Feature Screened In	AoS	Construction	Operation and Maintenance	Decommissioning	
Annex I Habitats						
Dogger Bank SAC	Sandbanks which are slightly covered by seawater all the time	A2/3	Changes in suspended solids (water clarity) Smothering and siltation rate changes (heavy/light) Underwater noise changes Introduction of marine INNS from vessel traffic Vibration In-combination effects	Changes in suspended solids (water clarity) Smothering and siltation rate changes (heavy/light) Water flow (tidal current) changes, including sediment transport considerations In-combination effects	Changes in suspended solids (water clarity) Smothering and siltation rate changes (heavy/light) Underwater noise changes Introduction of marine INNS from vessel traffic Vibration In-combination effects	
		A5	Screened out due to distance and no pathway for impacts to arise on receptors and therefore no effects expected.			
		A8				
Annex II Migratory Fish						

HRA SCREENING REPORT AND DRAFT RIAA

European Site	Designated Feature Screened In	AoS	Construction	Operation and Maintenance	Decommissioning
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All sites and features screened out due to distance and no pathway for impacts to arise on receptors and therefore no effects expected.

Annex II Marine Mammals

Southern North Sea SAC	Harbour porpoise	All	Underwater noise: impact piling Underwater noise: other construction activities and vessel noise Vessel interaction In-combination effects	Vessel interaction In-combination effects	In-combination effects
Humber Estuary SAC	Grey seal	A2/3	Screened out due to distance and no pathway for impacts to arise on receptors and therefore no effects expected.		
		A5			
		A8	Underwater noise: impact piling Underwater noise: other construction activities and vessel noise Vessel interaction Disturbance at seal haul out sites In-combination effects	Vessel interaction In-combination effects	In-combination effects

Annex II Marine Ornithological Features

HRA SCREENING REPORT AND DRAFT RIAA

European Site	Designated Feature Screened In	AoS	Construction	Operation and Maintenance	Decommissioning
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All sites and features screened out due to distance outside of foraging range, low abundance numbers in the direct disturbance areas, and localised and temporary nature of impacts to arise on receptors and therefore no effects expected.

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Table 8.2 Conclusions of the European Sites' assessment

European Site	Qualifying Feature	Potential Effects	Potential for adverse effect on site integrity alone/ in combination?
Annex I Habitats			
Dogger Bank SAC	Sandbanks which are slightly covered by seawater all the time.	Changes in suspended solids (water clarity) (Construction and O&M)	Potential for an AEol of the conservation objectives of the site can be confidently ruled out for the ANS alone and in-combination with other projects.
		Smothering and siltation rate changes (Construction and O&M)	
		Underwater noise changes (Construction)	
		Vibration (Construction)	
		Introduction or spread of INNS from vessel traffic	
		Water flow (tidal current) changes, including sediment transport considerations (O&M)	
Annex II Marine Mammals			
Southern North Sea SAC	Harbour Porpoise	Underwater noise: impact piling (Construction)	Potential for an AEol of the conservation objectives of the site can be confidently ruled out for the ANS alone and in-combination with other projects.
		Underwater noise: other construction activities and vessel noise (Construction)	
		Vessel interaction (Construction and O&M)	

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European Site	Qualifying Feature	Potential Effects	Potential for adverse effect on site integrity alone/ in combination?
Humber Estuary SAC	Grey Seal	Underwater noise: impact piling (Construction)	Potential for an AEoI of the conservation objectives of the site can be confidently ruled out for the ANS alone and in-combination with other projects.
		Underwater noise: other construction activities and vessel noise (Construction)	
		Vessel interaction (Construction and O&M)	
		Disturbance at seal haul out sites (Construction)	

8.2 Next Steps

430. This screening report and draft RIAA concludes potential effects are either screened out or assessed that there is no potential for AEol on any designated sites or species for the project alone or in-combination with other projects. Therefore, it is not proposed to carry out further assessment at RIAA for the DCO stage for these features. However, for Annex II marine mammals quantitative modelling and assessment for piling effects will be undertaken for the RIAA at the DCO stage to support a qualitative conclusion of no AEol on any designated sites or species for the Project alone or in-combination.

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Table of Acronyms

Acronym	Definition
AA	Appropriate Assessment
AEoI	Adverse Effect on Integrity
ANS	Artificial Nesting Structure
AoS	Area of Search
AtN	Aids to Navigation
BDMPS	Biologically Defined Minimum Population Size
CA	Competent Authority
CAA	Civil Aviation Authority
CEA	Cumulative Effects Assessment
CRA	Chemical Risk Assessment
cSAC	Candidate Special Area of Conservation
CTV	Crew Transfer Vessel
DBA	Dogger Bank A
DBB	Dogger Bank B
DBC	Dogger Bank C
DBD	Dogger Bank D
DBS	Dogger Bank South
DCO	Development Consent Order
DESNZ	Department for Energy Security & Net Zero
DP	Dynamic Positioning
EC	European Commission
EEZ	European Economic Zone
EIA	Environmental Impact Assessment
EPS	European Protected Species

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Acronym	Definition
ES	Environmental Statement
EU	European Union
GIS	Geographical Information System
HLV	Heavy Lift Vessel
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
IPMP	In-Principle Monitoring Plan
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
JUV	Jack-Up Vessel
kJ	Kilojoule
km	Kilometre (distance)
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effect
m	Metre (length)
m ²	Metre squared (area)
m ³	Metre cubed (volume)
MCA	Maritime and Coastguard Agency
MHWS	Marine High Water Spring
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPCP	Marine Pollution Contingency Plan
MU	Management Unit
NPS	National Policy Statement
NtM	Notice to Mariners

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Acronym	Definition
O&M	Operation & Maintenance
OCV	Offshore Construction Vessel
OREI	Offshore Renewable Energy Installation
OSPAR	Oslo and Paris Conventions
OWF	Offshore Wind Farm
PAH	Polyaromatic Hydrocarbons
PEIR	Preliminary Environmental Information Report
PEMP	Project Environmental Management Plan
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
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SACO	Supplementary Advice on Conservation Objectives
SCI	Site of Community Importance
SD	Standard Deviation
SMRU	Sea Mammal Research Unit
SNCB	Statutory Nature Conservation Body
SOV	Service Operation Vessel
SPA	Special Protection Area
SSC	Suspended Sediment Concentrations
SSSI	Site of Special Scientific Interest
SWF	Sea Watch Foundation

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Acronym	Definition
TSHD	Trailing Suction Hopper Dredger
TTS	Temporary Threshold Shift
UK	United Kingdom
UKHO	UK Hydrographic Office
UXO	Unexploded Ordnance
Zol	Zone of Influence

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