DOGGER BANK D WIND FARM

Preliminary Environmental Information Report

Volume 1
Chapter 17 Offshore Archaeology and Cultural Heritage

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Glossary

Term	Definition
Additional Mitigation	Measures identified through the EIA process that are required as further action to avoid, prevent, reduce or, if possible, offset likely significant adverse effects to acceptable levels (also known as secondary (foreseeable) mitigation). All additional mitigation measures adopted by the Project are provided in the Commitments Register.
Aviation Archaeology	The remains of crashed aircraft and archaeological material associated with historic aviation activities.
Commitment	Refers to any embedded mitigation and additional mitigation, enhancement or monitoring measures identified through the EIA process and those identified outside the EIA process such as through stakeholder engagement and design evolution. All commitments adopted by the Project are provided in the Commitments Register.
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Array Area	The area within which the wind turbines, inter-array cables and offshore platform(s) will be located.
Deemed Marine Licence (DML)	A consent required under the Marine and Coastal Access Act 2009 for certain activities undertaken within the UK marine area, which may be granted as part of the Development Consent Order.
Development Consent Order (DCO)	A consent required under Section 37 of the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Embedded Mitigation	Embedded mitigation includes: • An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance. • Measures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). All embedded mitigation measures adopted by the Project are provided in the Commitments Register.

Term	Definition
Enhancement	Measures committed to by the Project to create or enhance positive benefits to the environment or communities, as a result of the Project. All enhancement measures adopted by the Project are provided in the Commitments Register.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Environmental Statement (ES)	A document reporting the findings of the EIA which describes the measures proposed to mitigate any likely significant effects.
Evidence Plan Process (EPP)	A voluntary consultation process with technical stakeholders which includes a Steering Group and Expert Topic Group (ETG) meetings to encourage upfront agreement on the nature, volume and range of supporting evidence required to inform the EIA and HRA process.
Expert Topic Group (ETG)	A forum for targeted technical engagement with relevant stakeholders through the EPP.
Geoarchaeology	The application of earth science principles and techniques to the understanding of the archaeological record. Includes the study of soils and sediments and of natural physical processes that affect archaeological sites such as geomorphology, the formation of sites through geological processes and the effects on buried sites and artefacts.
Glacial / Interglacial	A glacial period is a period of time within an ice age that is marked by colder temperatures and glacier advances. Interglacial correspond to periods of warmer climate between glacial periods. There are three main periods of glaciation within the last 1 million years, the Elsterian, the Saalian and the Weichselian which ended about 12,000 years ago. The Holocene period corresponds to the current interglacial.
Historic Seascape Character	The attributes that contribute to the formation of the historic character of the seascape.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Inter-Array Cables	Cables which link the wind turbines to the offshore platform(s).
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.

Term	Definition
Marine Isotope Stage	Marine isotope stages are alternating warm and cool periods in the Earth's paleoclimate, deduced from oxygen isotope data reflecting changes in temperature derived from data from deep sea core samples.
Maritime Archaeology	The remains of boats and ships and archaeological material associated with prehistoric and historic maritime activities.
Mean High Water Spring	MHWS is the average of the heights of two successive high waters during a 24-hour period.
Mesolithic	10000 to 4000 BC The Middle Stone Age, falling between the Palaeolithic and Neolithic and marking the beginning of a move from a hunter gatherer society towards a food producing society.
Mitigation	Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development. All mitigation measures adopted by the Project are provided in the Commitments Register.
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.
Monitoring	Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur. All monitoring measures adopted by the Project are provided in the Commitments Register.
Offshore Development Area	The area in which all offshore infrastructure associated with the Project will be located, including any temporary works area during construction, which extends seaward of Mean High Water Springs. There is an overlap with the Onshore Development Area in the intertidal zone.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cables will be located, extending from the DBD Array Area to Mean High Water Springs at the landfall.
Offshore Export Cables	Cables which bring electricity from the offshore platform(s) to the transition joint bay at landfall.

Term	Definition
Offshore Platform(s)	Fixed structures located within the DBD Array Area that contain electrical equipment to aggregate and, where required, convert the power from the wind turbines, into a more suitable voltage for transmission through the export cables to the Onshore Converter Station. Such structures could include (but are not limited to): Offshore Converter Station(s) and an Offshore Switching Station.
Palaeoenvironmental Analysis	The study of sediments and the organic remains of plants and animals to reconstruct the environment of a past geological age.
Palaeographic Features	Features seen within sub-bottom profiler data (buried) and multibeam bathymetry data (sea floor) interpreted as representing prehistoric physical landscape features such as former river channels (palaeochannels).
Palaeolithic	500000 to 10000 BC The Old Stone Age defined by the practice of hunting and gathering and the use of chipped flint tools. This period is usually divided into Lower, Middle and Upper Palaeolithic.
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Safety Zones	A statutory, temporary marine zone demarcated for safety purposes around a possibly hazardous offshore installation or works / construction area.
Scoping Opinion	A written opinion issued by the Planning Inspectorate on behalf of the Secretary of State regarding the scope and level of detail of the information to be provided in the Applicant's Environmental Statement. The Scoping Opinion for the Project was adopted by the Secretary of State on 02 August 2024.
Scoping Report	A request by the Applicant made to the Planning Inspectorate for a Scoping Opinion on behalf of the Secretary of State. The Scoping Report for the Project was submitted to the Secretary of State on 24 June 2024.
Scour Protection	Protective materials used to avoid sediment erosion from the base of the wind turbine foundations and offshore platform foundations due to water flow.
Seabed Features	Features seen on the seafloor in the sidescan sonar or multibeam bathymetry data which are interpreted to represent heritage assets, or potential heritage assets. Also includes magnetic anomalies which may represent shallow buried ferrous material of archaeological interest.

Term	Definition
Seabed Prehistory	Archaeological remains on the seabed corresponding to the activities of prehistoric populations that may have inhabited what is now the seabed when sea levels were lower.
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore Wind Farm Project 4 Projco Limited'.
The Project	Dogger Bank D Offshore Wind Farm Project, also referred to as DBD in this PEIR.
Trenchless Techniques	Trenchless cable or duct installation methods used to bring offshore export cables ashore at landfall, facilitate crossing major onshore obstacles such as roads, railways and watercourses and where trenching may not be suitable. Trenchless techniques included in the Project Design Envelope include Horizontal Directional Drilling (HDD), auger boring, micro-tunnelling, pipe jacking / ramming and Direct Pipe.
Wind Turbines	Power generating devices located within the DBD Array Area that convert kinetic energy from wind into electricity.

17 Offshore Archaeology and Cultural Heritage

17.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the Environmental Impact Assessment (EIA) of the Dogger Bank D Offshore Wind Farm (herein 'the Project' or 'DBD') on offshore archaeology and cultural heritage.

2. **Chapter 4 Project Description** provides a description of the design of infrastructure components and construction, operation and maintenance, and decommissioning activities for DBD presented in **Section 4.5**.

3. The primary purpose of the PEIR is to support the statutory consultation activities required for a Development Consent Order (DCO) application under the Planning Act 2008. The information presented in this PEIR chapter is based on the baseline characterisation and assessment work undertaken to date. The feedback from the statutory consultation will be used to inform the final project design where appropriate and presented in an Environmental Statement (ES), which will be submitted with the DCO application.

4. This PEIR chapter:

   - Describes the baseline environment relating to offshore archaeology and cultural heritage;
   - Presents an assessment of the likely significant effects on offshore archaeology and cultural heritage during the construction, operation and decommissioning phases of the Project;
   - Identifies any assumptions and limitations encountered in compiling the environmental information; and
   - Sets out proposed mitigation measures to avoid, prevent reduce or, if possible, offset potential significant adverse environmental effects identified during the EIA process and, where relevant, monitoring measures or enhancement measures to create or enhance positive effects.

5. This chapter should be read in conjunction with the following related chapters:

   - **Chapter 8 Marine and Physical Processes**; and
   - **Chapter 24 Onshore Archaeology and Cultural Heritage**.

6. Inter-relationships are discussed further in **Section 17.11.1**.

7. Additional information to support the offshore archaeology and cultural heritage assessment includes:

   - **Volume 2, Appendix 17.1. Consultation Responses for Offshore Archaeology and Cultural Heritage;**
   - **Volume 2, Appendix 17.2. Offshore Archaeological Geophysical Survey Report; and**
   - **Volume 2, Appendix 17.3. Offshore and Intertidal Archaeology and Cultural Heritage Gazetteers.**

8. The acquisition and assessment of marine geophysical data from the offshore ECC (as presented to Historic England at an Expert Topic Group (ETG7) meeting on 16/05/2024) is ongoing and will be completed to inform the ES which will accompany the DCO application.

17.2 Policy and Legislation

17.2.1 National Policy Statements

9. Planning policy on energy National Significant Infrastructure Projects is set out in the National Policy Statements (NPS). The following National Policy Statements are relevant to the offshore archaeology and cultural heritage assessment:

   - Overarching NPS for Energy (EN-1) (DESNZ, 2023a);
   - National Policy Statement for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023b); and
   - National Policy Statement for Electricity Networks Infrastructure (EN-5) (DESNZ, 2023c).

10. The offshore archaeology and cultural heritage chapter has been prepared with reference to specific requirements in the above NPSs. The relevant parts of the National Policy Statements are summarised in **Table 17-1**, along with how and where they have been considered in this PEIR chapter.

11. Where relevant to the EIA, coordination measures have been detailed and considered in this chapter. Specific measures incorporated as part of the final project design and how they will be secured will be confirmed in the ES. The final findings of the EIA will consider the potential benefits of coordination measures committed to by the Project to reduce impacts on local communities and the environment from cumulative developments.

Table 17-1 Summary of Relevant National Policy Statement Requirements for Offshore Archaeology and Cultural Heritage

National Policy Statement Reference and Requirement	How and Where Considered in the PEIR
NPS for Energy (EN-1)	
Paragraph 5.9.10: "As part of the ES the applicant should provide a description of the significance of the heritage assets affected by the proposed development, including any contribution made by their setting. The level of detail should be proportionate to the importance of the heritage assets and no more than is sufficient to understand the potential impact of the proposal on their significance."	The significance of the archaeological receptors considered in this chapter, and the contribution of setting to that significance, have been detailed in **Section 17.6** and **Section 17.7**. Issues relating to the setting of onshore heritage assets have been considered as part of **Chapter 24 Onshore Archaeological and Cultural Heritage**.
Paragraph 5.9.11: "Where a site on which development is proposed includes, or the available evidence suggests it has the potential to include, heritage assets with an archaeological interest, the applicant should carry out appropriate desk-based assessment and, where such desk-based research is insufficient to properly assess the interest, a field evaluation. Where proposed development will affect the setting of a heritage asset, representative visualisations may be necessary to explain the impact."	**Section 17.7** of this chapter provides the results of the desk-based assessment undertaken for Offshore Archaeology and Cultural Heritage. The archaeological assessment of marine geophysical and geotechnical data (field evaluation) is underway, and a full assessment of the baseline environment will be presented in the ES.
Paragraph 5.9.12: "The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents."	This chapter provides a preliminary account of the potential impacts of the Project upon heritage assets and their significance based upon desk-based assessment only (**Section 17.7**). The results of the archaeological assessment of marine geophysical and geotechnical data will allow for the full extent of impacts to be understood and will be presented in the ES which will accompany the DCO application.
Paragraph 5.9.13: "The applicant is encouraged, where opportunities exist, to prepare proposals which can make a positive contribution to the historic environment, and to consider how their scheme takes account of the significance of heritage assets affected. This can include, where possible: • Enhancing, through a range of measures such a sensitive design, the significance of heritage assets or setting affected; • Considering where required the development of archive capacity which could deliver significant public benefits; and • Considering how visual or noise impacts can affect heritage assets, and whether there may be opportunities to enhance access to, or interpretation, understanding and appreciation of, the heritage assets affected by the Scheme."	The potential for enhancement of the archaeological record for the North Sea is discussed in **Section 17.8**.
NPS for Renewable Energy Infrastructure (EN-3)	
Paragraph 2.8.168: "Applicants should consult with the relevant statutory consultees, such as Historic England or Cadw, on the potential impacts on the marine historic environment at an early stage of development during pre-application, taking into account any applicable guidance (e.g. offshore renewables protocol for archaeological discoveries)."	Consultation has been undertaken with relevant statutory consultees, as outlined in **Section 17.3**. Consultation will be ongoing throughout the development process. The guidance considered for the assessment of offshore archaeology and cultural heritage is listed in **Section 17.6.1**.

National Policy Statement Reference and Requirement	How and Where Considered in the PEIR
Paragraphs 2.8.169 to 2.8.171: "Assessment of potential impacts upon the historic environment should be considered as part of the Environmental Impact Assessment process undertaken to inform any application for consent. Desk based studies to characterise the features of the historic environment that may be affected by a proposed development and assess any likely significant effects should be undertaken by competent archaeological experts. These studies should take into account any geotechnical or geophysical surveys that have been undertaken to aid the wind farm design."	**Section 17.7** of this chapter provides the results of the desk-based assessment undertaken for Offshore Archaeology and Cultural Heritage. The archaeological assessment of marine geophysical and geotechnical data (field evaluation) is underway, and a full assessment of the baseline environment will be presented in the ES which will accompany the DCO application.
Paragraph 2.8.176: "Assessment may also include the identification of any beneficial effects on the marine historic environment, for example through improved access or the contribution to new knowledge that arises from investigation."	Any beneficial effects to the offshore archaeology and cultural heritage Resource resulting from the Project have been identified in **Section 17.8**.
Paragraph 2.8.177: "Where elements of a proposed project (whether offshore or onshore) may interact with historic environment features that are located onshore, applicants should assess the effects in accordance with Section 5.9 in EN-1."	Potential impacts of the Project upon onshore heritage assets have been considered in **Chapter 24 Onshore Archaeology and Cultural Heritage**.
NPS for Electricity Networks Infrastructure (EN-5)	
Paragraph 2.2.10: "…applicants must take into account Schedule 9 to the Electricity Act 1989, which places a duty on all transmission and distribution license holders, in formulating proposals for new electricity networks infrastructure, to "have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and …do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects."	Potential impacts upon sites and objects of archaeological interest offshore are set out in **Section 17.8** along with a proposed approach to mitigation.

17.2.2 Other Policy and Legislation

12. Other policy and legislation relevant to the offshore archaeology and cultural heritage assessment is summarised in the following sections.

17.2.2.1 International

- European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (The Valletta Convention); and
- UNESCO Convention on the Protection of Underwater Cultural Heritage.

17.2.2.2 National

- Marine and Coastal Access Act 2009;
- Merchant Shipping Act 1995;
- Protection of Military Remains Act 1986;
- Ancient Monuments and Archaeological Areas Act 1979;
- Protection of Wrecks Act 1973: Section One and Two;
- National Planning Policy Framework (NPPF); and
- UK Marine Policy Statement (MPS).

17.2.2.3 Regional

- East Inshore and East Offshore Marine Plan (Defra, 2014), and the North East Inshore and Offshore Marine Plan (Defra, 2021).

17.3 Consultation

13. Topic-specific consultation in relation to offshore archaeology and cultural heritage has been undertaken in line with the process set out in **Chapter 7 Consultation**. A Scoping Opinion from the Planning Inspectorate was received on 2nd August 2024, which has informed the scope of the assessment presented within this chapter (as outlined in **Section 17.5.1**).

14. Feedback received through the ongoing Evidence Plan Process (EPP) in relation to ETG meetings and wider technical consultation meetings with relevant stakeholders has also been considered in the preparation of this chapter. Details of technical consultation undertaken to date on offshore archaeology and cultural heritage are provided in **Table 17-2**.

Table 17-2 Technical Consultation Undertaken to Date on Offshore Archaeology and Cultural Heritage

Meeting	Stakeholder(s)	Date(s) of Meeting / Frequency	Purpose of Meeting
ETG Meetings			
ETG7 Offshore Archaeology and Cultural Heritage Meeting 01	Historic England Humber Archaeology Partnership (East Riding of Yorkshire Council and Hull City Council)	18th September 2023	To agree the approach to assessment.
ETG7 Offshore Archaeology and Cultural Heritage Meeting 02	Historic England	16th May 2024	To provide a general project update, details of the assessment of geophysical data and details of future planned geophysical and geotechnical surveys.

15. **Volume 2, Appendix 17.1 Consultation Responses for Offshore Archaeology and Cultural Heritage** summarises how consultation responses received to date are addressed in this chapter.

16. This chapter will be updated based on refinements made to the Project Design Envelope and to consider where appropriate stakeholder feedback on the PEIR. The updated chapter will form part of the ES to be submitted with the DCO application.

17.4 Basis of the Assessment

17. The following sections establish the basis of the assessment of likely significant effects, which is defined by the Study Area(s), assessment scope, and realistic worst-case scenarios. This section should be read in conjunction with **Volume 2, Appendix 1.2 Guide to PEIR**, **Volume 2, Appendix 6.2 Impacts Register** and **Volume 2, Appendix 6.3 Commitments Register.**

17.5 Study Area

18. The offshore archaeology and cultural heritage Study Area (referred to as the offshore archaeology Study Area) has been defined as the Offshore Development Area, including the intertidal zone at the landfall up to Mean High Water Springs (MHWS). The offshore archaeology Study Area (**Figure 4.1**) corresponds to the footprint within which development activities could occur and, consequently, the area of potential impacts to the offshore archaeology and cultural heritage baseline environment.

19. At the landfall, areas of the Onshore Development Area which are located below MHWS are also included in the offshore archaeology Study Area. This Study Area was determined in consultation with Historic England through the ETG meetings. Potential impacts to onshore archaeology (above MHWS) are assessed in **Chapter 24 Onshore Archaeology and Cultural Heritage**.

17.5.1 Scope of the Assessment

20. Several impacts have been scoped out of the offshore archaeology and cultural heritage assessment. These impacts are outlined in the Impacts Register provided in **Volume 2, Appendix 6.1**, along with supporting justification and are in line with the Scoping Opinion (discussed in **Section 17.3**) and the project description outlined in **Chapter 4 Project Description**.

21. Impacts scoped into the assessment relating to offshore archaeology and cultural heritage are outlined in **Table 17-3** and discussed further in **Section 17.8**.

Table 17-3 Offshore Archaeology and Cultural Heritage – Impacts Scoped into the Assessment

Impact ID	Impact and Project Activity	Rationale
Construction		
OFA-C-01	Direct physical impacts to known heritage assets – construction activities.	Direct impacts may occur if archaeological material is present within the footprint of the Project (e.g. cabling, foundations, footprint of jack-up vessels). Direct impacts within both the Array Area and offshore ECC.
OFA-C-02	Direct physical impacts to potential heritage assets – construction activities.	
OFA-C-03	Indirect impacts to heritage assets associated with changes to marine physical processes – construction activities.	Indirect impacts to heritage assets could occur if the physical presence of construction vessels and offshore infrastructure leads to changes to the hydrodynamic regime.
Operation and Maintentance		
OFA-O-01	Direct physical impacts to known heritage assets – operational activities.	Direct impacts may occur if archaeological material is present where routine and non-routine maintenance activities which disturb the seabed (e.g. seabed contact by legs of jack-up vessels and / or anchors). Similarly, this can occur in exceptional circumstances such as the replacement of cabling.
OFA-O-02	Direct physical impacts to potential heritage assets – operational activities.	
OFA-O-03	Indirect impacts to heritage assets associated with changes to marine physical processes – operational activities.	Indirect impacts to heritage assets may occur if the physical presence of the installed infrastructure impacts the hydrodynamic or sedimentary regime. This includes the potential for increased scour around foundations
OFA-O-04	Change to the setting of heritage assets, which could affect their heritage significance – operational activities.	Changes to the setting of heritage assets, may occur due to the presence of the installed infrastructure and ongoing maintenance activities.
Decommissioning		
OFA-D-01	Direct physical impacts to heritage assets – decommissioning activities not yet defined.	Decommissioning impacts are scoped in. However, details of offshore decommissioning activities are not known at this stage. As discussed in **Section 17.8.3**, decommissioning impacts will be assessed in detail through the Offshore Decommissioning Programme (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**) where relevant, which will be developed prior to the construction of the offshore works. In this assessment, it is assumed that most decommissioning activities would be the reverse of their construction counterparts, and that their impacts would be of similar nature to, and no worse than, those identified during the construction phase.
OFA-D-02	Direct physical impacts to heritage assets – decommissioning activities not yet defined.	
OFA-D-03	Indirect impacts to heritage assets associated with changes to marine physical processes – decommissioning activities not yet defined.	

22. A full list of impacts scoped in / out of the offshore archaeology and cultural heritage assessment is summarised in the **Impacts Register** provided in **Volume 2, Appendix 6.1**. A description of how the Impacts Register should be used alongside the PEIR chapter is provided in **Chapter 6 Environmental Impact Assessment Methodology**.

17.5.2 Embedded Mitigation Measures

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

24. **Volume 2, Appendix 6.3 Commitments Register** is provided at PEIR stage to provide stakeholders with an early opportunity to review and comment on the proposed commitments. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the Project's design envelope and stakeholder feedback. The final commitments will be confirmed in the Commitments Register submitted along with the DCO application.

25. The Project has made several commitments to avoid, prevent, reduce or, if possible, offset potential adverse environmental effects through mitigation measures embedded into the evolution of the Project's design envelope. These embedded mitigation measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects. The assessment of likely significant effects has therefore been undertaken on the assumption that these measures are adopted during the construction, operation and decommissioning phases. **Table 17-4** identifies proposed embedded mitigation measures that are relevant to the marine water and sediment quality assessment.

Table 17-4 Embedded Mitigation Measures Relevant to Offshore Archaeology and Cultural Heritage

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Offshore Archaeology and Cultural Heritage Assessment	Relevance to Impact ID
CO1	An Offshore Written Scheme of Investigation (WSI) and Protocol of Archaeological Discoveries (PAD) will be developed in accordance with the Outline Offshore WSI in consultation with Historic England.	DML Condition - Offshore Written Scheme of Investigation	Sets out potential mitigation measure that will reduce the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03 OFA-O-04
CO2	A Layout Plan (including sub-sea cables and the wind turbines) will be provided and agreed with the Marine Management Organisation (MMO) following consultation with Trinity House and the Maritime and Coastguard Agency (MCA). The Layout Plan will take account of the distribution of geophysical anomalies of archaeological interest and the requirement to avoid Archaeological Exclusion Zones (AEZ).	DML Condition - Layout Plan	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03 OFA-O-04
CO3	Archaeological input will occur into specifications for and analysis of future pre-construction geotechnical and geophysical surveys, including a provision for sampling, analysis and reporting of recovered cores, if appropriate. For post-construction marine geophysical data, archaeological assessment will include an assessment of AEZ. The results of all geoarchaeological investigations will to be compiled in final report.	DML Condition - Offshore Written Scheme of Investigation	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03
CO4	All anomalies of possible archaeological potential will be reviewed against the final offshore layout and design. If they are likely to be impacted by the development, these anomalies would undergo further archaeological investigation.	DML Condition - Offshore Written Scheme of Investigation	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Offshore Archaeology and Cultural Heritage Assessment	Relevance to Impact ID
CO5	Archaeologists will be consulted in the preparation of any pre-construction Remotely Operated Vehicle (ROV) or diver surveys and in monitoring / checking of data, if appropriate, based upon the findings of the archaeological assessment of geophysical survey data.	DML Condition - Offshore Written Scheme of Investigation	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03
CO6	The implementation of Archaeological Exclusion Zones (AEZ) around known heritage assets to avoid impacts will be observed.	DML Condition - Offshore Written Scheme of Investigation	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-C-01 OFA-C-02 OFA-C-03 OFA-O-01 OFA-O-02 OFA-O-03
CO21	An Offshore Decommissioning Programme will be provided prior to the construction of the offshore works and implemented at the time of decommissioning, based on the relevant guidance and legislation.	DCO Requirement - Offshore Decommissioning Programme	Sets out potential mitigation measure that will reduce the effects on offshore archaeology and cultural heritage assets	OFA-D-01 OFA-D-02 OFA-D-03
CO28	An Offshore Operations and Maintenance Plan (O&M) will be provided prior to commencement of operation and will outline the reasonably foreseeable O&M offshore activities.	DML Condition - Offshore Operations and Maintenance Plan	Reduces the effects on offshore archaeology and cultural heritage assets	OFA-O-01 OFA-O-02 OFA-O-03

26. An Outline Written Scheme of Investigation (WSI) will detail measures relevant to offshore archaeology and cultural heritage and will be submitted with the DCO application. Indicative embedded mitigation measures which are proposed to be included in the Outline WSI are set out in **Table 17-5.**

Table 17-5 Indicative Embedded Mitigation Measures to be Included in the Outline WSI

Measures to be Included: Outline WSI
Further site investigations if required comprising: • Marine Geophysical Survey; • Marine Geoarchaeological Investigations; • Non-archaeological Diver / ROV Surveys; • Archaeological Diver / ROV based site assessment; and • Archaeological Watching Briefs
The Outline WSI will include provision for archaeological input into the micro-siting of foundations (where appropriate and feasible), cables, legs of jack-up crane vessels and/or anchors of other vessels following the completion of the archaeological assessment of geophysical data and identification of any further AEZs. If it is not possible for the Projects to avoid geophysical anomalies of archaeological potential through micro-siting of the design, further assessment will need to be undertaken to confirm the character and archaeological interest of anomalies. Palaeogeographic features such as palaeochannels do not require AEZs or avoidance, but rather potential impacts are mitigated and offset through further assessment of existing material or further investigation.
The Outline WSI will make provisions for the implementation of AEZs around known wrecks, aircraft, or features of potential archaeological interest in consultation with the relevant heritage stakeholders. AEZs comprise a boundary placed around a heritage asset or potential assets where no development activities can be undertaken. The AEZ will extend from the boundary of the assets and will include a buffer to ensure that material associated with that asset is encapsulated inside the boundary, as well as to reduce the risk of unintentional impacts. The implementation, monitoring (**Section 17.12**), and modification of AEZs will take place in accordance with the measures specified in The Crown Estate (2021) guidance (or latest relevant guidance).
The Outline WSI will include a formal Protocol for Archaeological Discoveries (PAD) to account for unexpected discoveries of archaeological material made during, construction, operation (maintenance) and decommissioning. If material of archaeological interest is encountered during any phase of the Project, they would be reported through the protocol based on the Offshore Renewables Protocol for Archaeological Discoveries (ORPAD) (The Crown Estate 2014). This will establish whether the objects are of archaeological interest and allow for appropriate mitigation measures to be recommended where necessary.
The WSI will include provision for the establishment of an approach to supporting public benefit of data sharing, and to the creation of joined-up objectives for post-consent investigation and mitigation. This will be established post-consent in consultation with key stakeholders, including Historic England.
Post-construction monitoring will be set out where required in order to monitor the effectiveness of AEZs and to assess the effects of any direct or indirect impacts that may have occurred due to the construction of the Project.

17.5.3 Realistic Worst-Case Scenarios

27. To provide a precautionary, but robust, assessment at this stage of the Project's development process, a realistic worst-case scenario has been defined in **Table 17-6** for each impact scoped into the assessment (as outlined in **Section 17.5.1**). The realistic worst-case scenarios are derived from the range of parameters included in the design envelope. They ensure that the assessment of likely significant effects is based on the maximum potential impact on the environment. Should an alternative development scenario be taken forward in the final design of the Project, the resulting effects would not be greater in effect significance. Further details on the design envelope approach are provided in **Chapter 6 Environmental Impact Assessment Methodology**.

28. Following the PEIR publication, further design refinements will be made based on ongoing engineering studies and considerations of the EIA and stakeholder feedback. Therefore, realistic worst-case scenarios presented in the PEIR may be updated in the ES. The design envelope will be refined where possible to retain design flexibility only where it is needed.

Table 17-6 Realistic Worst-Case Scenarios for Impacts on Offshore Archaeology and Cultural Heritage

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Construction			
OFA-C-01 OFA-C-02	Direct (physical) impact to known heritage assets as a result of construction activities. Direct (physical) impact to potential heritage assets as a result of construction activities.	**Cables** **Inter-array Cables** Inter-array cable seabed sand wave levelling and installation including seabed preparation activities (35m width x 400km length of inter-array cables) = 14,000,000m^2. Inter-array cable sand wave levelling (35m width x 400km length of inter-array cables x 4m depth) = 56,000,000m^3. Inter-array cable burial volume (5m width x 400km length of inter-array cable x 3.5m depth) = 7,000,000m^3. Worst-case scenario volume for inter-array cables (sand wave levelling + trenching for inter-array cable installation) = **63,000,000m^3**. **Offshore Export Cable Corridor (including scour protection)** Export cable sand wave levelling footprint (230,400m long x 35m width) = 8,064,000m^2. Export cable installation footprint (569,600m long x 5m width) = 8,544,000m^2. Landfall exit pits footprint = (3 x 100m length x 25m width) = 7,500m^2. Worst-case scenario footprint for export cables (sand wave levelling + offshore export cable installation + landfall exit pits) = **16,615,500m^2**. Displaced sediment volume during sand wave levelling for Offshore Export Cables (230,400m long x 4m depth x 35m width) = 32,256,000m^3. Displaced sediment volume during trenching for Offshore Export Cable installation (569,600m long x 3.5m depth x 5m width) = 14,000,000m^3. Landfall exit pits = (3 x 100m long x 25m width x 3.5m depth) = 26,250m^3. Worst-case scenario volume for export cables (sand wave levelling + trenching for offshore export cable installation + landfall exit pits) = **46,282,250m^3**.	The worst-case scenario represents the maximum area of disturbed seabed sediments with the potential for archaeological material to be present either on the seafloor or buried within seabed deposits. The worse case scenario for OP is two small platforms as opposed to one large platform, both in terms of extent and volumes, hence only the worst case parameters shown.
		Vessel Impacts **Array Area** Vessel jack up assuming 5 jack-up locations per WTG / OSP (400m^2 per jack up leg x 6 legs x 5 jack up operations per WTG x 113 WTG and 2 OPs) = 1,380,000m^2. Anchoring during WTG and OP installation (based on 16 anchors x 100m^2 footprint x 115 (1 anchoring events per 113 WTG and 2 OPs)) = 187,600m^2. Anchoring during inter-array cable installation (based on 6 anchors x 100m^2 x 22.6 anchoring events) = 13,560m^2. Maximum area disturbed in array area = **1,581,160m^2**. **Offshore Export Cable Corridor**	

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
		Anchoring during offshore export cable installation (based on 6 anchors x 100m^2 x 24 anchoring events) = 14,400m^2. Anchoring at landfall exit pits during installation (based on 6 anchors x 100m^2 x 12 anchoring events) = 7,200m^2. Maximum area disturbed in offshore ECC = **21,600m^2**.	
		Foundation Footprints and Associated Scour Protection **Array Area** Maximum scour protection area per foundation including structure footprint for suction buckets of 14,314m^2 x 113 wind turbines = 1,617,482m^2. Two OPs with monopile foundations, scour protection area plus structure footprint (25,000m^2 monopile foundation plus scour protection footprint x 2 platforms) = 50,000m^2. Maximum area disturbed in array area = **1,667,482m^2**.	
OFA-C-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of construction activities	The worst-case scenarios for marine physical processes are set out in **Chapter 8 Marine Physical Processes** (**Table 8-8**). The following impacts are relevant to the worst-case for offshore archaeology and cultural heritage (i.e. increased exposure of buried archaeological material to marine processes due to loss of sediment cover): • MPP-C-08: Changes in seabed level due to cable installation at the landfall; and • MPP-C-10: Indentations on the seabed due installation vessels. Conversely, marine physical processes impacts which correspond to increased bed-level and consequent increased potential for the protection of heritage assets which are currently exposed through additional sediment cover (sediment deposited from plume) are: • MPP-C-01: Changes to seabed level due to seabed preparation for foundation installation; • MPP-C-02: Changes to seabed level due to drill arisings from foundations; and • MPP-C-03: Changes to seabed level due to array, inter platform and offshore export cable installation.	

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Operation and Maintenance			
OFA-O-01 OFA-O-02	Direct physical impacts to known heritage assets as a result of operational activities. Direct physical impacts to potential heritage assets as a result of operational activities.	**Array Area:** • Seabed disturbance from jacking-up activities over the Project's lifetime (7 visits for WTG over lifetime x (400m^2 per jack up leg x 6 legs x 5 jack up operations per WTG) = 84,000m^2. • Inter-array cable repairs - seabed disturbance over the Project's lifetime (15 visits over project lifetime x 1,000m (distance per year) x 15m width of seabed preparation) = 225,000m^2. • Inter-array cable reburial - seabed disturbance over the Project's lifetime (35 visits over project lifetime (1 per year) x 2,000m (distance per year) x 15m width of seabed preparation) = 1,050,000m^2. • Anchoring during inter-array cable repairs/reburial (based on 6 anchors x 100m2 x 35 anchoring events) = 21,000m^2. • Total disturbance in Array Area (sum of above) = **1,380,000m^2**. **Offshore ECC (includes portion within Array Area):** • Export cable repairs - seabed disturbance over the Project's lifetime (35 visits over project lifetime (1 per year) x 1,000m (distance per year) 15m width of seabed preparation) = 525,000m^2. • Export cable reburial - seabed disturbance over the Project's lifetime (35 visits over project lifetime (1 per year) x 2,000m (distance per year) 15m width of seabed preparation) = 1,050,000m^2. • Anchoring during export cable repairs/reburial (based on 6 anchors x 100m^2 x 35 anchoring events) = 21,000m^2. • Total disturbance in offshore ECC (sum of above) = **1,596,000m^2**. Total disturbance footprint = **2,976,000m^2**	The worst-case scenario represents the maximum area of disturbed seabed sediments with the potential for archaeological material to be present either on the seafloor or buried within seabed deposits.
		Landfall All cables will be buried below landfall, assumed no maintenance activities required during the operational stage. As such no operational impacts predicted to occur at landfall.	

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
OFA-O-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of operational activities	The worst-case scenarios for marine physical processes are set out in **Chapter 8 Marine Physical Processes** (**Table 8-8**). The following impacts are relevant to the worst-case for Offshore Archaeology and Cultural Heritage: • MPP-O-01: Changes to the tidal regime due to the presence of infrastructure (wind turbines and offshore platforms). • MPP-O-02: Changes to the wave regime due to the presence of infrastructure (wind turbines and offshore platforms). • MPP-O-04: Changes to bedload sediment transport and seabed morphology due to the presence of infrastructure (wind turbines and offshore platforms). • MPP-O-05: Changes to bedload sediment transport and seabed morphology due to the presence of cable protection measures. • MPP-O-06: Cable repairs and reburial.	The worst-case scenario represents the greatest potential for increased scour and sediment stripping across an area due to changes to physical processes which could result in the exposure and degradation of heritage assets which are currently buried and protected from marine processes.
OFA-O-04	Change to the setting of heritage assets, which could affect their heritage significance as a result of operational activities	Presence of wind farm infrastructure: • Up to 113 wind turbines. • Up to two OPs. Maximum temporal footprint: • The operational lifetime is expected to be 35 years. Vessels: • Maximum number of operation and maintenance phase vessels on site at any one time – 16. • Maximum total number of return trips per year = 96.	The worst-case scenario represents the maximum intrusive effect of installed infrastructure and operation and maintenance activities for the longest duration.
Decommissioning			
OFA-D-01 OFA-D-02 OFA-D-03	The final decommissioning strategy of the Project's offshore infrastructure has not yet been decided. For a description of potential offshore decommissioning works, refer to **Chapter 4 Project Description**. It is recognised that regulatory requirements and industry best practice change over time. Therefore, the details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning. Specific arrangements will be detailed in an Offshore Decommissioning Plan (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**), which will be submitted and agreed with the relevant authorities prior to the commencement of offshore decommissioning works. For this assessment, it is assumed that decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within the temporary construction working areas and require no greater amount or duration of activity than assessed for construction). The decommissioning sequence will generally be the reverse of the construction sequence. It is therefore assumed that decommissioning impacts would likely be of similar nature to, and no worse than, those identified during the construction phase.		

17.6 Assessment Methodology

17.6.1 Guidance Documents

29. The following guidance documents have been used to inform the baseline characterisation, assessment methodology and mitigation design for Offshore Archaeology and Cultural Heritage:

- CIfA Standard and Guidance for Historic Environment Desk-Based Assessments (2020) and Code of Conduct (2022);
- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021);
- Principles of Cultural Heritage Impact Assessment in the UK (Institute of Environmental Management and Assessment (IEMA), Institute of Historic Building Conservation (IHBC) and Chartered Institute of Archaeologists (CIfA), 2021);
- The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) (Historic England, 2017);
- Marine Geophysical Data Acquisition, Processing and Interpretation – guidance notes (Historic England, 2013);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble and Leather, 2011);
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology, 2008);
- Historic Environment Guidance for the Offshore Renewable Energy Sector Guidance (Wessex Archaeology, 2007); and
- Code for Practice for Seabed Development (Joint Nautical Archaeology Policy Committee (JNAPC), 2006).

30. The assessment of potential impacts upon offshore archaeology and cultural heritage has been made with specific reference to the relevant National Policy Statements (NPS) including the Overarching NPS for Energy (EN-1) (DESNZ, 2023a), the NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023b), and the NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2023c). These were published in November 2023 and were designated in January 2024. The specific assessment requirements for Offshore Archaeology and Cultural Heritage, as detailed in the NPS, are summarised in the **Section 17.2** and in **Table 17-1** together with an indication of the section of this chapter where each is addressed.

31. Further detail is provided in **Chapter 3 Policy and Legislative Context**.

32. Additional detail on how the legislation, policy and guidance applied to the assessment of offshore archaeology and cultural heritage is discussed, where relevant, in **Section 17.7** and **Section 17.8**.

17.6.1.1 Desk Study

33. A desk study has been undertaken to compile baseline information in the previously defined Study Area(s) (see **Section 17.5**) using the sources of information set out in **Table 17-7**.

Table 17-7 Desk-Based Sources for Offshore Archaeology and Cultural Heritage Data

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
Global Wrecks and Obstructions	Global	2024	Data set containing details of charted, uncharted, live, and dead wrecks and obstructions and shared on the Admiralty Marine data Portal by the United Kingdom Hydrographic Office (UKHO).
The National Heritage List for England (NHLE) maintained by Historic England	England	2024	Official, up to date, register of all nationally protect-ed historic buildings and sites in England - listed buildings, scheduled monuments, protected wrecks, registered parks and gardens, and battlefields. (including sites protected under the Protection of Military Remains Act 1986 and the Protection of Wrecks Act 1973).
Records held by Historic England, formally part of the National Record of the Historic Environment (NRHE) dataset	England	2024	Records of heritage assets and documented losses of wrecks and aircraft.
Humber Historic Environment Record (HHER)	East Riding of Yorkshire	2024	HERs are information services that provide access to comprehensive and dynamic re-sources relating to the archaeology and historic built environment of a defined geo-graphic area. HERs contain details of local archaeological sites and finds, historic buildings and historic landscapes and are regularly updated.
The Coastal and Intertidal Zone Archaeology Network (CITiZAN)	UK	2024	CITiZAN highlights the threat of coastal erosion to a wealth of foreshore and intertidal sites. These archaeological features encompass a huge time span, many are of considerable local or national significance.
Relevant documentary sources and grey literature	UK	Various	Includes reports and survey data gathered from previous offshore wind farm projects in the wider Dogger Bank area, e.g. Dogger Bank A, B, C, and Sofia.

17.6.1.2 Site Specific surveys

34. Wessex Archaeology undertook an archaeological assessment of geophysical data covering the DBD Array Area (Wessex Archaeology, 2024). Geophysical data for the Array Area were acquired by Enviros between 10th August and 5th October 2022. Line spacings were 100m for the main lines, with crosslines run at 2,000m (Enviros 2023). The Array Area is also partially covered by geophysical data acquired from a survey of one of the previous offshore ECC routing options, which has since been refined out (for detail on ECC site selection and refinement please see **Chapter 5 Site Selection and Consideration of Alternatives**). This geophysical data set was acquired by Ocean Infinity between 26 September and 28 October 2022 (Ocean Infinity 2023). In addition, the archaeological assessment reconsidered the results of a previous assessment of 2012 geophysical data, undertaken for the original Teesside A project with which the DBD Array Area completely overlaps, including reassessment of previously identified anomalies and recommended AEZs.

35. The results of this assessment have been used to inform the PEIR and are discussed in further detail in **Section 17.7.1.2**, and the full results of the assessment are presented in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**.

36. The acquisition of marine geophysical data from the offshore ECC is ongoing and assessment will be undertaken by Wessex Archaeology. This will inform the ES which will accompany the DCO application. Geophysical data was acquired from the former iteration of the offshore ECC, which was subsequently changed to the existing one. These changes to the scheme design were discussed in consultation with Historic England (see **Volume 2, Appendix 17.1 Consultation Responses for Offshore Archaeology and Cultural Heritage**). The results, including those for the previous iteration of the offshore ECC will be made available in the public domain should they be relevant to future archaeological work in the region.

37. Surveys which are relevant to the offshore archaeology and cultural heritage baseline characterisation that have been completed, are ongoing or are planned to be undertaken to inform the ES are summarised in **Table 17-8**.

Table 17-8 Site-Specific Survey Data for Offshore Archaeology and Cultural Heritage

Survey	Spatial Coverage	Year(s)	Summary of Survey Data
Completed			
Marine geophysical data	DBD ECC (within SAC)	2022	SSS, MBES, Mag., SB and positioning data acquired by Enviros.
Marine geophysical data	DBD Array Area Study Area	2022	SSS, MBES, Mag., SB and positioning data acquired by Enviros.
Marine geophysical data	DBD ECC (outside SAC)	2023	SSS, MBES, Mag., SB and positioning data using USV's acquired by XOcean
Ongoing			
Marine geophysical data	DBD ECC	2025	SSS, MBES, Mag. and positioning data
Marine geotechnical data	DBD Array Area and ECC	2025	Shallow Cone Penetration Testing (CPT's) and Vibrocores

38. Additionally, marine geophysical data was acquired in 2022 as part of the Dogger Bank C (DBC) Offshore Wind Farm Project which partially overlaps with the DBD Array Area. The relevant existing information presented in the Wessex Archaeology geophysical survey report (**Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**) has been incorporated into the PEIR assessment and is described further in **Section 17.7**.

39. In addition, a wider palaeolandscapes study covering the Dogger Bank A, Dogger Bank B, Dogger Bank C and Sofia Offshore Wind Farms is currently being progressed by Royal HaskoningDHV and Wessex Archaeology. As the DBD Array Area falls within the former boundary of DBC, DBD also falls within the boundary of the palaeolandscapes study. Geophysical data acquired for the Project, as well as previously acquired geotechnical data from the Dogger Bank D Array Area (formerly part of DBC) and the results of geoarchaeological assessment, also inform this wider study. The study is due to be completed in 2025 and the results, therefore, will inform the ES for DBD.

17.6.2 Impact Assessment Methodology

40. The impact assessment methodology adopted for offshore archaeology and cultural heritage will define heritage assets, and their settings, likely to be impacted by the proposed scheme and assess the level of any resulting benefit, harm, or loss to their significance.

41. The assessment is not limited to direct (physical) impacts, but also assesses possible indirect (physical) impacts upon heritage assets which may arise as a result of changes to hydrodynamic and sedimentary processes and changes to the setting of heritage assets, whether visually, or in the form of noise, dust and vibration, spatial associations, and a consideration of historic relationships between places which may impact their significance.

42. **Chapter 6 Environmental Impact Assessment Methodology** sets out the overarching approach to the impact assessment methodology. The topic-specific methodology for the offshore archaeology and cultural heritage assessment is described further in this section.

17.6.2.1 Impact Assessment Criteria

43. As set out in Principles of Cultural Heritage Impact Assessment in the UK (IEMA, IHBC and CIfA, 2021), Cultural Heritage Impact Assessment (CHIA) is concerned with "understanding the consequences of change to cultural significance". The principles of assessment are:

A. understanding cultural heritage assets; and

B. evaluating the consequences of change.

44. Understanding cultural heritage assets distinguishes between:

- Describing the asset (what it is and what is known about it);
- Ascribing cultural significance (a description of what is valued about it); and
- Attributing importance (a scaled measure of the degree to which the cultural significance of that asset should be protected).

45. Evaluating the consequences of change additionally distinguishes between three separate analytical stages:

- Understanding change (a factual statement of how a proposal would change a cultural heritage asset or its setting, including how it is experienced);
- Assessing impact (a scaled measure that brings together the magnitude of impact and the cultural heritage asset's importance); and
- Weighting the effect (the measure that brings together the magnitude of the impact and the cultural heritage asset's importance).

46. The three stages of 'understanding cultural heritage assets' (a description of the assets and their cultural significance, including the contribution of setting to that significance, and attributing importance) are described in **Section 17.7** (Baseline Environment). An evaluation of the consequences of change is presented in **Section 17.8** (Assessment of Effects) as set out below.

17.6.2.1.1 Sensitivity, Value and Magnitude

47. **Chapter 6 Environmental Impact Assessment Methodology** sets out the following steps in assessing significant effects:

- Identifying the source of potential impacts and establishing if a pathway exists between the course of the impact and the identified receptors;
- Identifying the sensitivity (heritage importance) of each receptor to the relevant impacts;
- Identifying the magnitude of the impact predicted; and
- Considering the receptor sensitivity (heritage importance) and likely impact magnitude, in order to assess the likely significance of effect for the potential impact.

48. For the purposes of this PEIR, the criteria for determining the sensitivity (heritage importance) of any relevant heritage assets are described in **Table 17-9.**

Table 17-9 Definition of Importance for Cultural Heritage Assets

Importance	Definition
High	Assets perceived of being of international / national importance including: • World Heritage Sites; • Scheduled Monuments; • Grade I and II* Listed Buildings or structures; • Protected wrecks; • Designated historic landscapes of outstanding interest; • Conservation Areas containing buildings or structures with high heritage importance; or high concentrations of listed buildings; • Non-designated assets of acknowledged international / national importance; • Assets that can contribute significantly to acknowledged international / national research objectives; and • Assets where the importance / existence/ level of survival of the asset has not been ascertained (or fully ascertained / understood) from available evidence are considered of high importance as a precautionary measure.

Importance	Definition
Medium	Assets perceived of being of regional importance including: • Grade II Listed Buildings or structures; • Designated special historic landscapes; • Other types and character of Conservation Areas (i.e. not containing buildings or structures with high heritage importance, or high concentrations of listed buildings); • Assets that contribute to regional research objectives; and • Assets with regional value, educational interest, or cultural appreciation.
Low	Assets perceived of being of local importance including: • 'Locally Listed' buildings or structures; • Assets that contribute to local research objectives; • Assets with local value, educational interest or cultural appreciation; and • Assets compromised by poor preservation and / or poor contextual associations.
Negligible	Assets with no significant value or archaeological / historical interest.

17.6.2.1.2 Impact Magnitude

49. The impact magnitude equates to the degree to which cultural significance is positively or negatively changed by the proposal.

50. The magnitude of adverse impact with respect to offshore archaeology and cultural heritage directly relates to the extent of harm to, or loss of, key elements of the assets' cultural significance, which may include its setting.

51. The magnitude of beneficial impact directly relates to the level of public benefit associated with an individual impact. Benefits may correspond directly to the project itself where a project will enhance the historic environment (e.g. through measures which will improve the setting of a heritage asset or public access to it). Alternatively, benefits may occur on the basis of data gathering exercises undertaken for the purpose of a project which will enhance public understanding by adding to the archaeological record (e.g. through the accumulation of publicly available information and data).

52. The criteria used for assessing the magnitude of impact regarding offshore archaeology and cultural heritage are presented in **Table 17-10**.

Table 17-10 Definition of Magnitude of Impacts

Importance	Definition
High Adverse	Key elements of the asset's fabric and / or setting are lost or fundamentally altered, such that the asset's cultural significance is lost or severely compromised.
Medium Adverse	Elements of the asset's fabric and / or setting which contribute to its significance are affected, but to a more limited extent, resulting in an appreciable, but partial, loss of the asset's cultural significance.
Low Adverse	Elements of the asset's fabric and / or setting which contribute to its cultural significance are affected, resulting in a slight loss of cultural significance.
Negligible	The asset's fabric and / or setting is changed in ways which do not materially affect its cultural significance.
Low Beneficial	Elements of the asset's physical fabric which would otherwise be lost, leading to a slight loss of cultural significance, are preserved in situ; or Elements of the asset's setting are improved, slightly enhancing its cultural significance; or Research and recording leads to a slight enhancement to the archaeological or historical interest of the asset. This only applies in situations where the asset would not be otherwise harmed i.e. it is not recording in advance of loss.
Medium Beneficial	Elements of the asset's physical fabric which would otherwise be lost, leading to an appreciable but partial loss of cultural significance, are preserved in situ; or Elements of the asset's setting are considerably improved, appreciably enhancing its cultural significance; or Research and recording leads to a considerable enhancement to the archaeological or historical interest of the asset. This only applies in situations where the asset would not be otherwise harmed i.e. it is not recording in advance of loss.
High Beneficial	Elements of the asset's physical fabric which would otherwise be lost, severely compromising its cultural significance, are preserved in situ; or Elements of the asset's setting, which were previously lost or unintelligible, are restored, greatly enhancing its cultural significance.
No impact	No change to the assets fabric or setting which affects its cultural significance.

17.6.2.1.3 Significance of Effect

53. The significance of effect is the measure that bring together the magnitude of the impact and the cultural heritage asset's importance to assess the degree to which any change would impact on cultural significance. This measure is indicative of the weight that should be given to the matter in influencing the design of the proposal or, ultimately, in influencing whether the proposal will be acceptable and permitted.

54. The determination of significance is guided by the use of an impact significance matrix presented in **Chapter 6 Environmental Impact Assessment Methodology**. Definitions for this weighted measure of significance of effect (in EIA terms) are provided in **Table 17-11**. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a significance of minor or negligible is not significant.

Table 17-11 Definition of Effect Significance

Significance	Definition
Major	Changes in cultural significance, both adverse or beneficial, which are likely to be important considerations at a national or regional level because they contribute to achieving national or regional objectives. Effective / acceptable mitigation options may still be possible, to offset and / or reduce residual impacts to satisfactory levels.
Moderate	Changes in cultural significance, both adverse or beneficial, which are likely to be important considerations at a local level. Effective / acceptable mitigation options may still be possible, to offset and / or reduce residual impacts to satisfactory levels.
Minor	Changes in cultural significance, both adverse or beneficial, which may be raised as local issues but are unlikely to be material considerations in the decision-making process. Industry standard mitigation measures may still apply.
Negligible	No material changes to cultural significance.
No change	No impact, therefore, no change to cultural significance.

17.6.3 Historic Seascape Character Assessment Methodology

55. The approach to the assessment of historic seascape character differs to that outlined above for heritage assets.

56. The historic character of the seascape is described in terms of availability to accommodate change. A key aspect of this ability is how that character is perceived by the public. For this reason, an approach is required which recognises the dynamic nature of seascape and how all aspects of the seascape, no matter how modern or fragmentary, can form part of the character of that seascape.

57. It is not meaningful, therefore, to assign a level of importance to these perceptions of character, which are by nature subjective, nor to assign a measure of magnitude to understand the nature of the potential changes. Rather, this change is expressed as a narrative description of the seascape character, how it is perceived by the public and how these perceptions could be affected by the Project, which may or may not be perceived as important from a historic perspective. In this respect, damage to, or destruction of, a heritage asset is considered permanent and irreversible, impacts to historic seascape character are dynamic, and may be temporary and reversible.

58. Changes to the historic seascape character and the extent to which these changes can be accommodated are discussed in **Section 17.7.1.4**.

17.6.4 Cumulative Effects Assessment Methodology

59. The cumulative effects assessment (CEA) considers other plans and projects that may act collectively with the Project to give rise to cumulative effects on offshore archaeology and cultural heritage receptors. The general approach to the CEA for offshore archaeology and cultural heritage involves screening for potential cumulative effects, identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. **Chapter 6 Environmental Impact Assessment Methodology** provides further details on the general framework and approach to the CEA.

60. The final assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available. However, for the purposes of the PEIR, it is possible to identify several projects and plans (Dogger Bank A, B and C Offshore Wind Farms, Dogger Bank South, and Sofia Offshore Wind Farm) which are likely to feature in that assessment and consider the extent to which cumulative effects might arise.

61. **Section 17.9** presents the following preliminary information regarding cumulative effects:

- Screening for cumulative effects; and
- A preliminary short list of plans and projects considered for CEA, including a brief description as to how projects have been screened in and the initial tier level they have been assigned.

17.6.5 Transboundary Effect Assessment Methodology

62. The transboundary effect assessment considers the potential for effects to occur due to the Project on offshore archaeology and cultural heritage receptors within the Exclusive Economic Zone (EEZ) of other European Economic Area (EEA) member states or other interests of EEA member states. **Chapter 6 Environmental Impact Assessment Methodology** provides further details on the general framework and approach to the transboundary effect assessment.

63. For offshore archaeology and cultural heritage, the potential for transboundary effects has been identified in relation to wrecks or aircraft of non-British nationality which could be subject to impact from development. Such wrecks may fall within the jurisdiction of another country, and may include, for example, foreign warships lost in UK waters.

64. Additionally, there is potential for developments, individually and cumulatively, to affect larger-scale archaeological features such as palaeolandscapes and to affect the setting of heritage assets and historic landscapes / seascapes which may also extent across these boundaries. This may also include sensitivities in conjunction with local community groups and interests.

65. Indirect transboundary impacts are associated with changes to marine physical processes, where those changes cross an international boundary. As the eastern boundary of the Array Area is located at the UK Economic Exclusion Zone boundary (EEZ), there is a potential for transboundary impacts upon marine physical processes receptors due to the Project's construction, operation and maintenance phase and decommissioning activities. An assessment of transboundary effects, which outlines the 'zone of influence' is detailed in **Section 276**.

17.6.6 Assumptions and Limitations

66. This preliminary assessment is an interim stage in the EIA process. The results presented in the following sections are based on early design assumptions and initial assessments which will be refined and presented in the ES which will be submitted with the DCO application. Additionally, no geophysical data is available for the ECC, however, the acquisition and assessment of marine geophysical data from the offshore ECC is ongoing and will be completed to inform the ES which will accompany the DCO application

67. In addition, the records held by the UKHO, Historic England, NHLE and formerly the National Record of the Historic Environment (NRHE), HHER and the other sources used in this assessment are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these datasets is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

17.7 Baseline Environment

17.7.1 Existing Baseline

68. The baseline environment within the offshore archaeology and cultural heritage Study Area is defined as the known archaeological and cultural heritage resource and the potential for previously unrecorded heritage assets and finds to be present within the Offshore Development Area with respect to:

- Seabed prehistory (i.e. archaeological remains on the seabed corresponding to the activities of prehistoric populations that may have inhabited what is now the seabed when sea levels were lower);
- Maritime archaeology (i.e. the remains of boats and ships and archaeological material associated with prehistoric and historic maritime activities);
- Aviation archaeology (i.e. the remains of crashed aircraft and archaeological material associated with historic aviation activities);
- Historic seascape character (i.e. the attributes that contribute to the formation of the historic character of the seascape); and
- Buried archaeology (including palaeoenvironmental deposits) within the intertidal zone below MHWS.

17.7.1.1 Seabed Prehistory

17.7.1.1.1 Description of Heritage Assets

69. The recent geological history of the southern North Sea is directly linked to glacial / interglacial cycles experienced by the area during the Pleistocene (2.5 million to 10,000 years ago), which resulted in large areas of the southern North Sea being periodically exposed as a terrestrial environment. These glacial cycles, and accompanying changes in sea level, are recorded as Marine Isotope Stages (MIS).

70. The potential for prehistoric sites to be present within the Offshore Development Area, either exposed on or buried below the seabed, is primarily associated with surviving terrestrial features and deposits corresponding to times when sea levels were lower and prehistoric hominin populations may have inhabited what is now the seabed.

71. Archaeological material may also be present within secondary contexts, as isolated finds within deposits that may have been reworked by marine or glacial processes. While these deposits formed during periods when the North Sea was inhabitable, they have some potential to contain reworked archaeological material.

72. There are no known in situ prehistory sites within the Offshore Development Area. However, late Mid- and Late-Pleistocene fauna have been recovered from the wider region by trawlers and a mammoth tusk reported from Marine Aggregate Licence Area 408 (located 125km south-west of the Array Area) has produced a date of approximately 44,000 years Before Present (BP) (Allen *et al.*, 2008). This indicates there is some potential for prehistoric faunal remains to be present in the Offshore Development Area.

73. Where discoveries of archaeological and faunal material are rare, submerged palaeolandscape features and deposits provide the environmental context to understand prehistory. The Dogger Bank region has long been known to preserve prehistoric landscapes and deposits (Reid, 1913; Coles, 1998). From as early as 1883, maps showing the distribution of 'moorlog' (peat / submerged forest) across Dogger Bank were produced (see Wessex Archaeology 2014 for a review). Many decades later, the North Sea Palaeolandscapes Project (Fitch *et al.*, 2005; Gaffney *et al.*, 2007) produced a regional-scale map showing the nature and distribution of prehistoric landscapes across Dogger Bank showing a complex network of palaeochannels that flooded during post glacial sea-level rise.

74. The formation of Dogger Bank is a product of the interplay between climate change, ice dynamics and sea-level change associated with the growth and demise of the British Irish Ice Sheet and Fennoscandian Ice Sheet during the last glacial period. Recent investigations have demonstrated large-scale glaciotectonic deformation across the large parts of Dogger Bank (including with the Array Area) which has created a highly complex stratigraphic record that is not a simple "layer cake" (Phillips *et al.*, 2018; Emery *et al.*, 2019). Interpretation of seismic data as horizon maps showing the palaeo-topography of the glacial landscape reveal a series of elongate arcuate ridges separated by low lying basins that ponded water creating proglacial lakes or kettle holes. As the climate warmed, these waterlogged environments would have attracted fauna and people and have high potential to preserve organic deposits or palaeoenvironmental material.

75. The baseline understanding of submerged prehistory at Dogger Bank was improved following a series of geophysical and geoarchaeological investigations undertaken in support of the Environmental Statements for the Dogger Bank Creyke Beck A & B and Teesside A & B projects, now known as Dogger Bank A, B and C and Sofia, respectively. A series of palaeolandscape features were identified including a network of palaeochannels, a possible pingo lake (depression caused by melting ice) and peat deposits (Wessex Archaeology, 2013a; 2013b). Further evidence of submerged palaeolandscapes was reported through the Offshore Protocol for Archaeological Discoveries (ORPAD) in 2012 when peat was recovered from the seabed during a benthic ecological survey (Russell and Stevens, 2014). Palaeoenvironmental assessment of peat deposits indicated remnants of Upper Palaeolithic to Mesolithic landscapes were preserved.

76. Glacial and post-glacial landscape evolution of Dogger Bank was researched as part of a PhD project using the geophysical data acquired to support the Teesside A & B projects (Emery, 2020). The sediments and palaeolandscape features preserved in the Array Area document the glacial, through terrestrial proglacial and paraglacial, to coastal and marine environments. As ice sheets melted and retreated from Dogger Bank at around 23,000 years ago, large drainage networks developed to drain ice marginal lakes and carry meltwater. These channels were emptied but as the climate warmed and rainfall increased around 17,000 years ago, a terrestrial river network developed, fringed by wetlands. As sea levels rose, a barrier island coastline formed, and remnants of this coastal landscape are preserved in the Array Area. The outputs from this research indicate there is high potential for deposits and palaeolandscape features with archaeological potential to be preserved within the Array Area.

77. A series of ongoing geoarchaeological and marine geophysical assessments are being undertaken for the consented Dogger Bank A, Dogger Bank B, Dogger Bank C and Sofia offshore wind farms. These are providing high resolution maps of the extensive prehistoric landscape (Wessex Archaeology, 2020) and palaeoenvironmental assessment and dating of deposits from wetland, riverine, lake and coastal environments is ongoing (Wessex Archaeology, 2022). The results will be available late 2024/early 2025 and will be used to inform the assessment of submerged prehistory in the Environmental Statement.

78. A geoarchaeological assessment of geotechnical survey data acquired within the consented DBC Array Area has been undertaken (Wessex Archaeology 2022). Of the 26 boreholes reviewed, 12 are located with the DBD Array Area. In addition, two vibrocores were acquired for dedicated geoarchaeological purposes (DBC-Arch-VC001 and DBC-Arch-VC002). These vibrocores are located within the DBD Array Area. Relevant geotechnical data have been reviewed by a geoarchaeologist to create an outline deposit model that represents the nature of the shallow geology of the Array Area (**Table 17-12**).

Table 17-12 Shallow Geology of the Array Area

Unit Name	Lithology	Epoch	BGS Formation	Archaeological potential
Gravel Lag	Sandy gravel with shell	Early to mid-Holocene	Indefatigable Grounds	Considered of low potential in itself, but possibly contains re-worked artefacts and can cover wreck sites and other cultural heritage.
Shallow Marine Sand	Slightly gravelly sand with shell fragments	Middle to Late-Holocene	Nieuw Zeeland Gronden Terschellinger Bank or Well Hole	
Alluvium	Slightly gravelly sand with rare organic matter, organic laminations and shell fragments	Early Holocene	Elbow	Potential to contain *in situ* and derived archaeological material, and palaeoenvironmental material.
Alluvium and Peat	Low to medium strength clay with fibrous wood fragments and rare organic matter	Early Holocene	Elbow	
Proglacial	Not recorded	Late Weichselian	Botney Cut	Glaciomarine deposits considered to have low potential. Glaciolacustrine deposits have potential to contain *in situ* and derived archaeological material, and palaeoenvironmental material.
Diamict and Glacial Sand	Stiff high strength gravelly clay with occasional beds of clayey sand	Weichselian	Bolders Bank or Dogger Bank	Considered low but has potential to bury deposits of interest or to contain reworked material.
Pre-Glacial Sand	Fine sand with rare lamina of clay or organic matter, fragments of organic matter, wood and shell	Holstenian to Eemian	Egmond Ground, Cleaver Bank, Tea Kettle Hole or Eem	Potential to contain *in situ* and derived archaeological material, and palaeoenvironmental material.

79. As part of the pre-construction investigations for the DBC Offshore Wind Farm, Unexploded Ordnance (UXO) investigation and clearance operations were undertaken using a Remotely Operated Vehicle (ROV) within the DBC ECC and array site in 2023. During the survey, the ROV operator recorded an object protruding the seabed as wood or peat at the location of Feature ECR23-119. The deposit was not sampled as a similar peat outcrop was identified and sampled during UXO clearance and investigation operations undertaken for Dogger Bank B in November 2022.

80. Peat has previously been recorded during benthic ecological surveys in the former 'Tranche B' (now the area of DBC and Sofia) which was subject to geoarchaeological assessment by Wessex Archaeology (2014). Attention is also drawn to historical accounts of 'moorlog' brought up in fishing trawlers and mapped on and around the Dogger Bank by Olsen in the late 19th century (see Figure 2 of Wessex Archaeology, 2014).

81. In 2022 an offshore site investigation survey was undertaken for the DBD Array Area which identified the main morphological characteristics of the defined survey area, as well as stratigraphic data and shallow geological formations (Enviros, 2022). The survey identified two palaeochannel systems within the DBD Array Area. One buried palaeochannel system was observed incising the Botney Cut Formation near the north-western limit of the survey area with the base of this buried palaeochannel reach up to 7m below sea floor. Another buried palaeochannel system was identified randomly incising the Dogger Bank Formation throughout the DBD survey area with the bases of this buried palaeochannel system possibly reaching up to 15m within the survey area.

82. The archaeological assessment of this data from the Array Area is informing the wider palaeolandscapes study which will be complete in 2025 and will, in turn, inform a detailed assessment of the Array Area to be presented in the ES. In addition, the archaeological assessment of geophysical data from the offshore ECC, and geoarchaeological assessment of planned geotechnical cores to be acquired from the offshore ECC in 2025, will also inform the assessment of the seabed prehistory in the ES.

17.7.1.1.2 Cultural Significance of Heritage Assets

83. There are no known seabed prehistory sites within the offshore archaeology Study Area for which significance can be described. As such, the significance of these palaeolandscapes lies primarily in their archaeological interest or research value, particularly when considered alongside survey data and interpretations produced for other seabed development projects on the Dogger Bank.

84. The setting of a heritage asset is described as the surroundings in which a heritage asset is experienced (Historic England, 2017). Elements of a setting may make a positive or negative contribution to the cultural significance of an asset, may affect the ability to appreciate that cultural significance or may be neutral. Historic England's guidance on setting notes how the setting of buried heritage assets may not be readily appreciated by a casual observer but would retain a presence in the landscape.

85. For offshore assets, for the most part, submerged archaeological sites are not 'readily appreciated by a casual observer'. With respect to former prehistoric landscapes in the southern North Sea, these are largely experienced conceptually in terms of interpreted data and research. As such, the setting of these assets (in terms of the surroundings in which they are experienced) does not form a key part of their cultural significance. However, changes within the physical setting will occur (i.e. the introduction of the Project into the seascape) and the capacity of these palaeolandscapes to accommodate this change is discussed alongside historic seascape character in **Section 17.7.1.4.**

17.7.1.1.3 Importance of Heritage Assets

86. The rarity of *in situ* prehistoric sites in the offshore contexts means that, where such sites are encountered, these will be of national, or possibly international interest, with significant potential to contribute to acknowledged international and national research objectives. Given the particularly high importance of these *in situ* sites, the features and deposits which have the potential to contain *in situ* prehistoric archaeological material (i.e. interpreted palaeo-land surfaces and palaeolandscape features) should also be considered of high importance. Similarly, should palaeoenvironmental evidence be discovered in the context of an *in situ* prehistoric site this would also be of high importance.

87. Although palaeoenvironmental material encountered beyond the context of an *in situ* prehistoric site sill has evidential value for understanding changes in the climate and environment with offshore contexts, isolated discoveries should be considered of low importance for the purposes of assessment.

88. Isolated finds of prehistoric archaeological material within secondary contexts, comprising material from terrestrial phases that may have been reworked by marine or glacial processes, also have evidential value for understanding patterns of population and exploitation of landscapes, for example. However, as these finds are derived, and out of context, they are regarded as being of medium rather than high importance.

89. The heritage importance of the potential heritage assets outlined above area presented in **Table 17-13**.

Table 17-13 Heritage Importance (Seabed Prehistory)

Asset Type	Definition	Importance
Potential *in situ* prehistoric sites	Primary context features and associated artefacts and their physical setting (if/where present)	High
	Known submerged prehistoric sites and landscape features with the demonstrable potential to include artefactual material	High
Potential submerged landscape features	Other known submerged palaeolandscape features and deposits likely to date to periods of prehistoric archaeological interest with the potential to contain *in situ* material	High
Potential derived prehistoric finds	Isolated discoveries of prehistoric archaeological material discovered within secondary contents	Medium
Potential palaeoenvironmental evidence	Isolated examples of palaeoenvironmental material	Low
	Palaeoenvironmental material associated with specific palaeolandscape features or archaeological material	High

17.7.1.2 Maritime and Aviation Archaeology

17.7.1.2.1 Description of Heritage Assets

90. There are no designated wrecks or other types of protected sites within the DBD array area. Should any material from a crashed military aircraft be encountered located within the offshore archaeology Study Area, these would automatically be protected under the Protection of Military Remains Act 1986.

91. As part of the overarching Dogger Bank Wind Farm development, Wessex Archaeology acquired a series of datasets comprising side scan sonar (SSS), magnetometer (Mag.) and multibeam echosounder (MBES) data (Wessex Archaeology 2013; 2023; 2024) which partially, or wholly covers the DBD Array Area. Data was initially gathered in 2012 for the proposed array of Teesside A, of which the DBD array sits wholly within.

92. A number of anomalies identified from the DBC array dataset also lie with the footprint of the DBD Array Area.

93. The most recent marine geophysical survey of the DBD Array Area was undertaken in 2022 and 2023. Additionally, ROV operations associated with UXO investigations and clearance were undertaken in 2023. This included the ground truthing of potential archaeological interest. Several of these proved to be non-archaeological and therefore have been removed from the gazetteers and further assessment. The combined results of these assessments are detailed below.

94. The geophysical survey has demonstrated the presence of 259 seabed features within the Offshore Development Area which have been identified as being of archaeological interest (A1) or potential archaeological interest (A2), in accordance with the definitions set out in **Table 17-14**. A2-l and A2-h anomalies are new discriminations which have been adopted for the 2022 and 2023 interpretations of geophysical data. Therefore, the interpretation of A2 anomalies outlined in **Table 17-14** applies to the A2 anomalies identified in the earlier DBC and Teesside A datasets. In addition, three are discriminated as A3 anomalies which are historical records of possible archaeological interest with no corresponding geophysical anomalies. A full list of seabed features interpreted from the data by Wessex Archaeology for the DBD Offshore Development Area is included in the gazetteer in **Volume 2, Appendix 17.3 Offshore and Intertidal Archaeology and Cultural Heritage Gazetteers**. The locations are illustrated on **Figure 17-1**.

Table 17-14 Anomalies of Archaeological Potential

Archaeological discrimination	Total	Interpretation
A1	10	Anthropogenic origin of archaeological interest.
A2	35	Uncertain origin of possible archaeological interest.
A2-h	29	Anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature.
A2-l	185	Anomaly of possible anthropogenic origin but the interpretation is uncertain; may be anthropogenic or a natural feature.
A3	3	Historic record of possible archaeological interest with no corresponding geophysical anomalies.
Total	262	

95. Of these, 233 are located within the Array Area, one within the Export Cable Corridor with the remaining 28 in the Offshore Development Area. Furthermore, these anomalies can be classified by probable type, which can further aid in assigning archaeological potential and importance as shown in **Table 17-15**.

Table 17-15 Types of Anomaly Identified

Anomaly classification	Number of anomalies
Wreck Areas of coherent structure including wrecks of ships, submarines, and some aircraft (where coherent structure survives).	2
Debris field A discrete area containing numerous individual debris items that are potentially anthropogenic, and can include dispersed wreck sites for which no coherent structure remains.	5
Debris Distinct objects on the seabed, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin	11
Linear debris	13

Anomaly classification	Number of anomalies
Distinct linear objects on the seabed, either straight or curved, generally exhibiting height or with evidence of structure, that are potentially anthropogenic in origin. May represent linear anthropogenic debris which can include, for example, lengths of rope or chain or abandoned fishing gear.	
Seabed disturbance An area of disturbance without individual, distinct objects. Potentially indicates wreck debris or other anthropogenic features buried just below the seabed.	39
Bright reflector Individual objects or areas of low reflectivity, characteristic of materials that absorb acoustic energy, such as waterlogged wood or synthetic materials. Precise nature is uncertain.	1
Dark reflector Individual objects or areas of high reflectivity, displaying some anthropogenic characteristics. Precise nature is uncertain.	102
Mound A mounded feature with height not considered to be natural. Mounds may form over wreck sites or other debris.	19
Depression An area of disturbed seabed with depth. Potentially indicates scour around a buried feature or where a feature has been cleared.	5
Magnetic No associated seabed surface expression, and have the potential to represent possible buried ferrous debris or buried wreck sites.	60
Magnetic trend A linear trend of individual or continuous magnetic anomalies with no associated seabed surface expression, and have the potential to represent possible buried ferrous debris	1
Recorded wreck Position of a recorded wreck at which previous surveys have identified definite seabed anomalies, but for which no associated feature has been identified within the current data set.	3
Rope/chain Curvilinear dark reflectors, often with a small amount of height, indicating a rope or chain (if ferrous).	1
Total	**262**

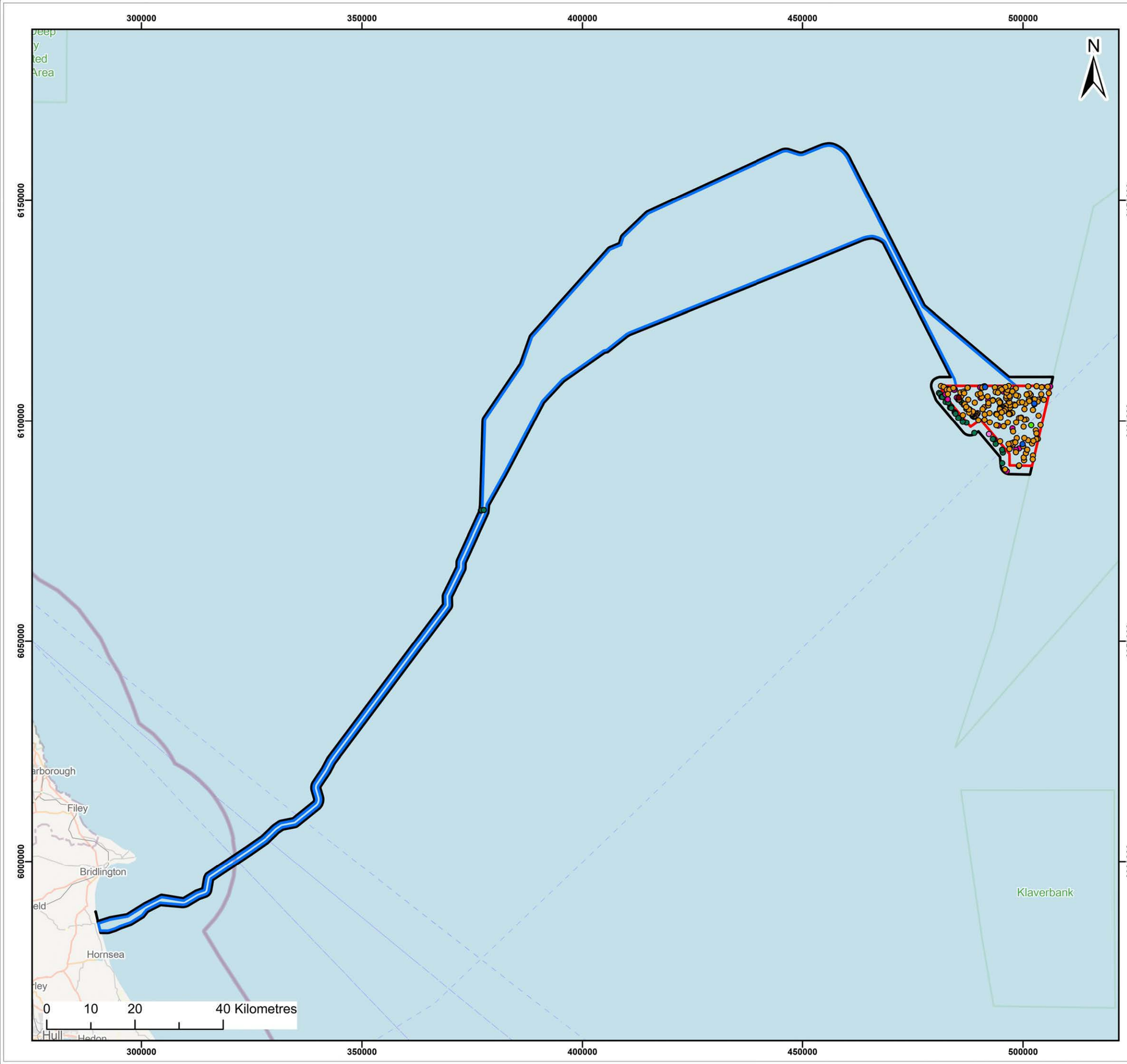
96. The preliminary results following the archaeological assessment of maritime geophysical data (SSS, Mag. and MBES) indicate the presence of 10 seabed features of archaeological interest (A1) within the DBD array, comprising:

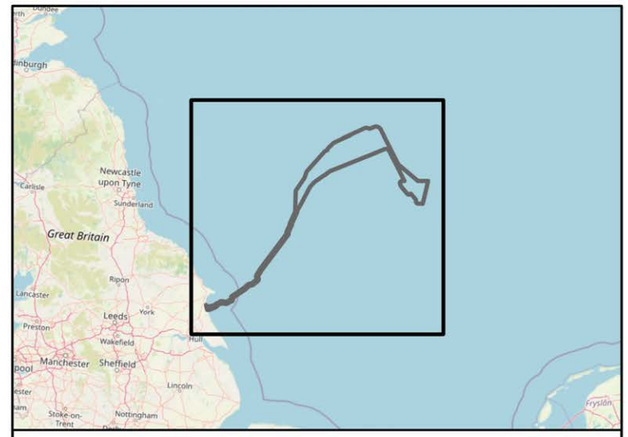
- Two unidentified wrecks 70587 (Large very well-preserved wreck on a sandy area of the seabed) and 70590 both of which were originally identified in the dataset assessed in 2012 as part of the DBC consents process (formerly known as Dogger Bank Teesside A);
- Four small items of debris (74099 – 74102) and a debris field (74103) discriminated as A1 due to their proximity to wreck 70587. These are all located outside the interpreted hull of the wreck and range in size from 0.8 x 0.7 x 0.1m (74099) to 2.9 x 1m (74103). No associated Mag. anomalies are present;
- One isolated debris field (74087) interpreted as being of anthropogenic origin and archaeological interest; and
- Two magnetic anomalies discriminated as A1 based on their amplitudes (70606 and 70608).

97. Further details on each wreck are provided in the gazetteer in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**.

98. In total, 35 anomalies identified within the DBD Offshore Development Area have been discriminated as of uncertain origin of possible archaeological interest (A2), which were identified during the 2012 and 2022 surveys undertaken for the DBC (Teesside A) project. Eight of these are located within the DBD Array Area. Their locations are shown on **Figure 17-1** and the full list is detailed in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**.

99. All 35 anomalies have been classified as magnetic anomalies ranging in amplitude from 5 nT (73768, 73794 and 73829) to 389 nT (73741). None of these have clearly a corresponding anomalous SSS or MBES feature associated, and all have the potential to represent possible ferrous debris that is either buried, or with no surface expression.





Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- Seabed Polygons within Array
- Seabed Polygons within SAC
- Seabed Linears within Array

Anomaly Type

- A1
- A2
- A2_h
- A2_l
- A3
- U2
- Additional Seabed Feature

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Archaeological Anomalies
- Page 1 of 5

Figure: 17-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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03	07/02/2025	JH	AB	A3	1:850,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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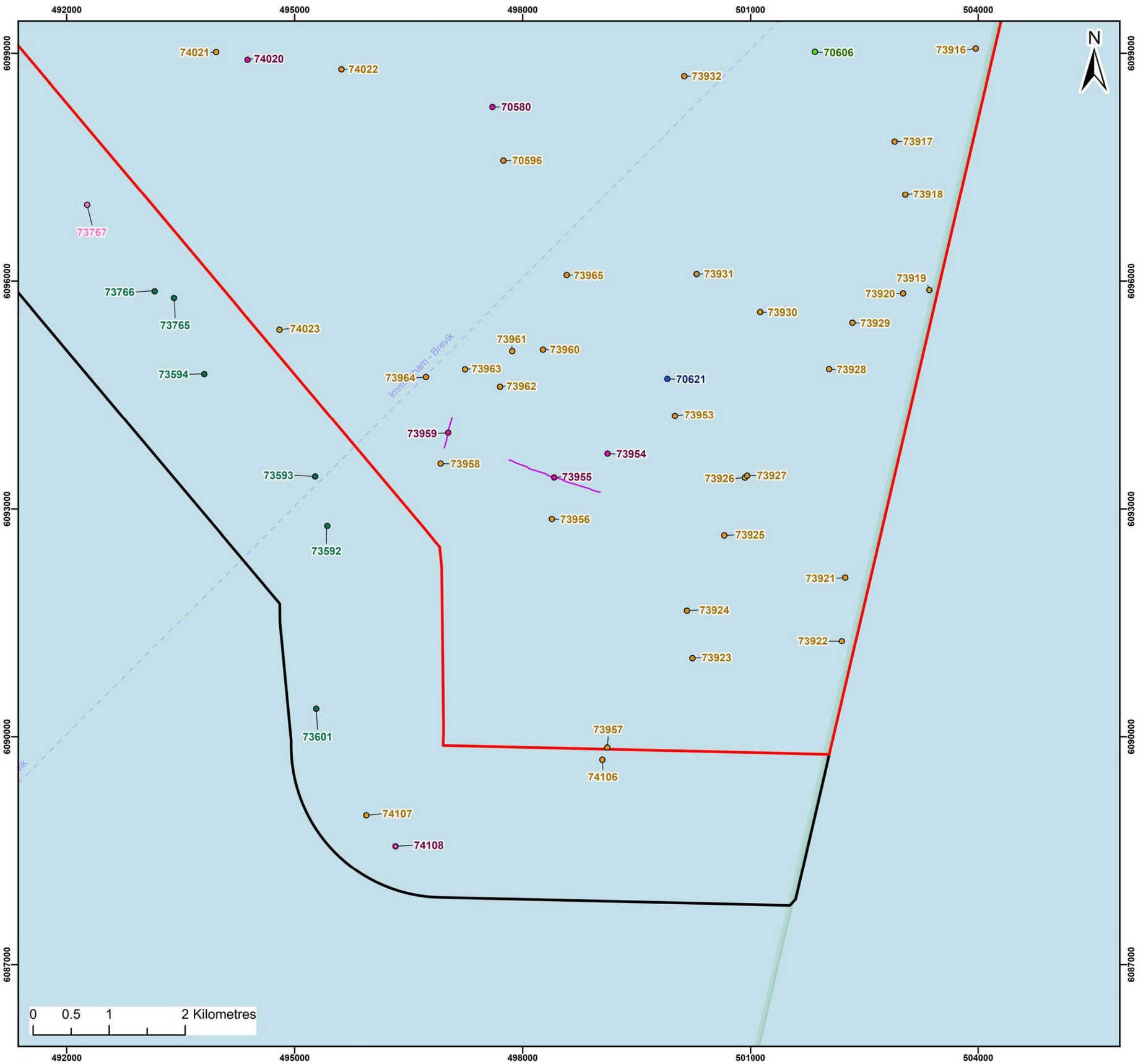

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Seabed Polygons within Array
- Seabed Polygons within SAC
- Seabed Linears within Array

Anomaly Type

- A1
- A2
- A2_h
- A2_l
- A3
- U2

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Distribution of Archaeological Anomalies - Page 2 of 5

Figure: 17-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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

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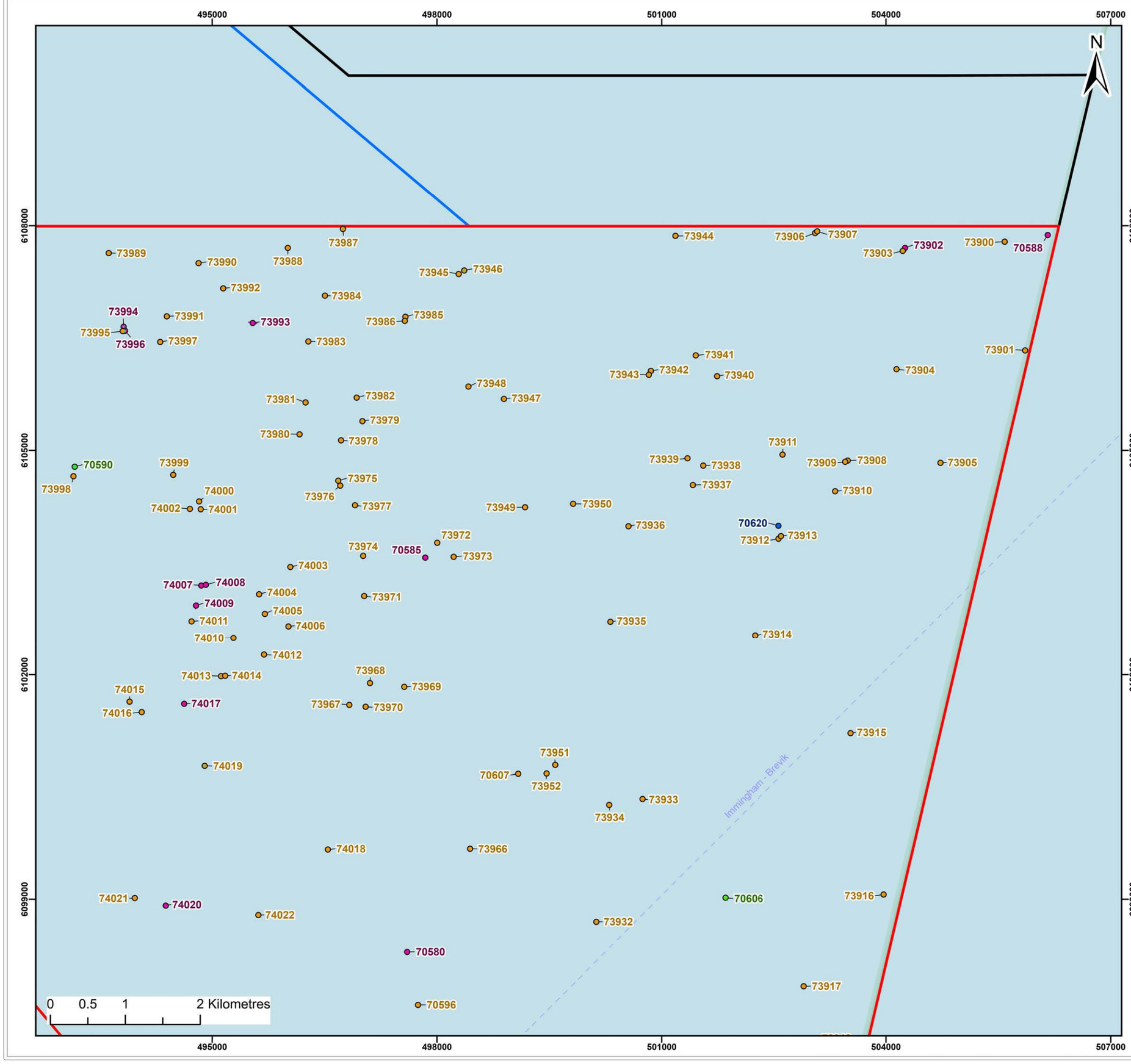

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- Seabed Polygons within Array
- Seabed Linears within Array

Anomaly Type

- A1
- A2_h
- A2_l
- A3

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Archaeological Anomalies
- Page 3 of 5

Figure:	Drawing No:
17-1	PC6250-RHD-XX-OF-DR-GS-0286

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

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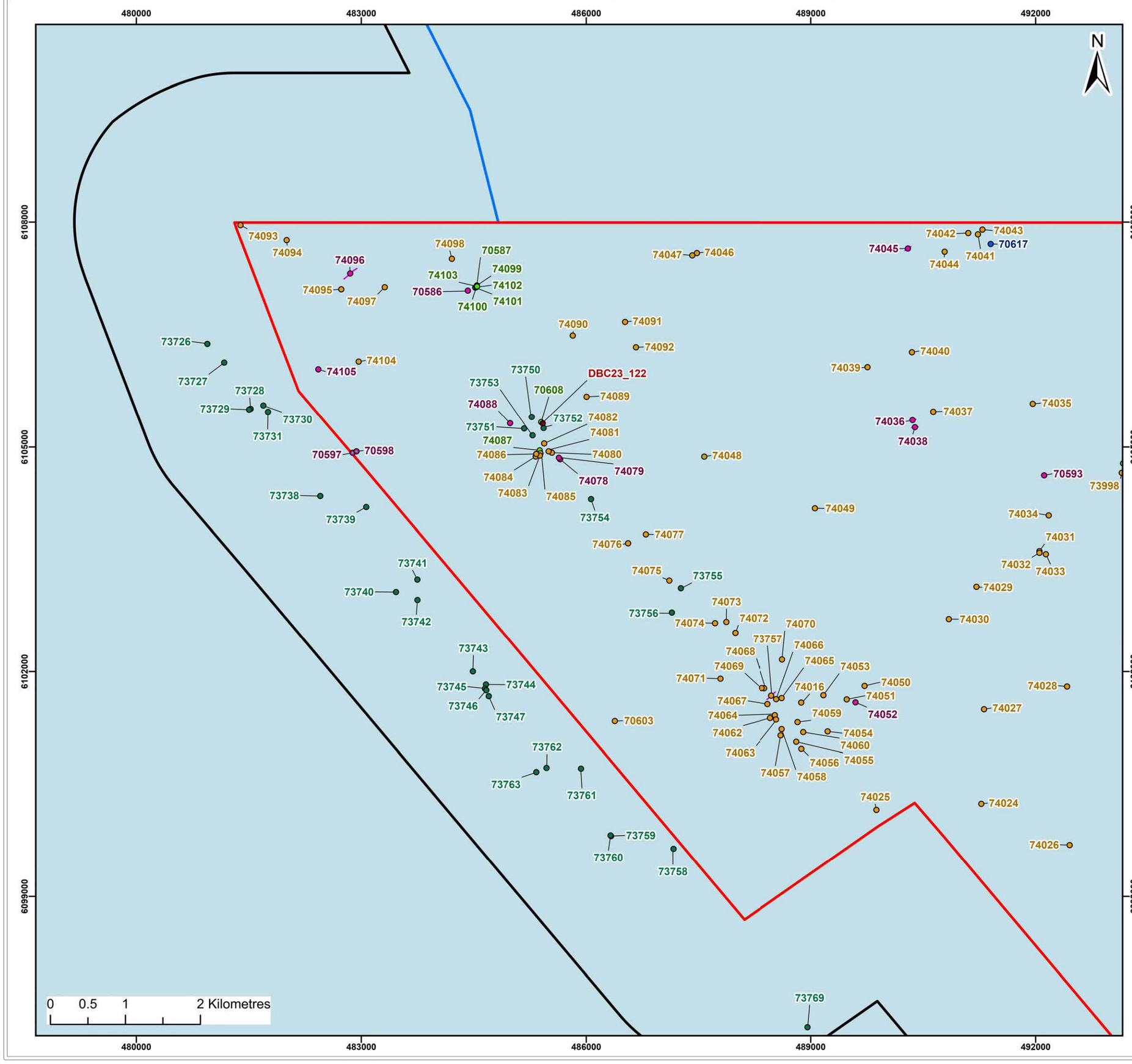

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- Seabed Polygons within Array
- Seabed Linears within Array

Anomaly Type

- A1
- A2
- A2_h
- A2_l
- A3
- Additional Seabed Feature

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Distribution of Archaeological Anomalies - Page 4 of 5

Figure: 17-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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Co-ordinate system: WGS 1984 UTM Zone 31N

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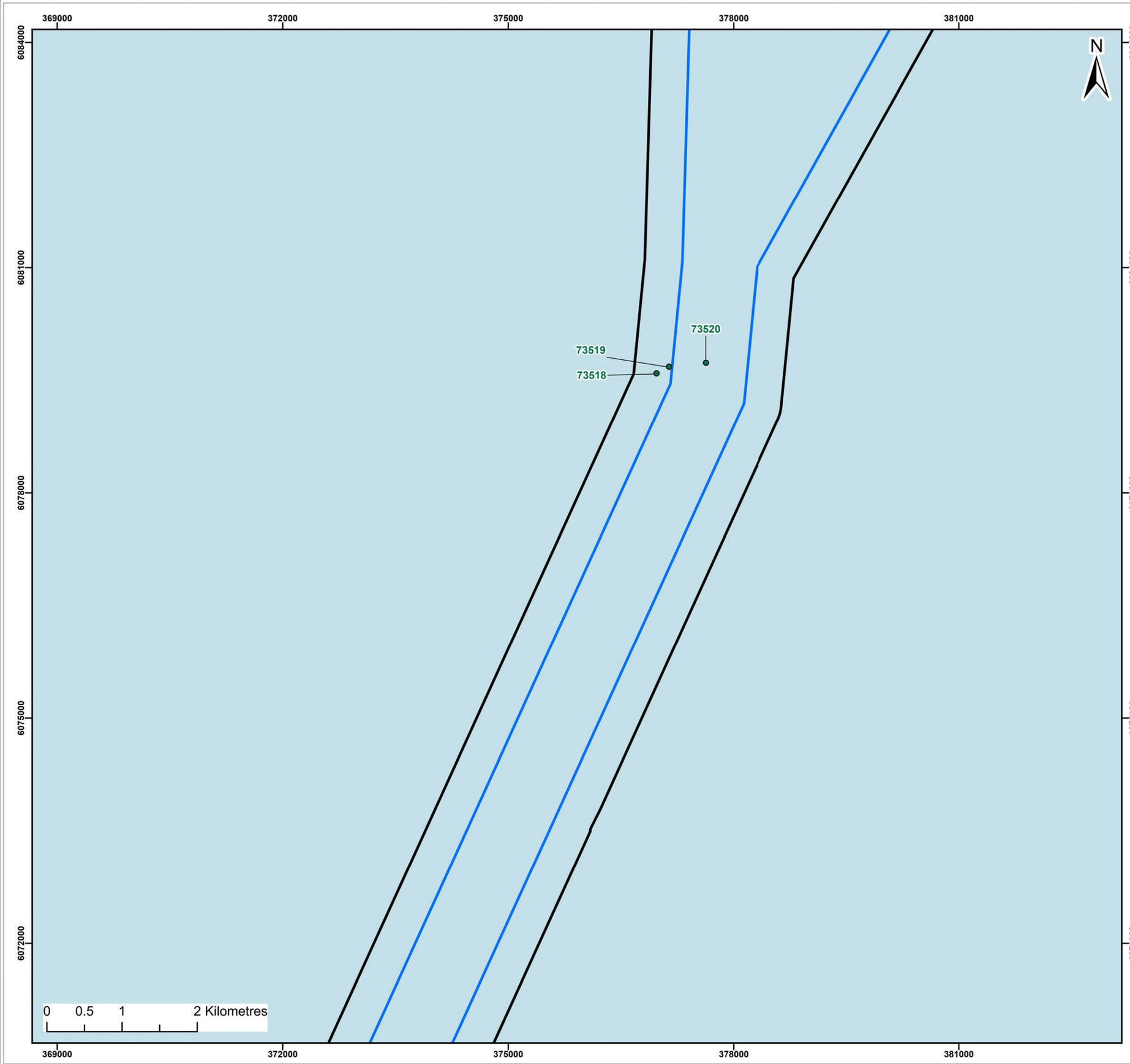

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Anomaly Type

- A2

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Archaeological Anomalies
- Page 5 of 5

Figure: 17-1

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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03	07/02/2025	JH	AB	A3	1:50,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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100. A total of 29 anomalies identified within the DBD Offshore Development Area have been discriminated as of likely anthropogenic origin but of unknown date, which may be of archaeological interest or a modern feature (A2-h). Their locations are shown on **Figure 17-1,** and the full list is detailed in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**. These anomalies include:

- Three anomalies (73994, 73996 and 74108) classified as debris fields ranging in size between 26.9 x 22.1 x 0.6m (74108) and 51.6 x 19.7 x 0.9m (73996). Anomalies 73994 and 73996 are situated 16m apart and are possibly related to one another;
- A total of seven anomalies classified as items of debris which range in sizes between 2.6 x 1.2 x 0.1m (70580) to 15.9 x 5.9 x 0.3m (74052). One of these anomalies has an associated Mag. anomaly of 10 nT (70593) and is interpreted as containing ferrous debris;
- A total of 13 anomalies (for full list see **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**) were classified as linear debris, with sizes between 19.6 x 1m (74007) and 1282.3 x 1m (73955). None have associated Mag. anomalies. These anomalies include possible rope or chain features, fishing gear and other anthropogenic linear features;
- Two anomalies (73918 and 70596) classified as depressions with some ferrous content and hence discriminated has A2-h. Both features were identified in the 2012 data as irregular depressions with magnetic. anomalies associated measuring 144 nT. Neither of these were covered by the 2022 data and so no comment can be made on their current status; and
- Four magnetic anomalies which are without associated SSS or MBES anomalies. The anomalies vary in amplitude between 104 nT (74078) and 245 nT (74079). These indicate potential ferrous debris that is either buried or without surface expression.

101. In total, 185 anomalies in the DBD Array Area have been discriminated as being of possible anthropogenic origin but of uncertain interpretation, which may represent anthropogenic or natural features (A2-l). Their locations are shown on **Figure 17-1** and the full list is detailed in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**. These anomalies include:

- A total of 39 anomalies classified as seabed disturbances; a feature or group of features of uncertain origin;
- One anomaly classified as a bright reflector (73961), possibly a natural feature or possible debris;
- A total of 100 anomalies classified as dark reflectors, with no associated Mag. anomalies. These features are interpreted as possible natural features or may be possible debris;
- 19 anomalies classified as mounds which could represent debris covered by seabed sediment or natural features;
- Two anomalies (70596 and 73918) classified as depressions. Anomaly 70596 was identified in the 2012 MBES data as a circular depression measuring 9 x 7.5 x -0.7m. No corresponding 2022 dataset contacts were identified and so this object may appear in the most recent datasets as a natural feature or may be buried. Anomaly 733918 measures 12 x 7.4 x -0.4m. Depressions potentially indicate scour around a buried feature or where a feature has been cleared; and
- A total of 23 magnetic anomalies which are without SSS or MBES anomalies, which range from 25 nT (70607) to 83 nT (70603) and indicate potential ferrous debris that is either buried or without surface expression.

102. Three anomalies within the dataset have been discriminated as historic records of possible archaeological interest with no corresponding geophysical anomaly (A3) and are outlined in **Table 17-16**.

Table 17-16 A3 Historic Records Within the Offshore Array Area

Wessex ID	UKHO ID	Description
70617	4950	The wreck of the *St Luke,* a British trawler vessel which was first recorded in Lloyd's and Marine Underwriter's reports. As a 'modern' vessel lost post-1970 this wreck is not of archaeological significance. No anomalous features were identified in the geophysical data at this location. Any remains associated with this record are either buried or located elsewhere.
70620	31201	An unidentified wreck of a sailing vessel originally recorded in the British Fishery Chart as a very dangerous wreck with the topmast and upper topsail showing. However, the wreck was not classified as dangerous to navigation in the later 1968 Edition of the Danish Fishery Chart 5502, and the record was amended to a 'non-dangerous wreck'. No anomalous features were identified at this location in the 2012 or 2022 geophysical datasets. Any remains associated with this record are either buried or located elsewhere.
70621	31199	The wreck of the *Membland*, a British steam ship recorded in the published WWI Losses. The *Membland* is thought to have struck a mine while on a voyage from Hull to the Tyne carrying 20 crew members. No anomalous features were identified in the 2012 or 2022 marine geophysical data at this location and any remains associated with this record are either buried or located elsewhere.

103. It should be noted that during UXO investigations and clearance operations undertaken in 2023 for DBC Offshore Wind Farm, the likely remains of the *St. Luke* (UKHO record 4950) were identified at 70608. These comprised a series of metal objects including a possible boiler or engine component, sheet metal, a large metal and wooden item and some possible mechanical components (possibly a prop shaft). Additional material was identified at location DBC23-122 (**Page 4** of **Figure 17-1**). As a modern wreck, the vessel is not considered to be of archaeological significance, however, as there remains a level of uncertainty an AEZ was applied to the wreck.

104. There is one record discriminated as of non-archaeological interest (U2) within the DBD array, which has been confirmed as lost geotechnical rods and has been retained in the gazetteer for positioning purposes.

105. There is one further UKHO record within the Offshore Development Area which relates to a modern feature. UKHO ID 79038 records the location of a seabed anchored wave, current and tidal measurement device deployed for the Dogger Bank Met Masts Project.

106. As stated in **Section 17.6**, site specific geophysical data for the offshore ECC is ongoing and will be assessed by Wessex Archaeology. The results will be communicated through the ETG meetings as part of the EPP and the full assessment results will inform the ES.

107. The baseline environment for the offshore ECC within this PEIR chapter is based on a desk-based review of existing records of wrecks and seabed features which may be of archaeological interest based on the sources set out in **Table 17-7**. This assessment also utilises Wessex Archaeology geophysical data obtained during a previous survey for the DBC wind farm, as there is an overlap with the updated route of the DBD offshore ECC.

108. The DBC geophysical survey identified three anomalies within the DBD Offshore ECC Development Area, discriminated as A2 anomalies, i.e. anomalies of uncertain origin (see **Table 17-14)**. These anomalies are summarised as:

- Anomaly 73519 has been classified as Rope/chain with dimensions of 8.5 x 0.9 x 0.1m. The feature is isolated, and no anomalous features were identified in the MBES or Mag. data at this location. The anomaly has been interpreted as a possible short length of rope or chain; and
- The two remaining anomalies have been classified as magnetic anomalies with amplitudes of 27 nT (73520) and 81 nT (73518). These anomalies have been interpreted as possible ferrous debris either buried or within no surface expression. 73520 is located in the Offshore ECC.

109. With the exception of the three UKHO records detailed in **Table 17-16** there are 65 records (comprising both UKHO and NRHE records) of previously recorded wrecks, reported losses, and obstructions within the Offshore Development Area, however, only 17 of these are located within the Offshore ECC. Full details of these records are provided in the gazetteer in **Volume 2, Appendix 17.2 Offshore Archaeological Geophysical Survey Report**. The locations are shown on **Figure 17-2** and **Figure 17-3** with a summary of the17 records located within the offshore ECC provided in **Table 17-17**.

Table 17-17 Summary of Records of Wrecks and Obstructions Within the Offshore Export Cable Corridor

UKHO ID	NRHE ID	Name	Status	Description
66241	N/A	*Manchester Engineer*	Dead	Wreck of a steam ship, originally thought to be the remains of the Manchester Engineer, but it was concluded to be too small both by dimensions and size of engine when it was visited on a dive in 2009. Last surveyed in 2016 with a strong magnetic anomaly and dimensions of 90 x 14 x 8.4m at a depth of 36.46m.
6164	908392	N/A	Dead	Possible remains of vessel.
5804	978621	*Nitedal*	Dead	Possible remains of a wreck located 5.5 miles SSE of Flamborough Head. This site was formerly suggested to be the remains of the 1917 wreck of the Norwegian cargo vessel *Nitedal*. However, *Nitedal* has been positively identified elsewhere.
57495	1454594	Leka	Dead	Possible remains of 1917 wreck of Norwegian cargo vessel which foundered 5.5 miles SSE of Flamborough Head after being torpedoed en route from Santander to Sunderland with iron ore. If the *Leka*, she was constructed of iron, and powered by steam.
N/A	1003367	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
N/A	1003369	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
66239	N/A	*Adventure*	Dead	Sailing vessel which sank after colliding with *SS Woodstock*.
N/A	1003380	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.

UKHO ID	NRHE ID	Name	Status	Description
6469	908397	*Ville De Valenciennes*	Live	Ville De Valenciennes, a French cargo vessel driven of steam and built of steel. Ville De Valenciennes was torpedoed by a German UC 64 submarine and sank 6.8 nautical miles south of Flamborough Head whilst carrying a cargo of coal from the River Tyne to Bordeaux. Last surveyed in 2016 and reported as broken up at a depth of 30.5m with dimensions of 101.8 x 18.7 x 5.09m.
N/A	1003378	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
N/A	1003385	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
6588	908398	N/A	Dead	Possible remains of vessel.
N/A	1003407	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
N/A	1003413	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
N/A	1003431	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
N/A	1003436	N/A	N/A	Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature.
78989	N/A	N/A	Live	Possible wreck.

110. ‘Live’ wrecks are wrecks considered to exist by the UKHO. A ‘dead’ wreck is a wreck which has not been detected by repeated surveys and is considered not to exist by the UKHO. However, as remains may still be present, possibly buried, at the recorded location of a ’dead’ wreck, these records are retained as part of the archaeological baseline.

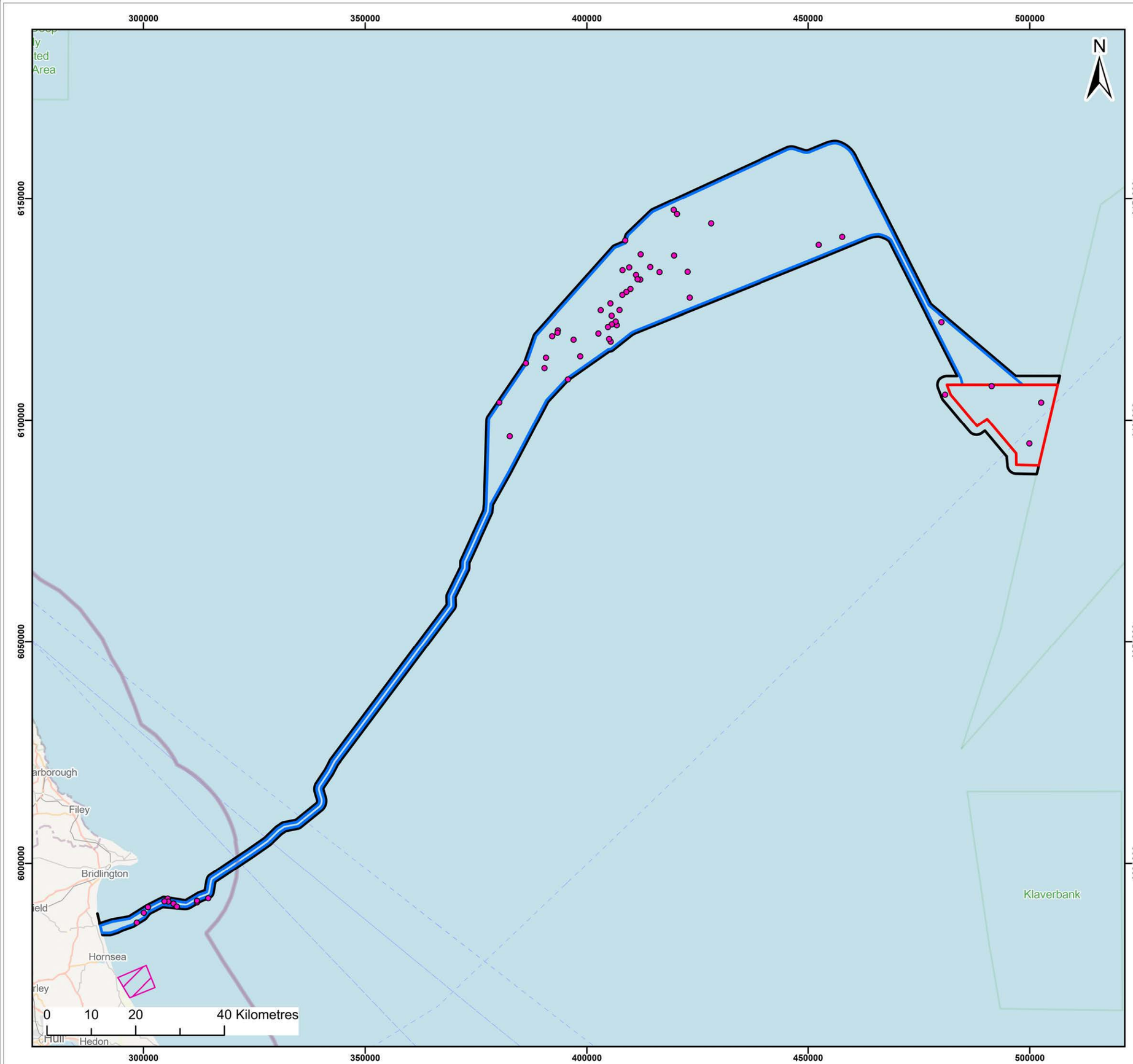
111. There is one Protected Place within the Offshore Development Area, the remains of the *HMS Falmouth* (UKHO ID 8558 / NRHE ID 907931) which is considered a ‘live’ wreck by the UKHO and is designated under the Protection of Military Remains Act 1986 (**Figure 17-2**) and therefore is of national significance. It is located c.120m south east of the Offshore Export Cable Corridor.

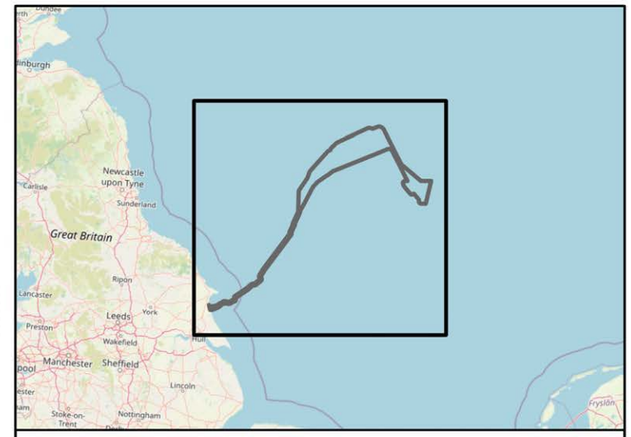
112. The *HMS Falmouth* was a British Town Class light cruiser with an authorised power of 22,000 Shaft Horsepower (shp). The vessel was built at the Dalmuir yard of William Beardmore and Co. on the River Clyde, a civil shipbuilding yard, and was launched on the 20th September 1910. The remains of the vessel also represents evidence of civil shipbuilding in warship construction. *HMS Falmouth* stood as the flagship of the Third Light Cruiser Squadron at the Battle of Jutland, the biggest naval engagement of WWI. During the battle, on the 20th August 1916, the ship was heavily torpedoed by a fleet of German U-boats and consequently sank in fairly shallow waters in Bridlington Bay, claiming the lives of 12 men, eight of whom were never found. There were attempts to salvage the wreck during the 1930s, but *HMS Falmouth*’s whereabouts were subsequently forgotten until a local diver rediscovered the wreck in 1973 (Historic England, 2016). The wreck was surveyed in 2016 with dimensions of 141.7 x 31.7 x 3.49m in a well broken up condition.

113. Research on the wreck was conducted by Fjordr Ltd (2016) commissioned by Historic England to mark the centenary of *HMS Falmouth*’s loss. Historic England and Fjordr worked with the Maritime and Coastguard Agency to survey the wreck in detail and a statement of significance was produced by Fjordr. Following this study, the Ministry of Defence (MoD) designated the wreck under the Protection of Military Remains Act 1986 and the wreck of *HMS Falmouth* became a ‘Protected Place’ on 3rd March 2017. Whilst diving on the site is permitted, it is an offence to interfere with a protected place, to disturb or to remove anything from the site.

114. The *HMS Falmouth* represents the only substantial wreck in England’s inshore waters of a ship that fought at the Battle of Jutland. The wreck is of High Importance particularly for its historic value and its ability to inform our understanding of Town Class light cruisers and Great Britain’s naval industry in WWI.

115. In addition to those records discussed above and summarised in **Table 17-17**, there are six wrecks considered to be ‘live’ in the Offshore Development Area. These are summarised in **Table 17-18**.





Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Areas
- UKHO Record Points

Project:
Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Distribution of UKHO Records
- Page 1 of 6

Figure: 17-2
Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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

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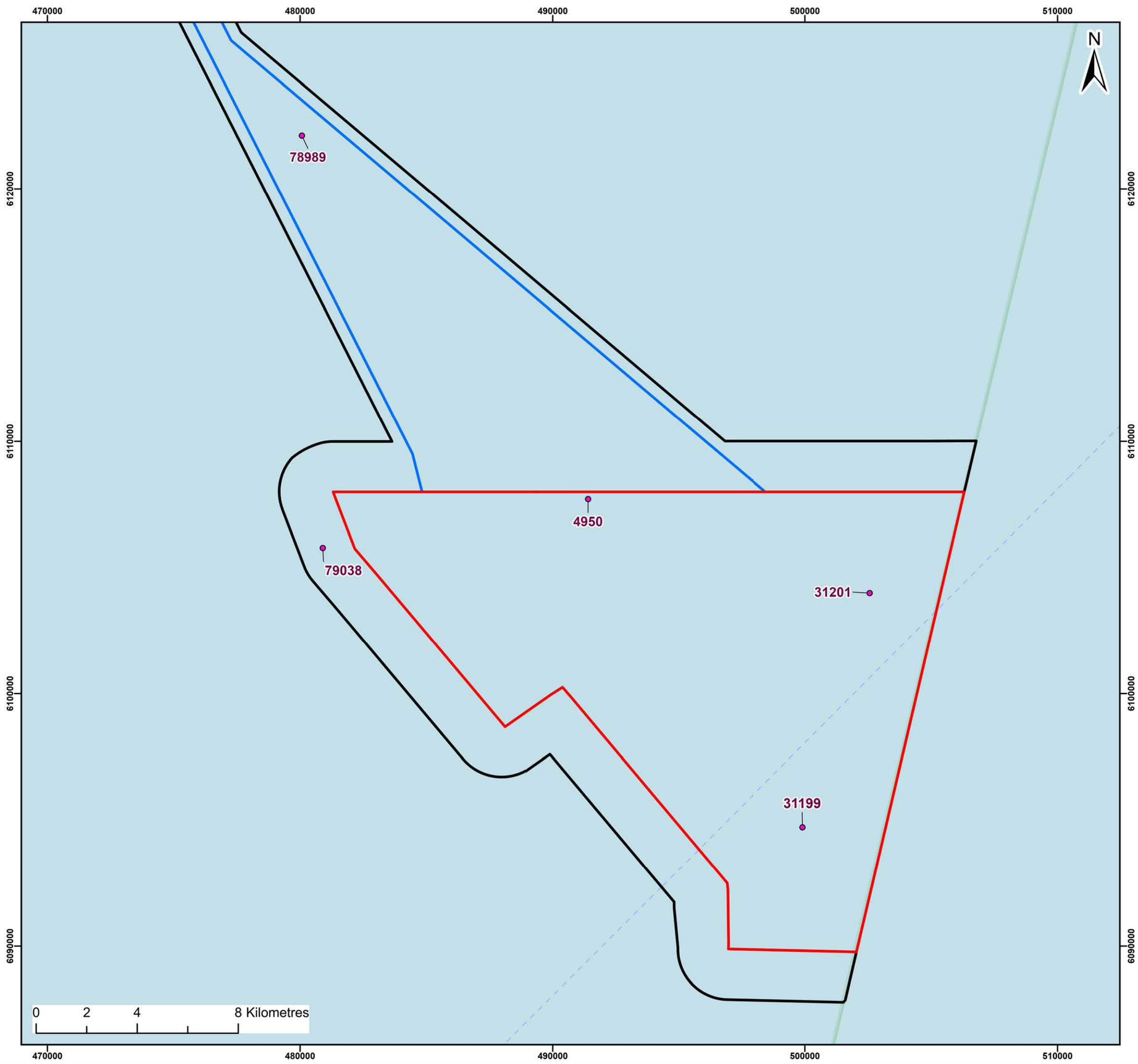

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Points

Project:
Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Distribution of UKHO Records
- Page 2 of 6

Figure: 17-2
Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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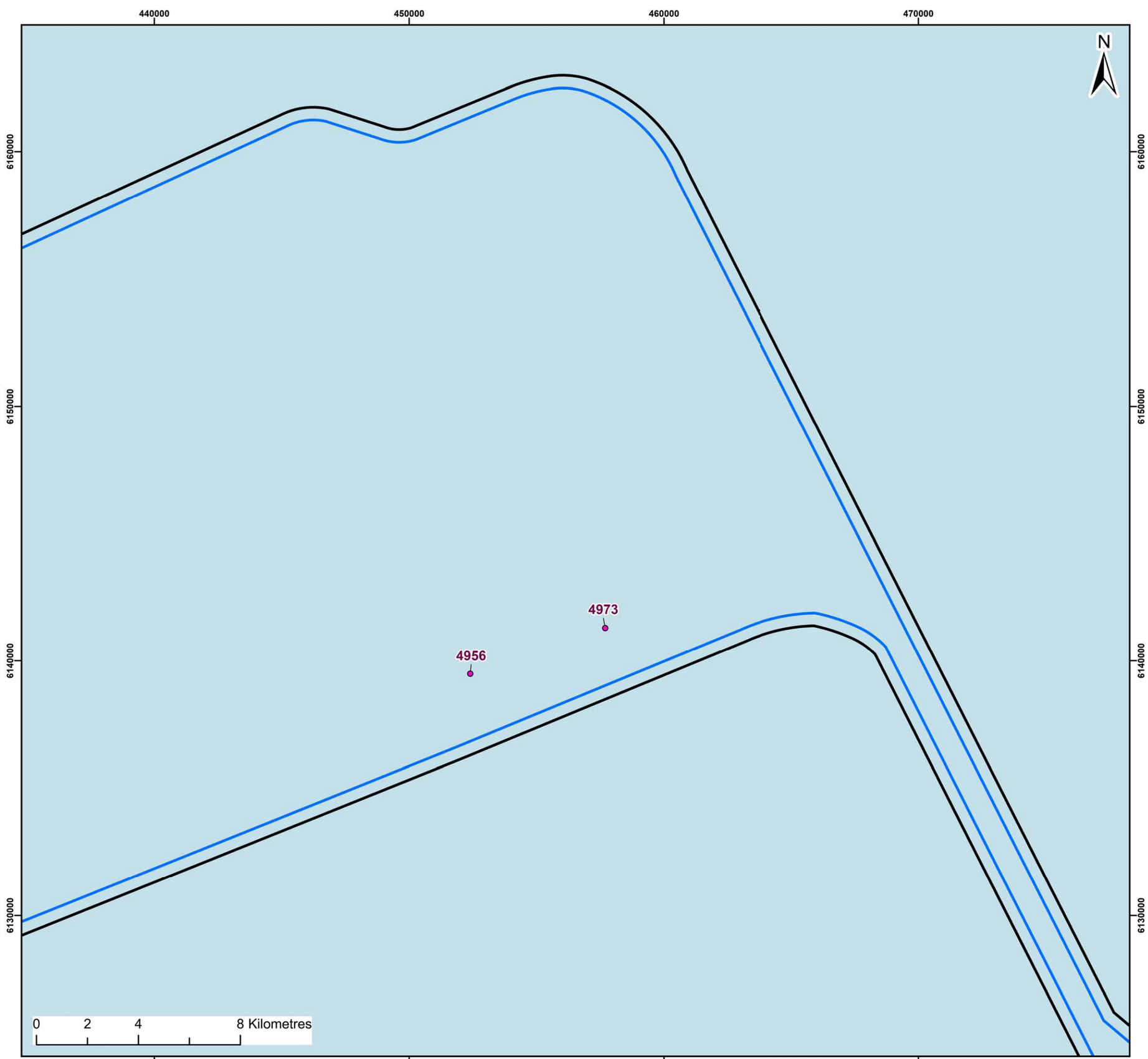

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Points

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of UKHO Records
- Page 3 of 6

Figure: 17-2

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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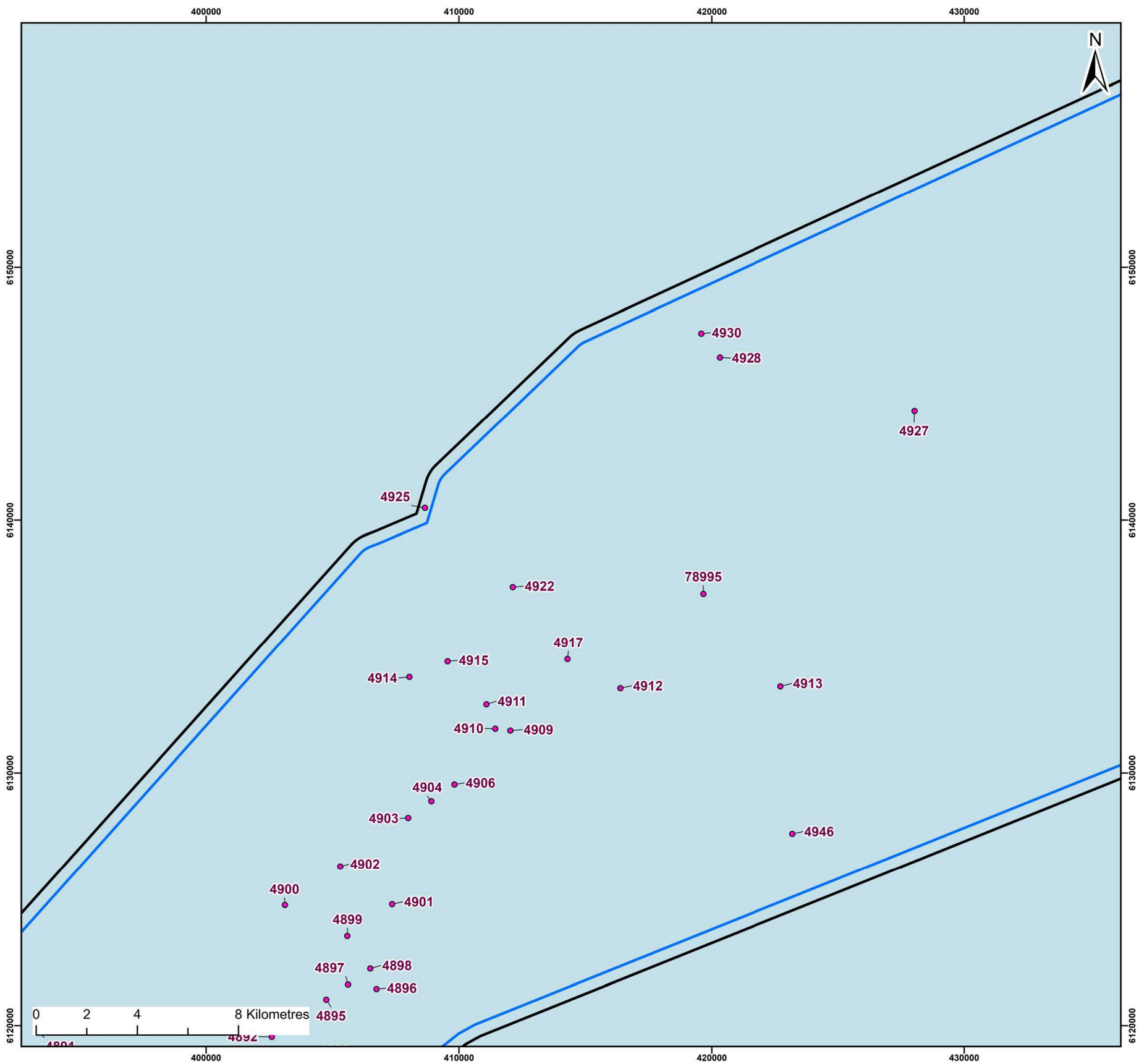

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Points

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of UKHO Records
- Page 4 of 6

Figure: 17-2

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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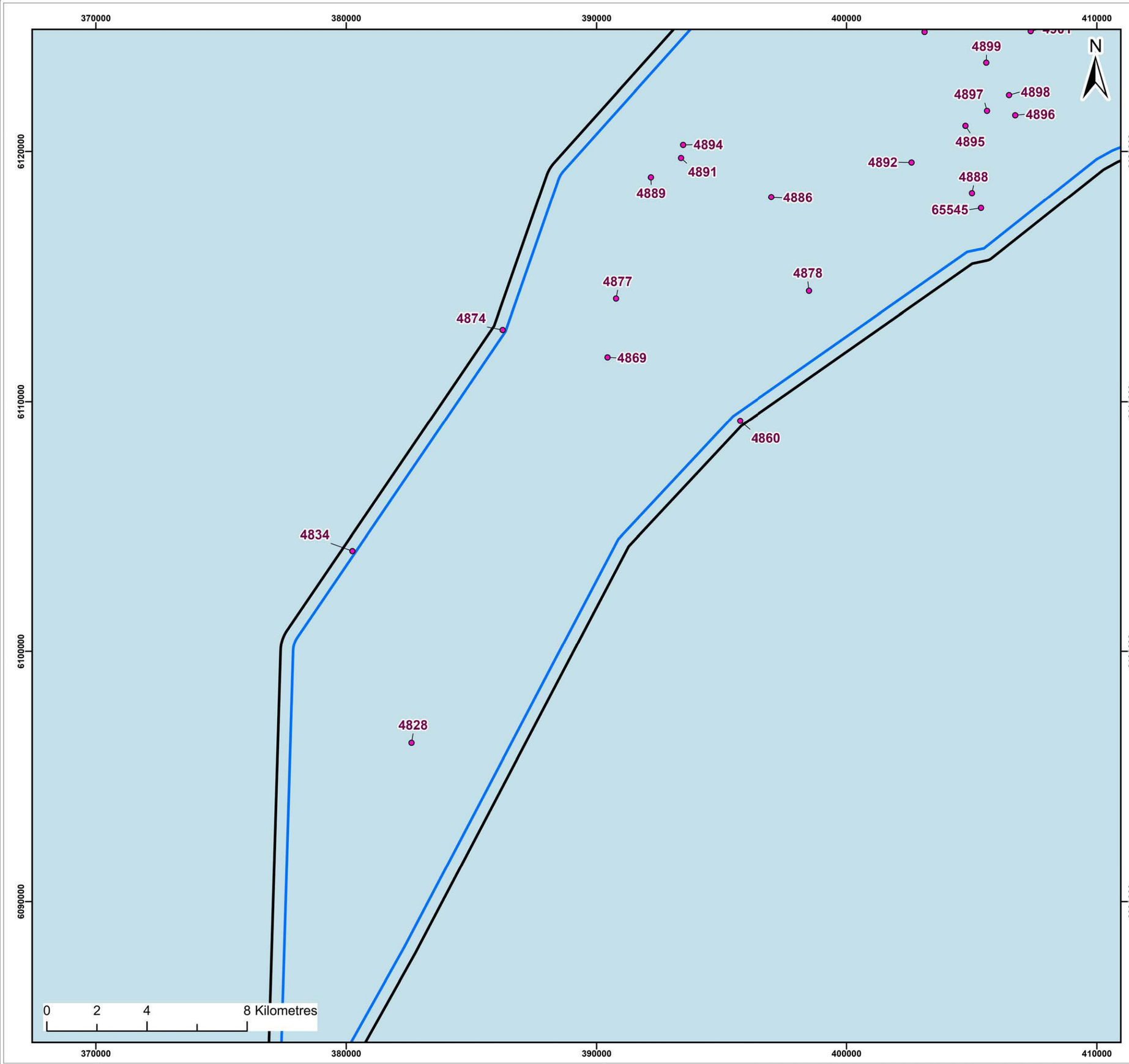

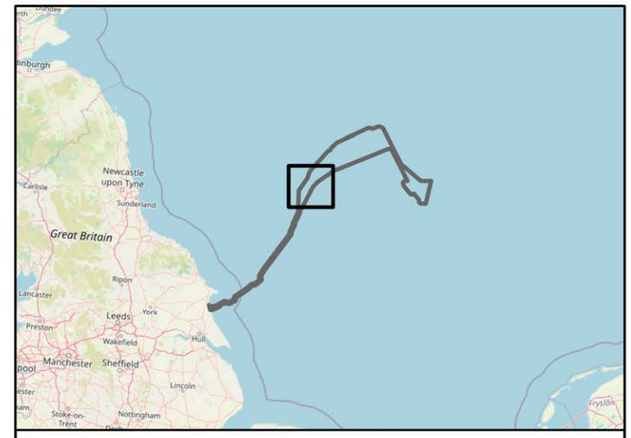

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Points

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Distribution of UKHO Records - Page 5 of 6

Figure: 17-2

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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Co-ordinate system: WGS 1984 UTM Zone 31N

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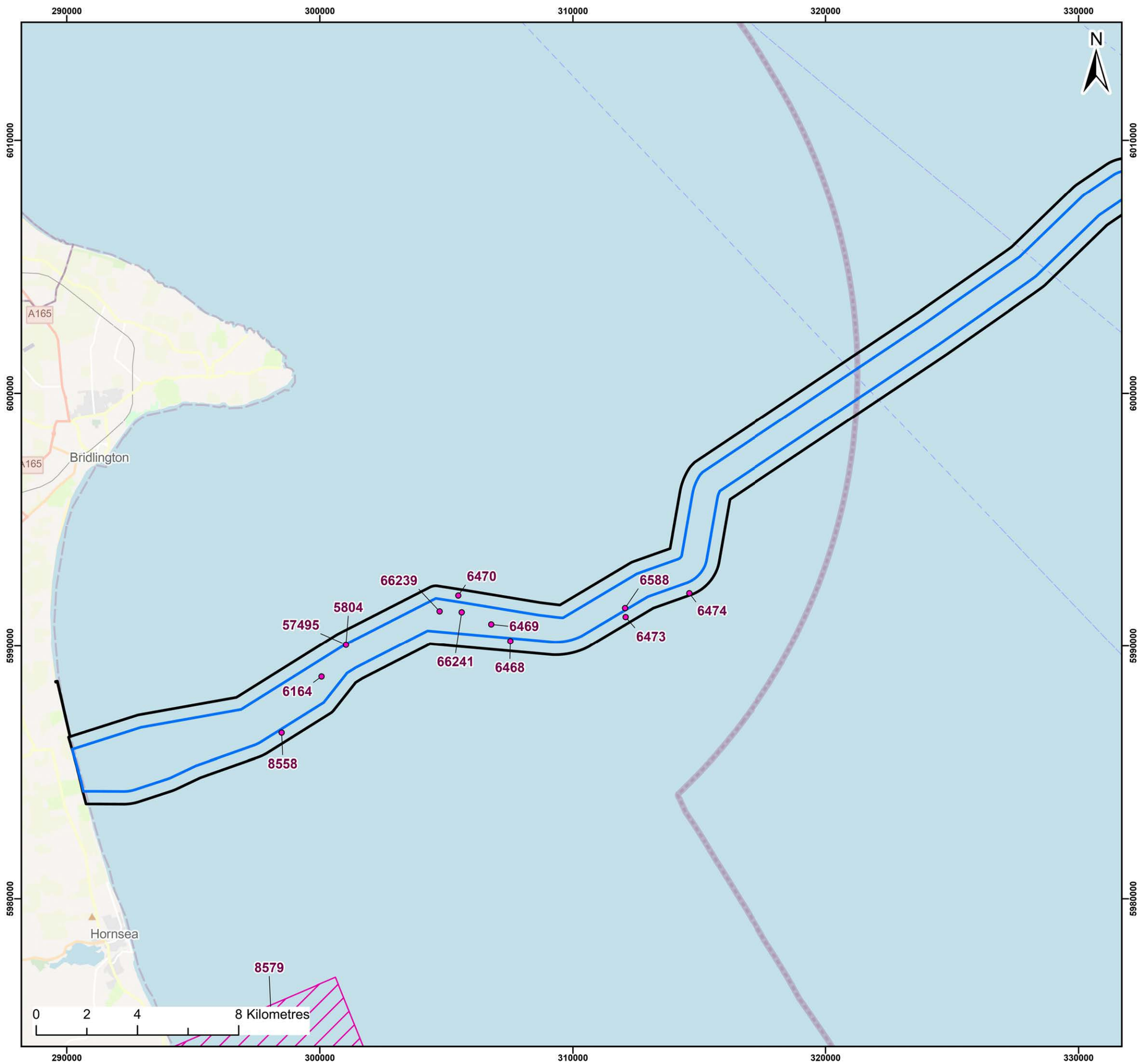

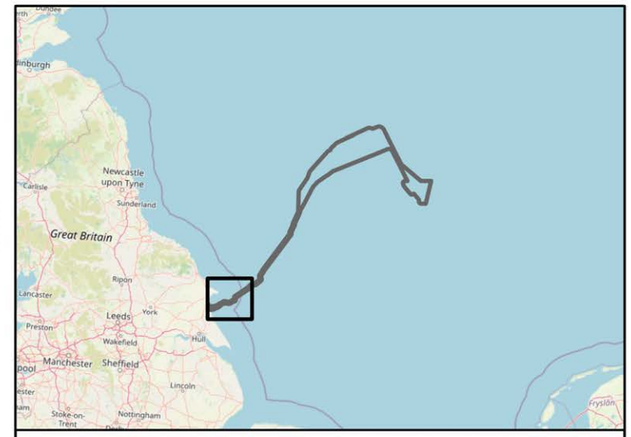

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- UKHO Record Points
- UKHO Record Areas

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of UKHO Records
- Page 6 of 6

Figure: 17-2

Drawing No: PC6250-RHD-XX-OF-DR-GS-0286

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Co-ordinate system: WGS 1984 UTM Zone 31N

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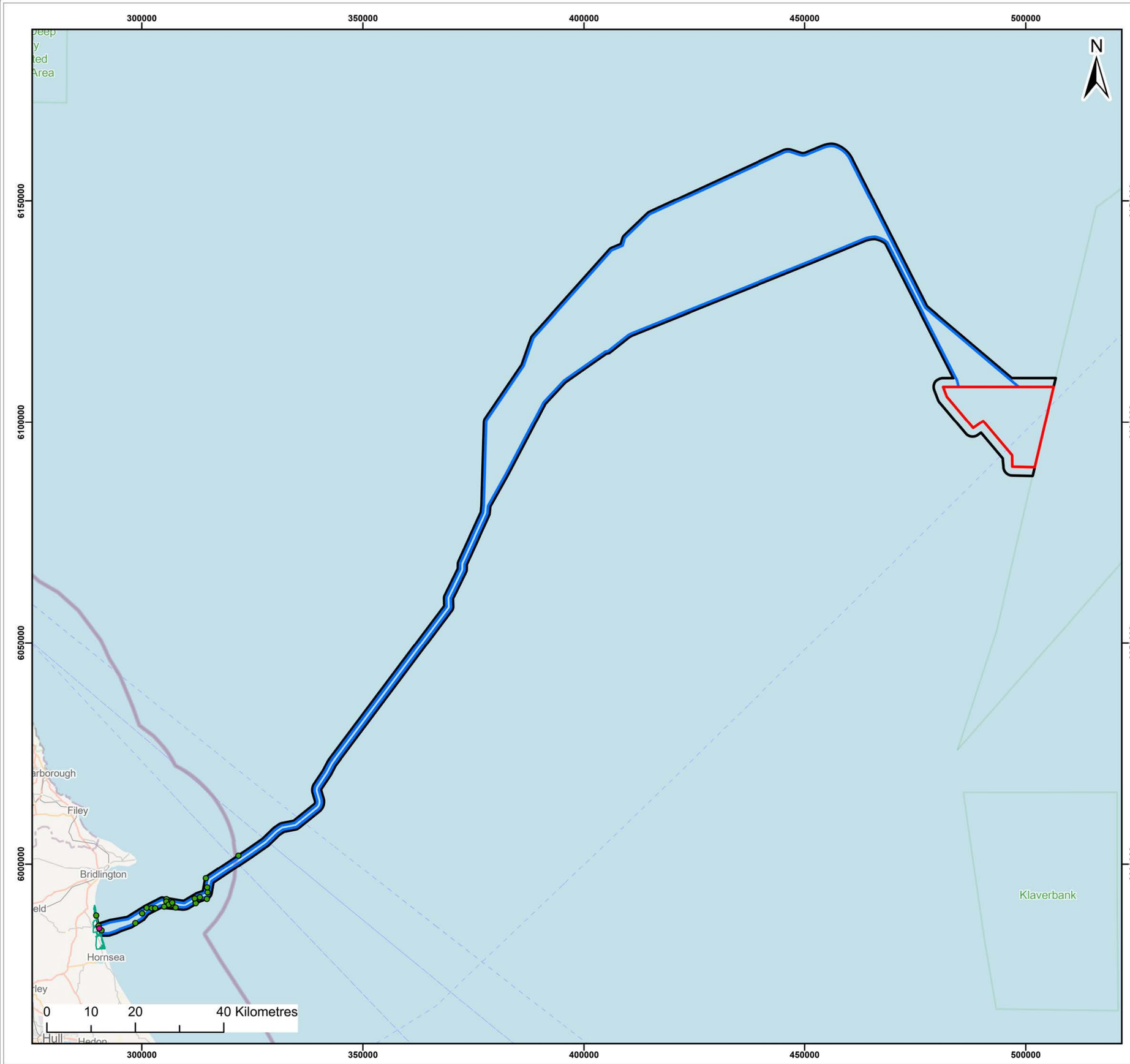

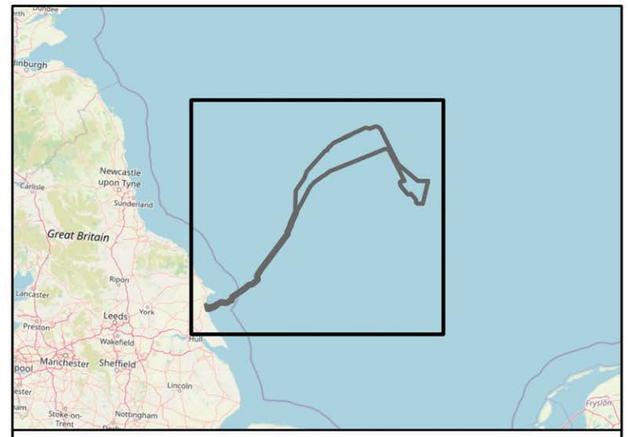

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- Monument Polygons
- Monument Points
- Events Points

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Historic England Records
- Page 1 of 4

Figure: 17-3

Drawing No: PC6250-RHD-XX-OF-DR-GS-0287

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

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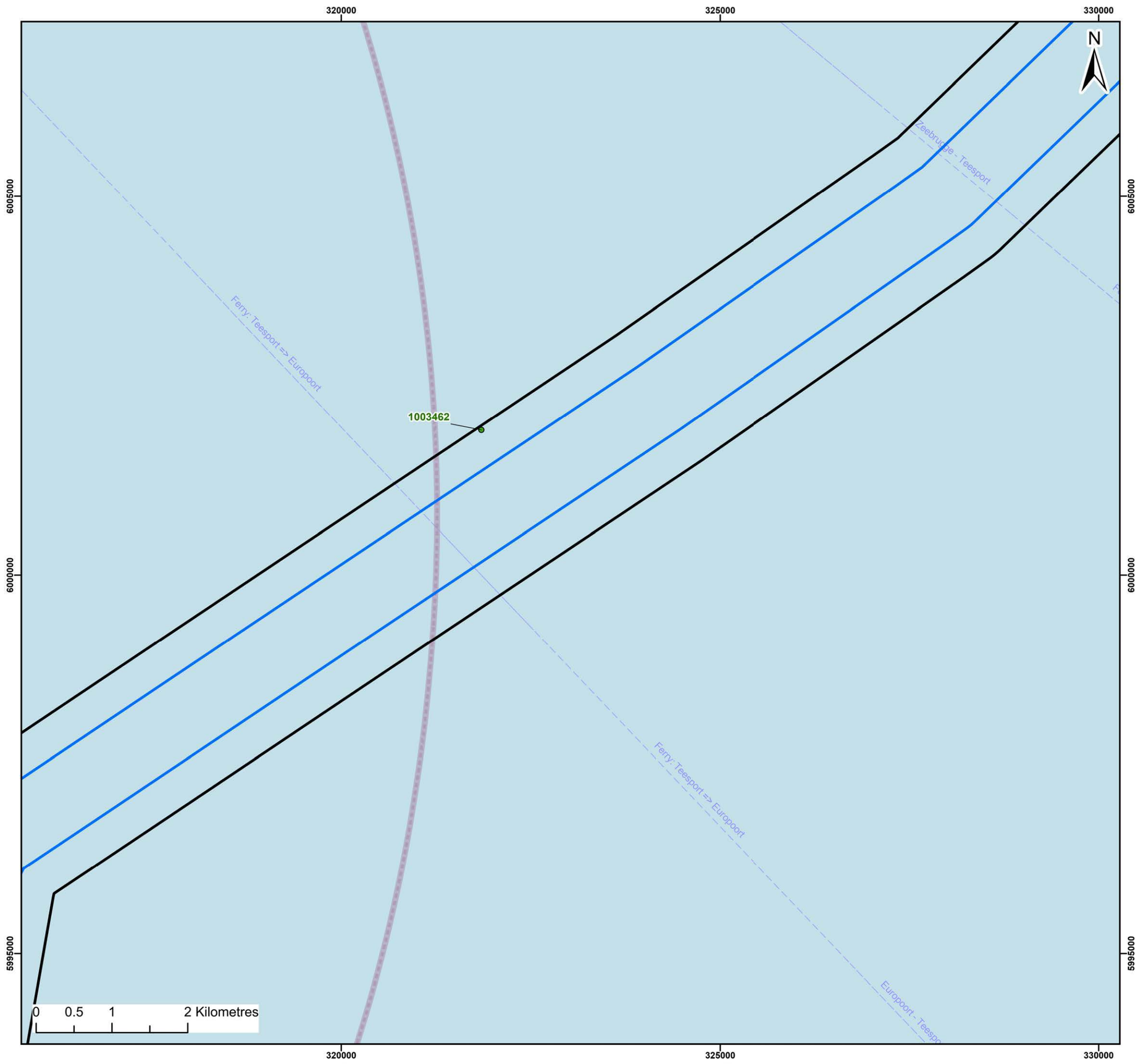

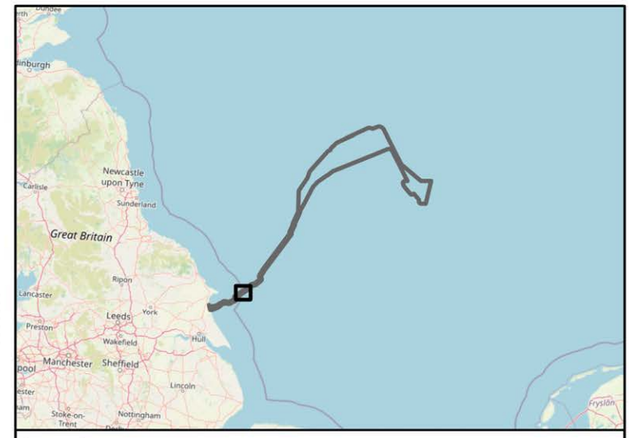

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Monument Points

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Distribution of Historic England Records - Page 2 of 4

Figure: 17-3

Drawing No: PC6250-RHD-XX-OF-DR-GS-0287

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Co-ordinate system: WGS 1984 UTM Zone 31N

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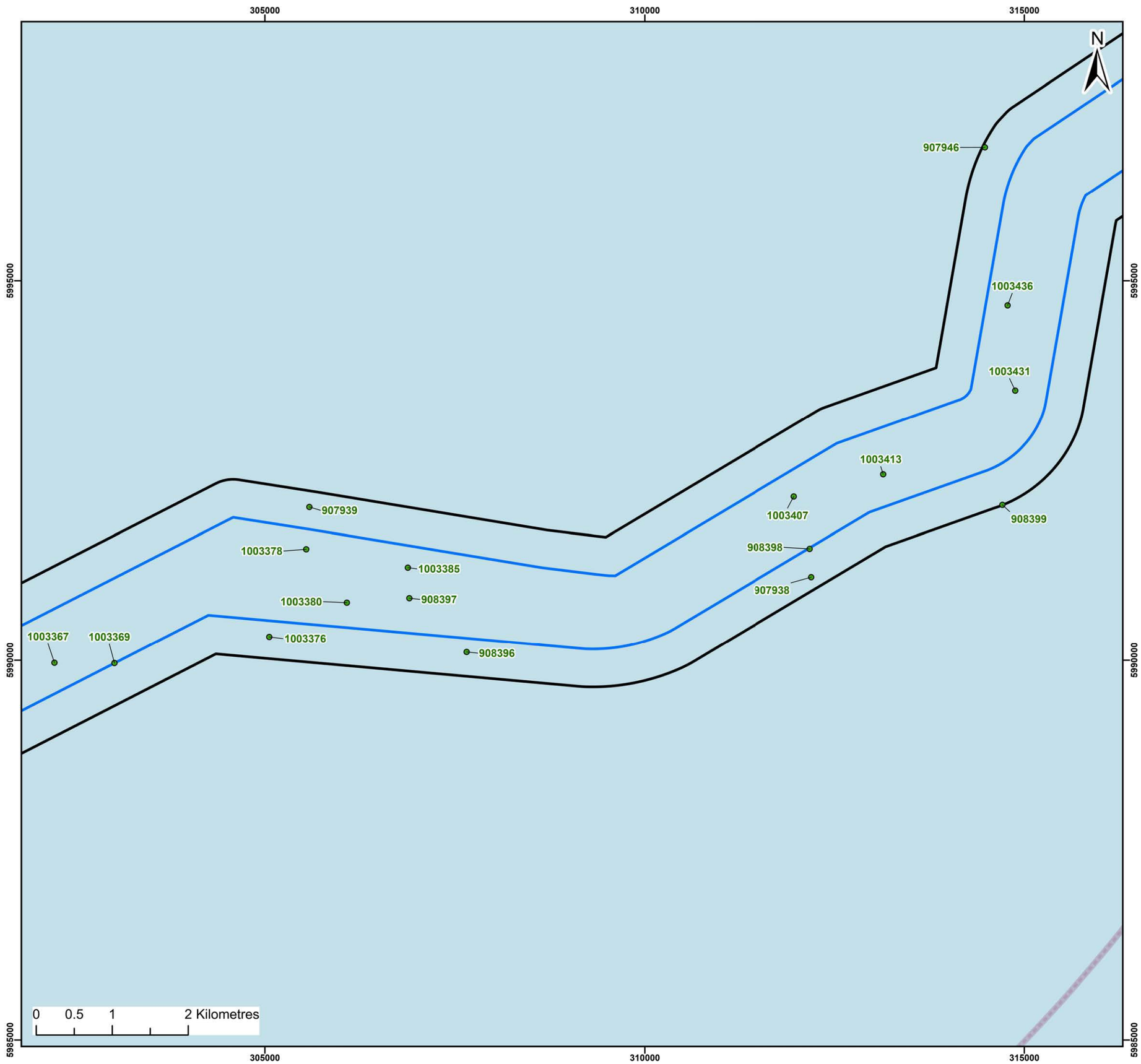

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Monument Points

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Distribution of Historic England Records - Page 3 of 4

Figure: 17-3

Drawing No: PC6250-RHD-XX-OF-DR-GS-0287

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Co-ordinate system: WGS 1984 UTM Zone 31N

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295000
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Ulrome
Sands
Ulrome
Sommers
Skipsea
Far Grange Park
Dandhills
Atwick
Beaster Hill
B1242
Skipsea Lane
Skipsea Road
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1445452
1445542
1444991
1546631
1445239
1445082
1445295
1445107
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Newcastle upon Tyne
Sunderland
Carlisle
Ripon
Lancaster
Leeds
York
Preston
Wakefield
Manchester
Sheffield
Hull
Lincoln
Stoke-on-Trent
Nottingham

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- Monument Polygons
- Monument Points
- Events Points

Project:
Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Distribution of Historic England Records
- Page 4 of 4

Figure: 17-3
Drawing No: PC6250-RHD-XX-OF-DR-GS-0287

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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01	26/11/2024	JH	AB	A3	1:50,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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Table 17-18 Summary of Wrecks Considered to be Live Within the Offshore Development Area

UKHO ID	Summary Description
6470	*Feltre*, originally the *Rhenania*, a steamship built in Germany in 1904 as a passenger ship for the Hamburg-Amerika Line. At the outbreak of WWI the ship was requisitioned and re-named *Feltre* by the Italian government and put to use as a cargo ship. *Feltre* was on route to the Tyne with a cargo of iron ore when the vessel was torpedoed and sunk by the German submarine UB-32 on 26th August 1917. The wreck was positively identified in 1986, from the original name on the ships bell found by divers. The site is known locally as Cap Morel, or Cattermole. The wreck was last recorded in 2016 with dimensions of 135.4 x 34.2 x 11.3m, broken up with a strong magnetic anomaly.
6468	*Knuthenborg*, wreck of Danish cargo steam ship, built of iron in 1880 which foundered during a collision with another Danish vessel, the *Rhone*, approximately 7.3 nautical miles south-east of Flamborough Head. The wreck has been subsequently surveyed a number of times, most recently in 2016, with reported dimensions of 58.2 x 8.9 x 5.51m at a depth of 38m with a strong magnetic anomaly, wreck partially intact.
4874	*GDY119*, a Polish fishing vessel.
65545	Wreck sighted by diver in 1990 in a well broken up condition. Subsequently surveyed in 2012 by Gardline Geosurvey with dimensions of 29 x 2.7 x 2.6m and an item of debris was recorded approximately 10m from the wreck.
6473	Wreck of a steam ship, originally thought to be the remains of the *Manchester Engineer*, but it was concluded to be too small both by dimensions and size of engine when it was visited on a dive in 2009. Last surveyed in 2016 with a strong magnetic anomaly and dimensions of 90 x 14 x 8.4m at a depth of 36.46m.
6474	*Tees,* wreck of steam ship which was built of iron in 1857 and owned at the time of loss by the Stockton & London Screw Steam Ship Company. *Tees* sank on a voyage to France carrying coal after a collision with the steamer *Spray* in 1883. The wreck was identified when its bell was found during a dive in 1996 inscribed 'Tees 1857'. Last surveyed in 2016 at recorded depth of 44.57m, with dimensions of 47.7 x 10.2 x 2.96m. Strong magnetic anomaly, wreck partially intact.
4973	*Olympic*, a British fishing vessel, sank after explosion in engine room in 1980. Unsurveyed vessel, unsafe clearance depth 30m. Wooden hull.
4912	*Angol,* a fishing vessel, sank after setting sail in high winds. Not surveyed since sinking.

116. Two of the UKHO losses relate to British vessels. The Scanlord (UKHO ID 4828), lost in 1964 and the King Charles (UKHO ID 4860) lost in 1915. The Scanlord reportedly foundered approximately 80m north-east of the Humber, while the King Charles is recorded in the Grimsby Loss List as a fishing trawler sunk by a German torpedo.

117. One record relates to the possible remains of the vessel Lister (UKHO ID 4896), a Swedish steam freighter which reportedly sank in 1939 when making a journey to Antwerp after it was torpedoed by a submarine (U-59). All of these records are listed as 'dead'.

118. The *Angol* and *Olympic* relate to modern losses of vessels lost after 1970. As 'modern' vessels these wrecks are not of archaeological significance.

119. The remaining records relate to either 'dead' wrecks, fisherman's fasteners, seabed obstructions, wrecks shown on Danish Fisheries Chart 5500 (1965 Edition) which have not subsequently been surveyed by the UKHO or reported locations of loss rather than actual wreck remains.

120. Further details of these losses are provided in **Volume 2, Appendix 17.3 Offshore and Intertidal Archaeology and Cultural Heritage Gazetteers**.

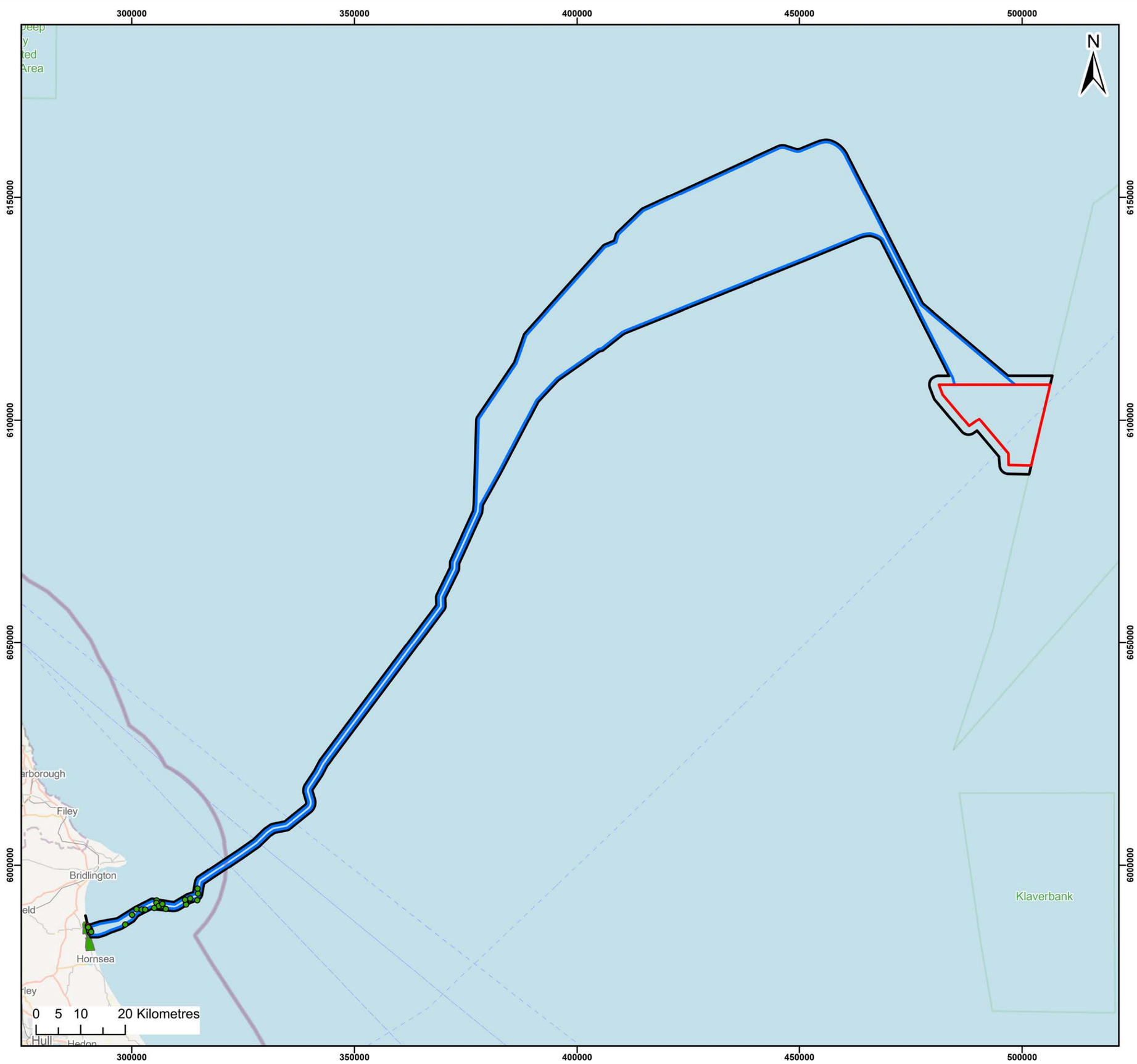
121. There are also five records within the HHER (**Figure 17-4**) which are recorded in the nearshore area of the Offshore Development Area. These include:

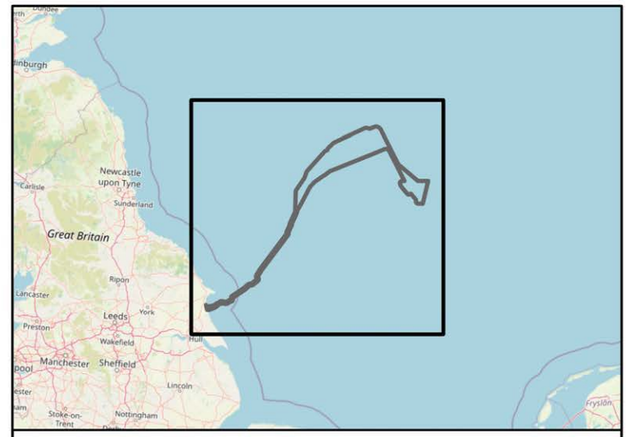
- Site of Town of Hyde (MHU8845);
- Site of Fish Weir, Skipsea (MHU15051);
- Findspot of Mammoth Tusk (MHU6665);
- Site of WWII Tank Trap (MHU21218); and
- Site of Cleeton Lost Village (MHU3412 / NRHE ID 80897).

122. The potential remains of Cleeton Lost Medieval Village (MHU3412 / NRHE ID 80897) were identified further west at the landfall as part of the archaeological investigations for the DBS Wind Farms Project (RWE, 2024). As such, it is no longer considered that any remains associated with the village of Cleeton lie at the location recorded in the HHER and NRHE datasets.

123. All the recorded positions within the offshore archaeology Study Area will be reviewed as part of the archaeological assessment of site-specific survey data being undertaken by Wessex Archaeology, with the results presented in the ES. This will clarify the potential for further maritime archaeological material to be present within the offshore archaeology Study Area.

124. In addition to the 'wrecks and obstructions' summarised above, there is potential for the presence of previously unrecorded maritime archaeological material to be present, dating from the Mesolithic period up to the present day. Similarly, there is potential for the discovery of previously unknown aircraft material.





Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- HHER Polygon
- NRHE Polygon
- HHER Points
- NRHE Points

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Humber Historic Environment Records
- Page 1 of 3

Figure: 17-4

Drawing No: PC6250-RHD-XX-OF-DR-GS-0288

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	10/03/2025	JH	AB	A3	1:850,000
01	26/11/2024	JH	AB	A3	1:850,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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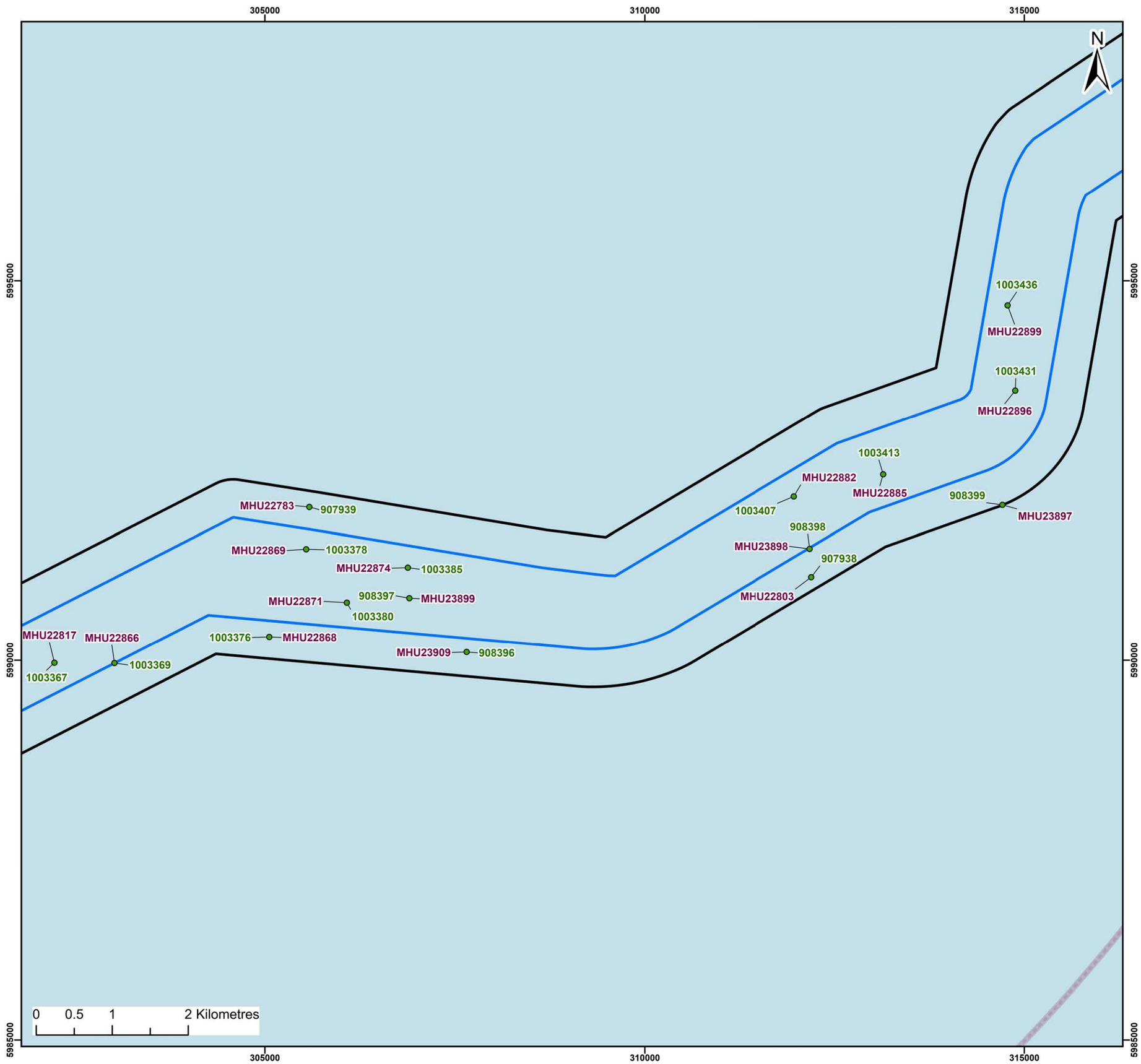

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- HHER Points
- NRHE Points

Project:
Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Distribution of Humber Historic Environment Records
- Page 2 of 3

Figure:	Drawing No:
17-4	PC6250-RHD-XX-OF-DR-GS-0288

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	10/03/2025	JH	AB	A3	1:50,000
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Co-ordinate system: WGS 1984 UTM Zone 31N

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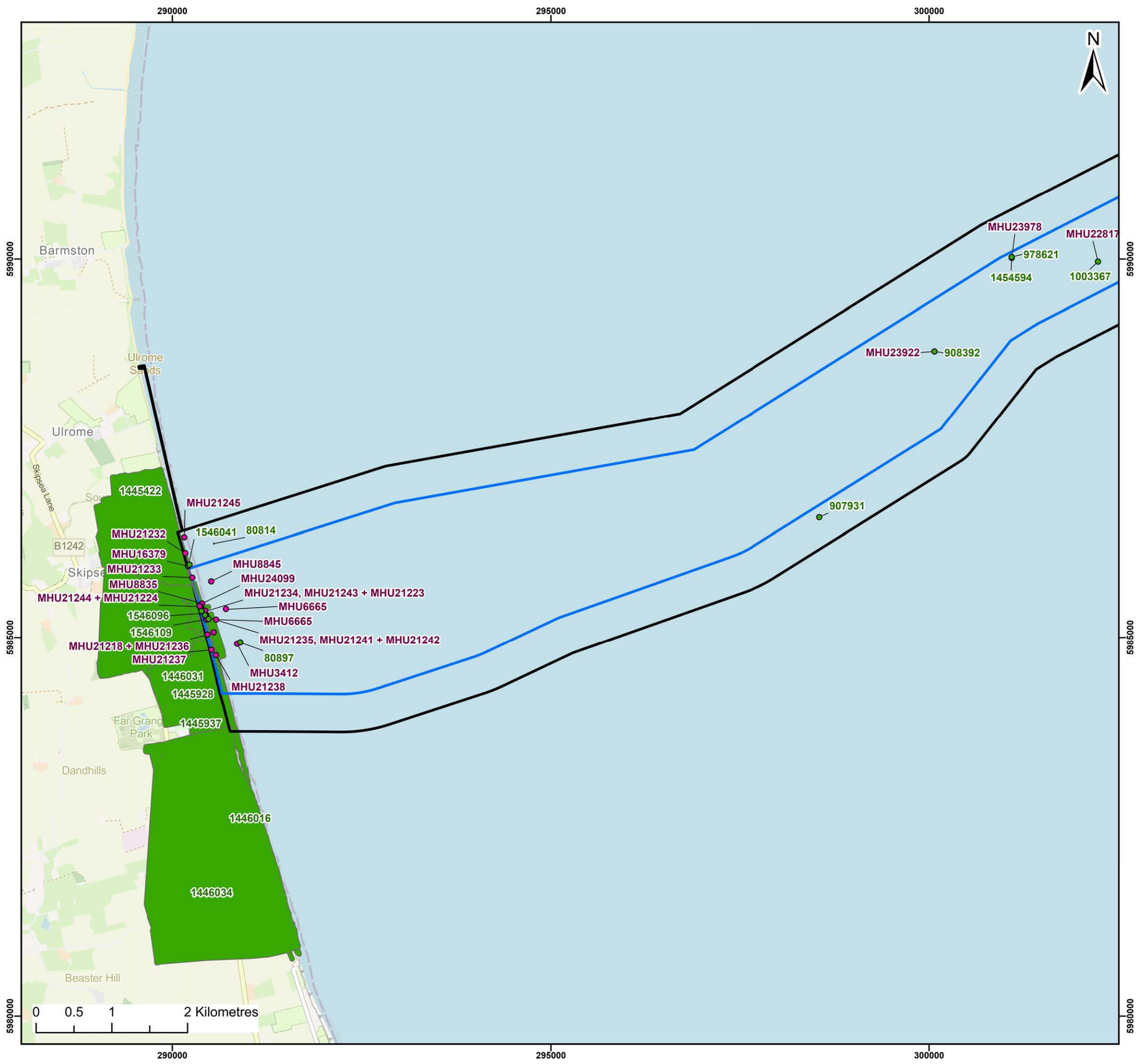

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor
- HHER Polygon
- NRHE Polygon
- HHER Points
- NRHE Points

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Distribution of Humber Historic Environment Records
- Page 3 of 3

Figure: 17-4

Drawing No: PC6250-RHD-XX-OF-DR-GS-0288

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

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17.7.1.2.2 Cultural Significance of Heritage Assets

125. The five records within the HHER dataset relate to previously recorded assets which are no longer present or have been confirmed located elsewhere. Their cultural significance, therefore, is currently negligible, although the archaeological interest (or otherwise) of any remains which come to light during the course of the Project will be described to inform any requirements for further work on a case-by-case basis.

126. Previously recorded assets are no longer present within their 'setting' and setting does not, therefore, contribute to their significance. As these assets are situated below MHWS, their contribution to a perceived contextual setting is limited through their survival as fragmentary, buried remains as opposed to *in situ* extant structures which are found at the intertidal zone.

127. The cultural significance of unidentified wrecks and debris and potential wrecks and isolated finds (which are yet to be discovered) is currently unknown. The archaeological interest (or otherwise) or features located within the construction footprint, which may be impacted by the Project, will be further examined post-consent (e.g. investigation of individual anomalies (ground-truthing) through ROV and / or diver survey. Once the character, nature and extent of selected features are more fully understood, their cultural significance can be described to inform any requirements for further work on a case-by-case basis.

128. The cultural significance of shipwrecks lies largely in their historic and archaeological interest, in terms of their historical associations with people or events and with their research value.

129. There are currently three identified wrecks of archaeological interest known to exist within the offshore archaeology Study Area.

130. The wreck of the HMS *Falmouth* (UKHO ID 8558 / NRHE ID 907931) is a Protected Place of national significance, protected under the Protection of Military Remains Act 1986, representing the only known remains of a class of vessel that played a very active role in WWI. Town Class light cruisers were directly involved in many of the key engagements of conflict around the globe, and *Falmouth* represents the only substantial wreck of the Royal Navy veteran of Jutland in English Territorial Waters. The loss of HMS *Falmouth* draws attention to a relatively little-known action in August 1916, a type of conflict which would not occur again in either the First or Second World War.

131. The *Feltre* (UKHO ID 6470 / NRHE ID 907939), previously named *Rhenania*, was laid up in Naples at the outbreak of WWI and was requisitioned and renamed *Feltre* by the Italian Government and put to use as a cargo ship.

132. The loss of this vessel during WWI in 1917 after being torpedoed is of particular cultural significance. It is noted that two further cargo vessels, *Nitedal* (UKHO ID 5804 / NRHE ID 978621) and *Leka* (UKHO ID 57495 / NRHE ID 1454594), are reported to have been torpedoed in 1917, although the remains are not known to be present within the offshore archaeology Study Area itself.

133. Also of archaeological interest is the *S.S. Membland* (UKHO ID 31199) which is recorded in the published World War I Losses. The *Membland* was a British steam ship which was lost while on a voyage from Hull to the Tyne on February 15th, 1915. The vessel was owned at the time by Lacbeth & Co. Ltd. and had recorded dimensions of 100 x 4.3 x 6.7m. The ship and the 20 crew members are thought to have been lost when the vessel struck a mine which damaged the bottom of the boat so badly that it sank immediately. However, the 2022 geophysical survey did not identify any anomalous features at this location, and any remains associated with this record are either buried or located elsewhere.

134. The study East Coast War Channels in the First and Second World War (Firth, 2014) examines the spatial extent of navigation channels and minefields between the Thames and the Scottish border during both wars and the heritage assets that are associated with these channels. Together with the presence of military installations at the landfall (see **Section 17.7.1.3**) the context of the East Coast war channels represents the wider setting of 20th century military activity within which the offshore archaeology Study Area is located. The use and loss of the wrecks against the wider backdrop of hostile military action along the east coast means that their setting should be considered to contribute to their significance, although this corresponds more broadly to their cumulative research value.

135. Similarly, although there are no known aircraft crash sites within the offshore archaeology Study Area, the aircraft losses reported during WWII further demonstrate this military setting.

136. However, it is also notable that the largest number of reported losses represent 19th century losses of fishing and cargo vessels of local, vernacular types (e.g. brigs, snows, dandys, luggers and schooners) rather than larger sailing ships and steamships. This is indicative of the importance of coastal trade and fishing to the region and should any of these vessels be identified these would likely have particular local / regional cultural significance.

17.7.1.2.3 Importance of Heritage Assets

137. The importance of unidentified wrecks and debris, and potential wrecks, aircraft, and isolated finds (which are yet to be discovered) is currently unknown and these are, therefore, assessed as being of high importance as a precautionary measure. However, for 'potential' sites each individual discovery will be considered independently and any requirements for further data gathering, or analysis will be considered on a case-by-case basis proportionate to the importance of the discovery.

138. As a wreck designated under the Protection of Military Remains Act 1986 by the Ministry of Defence (MoD), the HMS *Falmouth* is a nationally significant 'Protected Place'. The wreck of HMS *Falmouth* is important in terms of its period and rarity, with a clear association with the landscape of the North Sea in WWI. These aspects of its significance arise from the narratives manifest in *Falmouth*'s physical remains relating to its construction, motive power, operational history, and life on board. HMS *Falmouth* also exhibits several key aspects of England's history immediately prior to the WWI and in the first two years of the conflict.

139. The wreck of the *Membland* represents a British steam ship recorded in the World War I losses publication and is assessed as being of medium importance due to its association with WWI military activities. As a civilian vessel only, the wreck of the *Membland* is not anticipated to warrant protection at a national level, but the wreck is likely to be of regional interest. Although no geophysical anomaly was identified at the recorded location of the *Membland* in the previous geophysical surveys, this does not preclude the possibility of the wreck existing at the location buried beneath seabed sediment.

140. As a broken-up wreck, the *Feltre* is not considered to represent an example which could be considered of national importance warranting protection at a national level. On the basis the wreck may be considered as asset of regional interest, due to its association with the military activities of WWI, *Feltre* is assessed as being of medium importance.

141. As the vessel lies within the offshore ECC, the geophysical survey interpretations are still ongoing so at it is not possible to comment further on the current extent of the remains. However, should further information become available, as part of the pre-construction investigations, for example, the importance of *Feltre* and other wrecks which may yet be identified could be enhanced by additional contextual information.

142. Isolated finds of maritime or aviation origin within secondary contexts will have evidential value for patterns of activities offshore and are assessed as being of medium importance.

143. The heritage importance of the heritage assets outlined above are presented in **Table 17-19**.

Table 17-19 Heritage Importance (Maritime and Aviation Archaeology)

Asset type	Definition	Importance
Known maritime heritage assets	*HMS Falmouth* (UKHO ID 8558)	High
	Feltre (UKHO ID 6470)	Medium
	Membland (UKHO ID 31199)	Medium
Potential wrecks	Wrecks within the offshore archaeology Study Area that are yet to be discovered	High
Potential derived maritime finds	Isolated artefacts lost from a boat or ship or moved from a wreck site	Medium
Potential aircraft	Aircraft within the offshore archaeology Study Area that are yet to be discovered	High
Potential derived aviation finds	Isolated artefacts lost from an aircraft or moved from a crash site	Medium

17.7.1.3 Intertidal Archaeology

17.7.1.3.1 Description of Heritage Assets

144. There are no designated heritage assets below MHWS at the landfall.

145. Records of non-designated heritage assets within the intertidal zone have been compiled from searches of the HHER and records held by Historic England which were formerly part of the NRHE dataset. Records of heritage assets which were once located on land, but which have been lost due to coastal erosion, have also been included as relevant to the potential for fragmentary remains to survive within the offshore archaeology Study Area.

146. Where possible, duplicate records have been removed. The locations of the heritage assets recorded in the Humber HER and NRHE are illustrated on **Figure 17-3** and **Figure 17-4**, with a full list provided in **Volume 2, Appendix 17.3 Offshore and Intertidal Archaeology and Cultural Heritage Gazetteers**.

147. Several heritage assets within the intertidal baseline were visited as part of the onshore heritage walkover survey which took place over the 8th to 10th and 31st October 2024. The full results of the walkover survey are detailed in **Volume 2, Appendix 24.4 Onshore Heritage Walkover Report**.

148. The records suggest a high potential for archaeological remains within the intertidal zone, including buried archaeology, corresponding to three main areas of potential:

- Prehistoric archaeology including the potential for buried features;
- Medieval and Post-medieval agricultural remains which have been lost due to coastal erosion;
- 20th century military coastal defences and installations, many of which have also been lost or have fallen onto the beach due to coastal erosion; and
- Undated features.

17.7.1.3.1.1. Prehistoric

149. Early prehistoric activity is demonstrated through the presence of findspots of faunal remains (NRHE ID 1546096 and MHU6665), stone, flint and bone implements (MHU20667, MHU240099, MHU8835, NRHE ID 80918), and an unidentified amber object (NRHE ID 1546109).

150. Finds of later Prehistoric material include a Bronze Age beaker from the Withow Peat Bog (NRHE ID 80921) and Bronze Age animal horns (MHU16379). The Neolithic occupation site of Withow Mere (NRHE ID 910838) is also recorded within the intertidal zone, where carved wooden rods and stakes of early Neolithic date were found in carr peats, dating to around 4770 BC. The site was visited during the walkover survey (**Volume 2, Appendix 24.4 Onshore Heritage Walkover Report**) where evidence of wood features surviving in the cliff section were observed, associated with the Lake Dwelling at Withow Gap. Existing evidence would suggest these deposits could date to either the Mesolithic or Neolithic periods.

151. There are also two records within the NRHE data relating to an alleged lake dwelling found in 1894 (NRHE ID 1546107 and 80814) which have been classified as undated, but likely date to the Prehistoric period.

152. The potential for Prehistoric finds should, therefore, be considered high. Due to coastal erosion, in situ sites within the intertidal zone are unlikely to survive, although isolated finds may be encountered. Features such as the organic deposits in the cliffs at Withow Mere (NRHE ID 910838), however, may survive in situ exposed in the cliff face and there is potential for further buried deposits and pits or ditches to be exposed with ongoing coastal erosion.

17.7.1.3.1.2. Medieval to Post-medieval

153. Records of Medieval and Post-medieval activity at the intertidal zone are limited to records of ridge and furrow earthworks (NRHE ID 1446031 and NRHE ID 1445422) identified on aerial imagery sources. There are no Medieval or Post-medieval findspots recorded from within the intertidal zone.

154. These previously recorded features suggest a lower potential for encountering Medieval or Post-medieval remains within the intertidal zone, in comparison to prehistoric material, for example. However, isolated finds or further features within the cliff face may prove to date to this period.

17.7.1.3.1.3. 20th Century Military Activity

155. Most records within the intertidal zone correspond to WWII structural remains built along the Holderness Coast for defensive purposes, although many of these structures are no longer extant.

156. In summary, the records primarily correspond to former coastal defence structures which have been identified through aerial imagery, including:

- Pillboxes (MHU21237, MHU21223, MHU21224, MHU21233, MHU21242 and NRHE ID 1445140);
- Airfield Bombing Decoy (NRHE ID 1445928);
- Spurn Head WWII Observation Post (MHU21209);
- Anti-Aircraft Obstacles (MHU21245);
- Anti-Tank Cubes (MHU21238 and MHU21234);
- Beach Defences (MHU21241);
- Beach Defence Light (MHU21235);
- Beach Obstacles (MHU21244);
- Coastal Defences (NRHE ID 1446016, NRHE ID 1445909);
- Gunhouse (MHU21243);
- Tank Trap (MHU21218); and
- Training Site (NRHE ID 1445937).

157. During the heritage walkover survey a number of these previously recorded locations were visited (**Volume 2, Appendix 24.4 Onshore Heritage Walkover Report**). Most were not observed to survive extant, although remains which were observed on the beach comprised:

- WWII Beach Defences (MHU21241);
- Anti-Tank Cubes (MHU21234);
- Pillbox 21224; and
- Pillbox 21233.

158. It is therefore considered that the potential for WWII remains to be present in the intertidal zone is high. However, due to the action of coastal erosion these will be fragmentary and most likely to comprise the remains of structures which once would have stood on the cliff top. In situ remains such as anti-tank cubes may survive, potentially buried, although these may now be located further offshore.

17.7.1.3.1.4. Undated features

159. There are four records within the Humber HER and NRHE datasets which are of an undetermined date, including a pit (MHU21232) and double ditch (MHU21236), seaside huts (MHU21797), and an undated bone spear (NRE ID 80939).

160. It is considered that there is a moderate potential for further undated remains and/or findspots to be discovered at the intertidal zone, which may be fragmentary, isolated or *in situ*, and of potentially moderate to high importance.

17.7.1.3.2 Cultural Significance of Heritage Assets

161. Most of the Humber HER records pertain to previously documented assets and findspots that are no longer extant. However, there is a significant potential for discovering Prehistoric finds and possibly *in situ* features within the cliff face, as well as fragmentary remains of WWII defensive structures. The cultural significance of these remains is, therefore, currently undetermined. Any archaeological findings that emerge during the course of the Project will be evaluated to determine the need for further investigation on a case-by-case basis.

162. Previously recorded assets and findspots are no longer present within their original 'setting,' and therefore, the setting does not contribute to their significance. While buried archaeological sites may not be 'readily appreciated by a casual observer', any WWII defensive structures that might be found will be encountered within their intended coastal setting. This context was crucial for their role in Britain's defence during WWII. Therefore, if such remains are present, their setting would enhance their significance. However, this contribution is limited due to their survival as fragmentary, buried remains rather than intact, *in situ* structures.

17.7.1.3.3 Importance of Heritage Assets

163. If *in situ* prehistoric sites are discovered, especially in conjunction with nearshore evidence of prehistoric occupation, they will be of national or potentially international significance. These sites have a substantial potential to contribute to recognised international and national research goals. Due to the high importance of these *in situ* sites, any palaeoenvironmental evidence found in this context would also be highly significant.

164. While palaeoenvironmental material found outside the context of an *in situ* prehistoric site still holds value for understanding climate and environmental changes in offshore areas, isolated findings should be considered of low importance for assessment purposes.

165. Isolated finds of prehistoric archaeological material within secondary contexts, also have evidential value for understanding patterns of population and exploitation of former landscapes, for example. However, as these finds are derived, and out of context, they are regarded as being of medium rather than high importance.

166. The fragmentary and buried remains of WWII coastal defences and isolated finds relating to WWII activities are also assessed as being of medium importance.

167. The heritage importance of the potential heritage assets outlined above are presented in **Table 17-20**.

Table 17-20 Heritage Importance (Intertidal Archaeology)

Asset type	Definition	Importance
Potential *in situ* prehistoric sites	Primary context features and associated artefacts and their physical setting (if/where present)	High
Potential palaeoenvironmental evidence	Isolated examples of palaeoenvironmental material	Low
	Palaeoenvironmental material associated with prehistoric settlements or archaeological evidence for prehistoric activities	High
Intertidal heritage assets	WWII coastal defences (fragmentary and buried remains on beach)	Medium
Potential derived intertidal finds	Isolated artefacts and findspots dating to all periods which are located within the intertidal zone	Medium

17.7.1.4 Historic Seascape Character

168. The historic seascape character of coastal and marine areas around England has been mapped through a series of eight separate Historic Seascape Characterisation (HSC) projects funded by Historic England and undertaken between 2008 to 2014. This has since been followed by an initiative to consolidate the existing projects into a single national database (LUC, 2017a, 2017b, 2017c). The programme uses Geographical Information Systems (GIS) to map data that can be queried to identify the key cultural processes that have shaped the historic seascape within a given area.

169. The consolidated national GIS dataset was mapped against the offshore archaeology Study Area to identify the primary cultural processes which have shaped the historic seascape of this area. This includes both the current character types (**Figure 17-5**) and the previous (prehistoric and historic) (**Figure 17-6**) character types for which information is available. The accompanying character texts were used to identify the primary values and perceptions for each character type summarised in **Figure 17-5** and **Table 17-21**.

170. A qualification of change since production of the HSC baseline as well as potential changes to the character should the DCO application for DBS East and West be successful is also included in **Figure 17-5**.

171. A qualification of change since production of the HSC baseline as well as potential changes to the character should the DCO application for DBS East and West be successful is also included in **Table 17-21**.

17.7.2 Predicted Future Baseline

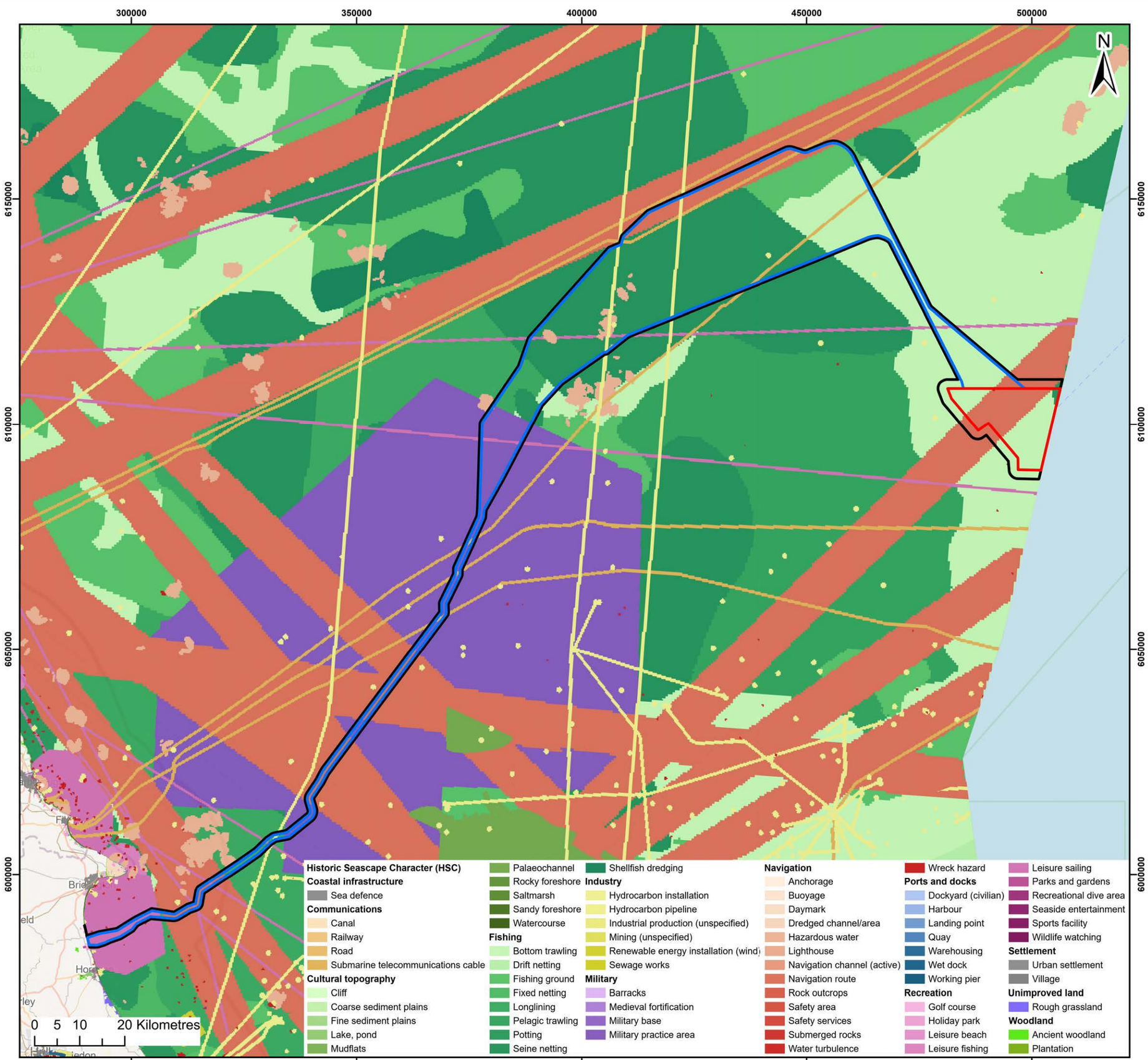
172. If the Project is not developed, an assessment of future conditions for offshore archaeology and cultural heritage has been carried out and is described within this section.

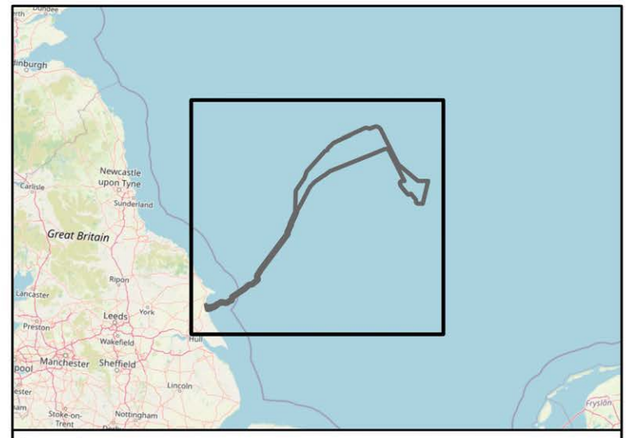
173. The baseline environment for offshore archaeology and cultural heritage has been shaped by a combination of factors, with the most prevalent being changes in global sea levels and associated climatic and environmental conditions which have affected the burial and preservation of prehistoric archaeology, and latterly that of maritime and aviation archaeology. Historic England (2022) recognise, ‘that the marine and intertidal zones are dynamic and have always undergone natural environmental change and changing patterns of use and exploitation which are nothing new’.

174. Cycles of burial and exposure resulting from marine physical processes, including storm events which can result in the stripping of shallow sediment from the seabed and beach, have an ongoing effect upon the preservation of archaeological material. Exposed heritage assets are at greater risk from erosion and degradation due to the effects of marine physical processes than those which remain buried and are consequently provided with greater protection from continued sediment cover. These cycles of burial and exposure are anticipated to continue although the effect upon individual heritage assets is difficult to predict as this will depend upon site specific conditions and the nature of any exposed archaeology.

175. As outlined in **Chapter 8 Marine Physical Processes** the baseline conditions for marine physical processes will continue to be controlled by waves and tidal currents driving changes in sediment transport and then seabed morphology, as well as anthropogenic influences in relation to water quality. These long-term drivers may be affected by environmental changes including climate change driven sea-level rise. This will have the greatest impact at the coast where more waves will impinge on the cliffs, potentially increasing their rate of erosion. Climate change will have little effect offshore where landscape-scale changes in water levels (water depths) far outweigh the effect of minor changes due to sea-level rise.

176. Consequently, future trends in terms of marine physical processes suggest that continued erosion will result in further loss of archaeological material eroding from the cliffs in the long term.





Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 1 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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

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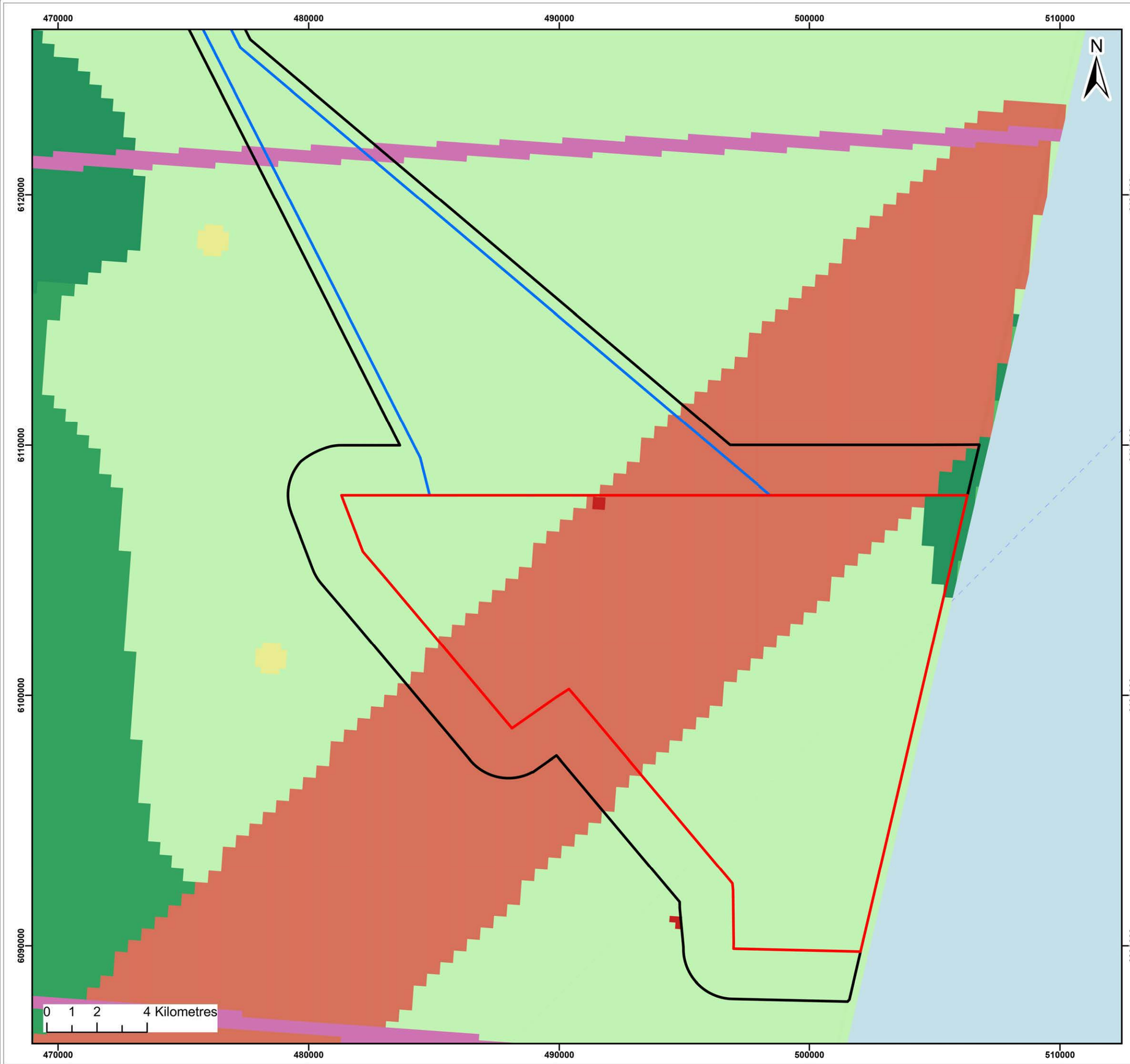

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Fishing

- Bottom trawling
- Fishing ground
- Pelagic trawling
- Seine netting

Industry

- Hydrocarbon installation

Navigation

- Navigation route
- Wreck hazard

Recreation

- Leisure sailing

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 2 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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Co-ordinate system: WGS 1984 UTM Zone 31N

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Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Communications

- Submarine telecommunications cable

Fishing

- Bottom trawling
- Fishing ground
- Seine netting

Industry

- Hydrocarbon installation

Navigation

- Navigation route

Project:
Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Historic Seascape Character
- Page 3 of 8

Figure: 17-5
Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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Co-ordinate system: WGS 1984 UTM Zone 31N

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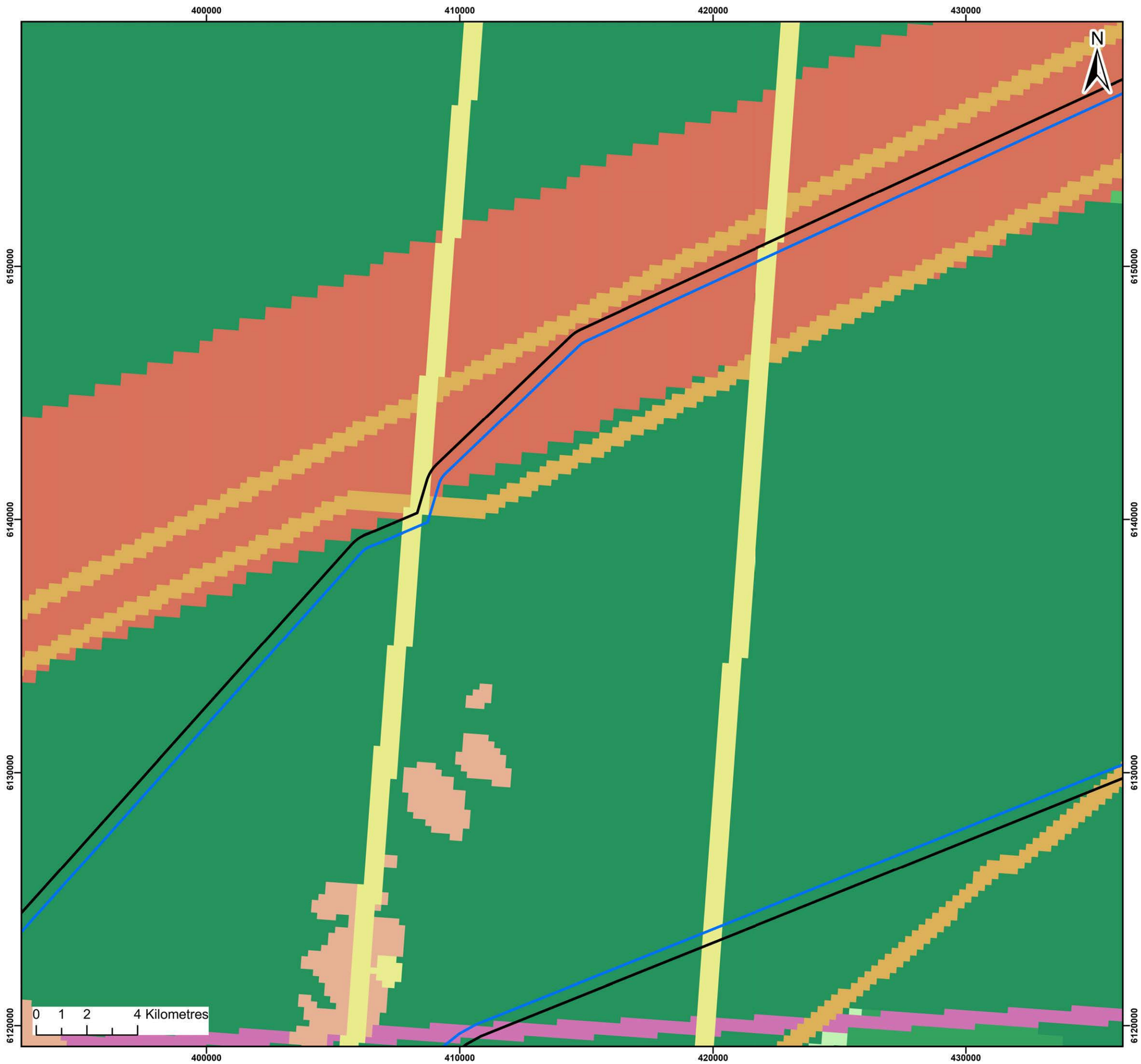

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Communications
- Submarine telecommunications cable

Fishing
- Bottom trawling
- Fishing ground
- Pelagic trawling
- Seine netting

Industry
- Hydrocarbon installation
- Hydrocarbon pipeline

Navigation
- Hazardous water
- Navigation route

Recreation
- Leisure sailing

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 4 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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Co-ordinate system: WGS 1984 UTM Zone 31N

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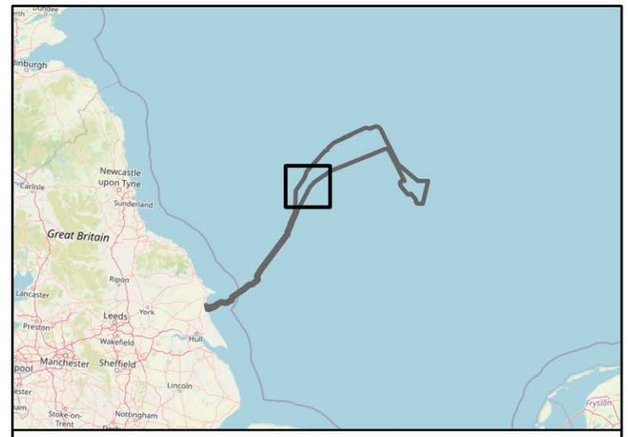

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Communications
- Submarine telecommunications cable

Fishing
- Bottom trawling
- Fishing ground
- Longlining
- Pelagic trawling
- Seine netting

Industry
- Hydrocarbon installation
- Hydrocarbon pipeline

Military
- Military practice area

Navigation
- Hazardous water
- Navigation route

Recreation
- Leisure sailing

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 5 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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

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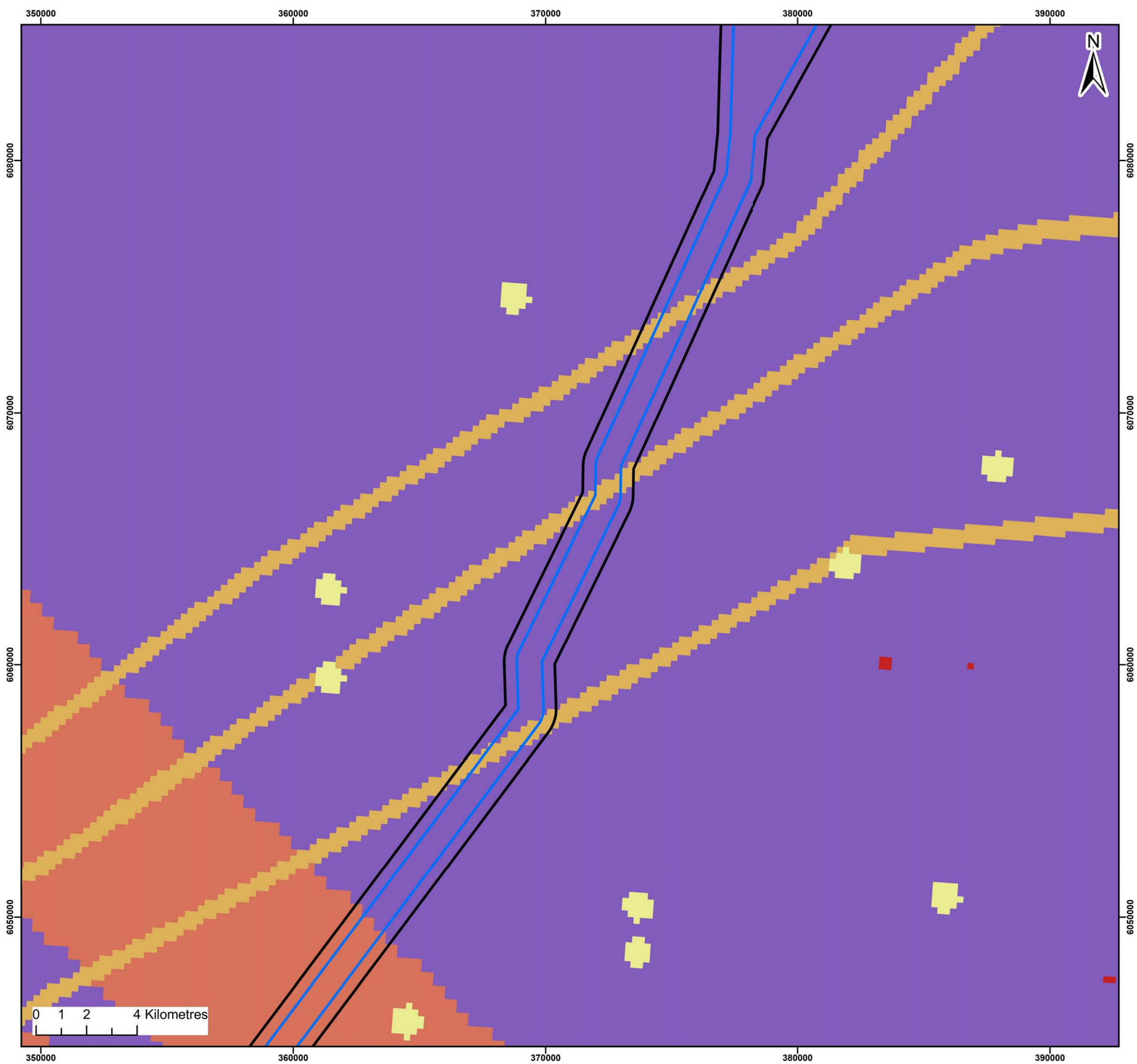

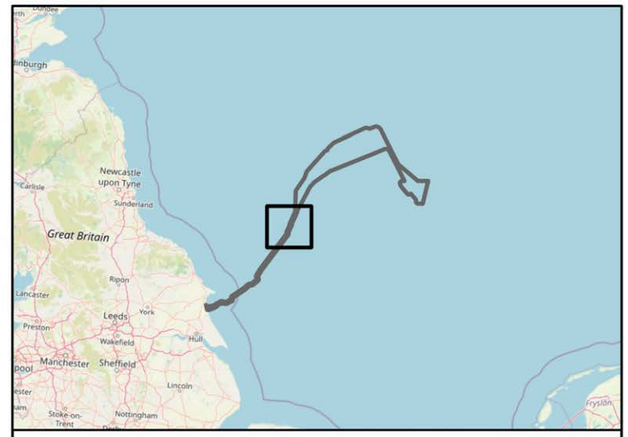

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Communications

- Submarine telecommunications cable

Industry

- Hydrocarbon installation

Military

- Military practice area

Navigation

- Navigation route
- Wreck hazard

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 6 of 8

Figure:	17-5	Drawing No:	PC6250-RHD-XX-OF-DR-GS-0289		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: WGS 1984 UTM Zone 31N

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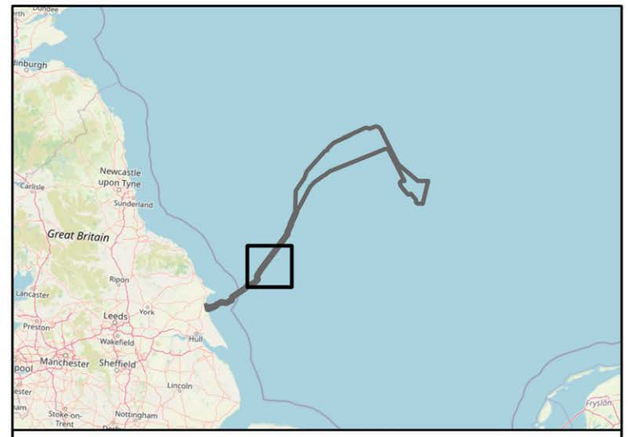

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC)

Communications
- Submarine telecommunications cable

Cultural topography
- Palaeochannel

Fishing
- Fishing ground
- Longlining
- Seine netting

Industry
- Hydrocarbon installation
- Hydrocarbon pipeline

Military
- Military practice area

Navigation
- Navigation route
- Wreck hazard

Recreation
- Leisure sailing

Project:
Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Historic Seascape Character
- Page 7 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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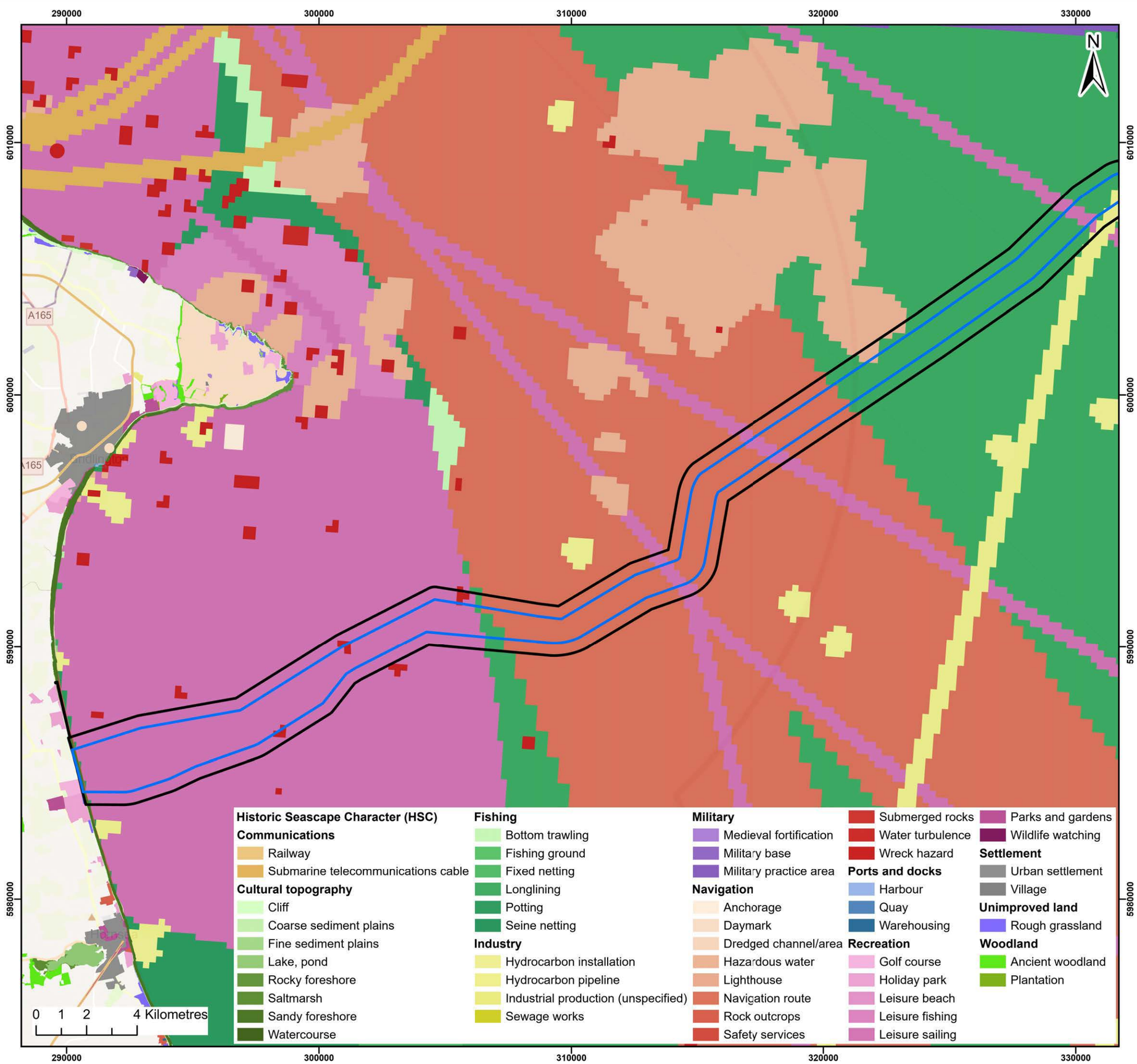

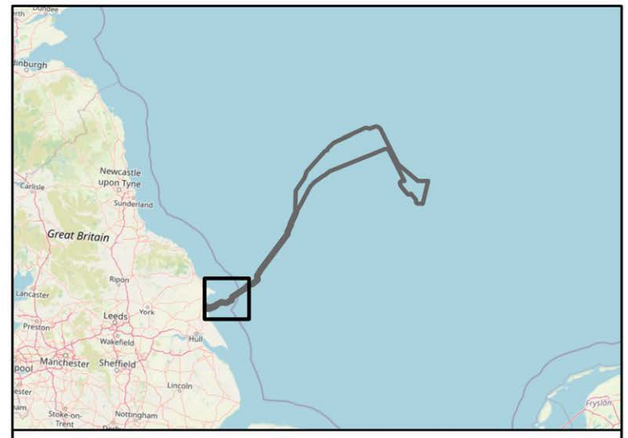

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character
- Page 8 of 8

Figure: 17-5

Drawing No: PC6250-RHD-XX-OF-DR-GS-0289

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

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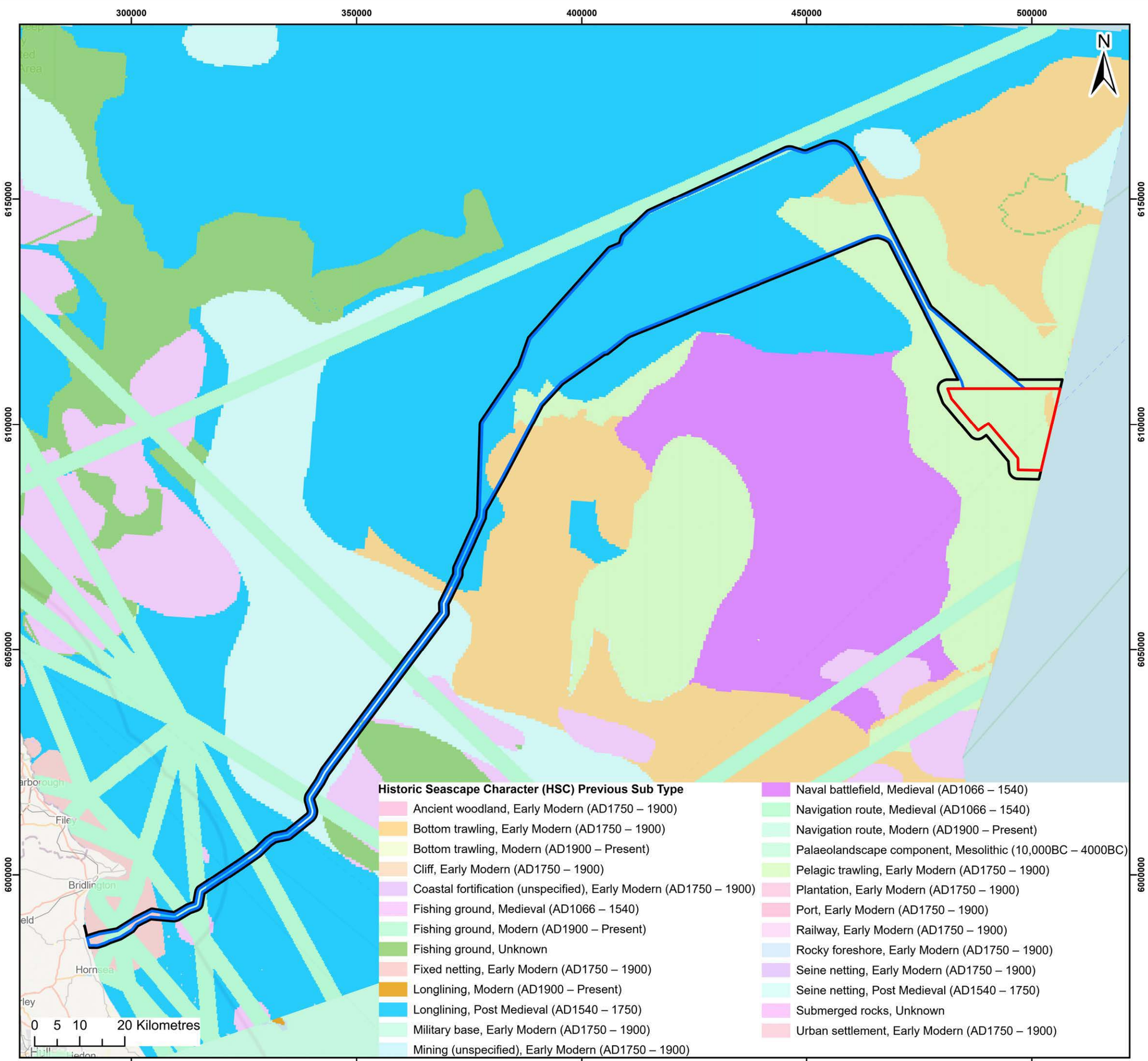

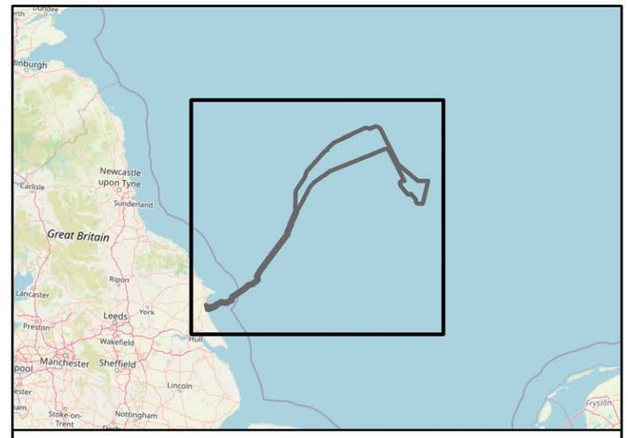

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types - Page 1 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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

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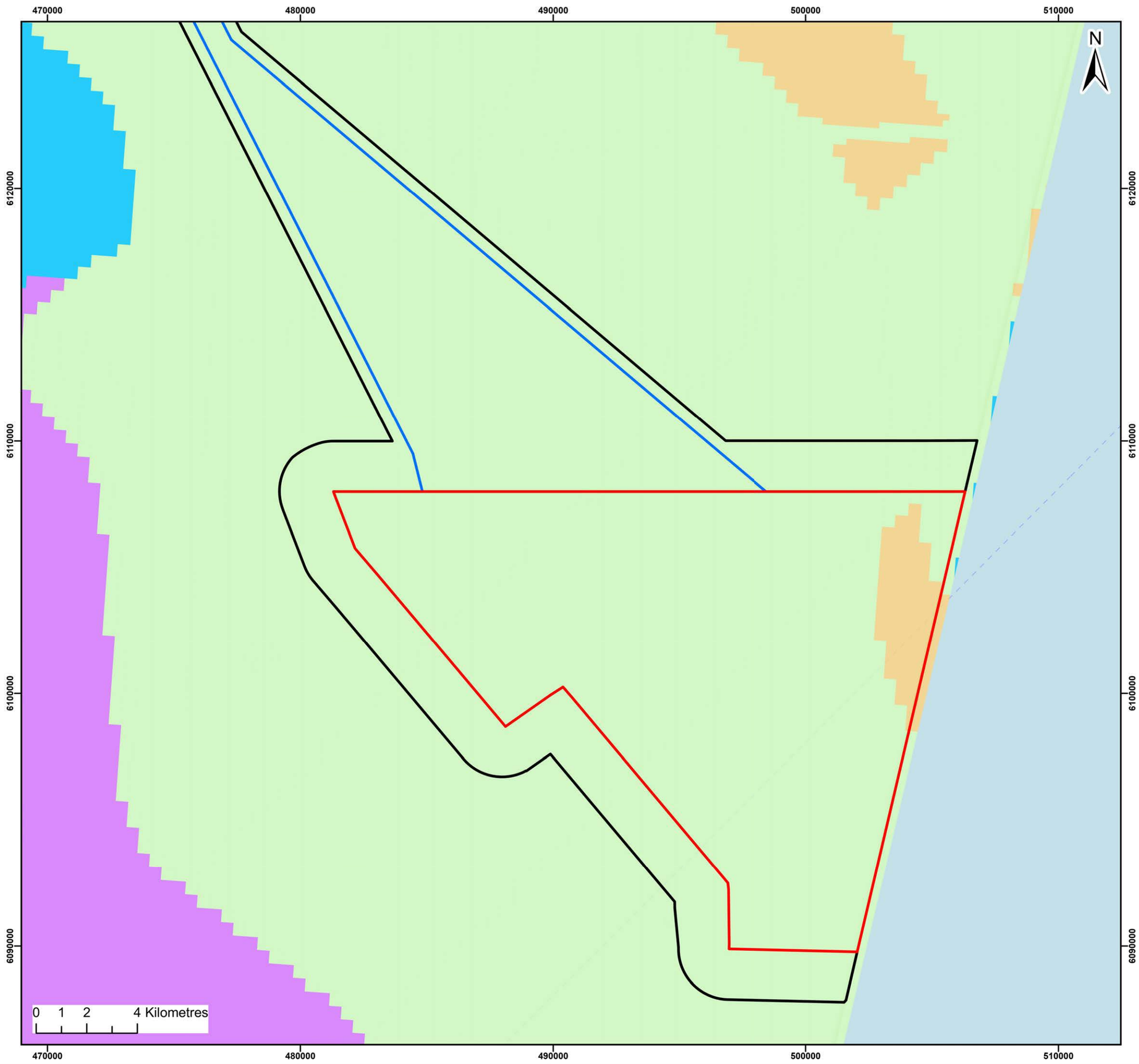

Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Bottom trawling, Early Modern (AD1750 – 1900)
- Longlining, Post Medieval (AD1540 – 1750)
- Naval battlefield, Medieval (AD1066 – 1540)
- Pelagic trawling, Early Modern (AD1750 – 1900)

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types - Page 2 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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

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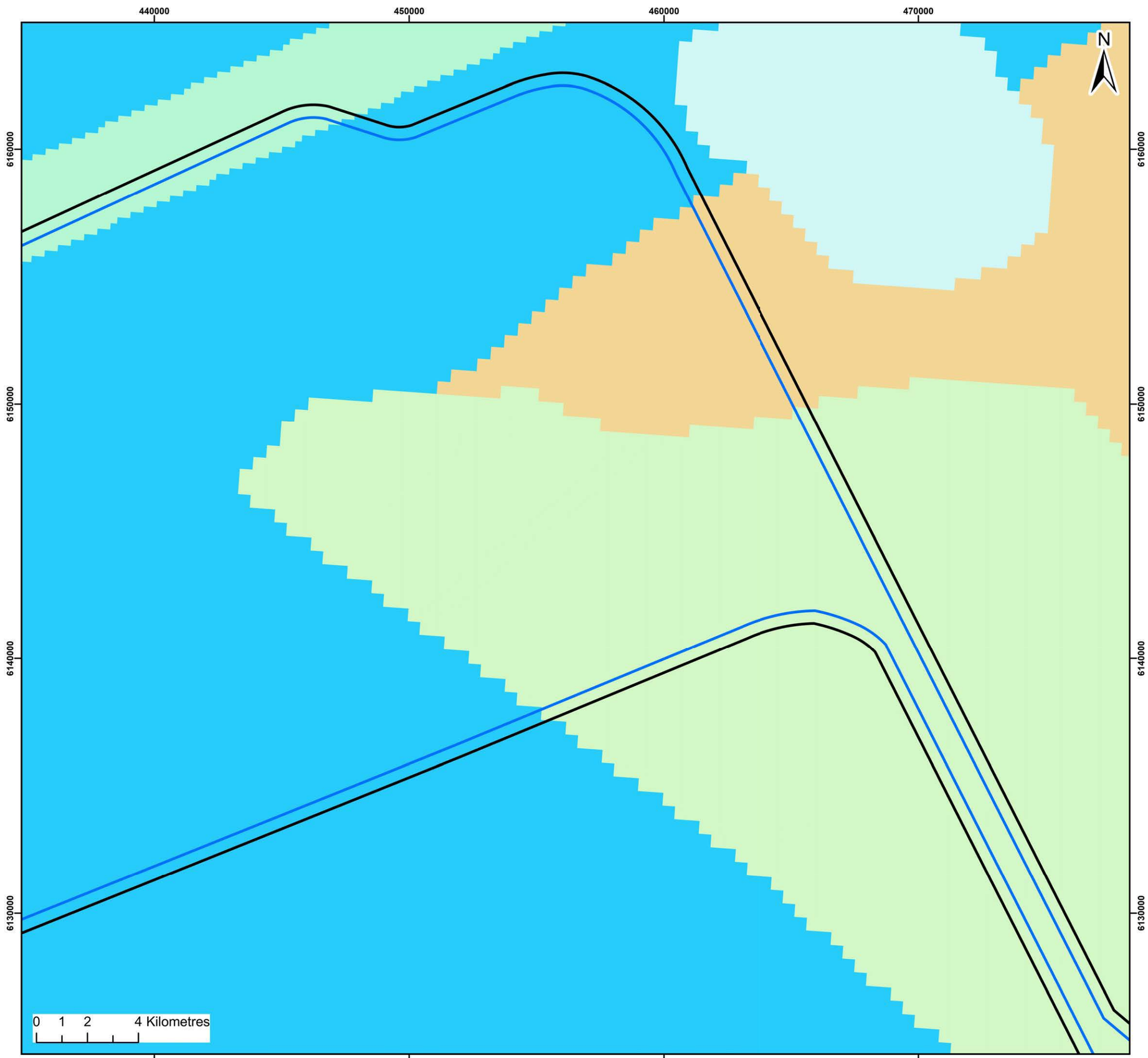

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Bottom trawling, Early Modern (AD1750 – 1900)
- Longlining, Post Medieval (AD1540 – 1750)
- Navigation route, Medieval (AD1066 – 1540)
- Pelagic trawling, Early Modern (AD1750 – 1900)
- Seine netting, Post Medieval (AD1540 – 1750)

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types
- Page 3 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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

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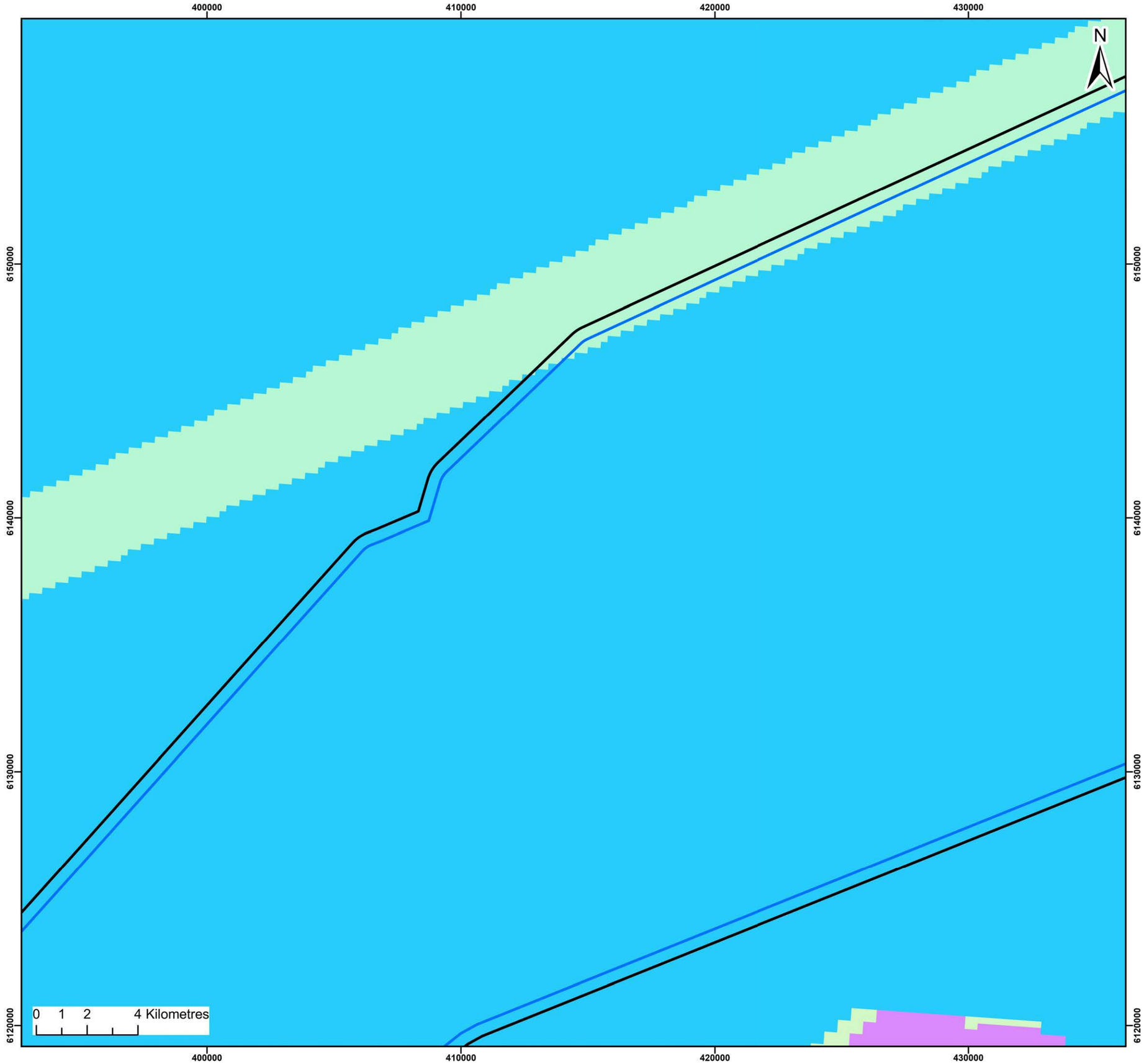

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Longlining, Post Medieval (AD1540 – 1750)
- Naval battlefield, Medieval (AD1066 – 1540)
- Navigation route, Medieval (AD1066 – 1540)
- Pelagic trawling, Early Modern (AD1750 – 1900)

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types
- Page 4 of 8

Figure:	Drawing No:
17-6	PC6250-RHD-XX-OF-DR-GS-0290

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

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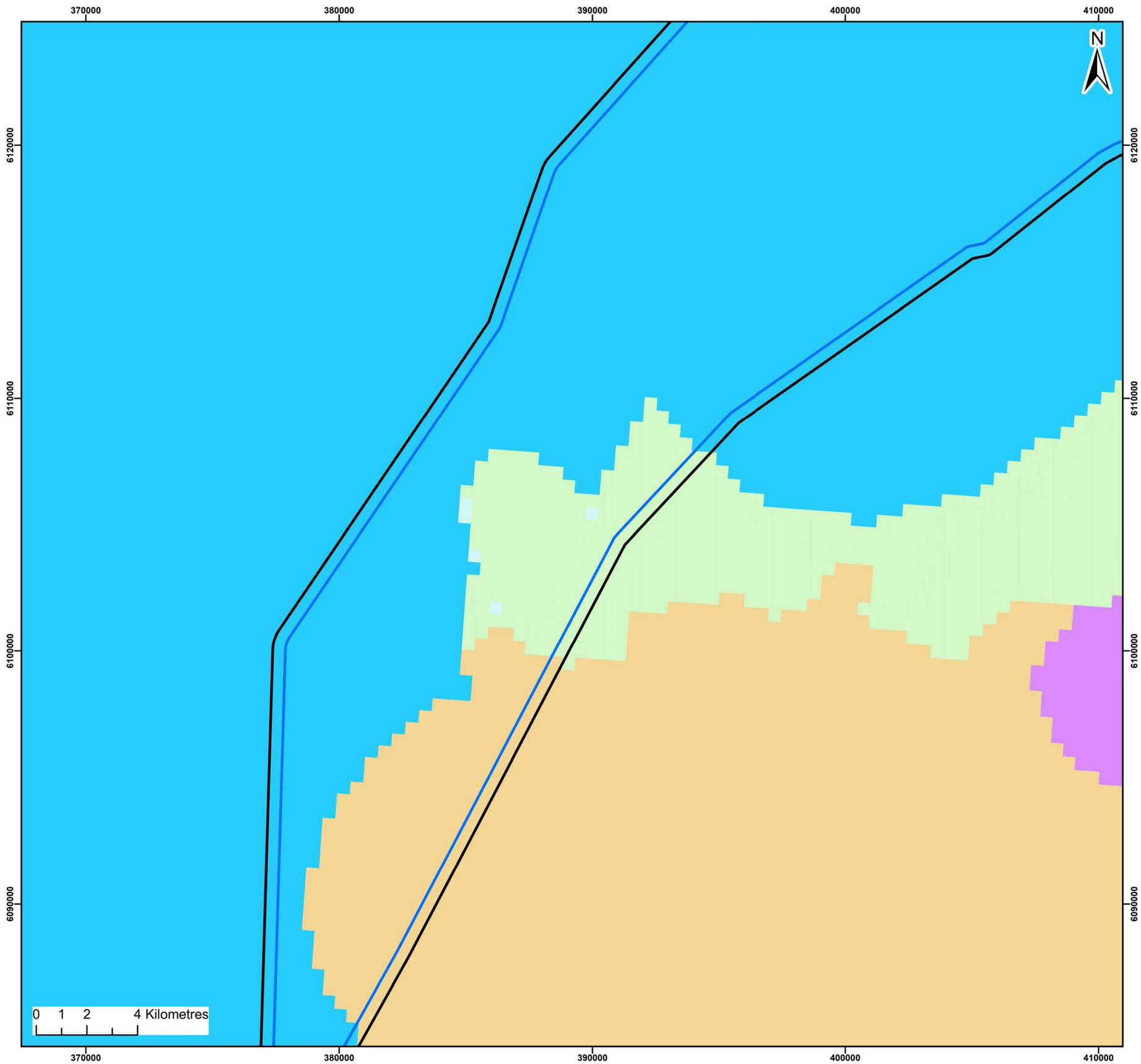

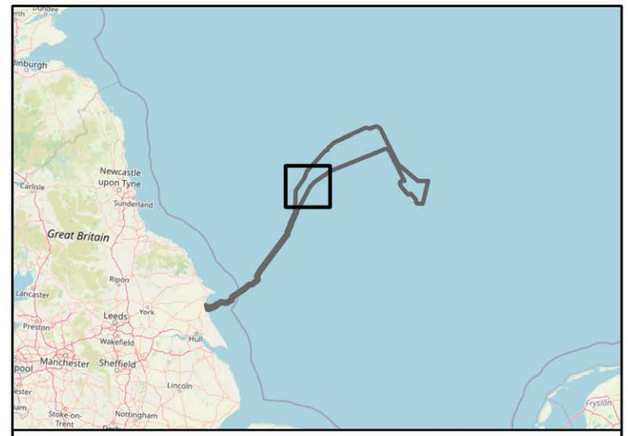

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Bottom trawling, Early Modern (AD1750 – 1900)
- Longlining, Post Medieval (AD1540 – 1750)
- Naval battlefield, Medieval (AD1066 – 1540)
- Pelagic trawling, Early Modern (AD1750 – 1900)
- Seine netting, Post Medieval (AD1540 – 1750)

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types - Page 5 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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

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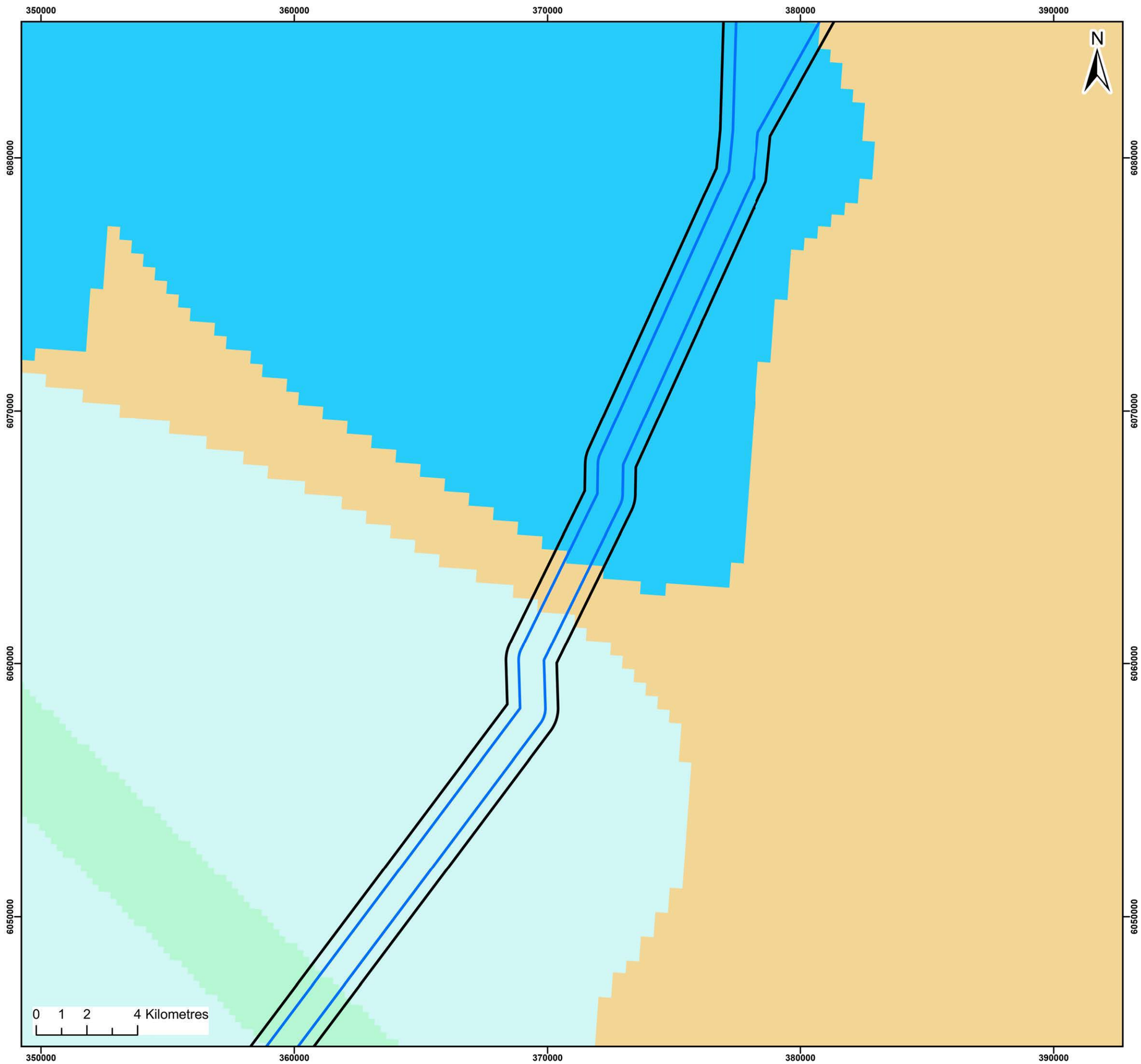

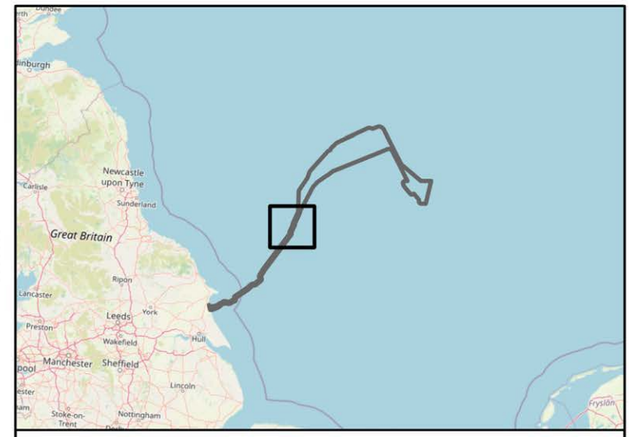

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Bottom trawling, Early Modern (AD1750 – 1900)
- Longlining, Post Medieval (AD1540 – 1750)
- Navigation route, Medieval (AD1066 – 1540)
- Seine netting, Post Medieval (AD1540 – 1750)

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types
- Page 6 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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

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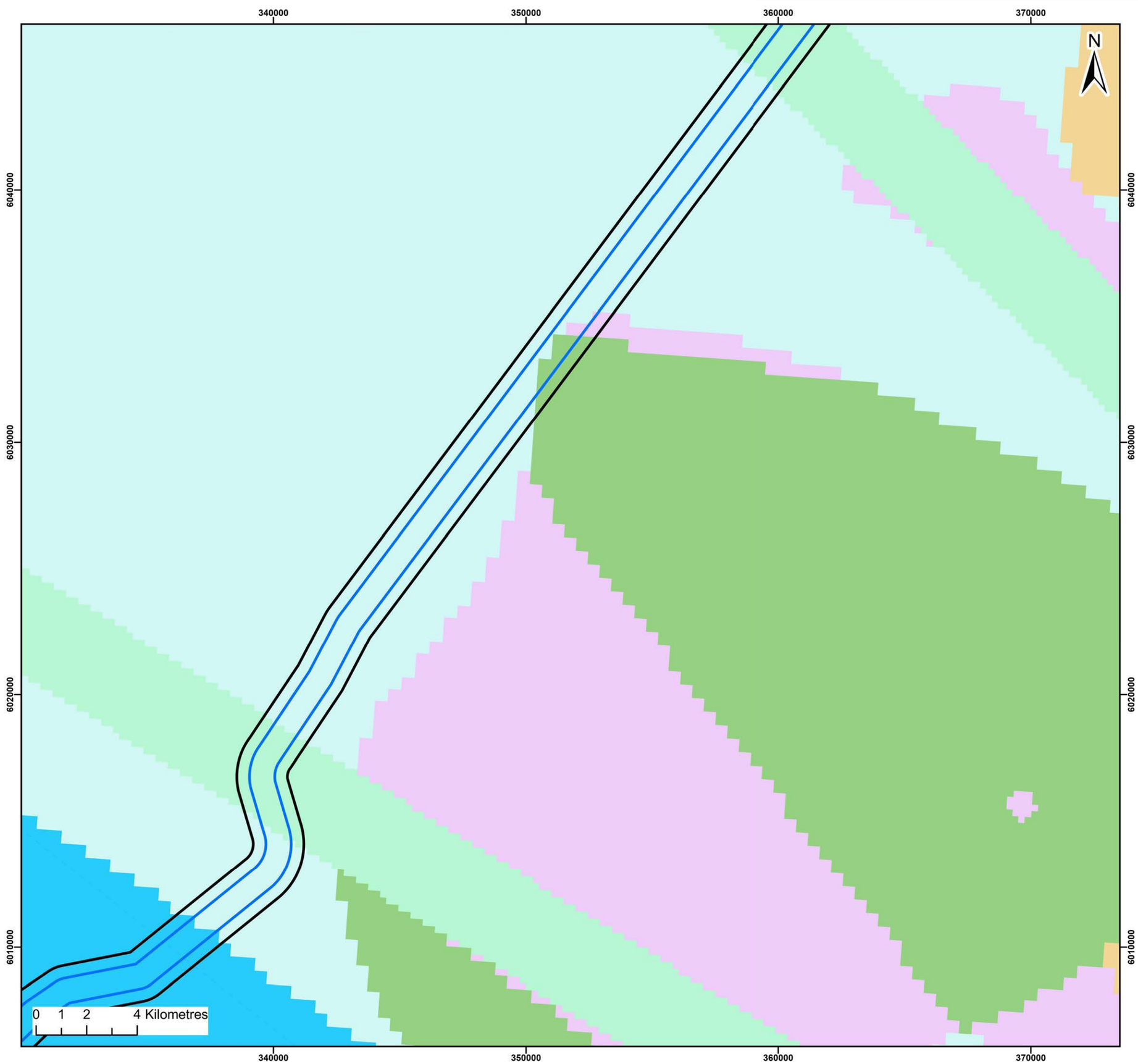

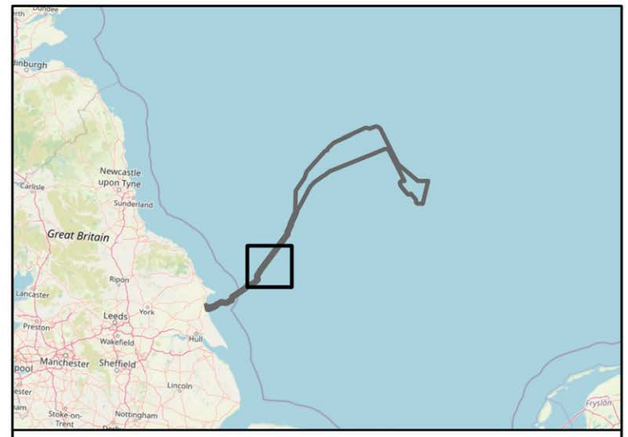

Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Bottom trawling, Early Modern (AD1750 – 1900)
- Fishing ground, Medieval (AD1066 – 1540)
- Fishing ground, Unknown
- Longlining, Post Medieval (AD1540 – 1750)
- Navigation route, Medieval (AD1066 – 1540)
- Seine netting, Post Medieval (AD1540 – 1750)

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types - Page 7 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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02	19/12/2024	JH	AB	A3	1:150,000

Co-ordinate system: WGS 1984 UTM Zone 31N

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290000 300000 310000 320000 330000

6010000 6000000 5990000 5980000

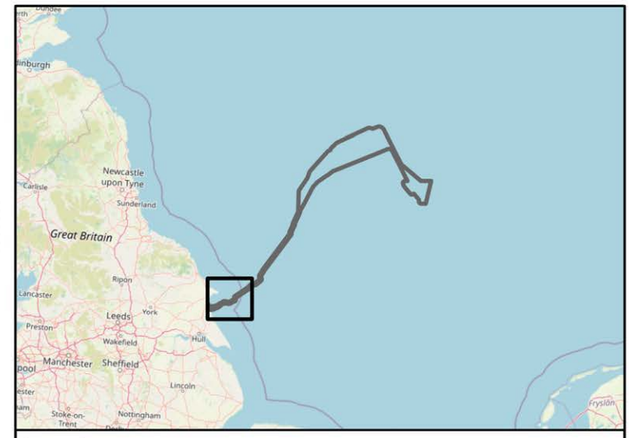
N

A165

Bridlington

Hornsea

0 1 2 4 Kilometres



Legend:

- Offshore Development Area
- Offshore Export Cable Corridor

Historic Seascape Character (HSC) Previous Sub Type

Previous Sub Type 1

- Fishing ground, Medieval (AD1066 – 1540)
- Fixed netting, Early Modern (AD1750 – 1900)
- Longlining, Post Medieval (AD1540 – 1750)
- Navigation route, Medieval (AD1066 – 1540)
- Seine netting, Post Medieval (AD1540 – 1750)
- Submerged rocks, Unknown

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Historic Seascape Character Precious Sub-Types
- Page 8 of 8

Figure: 17-6

Drawing No: PC6250-RHD-XX-OF-DR-GS-0290

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Co-ordinate system: WGS 1984 UTM Zone 31N

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Table 17-21 Summary of Historic Seascape Character Types

Broad Character Types	Character Sub-Types	Description, Values and Perceptions	Qualification of Change Since HSC Baseline	Capacity to Accommodate Change with DBD
Communications	Submarine telecommunications cable	Mapped as a minor character type within the Study Area, crossing Export Cable Corridor and the north-east corner of the Wind Farm Site. Submarine telecommunications cables are mostly undetected in the marine environment. However, they are a highly reliable form of transferring information and are critical to our present-day life. They can be perceived as obstacles to certain sea users such as fishermen and dredgers.	No identified change.	As submarine telecommunications cables are mostly undetected in the marine environment it is unlikely that perceptions of this character type will be altered by construction activities or by the presence of in-stalled infrastructure.
Fishing	Bottom Trawling Seine Netting Fishing Ground Longlining Potting	Commercial fishing is a primary cultural and historic character of the Dogger Bank area.	Bottom trawling was banned with-in the Dogger Bank Special Area of Conservation (SAC) in June 2022.	Although there will be areas where fishing activities are temporarily displaced due to construction works, fishing activities will still be permitted in areas of the offshore development not undergoing construction activities. Similarly, fishing activities will not be prohibited during the operation and maintenance of DBD, although temporary restrictions may apply during construction and around major maintenance activities.
Energy	Hydrocarbon installation Hydrocarbon Pipeline	The North Sea has always been important to the energy industry, most notably for its natural oil and gas resources which have been heavily exploited since the 1960s.Hydrocarbon installations and pipelines are present within DBD offshore development area and more recently renewable energy sources have become viewed as more important due to increasing concerns about carbon dioxide emissions from energy generation using fossil fuels.	The most significant change since compilation of the HSC dataset is the introduction of new offshore wind farms within the North Sea. The Dogger Bank A, B, C and Sofia wind farms are currently under construction. Similarly, Hornsea Project 1 became fully operational in 2019 and Project 2 in 2022 with Hornsea 3 consented in 2020 and Hornsea 4 has also been consented.	Overall, perceptions of the North Sea energy industry place greater emphasis upon renewable energy. The HSC states that Britain has the best offshore wind resource in Europe and changing perceptions associated with the construction of DBD are therefore likely to be seen as part of this natural progression for energy generation and as a positive change from fossil fuels to renewable energy. This is further qualified by UK climate change policies. Overall, wind turbines are becoming larger and more dispersed representing fewer discrete locations for avoidance in determining the final layouts and maintaining broader access to the seabed within the wind farms themselves, once constructed. This change will be further understood following the acquisition of additional information to inform detailed design post-consent.
Navigation	Navigation Route	Although the region's coastal economy is more strongly perceived for its fishing character, navigation activity is also an important element of the offshore region, with the main port of Hull to the South. For centuries communities have made their living from their proximity to the North Sea and its connecting routes, linking the region to other parts of Britain and to the continent.	No identified change.	Construction and maintenance activities and additional vessel traffic would occur within the context of existing navigation routes in to, and out of, Hull for example. How-ever, this additional traffic is unlikely to be perceived as a material change. It is anticipated that no change to the perception of this character type would occur due to construction activities.

Broad Character Types	Character Sub-Types	Description, Values and Perceptions	Qualification of Change Since HSC Baseline	Capacity to Accommodate Change with DBD
Navigation	Wreck Hazard Rock Outcrops Hazardous Water	Historically, the sea has been perceived as a dangerous place which often behaves in unexpected and unpredictable ways. Wrecks have most relevance from their roles as hazards to navigational activity or as indicators of areas and routes of past navigational, naval, or trading activity. For example, the study East Coast War Channels in the First and Second World War (Firth, 2014), examines the spatial extent of navigation channels and minefields between the Thames and the Scottish border during both wars and the heritage assets that are associated with these channels. Hazardous water includes wrecks and other hazards such as submerged rocks, shoal, or flats. Navigational hazards have always been a preoccupation for sailors, but they became prominent in people's consciousness, including in tales and myths, evoking rhymes, and songs, due to the danger associated within them. Wrecks, although fatal for many, added to the local heritage of stories about dangers on the high seas. They are also now perceived as recreational opportunities, with many wrecks dived by both amateur dive groups and professional organisations. Many wrecks are also valued for their strong contribution to habitat diversity and by the fishing community as they attract certain prey specifies. See **Section 17.6.1.2** for detail on wrecks within the Study Area.	Survey and evaluation for new plans and projects have extended public understanding of these hazards and new wrecks and finds have been identified due to these activities. This ongoing accumulation of publicly available data acquired as part of the consenting process is of public value.	The primary perceptions which associate hazardous water, debris and wrecks with local heritage and stories relating to dangers of the high seas, to recreational diving and to wrecks as habitats could be enhanced through the provision of publicly available data on seabed features identified during geophysical survey, and in the event of unexpected discoveries reported through the protocol for archaeological discoveries during construction activities. During operation, the Project may result in a change to the perception of navigational hazards on the basis that the introduction of wind turbines represents additional navigation hazards. They are, however, equipped with navigational features such as warning lights. On this basis, this character sub-types are considered to have the capacity to accommodate this level of change.
Recreation	Leisure Sailing	The nearshore export cable corridor is mapped as an area characterised by Leisure Sailing. As described in **Chapter 30 Tourism and Recreation**, for most of the Northeast coast, there is very little recreational boating within the coastal area around Creyke Beck. Recreational vessel usage is generally low in the region, and offshore recreational vessel usage is very low, almost absent.	No identified change.	Short term construction activities in the nearshore export cable corridor, and the presence of landfall infrastructure and offshore export cables, which will be undetectable once installed and therefore not perceived by the public, are considered unlikely to result in a meaningful change to the perceived character of leisure sailing.

Broad Character Types	Character Sub-Types	Description, Values and Perceptions	Qualification of Change Since HSC Baseline	Capacity to Accommodate Change with DBD
Military	Military Practice Area	Military practice areas are used by the armed forces for training and military exercises and this character type is mapped across the DBD offshore ECC. In UK waters there are several designated military practice areas, formally entitled 'Practice and Exercise Areas' (PEXAs), which are in use or available for use by the Ministry of Defence (MoD) for practice and exercises. These include Royal Air Force (RAF) practice areas, submarine exercise areas and firing danger areas. Public access across these areas is only restricted during active exercises.	No identified change.	It is anticipated that the Project would not impact on any military activities and there would be no change to the current character of these areas.
Previous character types	Palaeolandscape Component - Mesolithic (10,000BC – 4000BC)	Within the Study Area, the HSC maps areas of high, medium, and low potential for the existence and survival of archaeological evidence for Mesolithic human habitation based on documentary research and available models (**Figure 17-6**). In England, growing interest in submerged landscapes fueled by the media and popular culture is increasing the value placed on these offshore palaeolandscapes. There is a developing interest within certain sectors of society who encounter the resource (e.g. fishermen and aggregate dredgers). Submerged landscapes are becoming ever more recognised and valued within the archaeological community. See **Section 17.7.1.1** for detail on submerged prehistoric landscapes within the Study Area.	As stated for the cultural topography character type above, new plans and projects have further restricted access to these deposits and the underlying palaeolandscapes (through the physical presence of cables and foundations, for example) or reduced the extent of deposits, through dredging for example. However, a beneficial impact is the ongoing accumulation of publicly available data ac-quired as part of the consenting process which is of public value.	There is the potential for positive enhancement of primary perceptions associated with a growing interest in submerged landscapes through the provision of publicly available data on palaeolandscapes following the further archaeological and geoarchaeological assessment of survey data. As the final design of layouts will take palaeolandscapes into account, this change can be offset by the accumulation of publicly available data acquired by the Project prior to construction which is of public value.
	Longlining - Post Medieval (AD1540 – 1750) Fixed Netting - Early Modern (AD1750 – 1900) Pelagic Trawling - Early Modern (AD1750 – 1900) Fishing Ground - Unknown Fishing Ground - Medieval (AD1066 – 1540) Fishing Ground - Early Modern (AD1750 – 1900)	Historic character types associated with the commercial fishing activities described above are mapped throughout the Study Area (**Figure 17-6**). The HSC makes specific reference within the Study Area to: Cod fishing around Dogger Bank during the 14th century. Documentary sources suggest longlining activities off the Dogger Bank during the 18th century. Historically, longlining for white fish from cobles was the most common fishing activity in the Northeast. Inshore vessels mainly cobles. Set Netting and lining. Haddock, Whiting, Coalfish, Pollack, Wrasse, and Cod Beam trawlers worked the Yorkshire coast in the 19th century.	Bottom trawling was banned with-in the Dogger Bank Special Area of Conservation (SAC) in June 2022.	As stated for the fishing character types above, the presence of the wind farm infrastructure is not anticipated to fundamentally alter perceptions of the historic fishing industry. The distance of DBD wind farm site from the coast, and the minimal above ground infrastructure at the coast, means that the Project will be largely undetectable by the public and historic perceptions of the traditional fishing industry, which the HSC described as having taken on a 'quaint' character, a memory of better days, will remain largely unchanged.

Broad Character Types	Character Sub-Types	Description, Values and Perceptions	Qualification of Change Since HSC Baseline	Capacity to Accommodate Change with DBD
	Seine Netting Post - Medieval (AD1066 – 1540) Seine Netting Post - Medieval (AD1540 – 1750) Bottom Trawling Early - Modern (AD1750 – 1900)			
	Navigation Route - Medieval (AD1066 – 1540)	Coastal navigation routes are known to have existed through the Study Area from at least the medieval period, mapped as part of the ALSF funded England's Shipping project in 2007 which used GIS to map historic shipping movements recorded in historical archives. During the medieval period trading networks expanded across Europe and these coastal trade routes were fundamental to the connection of north-east England with this European trade. Although the routes themselves are not necessarily represented by tangible remains and are not easily appreciated by people observing the sea from land, these historic routes are often associated with increased potential for wrecks and local accounts of historic wrecking events, with coastal vessels driven on to shore and lost in storms, for example.	No identified change.	As stated for the navigation route character type above, construction and maintenance activities and additional vessel traffic would occur within the context of existing navigation routes in to, and out of, Hull for example. However, this additional traffic is unlikely to be perceived as a material change. It is anticipated that no change to the perception of this character type would occur as a result of construction activities.

17.8 Assessment of Effects

177. The likely significant effects to offshore archaeology and cultural heritage receptors that may occur during construction, operation and decommissioning of the Project are assessed in the following sections. The assessment follows the methodology set out in **Section 17.6** and is based on the realistic worst-case scenarios defined in **Section 17.5.3**, with consideration of embedded mitigation measures identified in **Section 17.5.2**, and where relevant, enhancement measures identified in **Section 17.5.2.**

17.8.1 Potential Effects During Construction

17.8.1.1 Direct physical impacts to known heritage assets (OFA-C-01)

178. Direct (physical) impacts, as stated in the National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) (DESNZ 2023b: 59), refer to the direct effects caused by the physical placement of the Project. These impacts can affect heritage assets located on the seafloor or buried within seabed deposits, potentially leading to damage or complete destruction of archaeological materials and their contextual relationships with the surrounding environment. These relationships are crucial to developing a full understanding of an asset. Such impacts may occur if heritage assets are within the footprint of DBD elements (e.g. foundations or cables) or within areas affected by activities like seabed clearance, anchoring, or the placement of jack-up barges.

179. There are no known seabed prehistory or aviation sites within the offshore archaeology Study Area.

180. As described in **Section 17.7.1.2**, there are 10 records of previously recorded wrecks which are considered 'live' and likely to comprise physical remains of archaeological interest, or possible archaeological interest. In addition, there is one item of possible debris or foul ground recorded which may also be of archaeological interest (UKHO ID 78995).

181. There are also a total of 259 geophysical anomalies and three historic records identified by Wessex Archaeology within the offshore archaeology Study Area, which are discriminated as of archaeological interest or of possible archaeological interest (A1 and A2), described in **Section 17.7.1.2**. It should be noted that geophysical survey of the remaining offshore ECC is ongoing, and the total number of seabed anomalies will be greater than the number used to inform this PEIR assessment.

182. There is potential for direct impacts to these features during the following activities:

- Seabed preparation (including UXO and boulder clearance, where required);
- Installation of wind turbine foundations and foundations for other offshore infrastructure;
- Installation of ancillary infrastructure;
- Installation of offshore cabling; and
- Seabed contact by legs of jack-up vessels and / or anchors.

183. The remaining records correspond to modern wrecks and debris, to natural features or to locations where the presence or absence of anthropogenic material is less certain. For the purposes of this PEIR assessment, these records are considered as potential heritage assets, discussed in **Section 17.8.1.2**. The presence or absence of any archaeological material at the recorded positions in the offshore ECC will be clarified through the archaeological assessment of marine geophysical data by Wessex Archaeology, the results of which will be presented in the ES.

184. Within the intertidal zone (see **Section 17.7.1.3**), known heritage assets comprise organic deposits in the cliffs at Withow Mere (NRHE ID 910838) and the fragmented remains of former WWII coastal defences observed during the heritage walkover survey (**Volume 2, Appendix 24.4 Onshore Heritage Walkover Report**).

185. Until the final design and layouts are confirmed, the exact nature and extent of any direct physical impacts to known heritage assets during construction (OFA-C-01) will remain uncertain. However, it is expected that these impacts can be avoided by using HDD or other trenchless techniques to install the cable ducts beneath the beach deposits and that there would be no direct pathway for impact to known intertidal assets.

186. The depth of sedimentary sequences of archaeological interest at the landfall will be further clarified through the geoarchaeological assessment of geotechnical data post-consent and will inform the design of HDD and nearshore cable installation.

17.8.1.1.1 Receptor Sensitivity / Value / Importance

187. The heritage importance (sensitivity) of identified assets is set out in **Section 17.7.1.1.3**, **Section 17.7.1.2.3**, and **Section 17.7.1.3.3**, using the guidance and legislations outlined in **Section 17.2**.

188. As there are no known seabed prehistory or aviation sites within the offshore archaeology Study Area, direct (physical) impacts to known heritage assets are limited to impacts to previously recorded wrecks and debris. Potential impacts also apply to anomalies of archaeological interest or possible archaeological interest, the importance of which is assessed as follows:

- The wreck *HMS Falmouth* (UKHO ID 8558 / NRHE ID 907931), as a Protected Place under the Protection of Military Remains Act 1986, is of **high** importance;
- The wreck *Feltre* (UKHO ID 6470 / NRHE ID 907939) is of **medium** importance;
- The wreck *Membland* (UKHO ID 31199 / Wessex ID 70621) is of **medium** importance;
- Four unidentified wrecks are of **high** importance (as a precautionary measure);
- Isolated items of debris (UKHO ID 78995) are of **medium** importance;
- Anomalies discriminated as A1 anomalies are of potentially **high** importance; and
- Anomalies discriminated as A2 anomalies are of potentially **medium** importance.

189. The sensitivity (heritage importance) of the receptors identified above are therefore considered to be of potentially **medium** to **high** heritage significance (importance).

17.8.1.1.2 Impact Magnitude

190. With the application of embedded mitigation (see **Section 17.5.2**), it is anticipated that all direct physical impacts to known heritage assets as a result of the Project would be avoided.

191. A total of 13 AEZs have been recommended across the DBD Array area from the 2022 and 2023 geophysical data, all of which are situated within the DBD array. These buffers are around A1 and A3 discriminated anomalies. Buffers of 25m, 50m and 100m have been recommended as deemed appropriate, based on the relationships between how well constrained the anomaly is, confidence in positioning, and the likelihood of further buried or low-lying material that is not currently visible. Anomalies that consist only of point data with uncertain, possibly buried, extents have been attributed a 100m buffer, this includes all A3 and Mag. anomalies.

192. AEZs will also be applied to the 'live' wrecks in the ECC following the acquisition geophysical data once their extent is better understood, however, as a precautionary measure 100m buffers will be attributed to these.

193. These AEZs all have the potential to be modified, and some may be able to be removed at a later date, should further information become available. The recommended AEZs are summarised in **Table 17-22** and are shown on **Figure 17-7**.

194. AEZs are not recommended at this time for features assigned an A2 archaeological discrimination. The positions of these features will be avoided by means of micro siting during detailed project design, where practicable. The archaeological assessment of pre-construction survey data, including high resolution geophysical data undertaken for the purposes of UXO identification, will further clarify the nature and extent of these anomalies and the scheme design will be modified to either avoid heritage assets (i.e. implement new AEZs where appropriate) or undertaken additional mitigation. A2s are considered further as 'potential' heritage assets under **Section 17.8.1.2**.

195. Following the acquisition and archaeological assessment geophysical data from the offshore ECC it is likely more archaeological material requiring an AEZ will be identified. As such, the list of recommended AEZs will be updated at the time of DCO application submission.

17.8.1.1.3 Effect Significance

196. Overall, it is predicted that the sensitivity (heritage importance) of the receptors outlined in **Section 17.8.1.1.1** is **medium** to **high** and the magnitude of impact is assessed as **high adverse**. However, with the application of AEZs, direct physical impacts to known heritage assets will be avoided and, therefore, there will be **no impact** to known heritage assets.

17.8.1.1.4 Additional Mitigation and Residual Effects

197. AEZs may be reduced, enlarged, or removed in agreement with Historic England if further relevant information becomes available. However, unless modified by agreement, it is important that AEZs are retained throughout the lifetime of the Project and monitoring of AEZs may be required by the regulator and Historic England to ensure adherence both during construction and in the future operation of the wind farms.

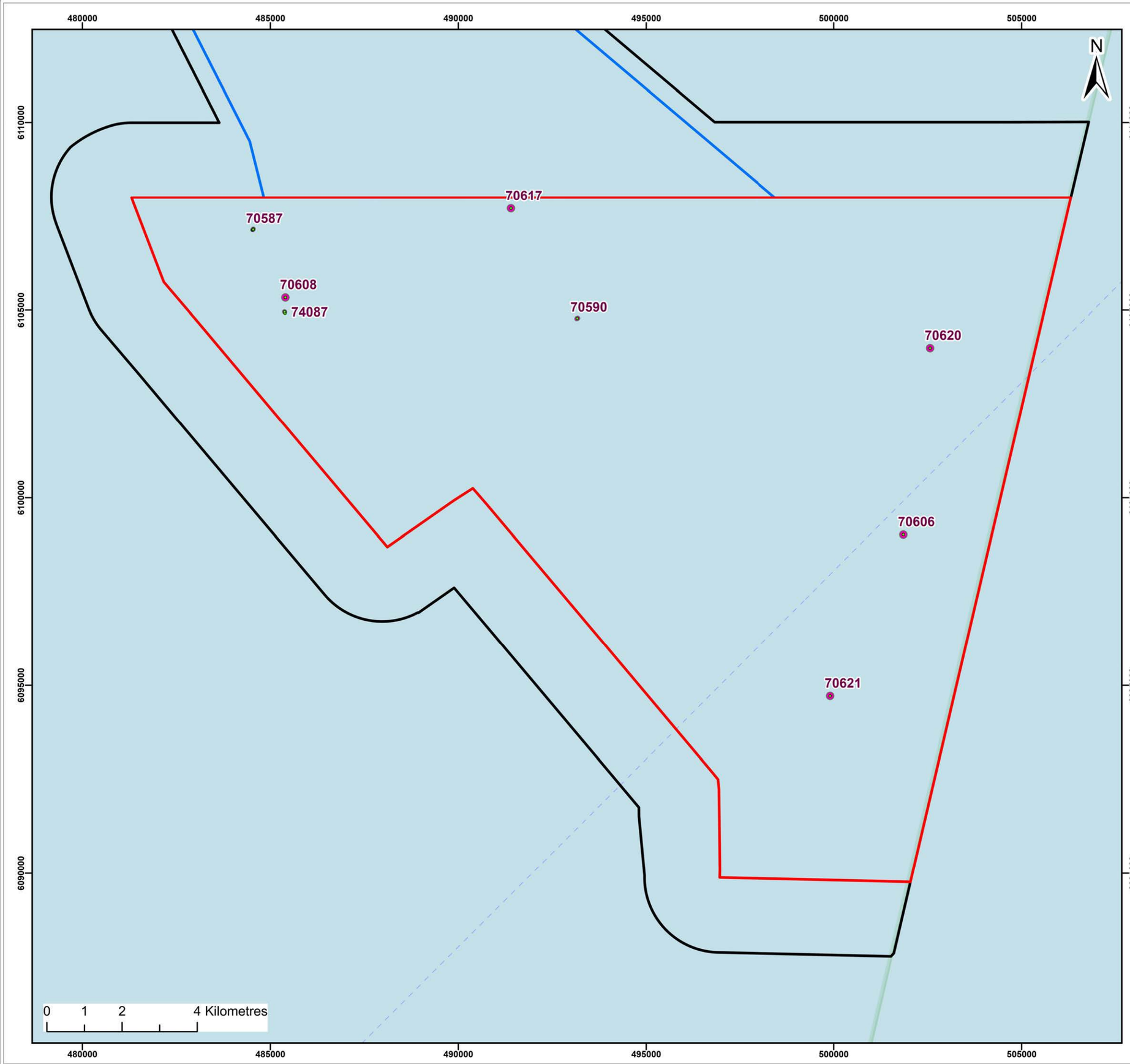
198. If features cannot be avoided, then additional work may be required (to be undertaken post-consent) to establish the archaeological interest of the feature (e.g. investigation of individual anomalies (ground truthing) through ROV and / or diver survey). Once the character, nature and extent of selected features are more fully understood, appropriate mitigation measures (proportionate to the significance of the asset) to reduce or offset impacts can be determined on a case-by-case basis.

199. The approach to the implementation of these measures will be set out in the Outline WSI (Offshore) which will be submitted alongside the DCO application.

200. The WSI will be prepared in accordance with the latest relevant industry standards and guidance including Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021).

Table 17-22 Recommended AEZs Within the Array Area

Wessex ID	Classification	Discrimination	Position (WGS84 UTM31N)		Dataset	Status	AEZ
			Easting	Northing			
70587	Wreck	A1	484539	6107143	DBD Array 2022, Teesside (78041)	Updated (anomaly 78041 in the original assessment)	50m buffer around current feature extent
70590	Wreck	A1	493165	6104781	Teesside A (78041)	Retained from previous project	50m buffer around previous feature extent
70606	Magnetic	A1	501852	6099020	DBD Array 2022, Teesside (78041)	Retained from previous project	100m buffer around previous position
70608	Magnetic	A1	485399	6105334	DBC IAC 2021 (201326), DBD Array 2022, Teesside A (78041)	Retained from previous project	100m buffer around previous position
70617	Recorded wreck	A3	491400	6107708	DBD Array 2022, Teesside (78041)	Retained from previous project	100m buffer around previous position
70620	Recorded wreck	A3	502564	6103991	DBD Array 2022, Teesside (78041)	Retained from previous project	100m buffer around previous position
70621	Recorded wreck	A3	499904	6094717	DBD Array 2022, Teesside (78041)	Retained from previous project	100m buffer around previous position
74087	Debris field	A1	485379	6104955	DBC IAC 2021 (201326)	Retained from previous project	50m buffer around previous feature extent
74099	Debris	A1	484542	6107155	DBD Array 2022	New	25m buffer merged with Wreck **70587**
74100	Debris	A1	484541	6107153	DBD Array 2022	New	25m buffer merged with Wreck **70587**
74101	Debris	A1	484520	6107127	DBD Array 2022	New	25m buffer merged with Wreck **70587**
74102	Debris	A1	484536	6107133	DBD Array 2022	New	25m buffer merged with Wreck **70587**
74103	Debris field	A1	484544	6107142	DBD Array 2022	New	25m buffer merged with Wreck **70587**



Legend:

- Dogger Bank D Array Area
- Offshore Development Area
- Offshore Export Cable Corridor
- AEZs within Array
- Seabed Points within Array

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Archaeological Exclusion Zones

Figure: 17-7

Drawing No: PC6250-RHD-XX-OF-DR-GS-0291

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
04	10/03/2025	JH	AB	A3	1:100,000
03	07/02/2025	JH	AB	A3	1:100,000

Co-ordinate system: WGS 1984 UTM Zone 31N

sse Renewables equinor

201. With the application of AEZs and micro-siting to avoid additional anomalies of possible archaeological interest, direct physical impacts to known heritage assets will be avoided, and there will be no impact during construction.

202. Where micro-siting is not possible, and therefore where additional mitigation will be required, it is anticipated that the magnitude and significance can be reduced or offset so that effects may be considered non-significance in EA terms (i.e. anticipated to be no worse than a minor adverse significance.

203. Adherence to AEZs as set out in the Outline (Offshore) WSI will ensure there are no residual effects on known heritage assets with respect to impact OFA-C-01.

204. With the adoption of additional mitigation, the magnitude of impact would be **low**. The residual effect is therefore of **minor** significance, which is **not significant** in EIA terms.

17.8.1.2 Direct physical impacts to potential heritage assets (OFA-C-02)

205. It is not possible to avoid heritage assets that have not yet been discovered (potential heritage assets). Therefore, unavoidable direct impacts may occur if archaeological material is present within the footprint of the Project associated with the following activities:

- Seabed preparation (including UXO and boulder clearance, where required);
- Installation of wind turbine foundations and foundations for other offshore infrastructure;
- Installation of ancillary infrastructure;
- Installation of offshore cabling;
- Seabed contact by legs of jack-up vessels and / or anchors; and
- Cable installation at the landfall.

17.8.1.2.1 Receptor Sensitivity / Value

206. The heritage importance (sensitivity) of potential heritage assets is set out in **Section 17.7.1.1.3**, **Section 17.7.1.2.3**, and **Section 17.7.1.3.3**.

207. As a precautionary measure all potential *in situ* sites are assessed as being of high importance whilst all isolated finds are of medium importance and isolated examples of palaoenvironmental material of low importance.

208. For the purposes of this PEIR assessment, potential heritage assets are regarded as comprising the following asset types:

- Potential *in situ* prehistoric sites, submerged landscape features, derived / isolated prehistoric finds and palaeoenvironmental evidence;
- Potential wrecks and derived / isolated maritime finds (including both A2 seabed features and any further discoveries of material not seen in the geophysical data) and specifically archaeological material relating to:
  - Three records representing the locations of ‘dead’ wrecks;
  - One record of a probable natural feature;
  - 37 records which note the positions of obstructions reported by fishermen;
  - Six records corresponding to wrecks shown on Danish Fisheries Chart 5400 (1965 edition) which have not subsequently been surveyed by the UKHO; and
  - Records documenting reported locations of loss.
- Potential aircraft and derived / isolated aviation finds (including both A2 seabed features and any further discoveries of material not seen in the geophysical data; and
- Potential intertidal finds and *in situ* features within the cliff face.

209. The overall sensitivity (heritage importance) of the receptors identified above is therefore considered to be of potentially **medium** to **high** significance (importance).

17.8.1.2.2 Impact Magnitude

210. Until the final design and layouts are confirmed, there will remain uncertainty in the precise nature and extent of any direct impacts, however, it is anticipated that, within the intertidal zone, the use of HDD, with entry on the landward side of the cliffs, and exit below MLWS in the marine zone, will mean that impacts to potential intertidal archaeological material can be avoided. The depth of sedimentary sequences of archaeological interest at the landfall will be further clarified through the geoarchaeological assessment of geotechnical data (to be acquired post-application/post-consent) and will inform the design of nearshore cable installation.

211. All direct impacts that result in damage to, or disturbance of, *in situ* prehistoric, maritime and aviation sites and potentially submerged landscape features and potential palaeoenvironmental evidence (where associated with palaeolandscape features or archaeological material) would be adverse, permanent, and irreversible. The ‘fabric’ of the asset and, hence, its potential to inform our historical understanding, will be removed.

212. In practice, the magnitude of the effect will not be fully understood until after the potential heritage asset has been encountered and the impact has occurred. The extent of any impact will depend on the presence, nature, and depth of any such remains, in association with the depth, location and nature of construction-related groundworks and contact with the seabed. However, as a precautionary approach, it should be assumed that key elements of the asset's fabric could be lost or fundamentally altered, such that the asset's heritage significance is lost or severely compromised Therefore, in accordance with the definitions set out in **Table 17-10**, without mitigation, there is potential for direct impacts of high adverse magnitude upon potential *in situ* heritage assets.

213. Isolated / derived artefacts, either of prehistoric, maritime or aviation origin within reworked deposits may be considered less sensitive to change than *in situ* material, as their relationship with their context or physical setting is less relevant to understanding their significance. Therefore, in accordance with the definitions set out in **Table 17-10**, without mitigation, there is potential for direct impacts of **moderate adverse** magnitude upon potential isolated finds. However, with the application of embedded mitigation, this magnitude would be reduced.

214. Further archaeological assessment of high-resolution geophysical data and geoarchaeological assessment of geotechnical data will be undertaken post-consent to reduce, as far as possible, the potential for unintended impacts during construction.

215. If *in situ* prehistoric sites are identified as a result of such work, then mitigation measures to record and /or protect such sits would be agreed in consultation with Historic England.

216. Similarly, planned pre-construction surveys will result in full coverage of the areas within which construction will take place (corresponding to the final wind farm layout and cable route) with high resolution SSS, MBES and magnetometer data. If features of archaeological interest are identified during these, they will be subject to the same mitigation as described for known heritage assets (see **Section 17.8.1.1.4**).

217. As stated above, AEZs are not recommended at this time for features assigned an A2 archaeological discrimination although the design will be micro-sited to avoid the recorded locations where practicable. As geophysical anomalies having potential archaeological interest, it is recognised that these features could also be of modern (A2-h) or natural (A2-l) origin.

218. Where features cannot be avoided, then additional work may be required (to be undertaken post-consent) to establish the archaeological interest of the feature (e.g. investigation of individual anomalies (ground-truthing) through survey work). Once the character, nature and extent of selected features are more fully understood, appropriate mitigation measures (proportionate to the significance of the asset) to avoid, reduce or off-set impacts can be determined on a case-by-case basis. For example, if features of archaeological interest are confirmed during these further investigations, which are considered to be of sufficient significance to warrant preservation *in situ*, then they will be subject to the same mitigation as described for known heritage assets (AEZs) described in **Section 17.8.1.1.2**.

219. Although measures will be taken to reduce, as far as possible, the potential for impact to previously undiscovered heritage assets it is still possible that unexpected discoveries may be encountered during construction. However, possible measures to further reduce the significance of potential impacts include ensuring that prompt archaeological advice is received in the event of a discovery and through recording and conserving any objects that have been disturbed.

220. In the event of an unexpected discovery, of an isolated find or where discoveries of multiple chance finds from a specific location might be indicative of a wider debris field representing previously unknown *in situ* archaeological material, this will be reported through a formal protocol for archaeological discoveries (PAD), based upon the established Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate, 2014) (ORPAD). This will establish whether the recovered objects are of archaeological interest and allow for the application of appropriate mitigation measures where necessary.

221. In the event of the discovery of *in situ* archaeological material, this will include the provision of a temporary exclusion zone to prevent further impacts from taking place until advice had been received. For all new discoveries, any further mitigation which may be required will be considered on a case-by-case basis, proportionate to the significance of the discovery. The approach to the implementation of the above embedded mitigation measures will be set out in the Outline WSI (Offshore) which will be submitted alongside the ES and DCO application.

222. If further seabed features are identified during the course of post-application/post-consent investigations, including the archaeological assessment of pre-construction survey data, these will be subject to the same mitigation measures (avoid, reduce or offset) as set out in **Section 17.8.1** above. Therefore, residual impacts will be the same as for known heritage assets (i.e. anticipated to be no worse than a **minor adverse** significance).

223. Similarly, regarding potential prehistoric sites, with the additional investigation of potential prehistoric deposits post-application/post-consent, and the application of additional mitigation in the event of the discovery of any prehistoric archaeological material, residual impacts will be reduced or offset to levels considered non-significant in EIA terms (i.e. anticipated to be no worse than **minor adverse** significance).

224. In the event of unforeseen impact to potential sites, the implementation of a formal protocol will ensure that any *in situ* archaeological material will be provided with a temporary exclusion zone to prevent further impacts from taking place until advice had been received, that finds are promptly reported, archaeological advice obtained, and any recovered material is stabilised, recorded, and conserved.

225. With the adoption of additional mitigation, the magnitude of impact would be **minor adverse**.

17.8.1.2.3 Effect Significance

226. As set out in **Table 17-13**, **Table 17-19** and **Table 17-20**, *in situ* prehistoric, maritime and aviation sites are assessed as being of potentially high heritage significance (importance), as are potential submerged landscape features and potential palaoenvironmental evidence (where associated with palaeolandscape features or archaeological material). In accordance with the significance matrix in **Table 17-11**, direct (physical) impacts to these heritage asset types thereby have the potential to be of major adverse significance, as a worst-case scenario.

227. Overall, it is predicted that sensitivity (heritage importance) of the receptors outlined in **Section 17.8.2.2** is **medium** to **high** and with the implementation of embedded mitigation measure the magnitude of impact is potentially **low adverse**. The effect is therefore of **minor adverse** significance, which is **not significant** in EIA terms.

228. Isolated / derived finds in secondary contexts are assessed as being of medium heritage significance (importance). Should they be encountered during construction activities, direct (physical) impacts to isolated finds are considered to be of potential **minor adverse** significance which is **not significant** in EIA terms.

17.8.1.3 Indirect impacts to heritage assets associated with changes to marine physical processes (OFA-C-03)

229. The Project also has the potential to interact with both local and regional hydrodynamic and sedimentary processes which in turn may result in impacts of an indirect (physical) nature occurring upon heritage assets. Changes in coastal processes can lead to re-distribution of erosion and accretion patterns while changes in tidal currents, for example, may affect the stability of nearby morphological and archaeological features.

230. Indirect impacts to heritage assets may occur if buried heritage assets become exposed to marine processes, due to increased wave / tidal action for example, as these will deteriorate faster than those protected by sediment cover. Conversely, if increased sedimentation results in an exposed site becoming buried this may be considered a beneficial impact.

231. As set out in **Chapter 8 Marine physical Processes** (**Table 8-8**), during the construction phase of DBD, there is the potential for foundations and cable installation activities to disturb sediment, potentially resulting in changes in seabed levels or, in the case of nearshore cable installation, shoreline morphology due to deposition or erosion.

232. The potential indirect impact to heritage assets from changes to physical processes is assessed with reference to **Section 8.7.2** (Potential Effects During Construction) of **Chapter 8 Marine Physical Processes**.

233. With regard to impact MPP-C-03: (Changes in suspended sediment concentration, transport, and seabed level due to Inter-Array Cable and Offshore Export Cable installation including at the landfall), **Chapter 8 Marine Physical Processes** determines that there would be no long-term effect on sediment transport processes from construction.

234. Similarly, regarding MPP-C-05 (Changes in seabed level due to indentations created by installation vessels) as it is only sediments within the immediate vicinity of the leg that will be impacted, it is also only heritage assets within the footprint of the legs that will be impacted (with no change in the near- and / or far-field). As this corresponds to the same footprint as the direct impacts discussed above, these indirect impacts are considered to equate to the same conclusions and mitigation as presented above and are not considered further.

235. Marine physical processes impacts which correspond to increased seabed level, and, therefore, increased potential for the protection of heritage assets which are currently exposed through additional sediment cover (sediment deposited from plume) are:

- MPP-C-01: Changes in suspended sediment concentration, transport, and seabed level due to drilling for foundation installation.
- MPP-C-02: Changes in suspended sediment concentration, transport, and seabed level due to seabed preparation for foundation installation; and
- MPP-C-04: Interruptions to bedload sediment transport due to sand wave levelling for Inter-Array Cable and Offshore Export Cable installation.

17.8.1.3.1 Receptor Sensitivity / Value

236. The heritage importance (sensitivity) of potential heritage assets is set out in **Section 17.7.1.1.3**, **Section 17.7.1.2.3**, and **Section 17.7.1.3.3**.

17.8.1.3.2 Impact Magnitude

237. The magnitude of impacts of marine physical processes from **Chapter 8 Marine Physical Processes** which correspond to increased seabed level, and, therefore, increased potential for the protection of heritage assets which are currently exposed through additional sediment cover (sediment deposited from plume) are set out in **Table 17-23**.

Table 17-23: Magnitude of Impact on Seabed Level Under the Worst-Case Scenario for Chapter 8 Marine Physical Processes

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Impact
MPP-C-01: Changes in suspended sediment concentration, transport, and seabed level due to drilling for foundation installation					
Near-field	Low	Negligible	Negligible	Negligible	Negligible
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible
MPP-C-02: Changes in suspended sediment concentration, transport, and seabed level due to seabed preparation for foundation installation					
Near-field	Low	Negligible	Negligible	Negligible	Negligible
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible
MPP-C-04: Interruptions to bedload sediment transport due to sand wave levelling for Inter-Array Cable and Offshore Export Cable installation					
Near-field	Medium	Negligible	Negligible	Low	Low
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible

17.8.1.3.3 Effect Significance

238. As the magnitude of impact is concluded to be no impact the significance will be **no change**, which is **not significant** in EIA terms

17.8.2 Potential Effects During Operation

17.8.2.1 Direct physical impacts to known heritage assets (OFA-O-01)

239. As all known heritage assets will be avoided through the retention of AEZs throughout the lifetime of DBD, there is **no potential** for impact during routine or unscheduled maintenance activities.

17.8.2.2 Direct physical impacts to potential heritage assets (OFA-O-02)

17.8.2.2.1 Receptor Sensitivity / Value

240. The heritage importance (sensitivity) of potential heritage assets is set out in **Section 17.7.1.1.3**, **Section 17.7.1.2.3**, and **Section 17.7.1.3.3**.

241. As a precautionary measure all potential *in situ* sites are assessed as being of high importance whilst all isolated finds are of medium importance. Isolated examples of palaeoenvironmental material are of low importance.

242. The overall sensitivity (heritage importance) of the receptor is therefore considered to be potentially **medium** to **high**.

17.8.2.2.2 Impact Magnitude

243. Direct physical impacts to potential heritage assets are unlikely to occur as a result of intrusive maintenance as any impacts would already have occurred during installation of the wind farm infrastructure during the construction phase and would already have been subject to appropriate and proportionate additional mitigation measures, as and where necessary. There will be no impact at the landfall during the operation and maintenance as there will be no groundworks within or disturbance of intertidal deposits.

244. There is, however, potential for impacts to occur if archaeological material is present within the footprint of jack-ups or vessel anchors deployed during planned or unscheduled maintenance activities, if these are located in areas which were not previously subject to disturbance. In practice, the nature and extent of individual impacts cannot be fully understood until after the impact has occurred.

245. Therefore, as for construction activities, and as a worst-case, there is potential for direct impacts upon potential *in situ* heritage assets and **low adverse** magnitude upon potential isolated finds.

246. The magnitude of impact is therefore considered to be of **low adverse** magnitude, however, with embedded mitigation this would be reduced.

247. The archaeological assessment of post-construction monitoring data will further reduce, as far as possible, the potential for unintended impacts during operation. If further features of archaeological interest are identified these will be subject to the same mitigation as described for known heritage assets described in **Section 17.8.1.2** above with the primary approach being avoidance.

248. In the event of an unexpected discovery, the ongoing implementation of a formal protocol for archaeological discoveries, will allow for such discoveries to be efficiently reported, for advice to be provided and for any further mitigation to be considered on a case by case basis.

249. The approach to the implementation of these mitigation measures will be set out in the Outline WSI (Offshore).

250. Although the precise nature of the impact, and the heritage significance of any material impacted, cannot be fully understood until the impact has occurred, it is anticipated that with this mitigation the residual magnitude and significance can be reduced or offset (i.e. through investigation and recording, preservation by record so that effects may be considered non-significant in EIA terms (i.e. anticipated to be no worse than a **negligible** magnitude).

17.8.2.2.3 Effect Significance

251. As set out in **Table 17-13**, **Table 17-19** and **Table 17-20**, *in situ* prehistoric, maritime and aviation sites are assessed as being of potentially high heritage significance (importance), as are potential submerged landscape features and potential palaeoenvironmental evidence (where associated with palaeolandscape features or archaeological material). In accordance with the significance matrix in **Table 17-11**, direct (physical) impacts to these heritage asset types thereby have the potential to be of major adverse significance, as a worst-case scenario.

252. Isolated / derived finds in secondary contexts are assessed as being of medium heritage significance (importance). Should they be encountered during operation activities, direct (physical) impacts to isolated finds are considered to be of potential minor adverse significance.

253. Overall, it is predicted that sensitivity (heritage importance) of the receptor is potentially **medium** to **high,** and the magnitude of impact is **negligible adverse**. The effect is therefore of **negligible adverse** significance, which is **not significant** in EIA terms.

17.8.2.3 Indirect impacts to heritage assets associated with changes to marine physical processes (OFA-O-03)

254. The potential indirect impact to heritage assets from changes to physical processes is assessed with reference to **Section 8.7.3** (Potential Effects During Operation) of **Chapter 8 Marine Physical Processes**.

255. The following impacts are relevant to the worst-case for offshore archaeology and cultural heritage (i.e. increased exposure of buried archaeological material to marine processes due to loss of sediment cover):

- MPP-O-01: Changes to the tidal regime due to the presence of infrastructure (wind turbines and offshore platforms);
- MPP-O-02: Changes to the wave regime due to the presence of infrastructure (wind turbines and offshore platforms);
- MPP-O-04: Changes to bedload sediment transport and seabed morphology due to the presence of infrastructure (wind turbines and offshore platforms);
- MPP-O-05: Changes to bedload sediment transport and seabed morphology due to the presence of cable protection measures; and
- MPP-O-06: Changes in suspended sediment concentration, transport, and seabed level due to cable repairs and reburial.

17.8.2.3.1 Receptor Sensitivity / Value

256. The heritage importance (sensitivity) of potential heritage assets is set out in **Section 17.7.1.1.3**, **Section 17.7.1.2.3**, and **Section 17.7.1.3.3**.

17.8.2.3.2 Impact Magnitude

257. The magnitude of impacts for the marine physical processes impacts from **Chapter 8 Marine Physical Environment** which correspond to changes which could result in scour and sediment stripping across the Study Area, and the exposure and increased degradation of heritage assets which are currently buried and protected from marine processes,) are set out in **Table 17-24**.

Table 17-24: Magnitude of Impact During Operation Under the Worst-case Scenario for Chapter 8 Marine Physical Processes

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Impact
MPP-O-01: Changes to the tidal regime due to the presence of infrastructure (wind turbines and offshore platforms)					
Near-field	Low	High	Medium	Negligible	**Low**
Far-field	Negligible	High	Medium	Negligible	**Negligible**
MPP-O-02: Changes to the wave regime due to the presence of infrastructure (wind turbines and offshore platforms)					
Near-field	Low	High	Medium	Negligible	**Low**
Far-field	Negligible	High	Medium	Negligible	**Negligible**

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Impact
MPP-O-04: Changes to bedload sediment transport and seabed morphology due to the presence of infrastructure (wind turbines and offshore platforms)					
Near-field	Low	High	Medium	Negligible	**Low**
Far-field	Negligible	High	Medium	Negligible	**Negligible**
MPP-O-05: Changes to bedload sediment transport and seabed morphology due to the presence of cable protection measures					
Near-field	Medium	Low	Low	Negligible	**Low**
Far-field	Negligible	Negligible	Negligible	Negligible	**Negligible**
MPP-O-06: Changes in suspended sediment concentration, transport, and seabed level due to cable repairs and reburial					
Near-field	Negligible	Negligible	Negligible	Negligible	**Negligible**
Far-field	Negligible	Negligible	Negligible	Negligible	**Negligible**

258. Based upon the assessment of marine physical process, therefore, the indirect effects of these changes will be **negligible, or low**, as a worst-case, and will not result in a measurable change to the preservation of heritage assets.

17.8.2.3.3 Effect Significance

259. Overall, it is predicted that sensitivity (heritage importance) of the receptor is **medium** to **high** and the magnitude of impact is **low** or **negligible**. The effect is therefore of **negligible** significance, which is **not significant** in EIA terms.

260. As each of these impacts is assessed as a **negligible** significance of effect, there is no measurable potential for the increased protection or exposure of heritage assets.

261. Therefore, the indirect effect of changes to marine physical process upon offshore heritage assets during operation is concluded to result in no impact and the significance would be **no change**. Therefore, no additional mitigation is required.

17.8.2.4 Change to the setting of heritage assets, which could affect their heritage significance (OFA-O-04)

262. Changes in setting due to construction activities will be temporary and of sufficiently short duration that they are not anticipated to give rise to material. The potential change to the setting of onshore heritage assets is discussed in **Chapter 24 Onshore Archaeology and Cultural Heritage**.

17.8.3 Potential Effects During Decommissioning

263. No decision has been made regarding the final decommissioning strategy for the offshore infrastructure, as it is recognised that regulatory requirements and industry best practice change over time.

264. Commitment ID CO21 (see **Volume 2, Appendix 6.3 Commitments Register**) requires an Offshore Decommissioning Programme to be prepared and agreed with the relevant authorities prior to the construction of the offshore works. This will ensure that decommissioning offshore archaeological and cultural heritage impacts will be assessed in accordance with the applicable regulations and guidance at that time of decommissioning where relevant, with appropriate mitigation implemented as necessary to avoid significant effects.

265. The detailed activities and methodology for decommissioning will be determined later within the Project's lifetime, but would be expected to include:

- Removal of all the wind turbine components and part of the foundations (those above seabed level);
- Removal of some or all of the array and export cables; and
- The Inter-Array and Offshore Export Cables will likely be cut at the cable ends and left in-situ below the seabed, and scour and cable protection would likely be left in-situ other than where there is a specific condition for its removal.

266. Whilst a detailed assessment of decommissioning impacts cannot be undertaken at this stage, for this assessment, it is assumed that decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within the temporary construction working areas and require no greater amount or duration of activity than assessed for construction). The decommissioning sequence will generally be the reverse of the construction sequence. It is therefore assumed that decommissioning impacts would likely be of similar nature to, and no worse than, those identified during the construction phase.

267. The magnitude of decommissioning effects will be comparable to, or less than, those as assessed during the construction and operation and maintenance. Accordingly, given that all effects were assessed to be **minor adverse** significance, or less, for the identified offshore archaeology receptors during the construction and operation and maintenances, it is anticipated that the same would be valid for the decommissioning phase regardless of the final decommissioning methodologies. Therefore, all would be considered as **not significant** in EIA terms.

17.9 Cumulative Effects

268. Cumulative effects are the result of the impacts of the Project acting in combination with the impacts of other proposed and reasonably foreseeable developments on receptors. This includes plans and projects that are not inherently considered as part of the current baseline.

269. The overarching framework used to identify and assess cumulative effects is set out in **Chapter 6 Environmental Impact Assessment Methodology**. The four-stage approach is based upon the Planning Inspectorate's Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (Planning Inspectorate, 2024) and the Offshore Wind Marine Environmental Assessments: Best Practice Advance for Evidence and Data Standards (Parker *et al.*, 2022). The fourth stage of the process is the assessment stage, which is detailed within the sections below for potential cumulative effects on offshore archaeology and cultural heritage receptors.

17.9.1 Screening for Potential Cumulative Effects

270. The first step of the CEA identifies which impacts associated with the Project alone, as assessed under **Section 17.8**, have the potential to interact with other plans and projects to give rise to cumulative effects. All potential cumulative effects to be taken forward in the CEA are detailed in **Table 17-25** with a rationale for screening in or out. Only impacts determined to have a residual effect of negligible or greater are included in the CEA. Those assessed as 'no impact' are excluded, as there is no potential for them to contribute to a cumulative effect.

17.9.2 Screening for Other Plans / Projects

271. The second step of the CEA identifies a short-list of other plans and projects that have the potential to interact with the Project to give rise to significant cumulative effects during the construction and operation and maintenances. The short-list provided in **Table 17-26** has been produced specifically to assess cumulative effects on offshore archaeology and cultural heritage receptors. The exhaustive list of all offshore plans and projects considered in the development of the Project's CEA framework is provided in **Volume 2, Appendix 6.4 Offshore Cumulative Effects** and **Volume 2, Appendix 6.5 Onshore Cumulative Effects.**

272. Developments that were fully operational during baseline characterisation, including at the time of site-specific surveys, are considered as part of baseline conditions for the surrounding environment. It is assumed that any residual effects associated with these developments are captured within the baseline information. As such, these developments are not subject to further assessment within the CEA and excluded from the screening exercise presented in **Table 17-26**.

273. For developments that were not fully operational, including those in planning / pre-construction stages or under construction, during baseline characterisation and operational developments with potential for ongoing impacts, these are included in the screening exercise presented in **Table 17-26**.

274. The screening exercise has been undertaken based on available information on each plan or project as of 31st December 2024. Information has been obtained from the Planning Inspectorate's Nationally Significant Infrastructure Project portal, East Riding of Yorkshire Council and Hull City Council planning portals and MMO's marine licence register and directly from other developers through data sharing arrangements with DBD.

275. It is noted that further information regarding the identified plans and projects may become available between PEIR publication and DCO application submission or may not be available in detail prior to construction. The assessment presented here is therefore considered to be conservative. The list of plans and projects will be updated at ES stage to incorporate more recent information at the time of writing. Plans and projects identified in **Table 17-26** have been assigned a tier based on their development status, the level of information available to inform the CEA and the degree of confidence. A seven-tier system based on the guidance issued by Natural England and the Department of Environmental, Food and Rural Affairs (Defra) has been adopted (Parker *et al.*, 2022).

Table 17-25 Offshore Archaeology and Cultural Heritage – Potential Cumulative Effects

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
Construction			
OFA-C-01	Direct (physical) impact to known heritage assets as a result of construction activities.	No	Direct cumulative impacts to known heritage assets are unlikely to occur due to the application of AEZs identified through EIA for constructed and planned projects as part of the consenting process.
OFA-C-02	Direct (physical) impact to potential heritage assets as a result of construction activities.	Yes	Although the effect of unavoidable impacts will be mitigated by agreed measures as part of the consenting process for each of the constructed and planned projects, the impacts will still have occurred, and permanent damage or destruction will have taken place. The assessment of cumulative impacts, therefore, needs to consider the effect of multiple unavoidable impacts from multiple projects upon the archaeological resource.
OFA-C-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of construction activities.	Yes	As set out in **Chapter 8 Marine Physical Processes**, depending on the construction timetable for other offshore wind farms, there is potential for temporal overlap in construction periods which could have a cumulative effect in relation to changes in seabed level due to deposition of suspended sediment plumes.
Operation & Maintenance			
OFA-O-01	Direct physical impacts to known heritage assets as a result of operational activities.	No	Direct cumulative impacts to known heritage assets are unlikely to occur due to the continued avoidance and retention of AEZs throughout the life of constructed and planned projects.
OFA-O-02	Direct physical impacts to potential heritage assets as a result of operational activities.	Yes	There is potential for multiple unavoidable impacts associated with operations and maintenance activities (e.g. cable repairs and vessel anchors/jack-up legs) during the operation and maintenances of multiple projects
OFA-O-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of operational activities	Yes	As set out in **Chapter 8 Marine Physical Processes**, cumulative effects could occur due to the presence of the Project alongside other offshore wind farms.
OFA-O-04	Change to the setting of heritage assets, which could affect their heritage significance as a result of operational activities.	No	Impacts to the setting of individual assets are not anticipated to give rise to material harm.
Decommissioning			
OFA-D-01	Direct physical impacts to heritage assets- decommissioning activities not yet defined.	No	Direct cumulative impacts to known heritage assets are unlikely to occur due to the continued avoidance and retention of AEZs throughout the life of constructed and planned projects.
OFA-D-02	Direct physical impacts to heritage assets- decommissioning activities not yet defined.	Yes	There is potential for multiple unavoidable impacts associated with decommissioning considered cumulatively with activities associated with other projects.
OFA-D-03	Indirect impacts to heritage assets associated with changes to marine physical processes- decommissioning activities not yet defined.	No	As no cumulative impacts are anticipated during the decommissioning phase (see **Chapter 8 Marine Physical Processes**), there is no pathway for cumulative impacts to heritage assets.

Table 17-26 Short List of Plans / Projects for the Offshore Archaeology and Cultural Heritage Cumulative Effect Assessment

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to Array Area (km)	Closest Distance to Offshore ECC (km)	Potential for Significant Cumulative Effects	Rationale
Wind								
Dogger Bank South East (EN010125)	Offshore Wind Farm	Examination	4	Construction: 2026 to 2032 Operation 2032 to 2035+	70.62	46.31	Yes	Potential for spatial and temporal overlap of construction activities
Dogger Bank South West (EN010125)	Offshore Wind Farm	Examination	4	Construction: 2026 to 2032 Operation 2032 to 2035+	78.6	16.09	Yes	
Dogger Bank A (EN010021)	Offshore Wind Farm	Under Construction	2	Construction 2024 to 2025 Operation 2026 to 2035+	42.85	31.04	Yes	
Dogger Bank B (EN010021)	Offshore Wind Farm	Under Construction	2	Construction 2024 to 2026 Operation 2027 to 2035+	52.25	9.08	Yes	
Dogger Bank C	Offshore Wind Farm	Under Construction	2	Construction 2024 to 2027 Operation 2028 to 2035+	0.00	3.07	Yes	
Hornsea 4 (EN010098)	Offshore Wind Farm	Consented	3	Construction: 2025 to 2029 Operation 2029 to 2035+	133.58	31.10	Yes	
Sofia (EN010051)	Offshore Wind Farm	Under Construction	2	Construction 2024 to 2026 Operation 2026 to 2035+	17.75	22.79	Yes	
Cables and Pipelines								
Aminth Energy Interconnector	Interconnector	In planning	7	Construction 2027 to 2032 Operation 2032 to 2035+	10.00	25.00	Yes	Potential for spatial and temporal overlap of construction activities
Dogger Bank A export cable (EN010021)	Export Cable	Under Construction	2	Construction 2024 to 2026 Operation 2027 to 2035+	63.00	0.00	Yes	
Dogger Bank B export cable (EN010021)	Export Cable	Under Construction	2	Construction 2024 to 2026 Operation 2027 to 2035+	67.00	0.00	Yes	
Dogger Bank C export cable	Export Cable	Under Construction	2	Construction 2024 to 2026 Operation 2027 to 2035+	0.00	0.00	Yes	
Dogger Bank South export cable (EN010125)	Export Cable	Pending Approval	4	Construction 2025 to 2032 Operation 2033 to 2035+	73.00	0.00	Yes	

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to Array Area (km)	Closest Distance to Offshore ECC (km)	Potential for Significant Cumulative Effects	Rationale
Eastern Green Link (EGL 3) (EN0210003)	Interconector	In Planning	6	Construction 2027 to 2032	172.00	0.00	Yes	
Eastern Green Link (EGL 4) (EN0210003)	Interconnector	In planning	6	Construction 2027 to 2032	165.00	0.00	Yes	
Hornsea Project Four export cable (EN010098)	Export Cable	Consented	1	Construction 2025 to 2030 Operation 2030 to 2035+	134.00	0.00	Yes	
Northern Endurance pipeline	Pipeline	In planning	4	Information unavailable	150.00	0.00	Yes	
Sofia export cable (EN010051)	Export Cable	Under Construction	2	Construction 2024 to 2027 Operation 2027 to 2035+	33.00	0.00	Yes	
Ossian Wind Farm Export Cable (EN0210006)	Export Cable	In Planning	7	TBC	161.00	0.00	Yes	

276. Each plan or project in **Table 17-26** has been considered on a case-by-case basis. Only plans and projects with potential for significant cumulative effects with the Project are taken forward to a detailed assessment, which are screened based on the following criteria:

- There is potential that a pathway exists whereby an impact could have a cumulative effect on a receptor;
- The impact on a receptor from the Project and the plan or project in consideration has a spatial overlap (i.e. occurring over the same area);
- The impact on a receptor from the Project and the plan or project in consideration has a temporal overlap (e.g. occurring at the same time);
- There is sufficient information available on the plan or project in consideration and moderate to high data confidence to undertake a meaningful assessment;
- There is some likelihood that the residual effect (i.e. after accounting for mitigation measures) of the Project could result in significant cumulative effects with the plan or project in consideration; and
- The CEA for offshore archaeology and cultural heritage has identified a total of 18 plans and projects where significant cumulative effects could arise in combination with the Project. A detailed assessment of cumulative effects is provided in the **Section 276**.

17.9.3 Assessment of Cumulative Effects

17.9.3.1 Cumulative Impact 1: Direct physical impacts to potential heritage assets during all phases of the project (OFA-C-02, OFA-O-02 and OFA-D-02)

277. It is recognised that each of the projects included in the assessment of cumulative effects as set out in **Table 17-26** will result in unavoidable direct (physical impacts) to potential heritage assets. When projects summarised in **Table 17-26** are considered in isolation and, assuming the application of appropriate mitigation, physical impacts might only be determined to be of **negligible** or **minor adverse** significance at worst.

278. However, when considered collectively on a regional scale, these multiple unavoidable impacts may be considered of greater adverse significance. For example, it is possible that unique aspects of former landscapes, or of the *in situ* maritime and aviation archaeological resource, may be lost as a result. In addition, if a site is damaged or destroyed, comparable sites elsewhere may increase in importance due to greater rarity and any future direct impacts will be of greater significance.

279. Data from each of the projects in **Table 17-26** will be included in the assessment at ES stage, once geophysical and geotechnical data has been collected for the ECR. Decommissioned sites may yield additional information. When considered cumulatively alongside the planned archaeological assessment for DBD there is potential for significant effects to be offset through the accumulation of data on a regional scale. Therefore, the information acquired to date for PEIR has identified potential benefits in the accumulation of further data to inform a full CEA at ES stage, as outlined below.

280. These archaeological assessments may include palaeolandscape features mapped through interpretations of SBP and MBES data and geoarchaeological assessment of geotechnical data. This helps to better understand the potential for terrestrial landscapes and inhabitable environments where prehistoric populations may have settled when sea levels were lower.

281. This contribution to wider strategic analysis in relation to the cumulative impact of multiple constructed and planned projects would facilitate greater understanding of the cumulative effect of offshore wind development within the wider Dogger Bank region. The Dogger Bank A, B and C Offshore Wind Farm Projects and the Sofia Offshore Wind Farm Project are all currently collaborating on the Dogger Bank Palaeolandscapes Study. This study aims to map the geophysical and geotechnical data produced by these projects to give an accurate representation of the Dogger Bank region. Data produced by this project will also be made available to contribute to this Project.

282. As such, on a regional level, the cumulative impacts from DBD with the projects listed in **Table 17-26** will be offset through a contribution to regional research initiatives and provide the foundation for the creation of 'joined-up' objectives for post-consent investigation and mitigation, including consideration of links with academic and industry wide research initiatives where warranted.

17.9.3.2 Cumulative Impact 2: Indirect impact to heritage assets from changes to marine physical processes during all phases of the project (OFA-C-03 and OFA-O-03)

283. The cumulative effects on marine physical processes are assessed in **Chapter 8 Marine Physical Processes.** All potential cumulative effects upon changes to the hydrodynamic regime are assessed as **minor adverse** to **negligible**, there is therefore no pathway for significant effects upon the survival of archaeological material and indirect impacts will not occur.

284. As all potential cumulative effects upon changes to the hydrodynamic regime are assessed as **minor adverse** to **negligible**, there is no pathway for significant effects upon the survival of archaeological material and indirect impacts will not occur.

17.9.3.3 Cumulative Impact 3: Changes to the setting of heritage assets during operation and maintenance (OFA-O-04)

285. Similarly, on a regional scale, the setting of heritage assets as part of wider the palaeolandscapes, maritime and aviation networks and heritage assets located along coastlines may contribute to considerations of cultural significance at a regional scale even if changes to that setting would not cause material harm on an individual basis. This will be further assessed at ES stage once further information is available.

17.10 Transboundary Effects

286. Transboundary impacts to individual heritage assets may occur as there is potential for the effects on tidal currents and waves to cross into adjacent international waters, with potential secondary effects on sediment transport or seabed morphology. However, as assessed in **Chapter 8 Marine Physical Processes** (**Section 8.9**) the marine physical processes that are operational adjacent to the Array Area within the Netherlands jurisdiction are like those assessed for the Array Area. As such, no changes to suspended sediment concentration or seabed level will extend into Dogger bank SAC during construction and no changes to tidal currents or waves during operation will occur within it. Therefore, there would be no measurable change to the preservation of heritage assets.

287. Additionally, although the Project is within the UK's EEZ, any data acquired and archaeologically assessed as part of the Project also has the potential to feed into wider research objectives initiated by neighbouring EEZs in the North Sea.

288. In terms of palaeolandscapes, Doggerland was a landscape of central importance in northern Europe, larger than many current European countries, and boasting a wealth of unexplored archaeology and environmental data vital to our understanding of how past populations met challenges of climate change and sea-level rise.

289. Regarding maritime and aviation archaeology, the North Sea has played host to numerous conflicts, migration and trade routes and wrecks and aircraft from multiple nations are known to be present on the seafloor. Therefore, impacts discussed above, are not restricted to the UK's EEZ and transboundary effects should also be considered.

290. The nature of these transboundary effects is connected to cumulative effects and the potential for integrated research and management to represent a positive cumulative, transboundary impact of development-led initiatives across all sectors of the North Sea. Alongside data produced through UK offshore wind farm development, and that of other European nations bordering the North Sea, data sharing across national boundaries has the potential to result in a significant beneficial effect.

291. As for cumulative effects, should the Project be granted consent, the approach to realising this public benefit, and to the creation of joined-up objectives for post-consent investigation and mitigation, including consideration of links with academic and transboundary research initiatives where warranted, will be established post consent in consultation with key stakeholders, including Historic England. A commitment to the delivery of this beneficial effect, including the completion of studies to professional archaeological standards and to making the results of such work publicly available, will be set out in the WSI (Offshore).

17.11 Inter-Relationships and Effect Interactions

17.11.1 Inter-Relationships

292. Inter-relationships are defined as effects arising from residual effects associated with different environmental topics acting together upon a single receptor or receptor group. Potential inter-relationships between offshore archaeology and cultural heritage and other environmental topics have been considered, where relevant, within the PEIR. **Table 17-27** provides a summary of key inter-relationships and signposts to where they have been addressed in the relevant chapters.

Table 17-27 Offshore Archaeology and Cultural Heritage – Inter-Relationships with Other Topics

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
Construction				
OFA-C-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of construction activities.	**Chapter 8 Marine Physical Processes**	**Section 17.8.1.3**	Significant changes to physical processes may impact the preservation / survival of buried / exposed heritage assets.
Operation				
OFA-O-03	Indirect impacts to heritage assets associated with changes to marine physical processes as a result of operation activities.	**Chapter 8 Marine Physical Processes**	**Section 17.8.2.3**	Significant changes to physical processes may impact the preservation / survival of buried / exposed heritage assets.

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
OFA-O-04	Change to the setting of heritage assets, which could affect their heritage significance as a result of operation activities .	**Chapter 24 Onshore Archaeology and Cultural Heritage**	Addressed in **Chapter 24 Onshore Archaeology and Cultural Heritage**	Impacts to the setting of heritage assets onshore may occur due to activities associated with the installation of offshore infrastructure.
Decommissioning				
The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Plan (see Commitment ID CO21 in Table 17-3). For this assessment, it is assumed that inter-relationships during the decommissioning phase would be of similar nature to those identified during the construction phase.				

17.11.2 Interactions

293. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 17-28**. This provides a screening tool for which effects have the potential to interact. **Table 17-29** provides an assessment for each receptor (or receptor group) as related to these impacts.

294. Within **Table 17-29** the effects are assessed relative to each development phase to see if multiple effects could increase the significance of the effect upon a receptor. Following this a lifetime assessment is undertaken which considers the potential for effect to affect receptors across all development phases.

Table 17-28 Offshore Archaeology and Cultural Heritage – Potential Interactions Between Impacts

Construction and Operation & Maintenance

	OFA-C-01	OFA-C-02	OFA-C-03	OFA-O-01	OFA-O-02	OFA-O-03	OFA-O-04
OFA-C-01		No	No	No	No	No	No
OFA-C-02	No		Yes	No	No	No	No
OFA-C-03	No	Yes		No	No	No	No
OFA-O-01	No	No	No		No	No	No
OFA-O-02	No	No	No	No		Yes	Yes
OFA-O-03	No	No	No	No	Yes		Yes
OFA-O-04	No	No	No	No	Yes	Yes	

Decommissioning

The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Programme (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**).

For this assessment, it is assumed that interactions during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.

Table 17-29 Interaction Assessment – Phase and Lifetime Effects

Impact ID	Impact and Project Activity	Receptor	Highest Significance Level			Phase Assessment	Lifetime Assessment
			Construction	Operation	Decommissioning		
OFA-C-02 OFA-C-03 OFA-O-02 OFA-O-03 OFA-O-04 OFA-D-02 OFA-D-03	Direct physical impacts to potential heritage assets as a result of construction activities. Indirect impacts to heritage assets associated with changes to marine physical processes as a result of construction activities. Direct physical impacts to potential heritage assets as a result of operational activities. Indirect impacts to heritage assets associated with changes to marine physical processes as a result of operational activities. Change to the setting of heritage assets, which could affect their heritage significance as a result of operational activities. Direct physical impacts to heritage assets- decommissioning activities not yet defined. Indirect impacts to heritage assets associated with changes to marine physical processes- decommissioning activities not yet defined.	Potential heritage assets	**Minor Adverse**	**Negligible**	**Minor Adverse**	All Phases No greater than individually assessed impact. While impacts to known heritage assets can be avoided, potential heritage assets may be subject to direct physical impact, indirect impacts from changes to physical processes and from changes to their setting (i.e. an artefact removed from the seabed). Once an impact has occurred (i.e. a new heritage asset has been discovered / encountered) the application of additional mitigation (such as additional recording, AEZs, micro-siting or relocation) means that the magnitude of each, spatially discrete impact (should an impact occur), will be no greater across all phases than each phase in isolation.	No greater than individually assessed impact. As for the phase assessment, once a new heritage asset is discovered or encountered, the application of additional mitigation means that the magnitude of each, spatially discrete impact (should an impact occur), will be no greater across the Project lifetime.

17.12 Monitoring Measures

295. Potential monitoring measures for offshore archaeology and cultural heritage will be developed through the EIA process and monitoring requirements for offshore archaeology and cultural heritage will be set out in the Outline WSI. This is anticipated to comprise the archaeological assessment of post construction marine geophysical data to include an assessment of AEZs to confirm that impacts have not occurred during or post-construction and that the size and extent of the AEZs remain fit for purpose.

296. Post-construction monitoring will be undertaken as required to assess if there have been any indirect effects which could include an assessment of any changes to sediment cover across the Offshore Archaeology Study Area which may result in the exposure or burial of heritage assets, which may affect their long-term preservation.

297. Proposed monitoring measures for offshore archaeology and cultural heritage will be further developed and agreed with stakeholders prior to construction taking into account of the final detailed design of the Project.

17.13 Summary

298. This chapter has provided a characterisation of the baseline environment for offshore archaeology and cultural heritage based on existing data which has established that with mitigation all potential impacts will be avoided or of minor adverse significance as a worst-case which is **not significant** in EIA terms.

299. There are no known *in situ* prehistory sites within the Study Area. However, considering the location of DBD at the western margin edge of the Dogger Bank which is known to preserve palaeolandscape features and deposits of archaeological interest, there is high potential for submerged prehistoric landscape features and deposits to be present. This potential will be assessed using project-specific geophysical and geotechnical data and incorporated into the ES.

300. Regarding maritime and aviation archaeology, there are 259 seabed features identified through the assessment of site-specific geophysical data and three historic records (A3s) within the Offshore Development Area. Of these 233 are in the Array Area and one within the ECC. Of these, 35 have been interpreted as A2 anomalies, 29 have been interpreted as A2-h anomalies, 185 have been interpreted as A2-i, while 10 have been identified as A1 anomalies. Geophysical survey of the offshore ECC is ongoing, the results of which will be presented in the ES.

301. In addition to the identified anomalies described above, there is also potential for the presence of further maritime and aviation archaeological material to be present, which has not been seen in the geophysical data. This may comprise isolated finds of material, or wrecks or aircraft crash sites, potentially buried and concealed within or beneath marine seabed sediments. This is evidenced by the large number of UKHO and NRHE records within the Offshore Development Area.

302. The potential for further maritime and aviation archaeological material will be further clarified following the assessment of marine geophysical data by Wessex Archaeology with the results included in the ES.

303. Within the intertidal zone, there is high potential for the discovery of isolated finds related to potential *in situ* prehistoric sites, submerged landscape features, and palaeoenvironmental evidence. There is also a high potential for fragmentary remains associated with former WWII coastal defensive structures.

304. The historic seascape character of the Study Area is primarily associated with commercial fishing activities with documentary evidence for fishing on the Dogger Bank from at least the 14th century. The presence of the wind farm infrastructure is not anticipated to fundamentally alter perceptions of the historic fishing industry. Whilst fishing activities are temporarily displaced due to construction works in the offshore ECC, fishing activities will still be permitted in areas of the offshore development not undergoing construction activities, with the exception of within the Dogger Bank SAC after the MMO passed a byelaw prohibiting bottom-towed fishing gear in April 2022. Also, the distance of DBD from the coast, and the minimal above ground infrastructure at the coast, means that the Project will be largely undetectable by the public and historic perceptions of the traditional fishing industry, which the HSC described as having taken on a ‘quaint’ character, a memory of better days, will remain largely unchanged.

305. A further dominant character type mapped within the Study Area is hydrocarbon industry. The most significant change since compilation of the HSC dataset is the introduction of new offshore wind farms to the north and south of DBD. Overall, perceptions of the North Sea energy industry place greater emphasis upon renewable energy and the changing perceptions associated with the construction of DBD are therefore likely to be seen as part of this natural progression for energy generation and as a positive change from fossil fuels to renewable energy.

306. With the application of mitigation measures, it is anticipated that all direct physical impacts to known heritage assets resulting from the Project will be avoided. The approach to the implementation of these mitigation measures will be set out in the Outline WSI (Offshore) which will submitted alongside the DCO application. This will be prepared in accordance with industry standards and guidance including Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021).

307. Subject to approval from Historic England, AEZs will be implemented around A1 anomalies. The AEZs will be retained for the lifetime of project. AEZs are not currently recommended for A2 anomalies. The positions of these features will be avoided by means of micro-siting during detailed project design, where possible.

308. The archaeological assessment of pre-construction survey data, including high resolution geophysical data undertaken for the purposes of UXO identification, will further clarify the nature and extent of these anomalies and the scheme design will be modified to avoid heritage assets where possible. If features cannot be avoided, then additional work may be required to establish the archaeological interest of the feature (e.g. investigation of individual anomalies (ground truthing) through ROV and/or diver survey) and to record features prior to removal, as appropriate.

309. It is not possible to avoid heritage assets that have not yet been discovered (potential heritage assets). To minimise this potential impact, further archaeological assessment of high-resolution geophysical data and geoarchaeological assessment of geotechnical data will be undertaken post-application/ post-consent prior to any construction works commencing. This will reduce, as far as possible, the potential for unintended impacts during construction. In the event of an unexpected discovery, this will be reported using a formal protocol for archaeological discoveries which will establish whether the recovered objects are of archaeological interest and recommend appropriate mitigation measures where necessary.

310. Through the protocol, any possible *in situ* heritage assets encountered on the seabed will be immediately provided with a temporary exclusion zone to prevent further impacts from taking place until advice had been received. Following confirmation of the presence of archaeological material, additional mitigation measures to record or conserve the site will be agreed in consultation with Historic England.

311. Potentially beneficial effects have also been identified through the contribution of data to academic and scientific research. The approach will be established post-consent in consultation with key stakeholders, including Historic England, and will be set out in the Outline WSI.

312. **Table 17-30** presents a summary of the preliminary results of the assessment of likely significant effects on offshore archaeology and cultural heritage during the construction, operation and decommissioning of the Project.

17.14 Next Steps

313. The acquisition and assessment of marine geophysical data from the offshore ECC is ongoing and will be completed to inform the ES. Following its completion consultation will be undertaken with Historic England to provide them with the results of the assessment and to discuss the implementation of AEZs. The Outline WSI will also be drafted in consultation with Historic England and submitted with the DCO Application.

Table 17-30 Summary of Potential Effects Assessed for Offshore Archaeology and Cultural Heritage

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Enhancement Measures	Receptor	Receptor Sensitivity / Value	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Construction										
OFA-C-01	Direct physical impacts to known heritage assets – construction activities.	CO1, CO2, CO3, CO4, CO5, CO6, CO28	Enhancement of public understanding by adding to the archaeological record	Known wrecks and debris of archaeological interest	**High**	**No impact**	**No change**	N/A	**No change**	See **Section17.12**
OFA-C-02	Direct physical impacts to potential heritage assets – construction activities.	CO1, CO2, CO3, CO4, CO5, CO6, CO28	Enhancement of public understanding by adding to the archaeological record	*In situ* prehistoric, maritime or aviation sites below MHWS	**High**	**Medium**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
				Sub-surface archaeology and geoarchaeological / palaeoenvironmental deposits	**High**	**Medium**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
				Isolated finds	**Low to medium**	**Low**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
OFA-C-03	Indirect impacts to heritage assets associated with changes to marine physical processes – construction activities.	CO1, CO2, CO3, CO4, CO5, CO6, CO28	Enhancement of public understanding by adding to the archaeological record	Known and potential heritage assets below MHWS	**Medium to high**	**No impact**	**No change**	N/A	**No change**	See **Section17.12**
				Sub-surface archaeology and geoarchaeological / palaeoenvironmental deposits within the cliffs	**Low to high**	**Medium**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
Operation										
OFA-O-01	Direct physical impacts to known heritage assets – operational activities.	CO1, CO2, CO3, CO4, CO5, CO6	Enhancement of public understanding by adding to the archaeological record	Known heritage assets	**Medium to high**	**No impact**	**No change**	N/A	**No change**	See **Section17.12**

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Enhancement Measures	Receptor	Receptor Sensitivity / Value	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
OFA-O-02	Direct physical impacts to potential heritage assets – operational activities.	CO1, CO2, CO3, CO4, CO5, CO6	Enhancement of public understanding by adding to the archaeological record	*In situ* prehistoric, maritime or aviation sites	**High**	**Negligible**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
				Isolated finds	**Medium**	**Low**	**Minor adverse (not significant)**	N/A	**Minor adverse (not significant)**	See **Section17.12**
OFA-O-03	Indirect impacts to heritage assets associated with changes to marine physical processes – operational activities.	CO1, CO2, CO3, CO4, CO5, CO6	Enhancement of public understanding by adding to the archaeological record	Known and potential heritage assets below MHWS	**Medium to high**	**No impact**	**No change**	N/A	**No change**	See **Section17.12**
OFA-O-04	Change to the setting of heritage assets, which could affect their heritage significance – operational activities.	N/A	Enhancement of public understanding by adding to the archaeological record	Known and potential heritage assets	**Medium to high**	**No impact**	**No change**	N/A	**No change**	See **Section17.12**

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Enhancement Measures	Receptor	Receptor Sensitivity / Value	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Decommissioning										
OFA-D-01	Direct physical impacts to known heritage assets – decommissioning activities not yet defined.	AEZs	Enhancement of public understanding by adding to the archaeological record	The details and scope of offshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Offshore Decommissioning Programme (see Commitment ID CO21 in **Volume 2, Appendix 6.3 Commitments Register**). For this assessment, it is assumed that interactions during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.						
OFA-D-02	Direct physical impacts to potential heritage assets – decommissioning activities not yet defined.	Further assessment and investigation and additional mitigation to avoid, reduce or offset impacts.	Enhancement of public understanding by adding to the archaeological record							
		Protocol for archaeological discoveries	Enhancement of public understanding by adding to the archaeological record							
OFA-D-03	Indirect impacts to heritage assets associated with changes to marine physical processes – decommissioning activities not yet defined.	N/A	Enhancement of public understanding by adding to the archaeological record							

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List of Acronyms

Acronym	Definition
AEZ	Archaeological Exclusion Zone
BP	Before Present
CEA	Cumulative Effects Assessment
CHIA	Cultural Heritage Impact Assessment
CIfA	Chartered Institute for Archaeologists
CITiZAN	The Coastal and Intertidal Zone Archaeology Network
CPT	Cone Penetration Testing
DBA	Dogger Bank A Offshore Wind Farm
DBC	Dogger Bank C Offshore Wind Farm
DBD	Dogger Bank D Offshore Wind Farm
DBS	Dogger Bank South Offshore Wind Farm
DCO	Development Consent Order
DML	Deemed Marine Licence
ECC	Export Cable Corridor
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ES	Environmental Statement
ETG	Expert Topic Group
GIS	Geographical Information Systems
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
HHER	Humber Historic Environment Record
HSC	Historic Seascape Characterisation
IEMA	Institute of Environmental Management and Assessment
IHBC	Institute of Historic Building Conservation
JNAPC	Joint Nautical Archaeology Policy Committee
Mag.	Magnetometer
MBES	Multibeam Echosounder
MCA	Marine and Coastguard Agency
MHWS	Mean High Water Springs
MIS	Marine Isotope Stages
MLWS	Medium Low Water Springs
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPS	Marine Policy Statement
NHLE	National Heritage List for England
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRHE	National Record of the Historic Environment
O&M	Operation and Maintenance
OP	Offshore Platform
ORPAD	Offshore Renewables Protocol for Archaeological Discoveries
OSP	Offshore Substation Platform
PAD	Protocol for Archaeological Discoveries
PEIR	Preliminary Environmental Impact Assessment

Acronym	Definition
PEXA	Practice and Exercise Area
RAF	Royal Air Force
ROV	Remotely Operated Vehicle
SSS	Side Scan Sonar
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
WSI	Written Scheme of Investigation
WWI	World War I
WWII	World War II