Dogger Bank South Offshore Wind Farms Environmental Statement

Non-Technical Summary

RWE Renewables UK Dogger Bank South (West) Limited
RWE Renewables UK Dogger Bank South (East) Limited

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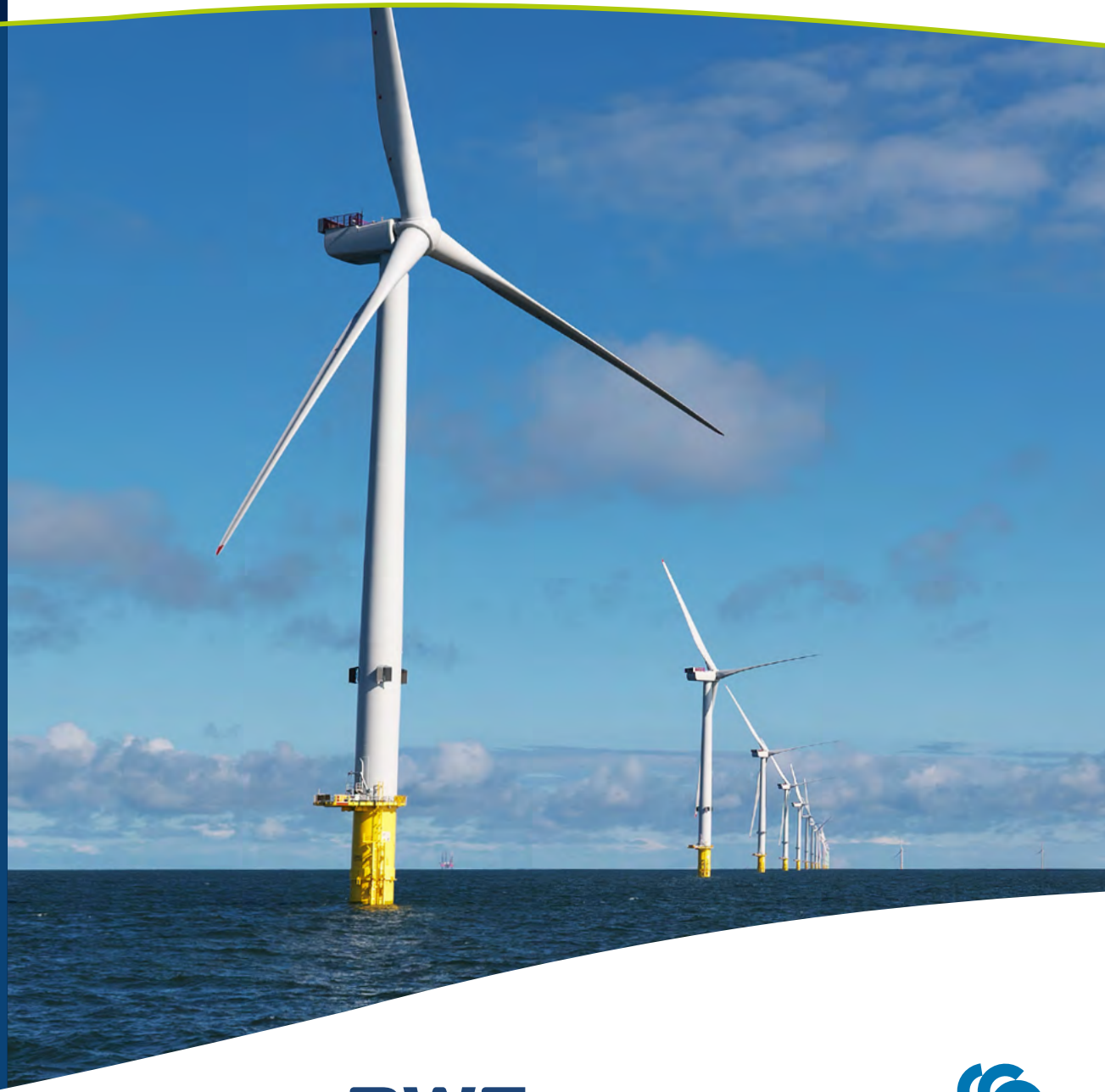

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Acronyms

Term	Definition
BEIS	Department for Business, Energy and Industrial Strategy
CCC	Committee on Climate Change
CO2	Carbon Dioxide
DBS	Dogger Bank South
DESNZ	Department for Energy Security and Net Zero
EIA	Environmental Impact Assessment
GW	Gigawatt
ICES	International Council for the Exploration of the Sea
IEMA	Institute of Environmental Management and Assessment
km	kilometre
kV	kilovolt
m	metre
UK	United Kingdom

01

Introduction

About this Document

This document is the Non-Technical Summary of the Environmental Statement for the Dogger Bank South (DBS) East and DBS West Offshore Wind Farms (herein 'the Projects').

The purpose of the Environmental Statement is to detail the findings of the Environmental Impact Assessment for the Projects and is informed by responses to the consultation on the Preliminary Environmental Impact Information Report which presented the initial environmental assessment. The Environmental Statement accompanies the application for a Development Consent Order for both Projects.

The Projects are Nationally Significant Infrastructure Projects. Consent to construct, operate and decommission the Projects is therefore being requested from the Secretary of State for the Department of Energy Security and Net Zero, under the Planning Act 2008. An Environmental Impact Assessment is required to support a Development Consent Order application by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

This Non-Technical Summary is a stand-alone document intended to provide a high-level overview of the Projects to date, including their design and how this has been developed, a summary of the consultation that has taken place and an overview of the potential environmental impacts of the Projects in non-technical terms. For further information, the full Environmental Statement should be referred to (Volume 7, Chapter 1 to 30 (application ref: 7.1 to 7.30))

See the Document Map at the end of this Non-Technical Summary for a list of all associated documents.

Note, the Environmental Statement has been updated where necessary during the examination phase of the Development Consent Order process to account for two Project Design Changes, Project Design Change 1 – Offshore and Intertidal (document reference 10.49) and Project Design Change 2 – Onshore Substation Zone (document reference 10.53). For further information, refer to Volume 7, Chapter 1 Introduction (application ref: 7.1).

RWE's goal is to triple its global offshore wind capacity from 3.3GW today to 10GW in 2030.

For further information visit:
www.rwe.com/rwe-renewables-uk

The Applicants and the Projects Team

The Applicants for the Projects are RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).

RWE is the leading power generator in the UK, with a diverse operational portfolio of onshore wind, offshore wind, hydro, biomass and gas. We produce enough energy to power the equivalent of around 12 million UK homes. We are investing today, with 2.2GW of new renewable projects currently in construction. This includes our 1.4GW Sofia offshore wind farm, three new onshore wind farms totalling 169MW, 11 new solar farms totalling 530MW and four co-located battery storage sites totalling 105MW. We have ambitious plans to expand our UK footprint even further, with over 15GW of renewables at various stages of development. This includes nine new offshore wind farms totalling nearly 10GW, and a GW scale pipeline of onshore wind and solar projects. Complementing our renewables pipeline, we have over 3.6GW of battery storage under development, and we are in the early stages of developing four gas carbon capture and storage (CCS) projects across the UK, totalling up to 4.6GW.

Masdar (Abu Dhabi Future Energy Company) is one of the world's leading clean energy companies. Masdar is advancing the development and deployment of solar, wind, geothermal, battery storage and green hydrogen technologies to accelerate the transformation of energy systems and help the world meet its net-zero ambitions. Established in 2006, Masdar has developed and invested in projects in over 40 countries with a combined capacity of 51 gigawatts (GW), providing affordable clean energy access to those who need it most and helping to power a more sustainable future. Masdar is jointly owned by TAQA, ADNOC, and Mubadala, and is targeting a renewable energy portfolio capacity of 100GW by 2030 while aiming to be a leading producer of green hydrogen by the same year.

Haskoning has been commissioned by the Applicants as the consultant to lead the Environmental Impact Assessment for the Projects, with support through the Environmental Impact Assessment process from additional consultants who are responsible for certain specialist topics. Haskoning's Environmental Impact Assessment activities and Environmental Statements are accredited by the Institute of Environmental Management and Assessment (IEMA) under the Environmental Impact Assessment Quality Mark Scheme and therefore satisfies the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 which state that the developer must ensure the Environmental Statement is prepared by competent experts.

Purpose of the Projects

Climate change as a result of greenhouse gas emissions is a global issue associated with impacts on weather, ecosystems, human health and welfare. The UK has made an ambitious commitment to bring all greenhouse gas emissions to net zero by 2050 (HM Government, 2021).

According to recent advice from the Committee on Climate Change (CCC, 2019), the UK may need at least 75GW of operating offshore wind farms to reach the legally binding net zero greenhouse gas emissions target by 2050.

The UK Government recognises the importance to businesses and households of access to an affordable, secure, and sustainable supply of energy and the importance of this is set out in the Energy White Paper (BEIS, 2020). Energy security relates to ensuring secure, reliable, uninterrupted supplies to consumers, and having an energy generation and transmission system that can effectively and efficiently respond and adapt to changes. As part of the UK government's British Energy Security Strategy published in 2022, the target for offshore wind capacity is now up to 50GW by 2030 (BEIS, 2022).

The Projects would make a substantial contribution to energy security, the achievement of national renewable energy targets towards net zero, and to the UK's contribution to global efforts to reduce the effects of climate change by reducing emissions and increasing the proportion of renewables within the energy mix and generating more electricity from low-carbon sources.

Based on an estimated capacity of 3GW once fully operational, the Projects could be capable of generating enough electricity to meet the average annual domestic energy needs of around three million typical UK homes. The Projects would reduce carbon emissions and significantly contribute to the economy by providing substantial investment locally and nationally, as well as employment and new infrastructure during all phases of the Projects.

As part of the UK government's British Energy Security Strategy published in 2022, the target for offshore wind capacity is now up to 50GW by 2030 (BEIS, 2022).

Site Selection and Assessment of Alternatives

The siting, design, and refinement of the Projects offshore and onshore infrastructure has followed a site selection process, taking account of environmental, physical, technical, commercial, and social considerations and opportunities. The details of the approach taken to select the Array Areas (where the wind turbines are located), Offshore Export Cable Corridor, Landfall, Onshore Export Cable Corridor and the location of the Onshore Converter Stations are provided in **Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)**. The aim of this process was to identify locations that would be environmentally and socially acceptable, deliverable, and capable of achieving consent, whilst also being economic and efficient.

The site selection process commenced with the identification of the offshore Array Area locations as part of The Crown Estate's Offshore Wind Leasing Round 4 process. Subsequently, National Grid Electricity Systems Operator advised that, following their own extensive site selection process, the onshore grid connections for the Projects would connect into the new National Grid substation. This new substation is located close to the existing Creyke Beck substation known as Birkhill Wood, in the East Riding of Yorkshire. This enabled a selection process to be undertaken to identify possible locations for Landfall, Onshore Converter Stations, Offshore and Onshore Export Cable Corridors, and Onward Cable Connection to the National Grid network.

In addition, refinements to the original Array Area boundaries were implemented following the publication of the Projects' Preliminary Environmental Information Report in June 2023. Such refinements were made in consideration of existing environmental and engineering constraints within the original Array Area boundaries. The Onshore Development Area was also refined, following the decision to locate both of the Onshore Converter Stations options on one Onshore Substation Zone to the south of Beverley. The Onshore Substation Zone was further refined following a reduction in the Onshore Converter Station footprint as a result of Project Change Request 2.

Plate 1-1 provides an overview of the site selection process undertaken for the Projects.

A number of strategic-level project design alternatives have been considered as part of the site selection and project design decision-making process. This strategic consideration of alternatives, which fed directly into the Projects' site selection process, are detailed in **Table 1-1.**

Plate 1-1
Overview of the DBS
Site Selection Process

Identification of offshore wind farm location
Offshore wind farm location for DBS East and DBS West

Identification of possible National Grid connection locations
A location in the vicinity of the existing National Grid substation at Creyke Beck, East Yorkshire

Identification of Areas of Search
Areas of Search identified for Landfall, Offshore Export Cable Corridor, Onshore Export Cable Corridor and Onshore Substation(s)

Identification of Long List
Long list of options identified for Landfall, Offshore Export Cable Corridor, Onshore Export Cable Corridor and Onshore Substation(s)

Identification of Short List
Short list of options identified for Landfall, Offshore Export Cable Corridor, Onshore Export Cable Corridor and Onshore Substation(s)

Technical Studies and Stakeholder Engagement
Stakeholder engagement, Public Information Days, project refinement, further studies and site visits

Design Freeze for EIA – Preliminary Environmental Information Report

Identification of Final Options
Finalisation of National Grid connection location, review of consultation feedback, further studies and site visits

Design Freeze for EIA – Environmental Statement

Submission of DCO Application

Table 1-1
Strategic-Level Project Design Alternatives Considered

Alternatives Considered	Decision	Environmental Benefits
A single application for development consent for DBS East and DBS West; or Separate consent applications.	A single development consent application to address both projects.	Consistency in the approach to the environmental assessment, consultation and examination; reduced burdens on stakeholders as only one application will be consulted on and subject to examination; and increased transparency for potential compulsory acquisition process.
Coordinating the design for DBS East and DBS West where possible; or Developing separate designs for each Project.	Pursuing a coordinated design for the Projects where possible (for example shared accesses). However, as they are still two separate Projects some flexibility has been built into the design for certain elements to remain individual e.g., Onshore Converter Stations.	By co-locating the infrastructure for both Projects (where possible) the number of receptors impacted by the Projects can be reduced.
Overhead lines along the onshore export cable route between Landfall and the grid connection location; or Buried cables within ducts along the onshore export cable route between Landfall and the grid connection location.	Buried Onshore Export Cables within ducts.	The environmental benefit of burying cables as opposed to overhead lines and pylons is a significant reduction of permanent visual impacts.
High Voltage Alternating Current technology and High Voltage Direct Current technology.	Two High Voltage Direct Current Onshore Converter Stations.	Reduced overall footprint of Development Area with benefit of co-locating the two Onshore Converter Stations within the same Onshore Substation Zone to reduce the overall number of receptors. Reduced power losses through transmission when utilising High Voltage Direct Current.

The Environmental Impact Assessment Process

The Environmental Impact Assessment considers all relevant topics under three general areas of physical environment, biological environment, and human environment. The topics to be included in the Environmental Impact Assessment were agreed with the Planning Inspectorate and other stakeholders through the scoping process, with the Planning Inspectorate providing a Scoping Opinion in September 2022, which is available at:

https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010125

The findings of the Environmental Impact Assessment for the Projects have been described in the Environmental Statement. As part of the process, a combination of desk studies, surveys and stakeholder consultation have informed our characterisation of the existing environment within which the Projects are proposed to be located.

All potential impacts of the construction, operation and decommissioning stages of the Projects have been identified as required by the scoping opinion, and an assessment made on the significance of likely effects by Environmental Impact Assessment specialists.

In relation to each potential impact, the receptors which would experience the impacts are identified and their level of sensitivity (i.e. if a receptor has the capacity to recover from a predicted impact) is assessed. The likely magnitude (i.e. the scale of the predicted impact) of the impact is also assessed. At this stage any standard mitigation measures or, mitigation embedded into the design of the Projects are taken into account.

The topics to be included in the Environmental Impact Assessment were agreed with the Planning Inspectorate and other stakeholders.

Table 1-2
Significance of Effect Matrix

The determination of significance is guided by the use of a significance of effect matrix, an example of which is shown in **Table 1-2**. Each chapter contains its own matrix and categorisation of effects significance. The significance of effect matrix may reach a conclusion of negligible, minor, moderate or major for each effect. Effects can be assessed as either adverse or beneficial. For the purposes of Environmental Impact Assessment, an effect is deemed 'significant' if the effect is moderate or major. An effect is deemed not significant if the effect is assessed as negligible, minor or no change.

		Adverse Magnitude			
		High	**Medium**	**Low**	**Negligible**
Sensitivity	**High**	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible
		Beneficial Magnitude			
		Negligible	**Low**	**Medium**	**High**
Sensitivity	**High**	Minor	Moderate	Major	Major
	Medium	Minor	Minor	Moderate	Major
	Low	Negligible	Minor	Minor	Moderate
	Negligible	Negligible	Negligible	Negligible	Minor

For the purposes of Environmental Impact Assessment, an effect is deemed 'significant' if the effect is moderate or major.

The above paragraph describes a general process, however some chapters such as **Volume 7, Chapter 14 Shipping and Navigation (application ref: 7.14)**, or **Volume 7, Chapter 15 Aviation and Radar (application ref: 7.15)** have variations on terminology describing significance of effect levels.

Where the impact assessment identifies that an aspect of the offshore wind farms are likely to give rise to a significant environmental effect, additional mitigation measures are proposed to avoid impacts or reduce them to acceptable levels. Mitigation will be agreed through ongoing consultation with the relevant authorities and stakeholders, where applicable. Following the application of mitigation the effects are reassessed to give a final residual effect.

The Environmental Impact Assessment process also considers:

- Inter-relationships, where impacts to one receptor can have a knock-on impact on another (for example an impact on a fish population may lead to reduced prey for birds and marine mammals);
- Cumulative impacts, where the Projects will be considered alongside the predicted impacts of other projects in the nearby area (for example another offshore wind farm or a road development); and
- Transboundary impacts, where activities in other countries may be impacted (for example shipping routes and fishing activities). The relevant countries have been identified as Belgium, Denmark, France, Germany, Netherlands, Norway, and Sweden.

Planning decisions will be taken within the clear policy framework... making these decisions as transparent as possible.

The Role of National Policy Statements in the Decision-Making Process

The Planning Act 2008 makes provision for National Policy Statements. National Policy Statements are produced by the UK Government and set out national policy against which proposals for major infrastructure projects will be assessed and decided on by the Planning Inspectorate. They integrate the Government's objectives for infrastructure capacity and development with its wider economic, environmental, and social policy objectives, including climate change goals and targets, in order to deliver sustainable development.

Planning decisions will be taken within the clear policy framework set out in the National Policy Statements, making these decisions as transparent as possible. The Planning Inspectorate will have regard for National Policy Statements in its examination of applications for development consent, and Ministers will also have regard for them when making decisions.

Six designated National Policy Statements relating to energy policy were produced by the Department of Energy and Climate Change in 2011, of which five were revised in 2023, with revised versions of these being designated in January 2024.

Three of the energy National Policy Statements are relevant to the Projects:

- EN-1 Overarching National Policy Statement for Energy, which highlights that there should be a presumption in favour of granting consent for projects which fall within relevant National Policy Statements and recognises that offshore wind is a key factor in meeting UK policy objectives (DESNZ, 2023a);
- EN-3 National Policy Statement for Renewable Energy Infrastructure, which identifies the construction of offshore generating stations in excess of 100 Megawatts as Nationally Significant Infrastructure Projects (DESNZ, 2023b); and
- EN-5 National Policy Statement for Electricity Networks Infrastructure, which covers the electrical infrastructure (including electricity cable systems and substations) in conjunction with EN-1 (DESNZ, 2023c).

The Environmental Statement outlines how the development will comply with the requirements of these National Policy Statements. National Infrastructure Planning advice notes from the Planning Inspectorate and the National Planning Policy Framework are also relevant to the Projects and have been considered, as required.

Other Planning Policies

Local authorities are required to prepare and maintain up-to-date Local Development Plans which set out their objectives for the use and development of land within their jurisdiction, and general policies for implementation.

Onshore, the Projects' areas fall under the jurisdiction of East Riding of Yorkshire Council. Therefore, their Local Plan (East Riding of Yorkshire Council, 2025) has been considered during the onshore site selection for the Projects to avoid, wherever possible, conflict with site-specific planning allocations. Where relevant for certain topics, such as the air quality and traffic assessments, the Hull City Council Development Plan has also been considered.

For the offshore components of the Projects, the relevant Marine Plans have been considered, which are the East Inshore and the East Offshore Marine Plans, and the North East Inshore and Offshore Marine Plan.

Consultation

The Applicants have undertaken community and stakeholder consultation, which has informed a number of key decisions in relation to the design and development of the Projects in order to deliver environmentally sustainable projects. A description of all consultation and how it has been considered has been provided in **Volume 5, Consultation Report (application ref: 5.1)**, which forms part of the Development Consent Order application.

The Applicants submitted a Scoping Report to the Planning Inspectorate on 26th July 2022. The Scoping Opinion was then adopted by the Planning Inspectorate (on behalf of the Secretary of State) pursuant to Regulation 10 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 on the 2nd September 2022.

A non-statutory Introductory Consultation took place from 9th September to 14th October 2022, which included a series of public exhibitions held across the East Riding of Yorkshire area to introduce the Projects to the public and provide updates to the Projects design. Full details of the results of the non-statutory consultation can be found in **Volume 5, Consultation Report, Appendix F Non-Statutory Consultation and Engagement (application ref: 5.7)** and are summarised in **Volume 5, Consultation Report (application ref: 5.1)**, which forms part of the application documents.

The Preliminary Environmental Information Report was provided as part of statutory public consultation, in accordance with Section 42 and 47 of the Planning Act 2008, on 6th June 2023. This consultation included a series of public exhibitions, with the window for providing comments running until the 17th July 2023. An additional targeted statutory consultation period was run by the Applicants from 4th August to the 15th September 2023 to allow for stakeholders that had been accidentally missed from the initial consultation period to provide their feedback. A further targeted statutory consultation period between the 13th November to the 10th December 2023 was undertaken involving all parties with an interest in the areas of land within the Onshore Development Area where adjustments had been made since the Projects' Preliminary Environmental Information Report consultation.

Since the Preliminary Environmental Information Report, there have been regular and targeted discussions with stakeholders through a process of technical consultation, largely through the Evidence Plan Process. The Applicants have consulted with stakeholders on a non-statutory basis through the Evidence Plan Process since 2021, with key consultation outcomes recorded in the first appendix of each technical chapter of the Environmental Statement. Details of the Projects' technical consultation process are presented in **Volume 7, Chapter 7 Consultation (application ref: 7.7)**.

02

DBS Project Description

DBS Project Description

The Projects' Array Areas are located in the Dogger Bank region of the southern North Sea. The closest point to the coast from the Array Areas is 100km from DBS West and 122km from DBS East. The location of the Projects' Offshore Development Area is shown on **Figure 2-1** and the Onshore Development Area is shown on **Figure 2-2**. When operational, DBS East and DBS West combined would have the potential to generate renewable power for up to three million UK homes[1]. A maximum of 200 wind turbines would be installed across both Projects. This is considered the worst case scenario for the majority of the assessments.

The Offshore Development Area includes the DBS East and DBS West Array Areas where the wind turbines, array cables and offshore platforms would be located, the Inter-Platform Cable Corridor between the two Array Areas, and the Offshore Export Cable Corridor that connect the Array Areas to the Landfall.

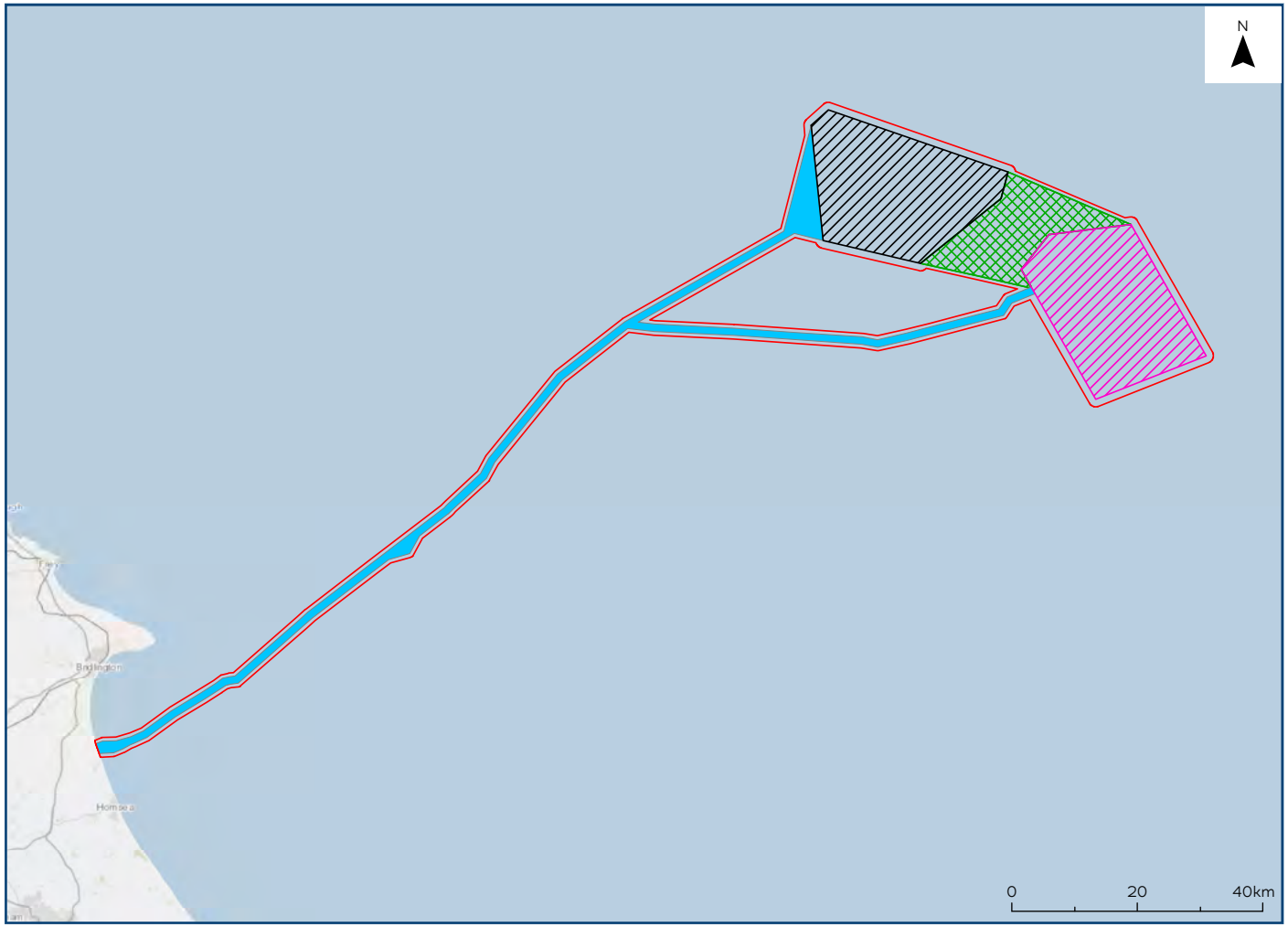
The Onshore Development Area includes the boundary within which all onshore infrastructure required for the Projects would be located including Landfall Zone, Onshore Export Cable Corridor, accesses, Temporary Construction Compounds and Onshore Converter Stations.

The earliest that construction could commence is 2026, with the onshore construction works likely to commence first. Further details of the key offshore and onshore components can be found in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**.

1 Calculation based on 2021 generation, and assuming average (mean) annual household consumption of 3,509 kWh, based on latest statistics from Department of Energy Security and Net Zero (Subnational Electricity and Gas Consumption Statistics Regional and Local Authority, Great Britain, 2021, Mean domestic electricity consumption (kWh per meter) by country/region, Great Britain, 2021.

All measurements are provided to the nearest integer.

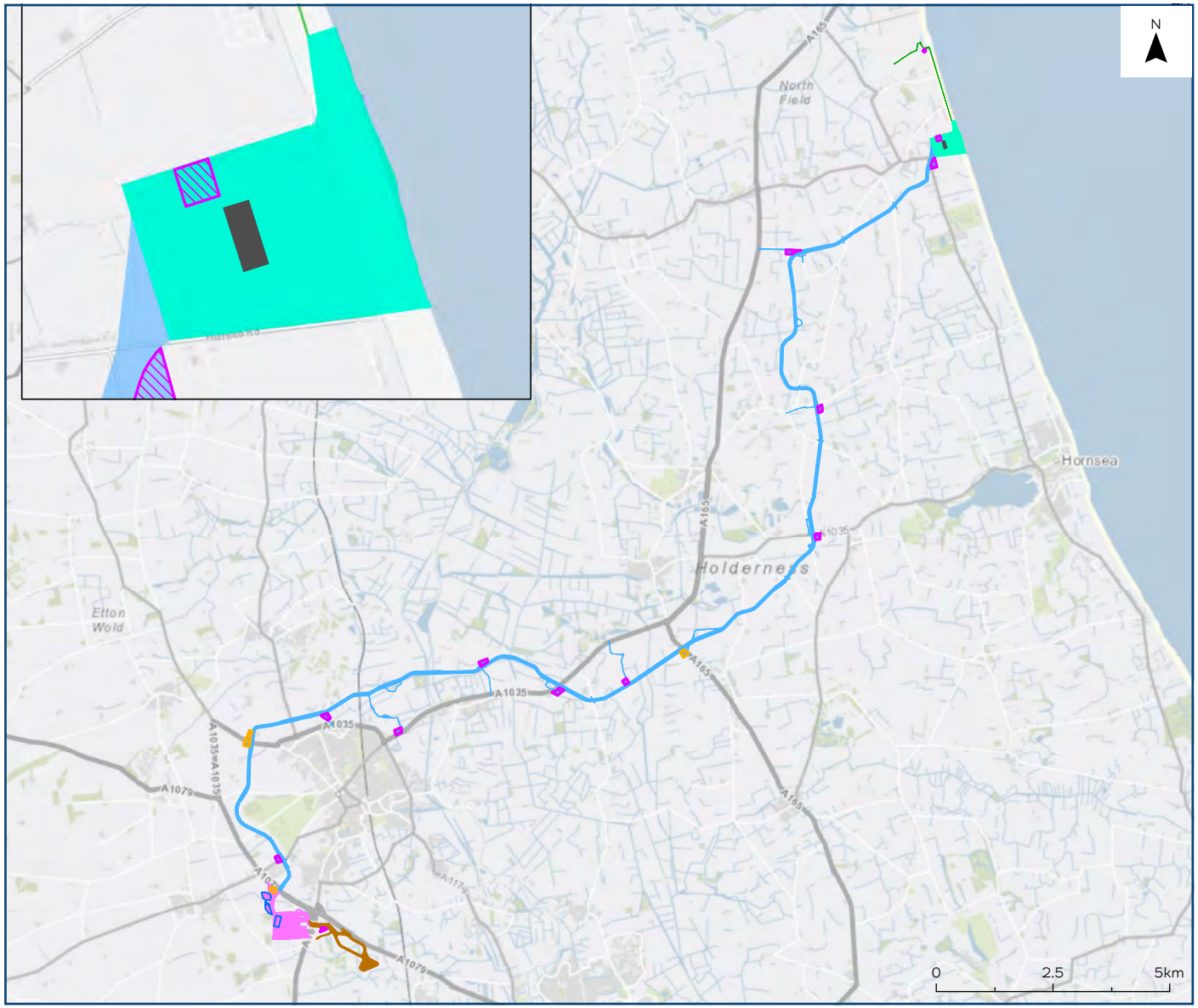
Figure 2-1
Offshore Development Area



Key

- Offshore Development Area
- Offshore Export Cable Corridor
- DBS East Array Area
- DBS West Array Area
- Inter-Platform Cable Corridor

Figure 2-2
Onshore Development Area showing key components of the Projects



Key

- Landfall Zone
- Onshore Export Cable Corridor
- Emergency Beach Access
- Substation Zone
- Onward Cable Connection to the proposed Birkhill Wood National Grid Substation
- Transition Joint Bay (TJB) Temporary Construction Compound
- Temporary Construction Compound

Key Components of the Offshore Wind Farms

The Projects would comprise the following main offshore infrastructure components (Plate 2-1):

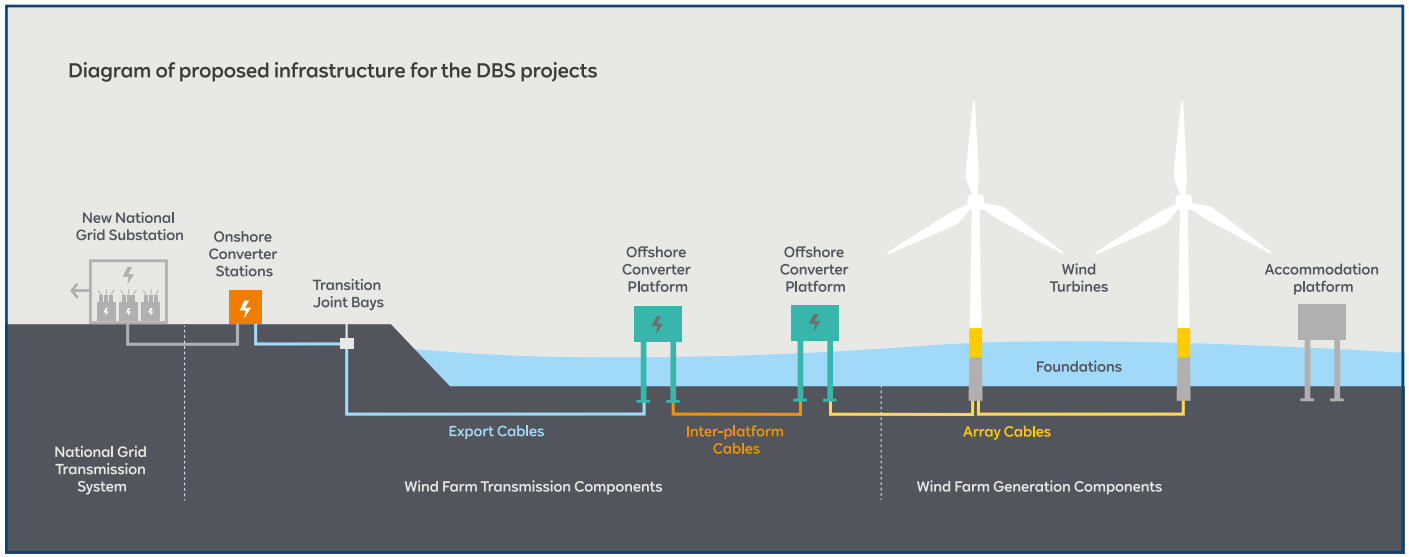
- Wind turbines;
- Offshore platforms (up to 3 platforms, including Offshore Converter Platforms and an accommodation platform);
- Foundation structures for wind turbines and offshore platforms;
- Scour protection (where required) which would protect the sediment around sub-surface structures from being eroded away due to water flows;
- Subtidal exit pits (located 350m below MLWS);
- Subsea cables including:
    - Array cables which link the wind turbines to each other and the offshore platforms;
    - Inter-Platform Cables which link the offshore platforms; and
    - Export cables from the offshore platforms to the Landfall.
- Cable Protection (as required).

The main onshore infrastructure components (Plate 2-1) of the Projects would include:

- Landfall and associated Transition Joint Bays which are used to connect the onshore and offshore cables at the Landfall;
- Onshore Export Cables installed underground from the Transition Joint Bays to the Onshore Converter Stations and associated Jointing Bays and Link Boxes;
- Up to two Onshore Converter Stations;
- Onward 400 kilovolt (kV) Cable Connection from the Onshore Converter Stations to the proposed Birkhill Wood National Grid Substation;
- Trenchless crossing locations (e.g. Horizontal Directional Drilling);
- Construction and operational accesses; and
- Temporary Construction Compounds.

Further details of the offshore and onshore works can be found below and in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**.

Plate 2-1
Proposed infrastructure for the DBS Projects



Project Development Scenarios

As the Projects are each Nationally Significant Infrastructure Projects in their own right, a single application for development consent has been made to cover both wind farms, and the associated electrical transmission infrastructure (i.e. export cables and converter stations). A single planning process and Development Consent Order application is intended to provide for consistency in the approach to the assessment, consultation and examination.

While a single Development Consent Order application is made for both Projects, separate Deemed Marine Licences are requested to cover the Array Areas and associated transmission infrastructure for each of the Projects. This approach allows each Project to retain rights to their own particular assets should ownership of each Project change over time.

Whilst the Projects are the subject of a single DCO application (with a combined Environmental Impact Assessment process and associated submissions), each Project is assessed individually, so that mitigation is Project-specific (where appropriate). DBS West and DBS East may be constructed at the same time, or at different times.

As such, the construction assessment of impacts has addressed the following three Development Scenarios (relating to both onshore and offshore works):

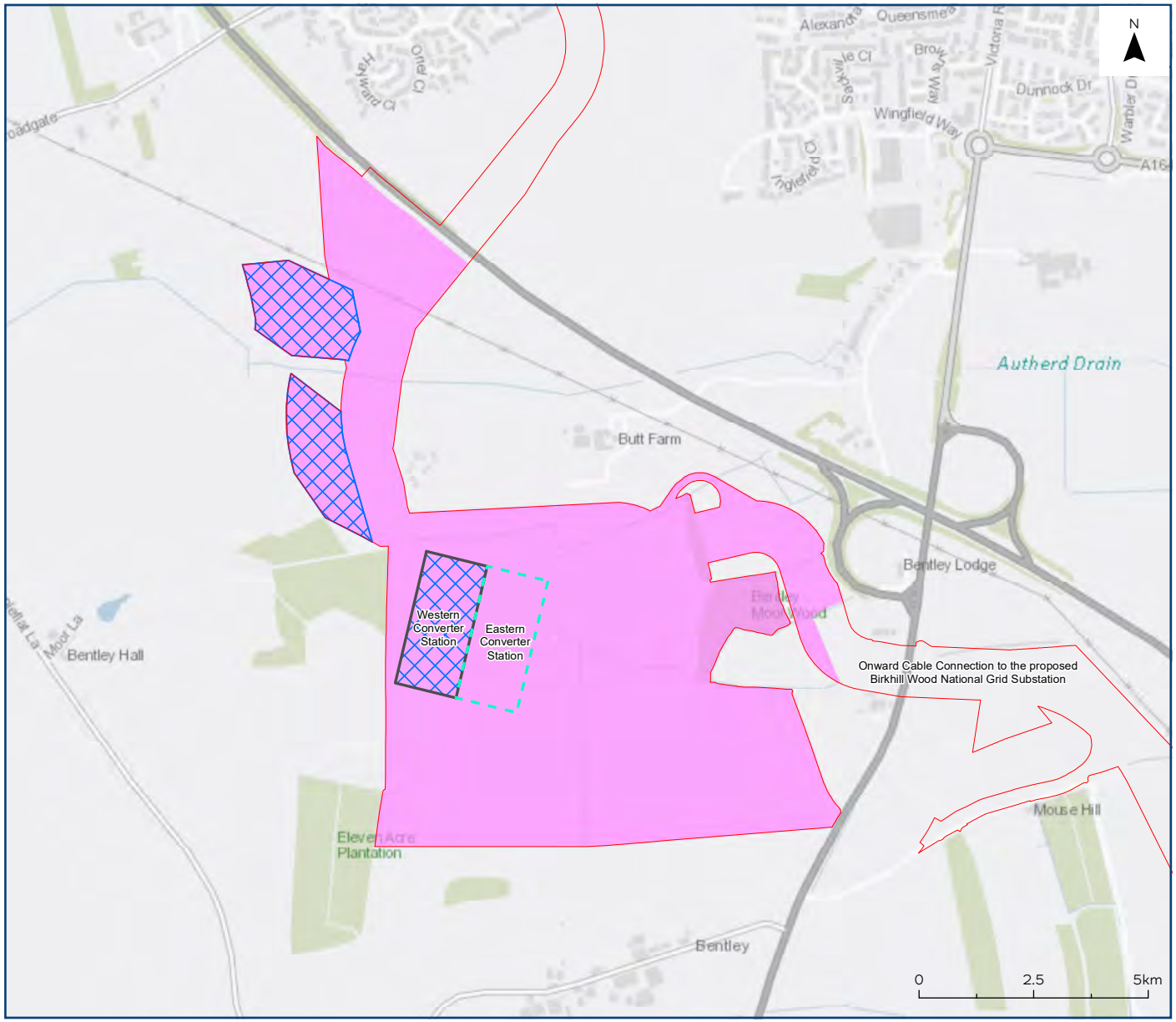
- DBS East or DBS West is developed In Isolation (the In Isolation Scenario). This would take up to five years of construction;
- Both DBS East and DBS West are developed at the same time (the Concurrent Scenario). This would also take up to five years of construction; and
- Both DBS East and DBS West are developed Sequentially (the Sequential Scenario). Either Project could be built first, and the first Project would be completed within five years, with construction of the second Project being completed within seven years.

The construction scenarios set out above all allow for flexibility to build out the Projects using a phased approach i.e. either Project could be partially completed and brought into operation before the remainder of that Project is built. This would allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the Onshore Grid Connection Points. These scenarios have been assessed within the Environmental Statement.

In order to ensure that a robust assessment has been undertaken, all three Development Scenarios have been considered to ensure the realistic worst case scenario for each topic has been assessed.

Both the DBS West and DBS East Projects would use High Voltage Direct Current to transmit electricity generated offshore to the Landfall and onward to the Onshore Converter Stations. The onward transmission from the Onshore Converter Stations to the proposed Birkhill Wood National Grid Substation would use High Voltage Alternating Current. Four export cables would be required for two High Voltage Direct Current projects, with two High Voltage Direct Current Onshore Converter Stations required within the Onshore Substation Zone. This Onshore Substation Zone is illustrated on Figure 2-3.

Figure 2-3
Onshore Substation Zone



Key

- **Onshore Development Area**
- **Onshore Substation Zone Temporary Construction Compounds**
- **Onshore Substation Zone**
- **Western Converter Station Footprint**
- **Eastern Converter Station Footprint**

Project Programme

The earliest any construction works would start is assumed to be 2026. If built sequentially, construction of the first Project would be completed within five years, with construction of the second Project being completed within seven years. Therefore, the maximum construction period over which the construction of both Projects could take place is seven years. If built In Isolation or concurrently, the maximum construction period over which the construction of both Projects could take place is five years.

The construction programme is dependent on a number of factors including consent timescales and funding mechanisms. As such, details of the construction programme are indicative at this stage in order to provide a reasonable and realistic basis for undertaking the environmental assessments. The final construction programme would not be confirmed until detailed design.

The onshore works construction programme is dependent on the Project Development Scenario. The main difference being that for a Concurrent and In Isolation Development Scenario, the maximum construction duration onshore would be four years.

For a Sequential Development Scenario, when either Project could be built first, construction works (i.e. onshore cable civil works, including duct installation) would be completed for both Projects simultaneously in the first four years, with additional works at the Landfall Zone, Onshore Substation Zone and cable joint bays in the following two years. This results in a maximum construction duration onshore of six years.

To minimise environmental impacts where possible during construction of a Sequential Development Scenario, reinstatement is proposed after completing the works for the Projects simultaneously where no further works are required to complete the second Project.

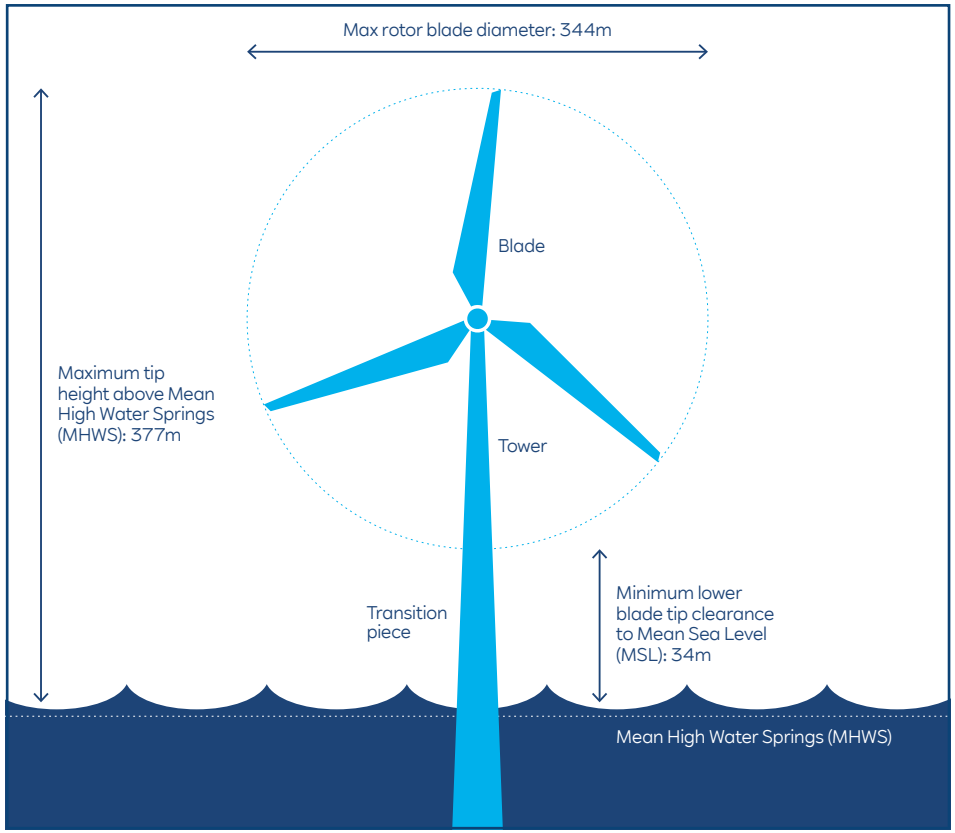
The offshore works construction programme is also dependent on the Project Development Scenario. The main difference being that for a Concurrent and In Isolation Development Scenarios the maximum construction duration offshore would be five years. For a Sequential Development Scenario, when either Project could be built first, there would be a five year period of construction for each project with a lag of up to two years in the start of construction of the second project (excluding Landfall duct installation). This would result in a maximum construction duration offshore of seven years.

The earliest any construction works would start is assumed to be 2026.

Plate 2-2
Indicative offshore wind turbine

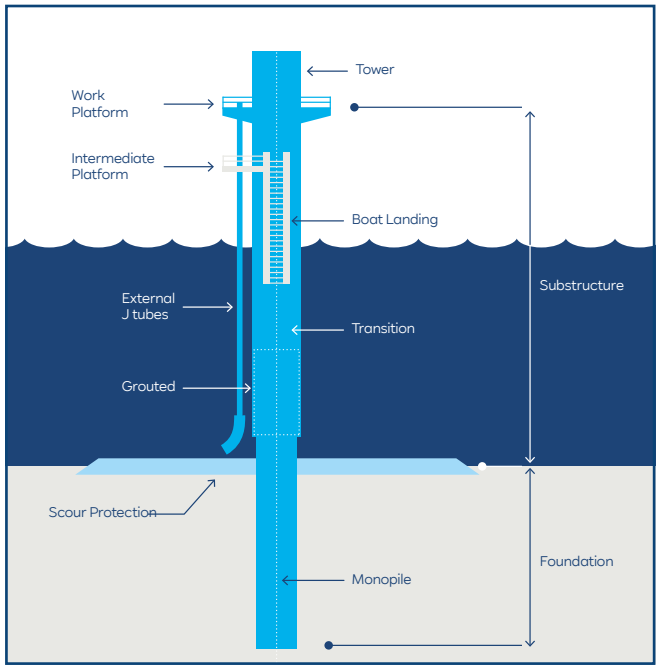
Offshore Works

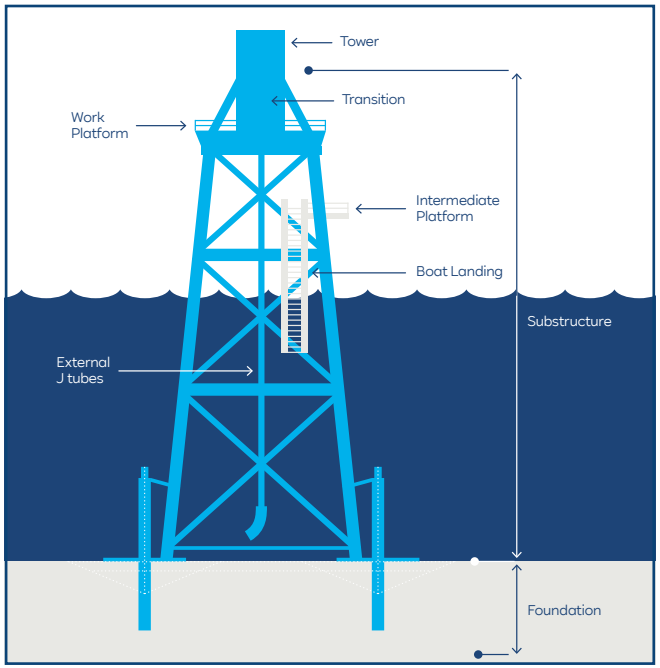
Up to 100 wind turbines would be installed at DBS East and up to 100 wind turbines at DBS West (**Plate 2-2**). A range of different turbine sizes and associated foundations (**Plate 2-3**) are under consideration, but the height of the turbine blade ('the maximum tip height') would be 377m[1] above sea level (i.e. Mean High Water Springs). If larger capacity wind turbines are used, fewer wind turbines would be required in total. Temporary Construction Buffer Zones of 1km would be applied around the Array Areas and 500m on both sides of the Offshore Export Cable Corridor and around the Inter-Platform Cable Corridor.



1 All measurements are provided to the nearest integer.

Plate 2-3
Examples of wind turbine foundations (left: monopile, right: pin pile jacket)





The wind turbines would be connected by Array cables which would transfer the High Voltage Alternating Current power produced to the Collector Platforms. This power would then be sent to an Offshore Converter Platform, via Inter-Platform Cables, where the power would be converted to High Voltage Direct Current. Depending on the Development Scenario, a maximum of three offshore platforms (**Plate 2-4**) combined between the Projects could be required. The Offshore Export Cable Corridor would connect the Offshore Converter Platform(s) with the Landfall near Skipsea. These would consist of up to four electrical cables and two fibre optic communications cables from two branches serving the individual Projects, which converge into an integrated corridor for transmission to the Landfall. Two electrical cables and one fibre optic cable would be located within each branch. The fibre optic cables would be bundled with the electrical cables up to the nearshore (i.e. in four cable trenches), at which point they may split into six separate trenches at the Landfall. As such up to six exit pits for the trenchless installation ducts may be required for the Projects at Landfall.

Plate 2-4
Example offshore electrical platform, Triton Knoll Offshore Wind Farm, 2022

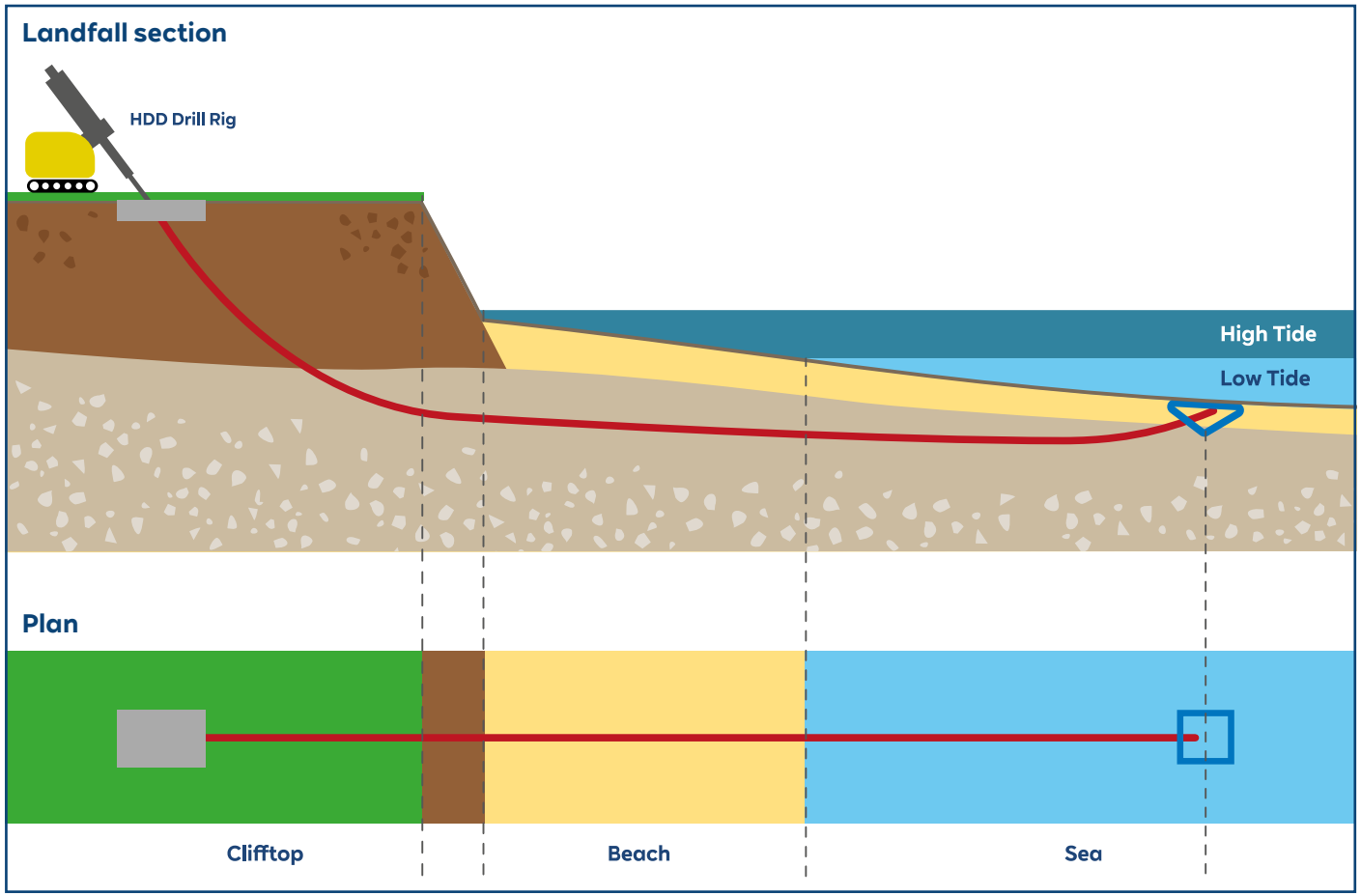
Landfall and Onshore Works

Figure 2-2 shows the Onshore Development Area, which includes the Landfall location, Temporary Construction Compounds, the Onshore Export Cable Corridor, the Onshore Substation Zone and the Onward Cable Connection to the proposed Birkhill Wood National Grid Substation.

The Offshore Export Cables make Landfall at Skipsea, following an assessment of alternative sites described in **Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)**. The Offshore Export Cables will be connected to the Onshore Export Cables in the Transition Joint Bays, which will be located onshore. The cables will be installed under the cliffs using a trenchless technique such as Horizonal Direction Drill (see **Plate 2-5**). There would be up to six completed ducts.

This installation method avoids the need for excavating trenches to bury the cables under the cliffs and uses a drilling rig to install the cables beneath these features instead. The cables will exit within the marine environment, beyond any areas at risk of coastal erosion. The installation method for this will be agreed following further detailed studies which will be undertaken post-consent.

Plate 2-5
Illustrative section and plan of Intertidal and Landfall works



Key

- Transition Joint Bay
- Long HDD
- Exit Pit

During the Landfall works temporary onshore compounds will be required to accommodate the drilling rigs, ducting and welfare facilities.

Two Onshore Converter Stations will be co-located within an Onshore Substation Zone located near the hamlet of Bentley (**Plate 2-6**). The Converter Stations will allow the conversion of electricity from High Voltage Direct Current to High Voltage Alternating Current, before onward High Voltage Alternating Current connection to the proposed Birkhill Wood National Grid Substation. The permanent footprint of one Onshore Converter Station would be up to 32,208m^2. The permanent footprint of two Onshore Converter Stations would be up to 64,416m^2. The tallest features associated with the Onshore Substation Zone will be a maximum of 24m above ground level for the buildings and 27m above ground level for the lightning mast.

Plate 2-6
Example of the Onshore Converter Stations' built form after construction on the left, and 10 years after the planting is established on the right. View from Coppleflat Lane, Bentley

The Onshore Export Cables will be installed between the Landfall and the Projects' Onshore Converter Stations. The main cable installation method will be open cut trenching. This method requires trenches to be excavated, cable ducts placed into the trenches, and soil backfilled to bury the ducts (**Plate 2-7**). Cables are pulled through the buried ducts at joint locations. Jointing Bays would be constructed at intervals along the Onshore Export Cable Corridor at the jointing locations to allow pulling and / or joining of the cables. Typically, the Jointing Bays would be located every 750m to 1.5km along the Onshore Export Cable Corridor.

Plate 2-7
Installation of ducting for the Onshore Export Cable route, Triton Knoll Offshore Wind Farm, 2022

However, there are also a number of locations where other trenchless techniques e.g. Horizonal Directional Drilling will be undertaken when crossing beneath some roads, rivers or other infrastructure (**Plate 2-8**).

Plate 2-8
Illustrative section of Horizontal Directional Drilling technique for laying Onshore Export Cables beneath an obstacle crossing (a water course)

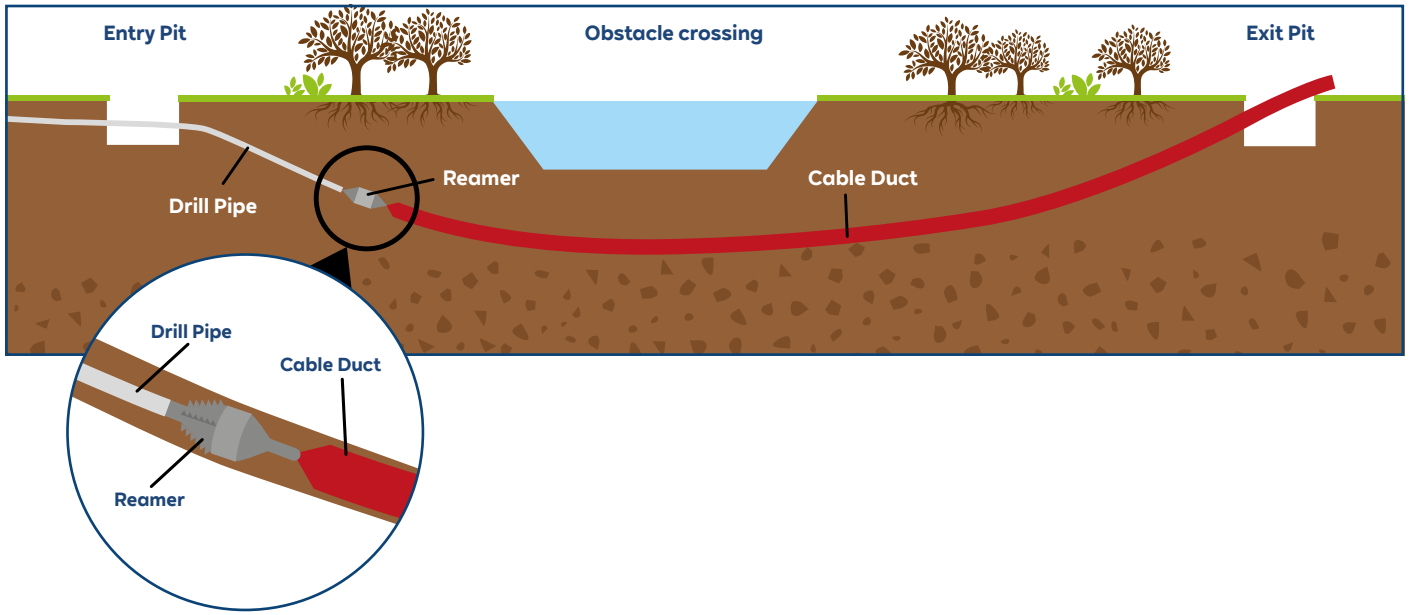
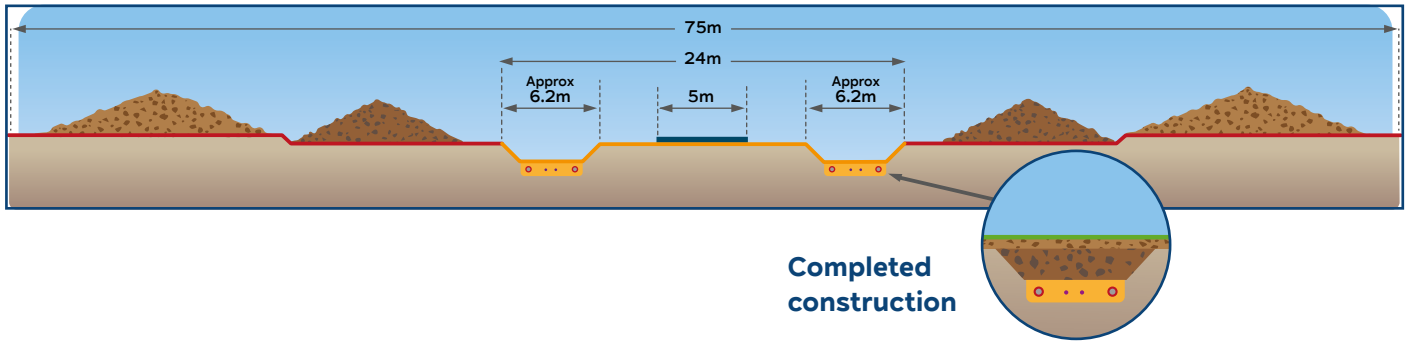


Plate 2-9
Illustrative section of Onshore Export Cable Corridor to the Onshore Converter Stations, including power cores and ducts, construction Haul Road and proposed topsoil laydown areas either side

Key
- **Topsoil**
- **Subsoil**
- **Haul Road**
- **2x HVDC power cores**
- **Fibre Optic Duct**
- **Permanent Easement**

The Onshore Export Cable Corridor will be approximately 32km long and 75m wide (**Plate 2-9**) between the Landfall Zone and the Onshore Substation Zone. At crossings, the Onshore Export Cable Corridor will be up to 90m wide. The Onshore Export Cable Corridor will have a burial depth of approximately 1.6m. Link boxes will be built to join the Onshore Export Cables together. The link box is installed with a ground level manhole to allow access for maintenance.



A 400 kV Onward Cable Connection approximately 2.5km long and 100m wide (**Plate 2-10**) will be constructed between the two Onshore Converter Stations and the proposed new Birkhill Wood National Grid Substation close to the existing Creyke Beck substation, to the south of Beverley. Birkhill Wood National Grid Substation itself will be delivered through a separate planning application by National Grid.

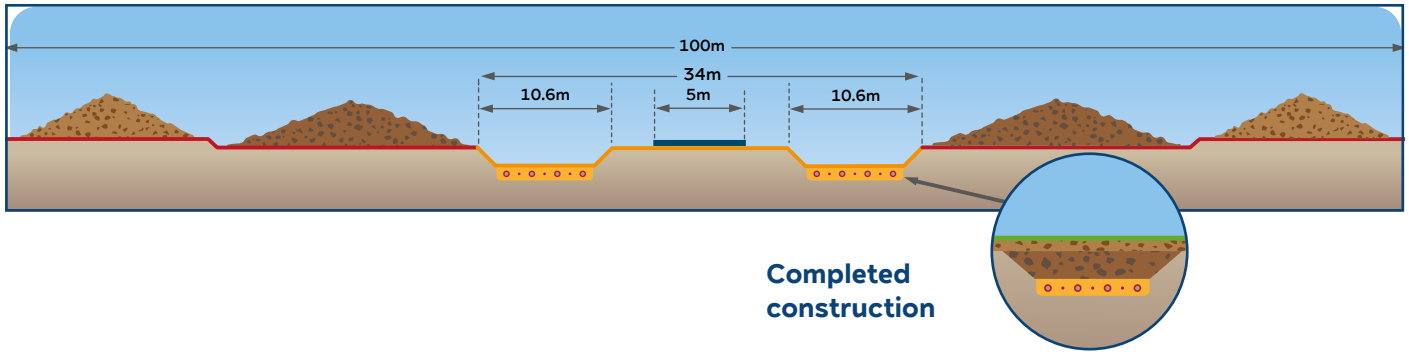


Plate 2-10
Illustrative section of Onward Cable Connection to the proposed Birkhill Wood National Grid Substation, including power cores and ducts, construction Haul Road and proposed topsoil and subsoil laydown areas.

Key

- **Topsoil**
- **Subsoil**
- **Haul Road**
- **2x HVDC power cores**
- **Fibre Optic Duct**
- **Permanent Easement**

Following completion of the onshore construction works the land will be reinstated and can return to its previous uses, with the exception of the Onshore Converter Stations, Link Boxes and Transition Joint Bays which will remain in place throughout the operational life of the Projects. The operational construction lifetime is expected to be 30 years for a Concurrent and In Isolation Scenario, and 32 years for a Sequential Scenario to accommodate the lag in completion of the construction for the two Projects. The Haul Road may either be removed and the land reinstated following completion of works for the first Project or retained to allow access to Jointing Bays for the second Project. This would depend on the final Jointing Bay locations. This retention may only be for parts of the cable corridor but the extents are unable to be defined at this stage. Land between Jointing Bays would be reinstated within 2 years.

Landscaping is proposed for the Projects and will be planted early on in the construction phase (**Figure 2-4**). An outline landscape plan has been developed around the Onshore Substation Zone which will provide a mixture of trees, shrubs and grassland that is designed to be sympathetic with the surrounding landscape.

Figure 2-4
Indicative landscape plan around the Onshore Converter Stations

Key

- Onshore Substation Zone
- Existing utilities
- Area of underground cables
- Proposed meadow grassland
- Proposed woodland meadow
- Existing woodland to be retained
- Proposed native woodland
- Existing hedgerow to be retained
- Proposed native hedgerow
- Proposed native hedgerow with trees
- Proposed scrub
- Area for SUDs (indicative)
- Area to be returned to agriculture
- Access
- Area of earthworks to be re-seeded with grassland
- Public Right of Way
- Public Right of Way diversion

03

Summary of Environmental Impact Assessments

Summary of Environmental Impact Assessments

The Environmental Statement covers a wide range of offshore and onshore environmental topics for which potential impacts have been assessed. Many of these assessments are related to each other and these links are highlighted within the Environmental Statement chapters, figures and appendices contained within **Volume 7, Chapters 1-30 (application ref: 7.1 to 7.30)** of the Development Consent Order application and listed in the **Document Map**.

The Environmental Statement for the Projects presents assessments for all of the topics and potential impacts that were specified within the Planning Inspectorate's Scoping Opinion (Planning Inspectorate, 2022). Each of these assessments is summarised in the sections that follow.

Embedded and standard mitigation measures relevant to the assessment have been incorporated into the design of the Projects and are detailed within each chapter. These form commitments which are presented within **Volume 8, Commitments Register (application ref: 8.6)**.

Each assessment considers the potential for impacts during the construction, operation and maintenance, and decommissioning phases of the Projects, with each assessment concluding a significance of effect. The determination of significance is guided by the use of a significance of effect matrix, as shown in **Table 1-2**. Further information on the methodology used in the Environmental Statement is provided in **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)**.

Where significant effects are predicted, additional mitigation measures are proposed to reduce impacts to acceptable levels where possible. These additional mitigation measures (i.e. commitments) are also presented within **Volume 8, Commitments Register (application ref: 8.6)**.

Offshore

Marine Physical Environment

This chapter provides a characterisation of the existing marine physical environment (which includes marine sediment and water quality) based on both existing and site-specific survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. For this topic, embedded mitigation includes the use of scour protection to minimise the amount of scour and sediment released, and cables being buried where possible to minimise the requirement for external cable protection measures and thus effects on sediment transport.

In addition, **Volume 8, Outline Project Environmental Management Plan (application ref: 8.21)** is included with this application and sets out all procedures and measures to be followed for pollution prevention.

The receptors that have been identified in relation to designated sites and features related to the marine physical environment are:

- Dimlington Cliff Site of Special Scientific Interest;
- Flamborough Head Site of Special Scientific Interest;
- Withow Gap Site of Special Scientific Interest;
- Holderness Inshore Marine Conservation Zone;
- Holderness Offshore Marine Conservation Zone; and
- Marine waters (inshore and offshore).

Additional receptors that are not related to designated sites and features are:

- Holderness Cliffs;
- Smithic Bank;
- Flamborough Front;
- Humber Estuary; and
- Dogger Bank.

The following effects are considered:

- Changes in suspended sediment concentrations;
- Reduction in water quality associated with the release of sediment-bound contamination;
- Changes in seabed level during construction;
- Indentations on the seabed due to installation, maintenance and repair vehicles;
- Changes to the tidal, wave and water circulation movements due to the presence of infrastructure;
- Changes to sediment transport and seabed morphology;
- Cable repairs and reburial; and
- Loss of seabed area due to the footprint of foundations.

Overall, considering the mitigation proposed as part of the assessment, **no significant effects** are identified upon Marine Physical Environment receptors.

Further information can be found in **Volume 7, Chapter 8 Marine Physical Environment (application ref: 7.8)**.

No significant effects are identified after implementation of mitigation on Marine Physical Environment receptors.

Benthic and Intertidal Ecology

This chapter provides an overview of the existing benthic (i.e. seabed) and intertidal environment for the proposed Offshore Development Area. The assessment is based on both existing and site-specific survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

Ecological surveys of the seabed and intertidal zone were undertaken across the Offshore Development Area to provide a detailed understanding of the benthic ecology of the seabed within the area. In addition, data available from neighbouring offshore wind farms in the wider Dogger Bank area were used. The data considered were used to identify the seabed composition and habitats present within the Offshore Development Area.

The seabed across the Offshore Development Area primarily comprises sand and muddy sand with varying amounts of gravel / shell fragments. A total of six benthic (seabed) ecological communities and habitats (receptors) were identified across the Offshore Development Area, all of which are typical of those found in sediments of the southern North Sea.

In addition, an intertidal survey at the Landfall described the local habitat as freely draining sandy beaches, which are barren due to their continual mobility.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic, is detailed within the chapter and taken into account during the assessment. Embedded mitigation for this topic includes minimising the amount of scour and external cable protection for any stretches of unburied cables and cable crossings, and foundations.

Ecological surveys were undertaken to provide a detailed understanding of benthic ecology.

No significant effects are identified on Benthic and Intertidal Ecology receptors after implementation of mitigation.

Potential impacts during construction and operation phases include:

- Temporary physical disturbance;
- Increases in suspended sediments concentrations including sediment deposition and smothering;
- Remobilisation of contaminated sediments;
- Underwater noise and vibration;
- Permanent habitat loss;
- Interactions of electromagnetic fields; and
- The potential colonisation of introduced substrate, including invasive non-native species.

Effects are generally temporary and localised in nature, being restricted to the Projects' boundaries and immediate surrounding area. Overall, considering the mitigation proposed as part of the assessment, **no significant effects** are identified upon Benthic and Intertidal Ecology receptors.

Further information can be found in **Volume 7, Chapter 9 Benthic and Intertidal Ecology (application ref: 7.9)**.

Fish and Shellfish Ecology

This chapter provides an overview of the existing fish and shellfish environment for the proposed Offshore Development Area based on both existing and site-specific survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The Fish and Shellfish Ecology Study Area is defined by the International Council for the Exploration of the Sea (ICES) rectangles that overlap with the Projects' Offshore Development Area. Information from these ICES rectangles has been supplemented by site-specific surveys (that were primarily undertaken for the benthic ecology baseline assessment), existing data from similar projects, and peer-reviewed literature. This allows consideration of effects that may occur directly within the Offshore Development Area as well as those that have the potential to occur within the wider region, such as on spawning or nursery grounds, or migratory pathways.

Spawning or nursery areas were identified for **spurdog, tope shark, Atlantic cod, anglerfish, whiting, blue whiting, plaice, sandeel species, European hake, ling, Dover sole, mackerel,** and **herring**.

Atlantic Cod - Gadus morhua

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. Embedded mitigation includes a seasonal restriction of various cable installation works within the Offshore Export Cable Corridor to mitigate impacts to Atlantic herring.

Potential impacts on fish and shellfish species are identified for activities during construction, operation, and decommissioning phases.

These include:

- Temporary and permanent losses of spawning and / or nursery grounds;
- Increases in local suspended sediment concentrations and sediment settlement;
- The release of sediment-stored contaminants;
- Effects of reduced fishing pressure;
- Electromagnetic effects from cables; and
- Impacts from underwater noise and vibration during clearance of unexploded ordnance and through construction or maintenance activities such as piling.

Overall, considering the mitigation proposed as part of the assessment, **no significant effects** are identified upon fish and shellfish. Effects are generally localised in nature, being restricted to the Fish and Shellfish Ecology Study Area, and in many cases to just the area immediately surrounding Projects' infrastructure.

Further information can be found in **Volume 7, Chapter 10 Fish and Shellfish Ecology (application ref: 7.10)**.

No significant effects are identified on Fish and Shellfish after implementation of mitigation.

Marine Mammals

This chapter provides a characterisation of the existing environment for marine mammals based on both existing and site-specific survey data. The assessment of potential impacts and residual effects following the implementation of mitigation measures has established that there will be some potential impacts to marine mammal receptors.

Site characterisation using site-specific aerial surveys, existing data from other offshore wind farms and other available information for the region identified the presence of the following key marine mammal species:

- Harbour porpoise;
- Bottlenose dolphin;
- Common dolphin;
- White-beaked dolphin;
- Minke whale;
- Grey seal; and
- Harbour seal.

The impacts assessed include:

- The potential for underwater noise from the clearance of unexploded ordnance;
- Disturbance from piling (including use of acoustic deterrent devices);
- Other construction, operation, maintenance and decommissioning works and vessels resulting in damage to hearing;
- Disturbance and behavioural impacts;
- Barrier effects (i.e. preventing movement of animals);
- Changes to foraging due to noise disturbances;
- Increased collision risk with vessels;
- Changes to prey resources;
- Changes to water quality; and
- Disturbances at seal haul-out sites.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account in the assessment. In addition, a Project Environmental Management Plan would be produced to set out best practice measures to minimise the risk of any accidental spills / leaks and collision with vessels.

Following the inclusion of additional mitigation to reduce underwater noise effects of piling activities and other measures to reduce disturbance of harbour porpoise, there are **no significant effects** identified upon marine mammal receptors.

No significant Cumulative Effects (with other schemes) are identified in relation to marine mammals.

Further information can be found in **Volume 7, Chapter 11 Marine Mammals (application ref: 7.11)**.

Common Dolphins – Delphinus capensis

No significant effects on Marine Mammals are identified after implementation of mitigation.

Offshore Ornithology

This chapter provides an overview of the existing Offshore Ornithology for the Offshore Development Area based on both existing and site-specific survey data. It also provides an assessment of potential impacts and residual effects following the implementation of mitigation measures.

Site characterisation of the existing environment for offshore ornithology is based on both existing data and site-specific aerial survey data which identified the following species as key receptors for assessment of significant effects:

- Fulmar;
- Gannet;
- Guillemot;
- Razorbill;
- Puffin;
- Kittiwake;
- Lesser black-backed gull;
- Herring gull;
- Great black-backed gull;
- Little gull;
- Common gull;
- Arctic skua;
- Great skua;
- Red-throated diver; and
- Great northern diver.

Potential impacts assessed are:

- Direct disturbance and displacement from increased vessel activity and presence of offshore infrastructure;
- Indirect impacts through effects on habitats and prey species;
- Collision risk with wind turbines; and
- Combined operational collision risk and displacement.

No significant effects are identified after mitigation on Offshore Ornithological receptors from the Projects independently of other schemes.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. For example, the wind turbine design includes a minimum height of 34m from mean sea level to the lowest point of the blade tip in order to reduce collision risk of seabirds flying close to the sea.

The assessment concluded that all effects as a result of the Projects alone are assessed as **not significant** in Environmental Impact Assessment terms.

Significant cumulative effects in combination with other schemes are identified for guillemot due to displacement during operation. Significant cumulative effects in combination with other schemes are also identified for kittiwake and great black-backed gull due to operational collision risk. No additional mitigation is proposed for moderate adverse effects, as the contribution of the Projects to the cumulative totals are minimal.

Details of proposed compensation where there are potential significant effects on species in relation to Special Protection Areas are provided within **Volume 6, Appendix 1 Project Level Kittiwake Compensation Plan (application ref: 6.2.1)** and **Volume 6, Appendix 2 Guillemot [and Razorbill] Compensation Plan (application ref: 6.2.2)** submitted with the Report to Inform Appropriate Assessment alongside the Environmental Statement.

Further information can be found in **Volume 7, Chapter 12 Offshore Ornithology (application ref: 7.12)**.

Commercial Fisheries

This chapter provides a characterisation of the existing environment for commercial fisheries based on existing and site-specific survey data, in addition to feedback from fisheries stakeholders, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The commercial fisheries assessment assesses impacts of the Projects on existing commercial fishing operations by dividing fishing operations by their fishing methodology (e.g. dredging, trawling, use of static gear etc.).

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account in the assessment. This mitigation is generally committed to via measures within the **Volume 8, Outline Fisheries Liaison and Co-existence Plan (application ref: 8.28)** submitted as part of the Development Consent Order submission. This includes measures such as ongoing liaison with the fishing industry through the Fisheries Liaison Officer during the lifetime of the Projects.

Potential impacts to commercial fisheries interests include:

- The loss or restricted access to fishing grounds;
- Displacement leading to gear conflict and increased pressure on adjacent fishing grounds;
- Temporary increased steaming times;
- Loss or damage to fishing gear due to snagging;
- Supply chain opportunities for local fishing vessels;
- Potential impacts on commercially important fish and shellfish resources; and
- Navigational safety.

Overall, after the incorporation of mitigation measures outlined within the **Volume 8, Outline Fisheries Liaison and Co-existence Plan (application ref: 8.28)**, there are **no significant residual effects** identified on Commercial fisheries from the Projects independently.

There is potential for cumulative effects in-combination with other schemes on some receptor groups during construction and decommissioning works. The Projects have committed to exploring options to encourage co-existence between sensitive commercial fishing receptors and construction vessels and / or activities as part of the **Volume 8, Outline Fisheries Liaison and Co-existence Plan (application ref: 8.28)**. With the consideration of additional mitigation measures, the majority of cumulative effects are considered to be not significant in EIA terms. Some significant cumulative effects, however, remain in the conclusions of the assessment.

Further information can be found in **Volume 7, Chapter 13 Commercial Fisheries (application ref: 7.13)**.

No significant effects are identified after mitigation on Commercial Fisheries groups by the Projects independently of other schemes.

Fishing trawler nets

Shipping and Navigation

This chapter provides a characterisation of the existing environment for shipping and navigation based on both existing and site-specific survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The assessment considers effects with respect to impacts predicted due to the physical presence of the Projects and associated vessel movements during the construction, operation, and decommissioning phases.

Key receptor groups identified within the shipping and navigation assessment include:

- All vessels; and
- Emergency responders.

The potential impacts to shipping and navigation include:

- Vessel displacement and increased vessel to vessel collision risk between third-party vessels;
- Increased vessel to vessel collision risk between a third-party vessel and a Projects vessel;
- Creation of vessel to structure Allision risk (i.e. vessels colliding with a wind farm structure);
- Reduction of under-keel clearance due to cable protection;
- Anchor interaction with sub-sea cables; and reduction of emergency response capability.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. This included the production of an Aids to Navigation Management Plan which would be agreed with the relevant authorities, post-consent.

Overall, after the consideration of mitigation, the assessment concluded that there are **no significant effects** upon Shipping and Navigation Receptors.

No significant Cumulative Effects (with other schemes) are identified in relation to shipping and navigation. Further information can be found in **Volume 7, Chapter 14 Shipping and Navigation (application ref: 7.14)**.

No significant effects are identified after implementation of mitigation upon Shipping and Navigation receptors.

Aviation and Radar

This chapter provides a characterisation of the existing environment for aviation and radar. It is based on existing publicly available data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The desk-based assessment considers effects with respect to impacts on radar and UK airspace predicted due to the physical presence of the Projects and associated air traffic during the construction, operation, and decommissioning phases. The terminology used to describe the significance of effects is different for aviation and radar assessments compared to other topics. Effects determined to be No Change or Not Significant have little to no effect on the aviation receptor. Effects determined to be Moderate Significant allow the receptor to continue safe operations with some restrictions in place. Those effects that are determined to be Major Significant do not allow receptors to continue safe operations, safe provision of air navigation services (radar) or effective air defence surveillance, and as such technical or operational mitigation of the impact is required.

Key receptor groups identified within the aviation and radar assessment include:

- Staxton Wold Primary Surveillance Radar;
- Military low flying aircraft;
- Helicopter traffic transiting to and from offshore oil and gas helidecks;
- Helicopters utilising Helicopter Main Route Indicator 8; and
- Other offshore fixed-wing and helicopter operations, including Search and Rescue.

Potential impacts include:

Impacts on the Staxton Wold Primary Surveillance Radar due to vessels / cranes and partially complete structures (during construction and decommissioning);

Permanent interference from wind turbines on the Primary Surveillance Radar (during operation);

- The creation and removal of an aviation obstacle environment; and
- Increased air traffic in the area related to wind farm construction activities, support activities and decommissioning.

Potentially affected aviation stakeholders include:

- Military radar facilities;
- Offshore fixed-wing and helicopter flights;, search and rescue operations;
- Search and rescue operations; and
- Helicopter support for the oil and gas industry.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account in the assessment, such as an Emergency Response and Cooperation Plan which would be developed in compliance with guidance and implemented for all phases of the Projects.

Overall, after the inclusion of additional mitigation such as consultation with aviation stakeholders and technical mitigation solutions for radar interference, it is expected that there would be **no significant effects** in relation to Aviation and Radar receptors.

Further information can be found in **Volume 7, Chapter 15 Aviation and Radar (application ref: 7.15)**.

Radar and navigation equipment

No significant effects are identified after implementation of mitigation upon Shipping and Navigation receptors.

Infrastructure and Other Users

This chapter provides a characterisation of the existing environment for infrastructure and other users based on existing public data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The characterisation of the existing environment indicates the potential for interactions between the Projects and the following other users:

- Other nearby offshore wind farms;
- Oil and gas infrastructure;
- Electrical infrastructure;
- Carbon capture and storage;
- Aggregate extraction sites;
- Dumping and disposal sites; and
- MoD activities.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment and includes the monitoring of vessel traffic which would be secured in accordance with the **Volume 8, Outline Vessel Traffic Monitoring Plan (application ref: 8.30)**.

No significant effects are identified on Infrastructure and Other Users after consideration of mitigation.

The potential impacts identified are:

- Potential interference with other wind farms arising from:
    - Navigational safety issues (e.g. vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to other wind farms);
    - Aviation (e.g. emergency helicopter operations from other wind farms being disrupted by presence of turbines);
    - Overlap of infrastructure and potential interactions during construction.
- Interference with oil and gas and carbon capture and storage operations (including decommissioning);
- Physical impacts on electrical infrastructure;
- Impacts on disposal sites; and
- Impacts on Ministry of Defence activities.

Overall, considering the mitigation proposed as part of the assessment, **no significant effects** are identified within the Infrastructure and Other Users topic area. Further information can be found in **Volume 7, Chapter 16 Infrastructure and Other Users (application ref: 7.16)**.

Offshore Archaeology and Cultural Heritage

The chapter provides a characterisation of the existing environment for offshore archaeology and cultural heritage based on existing data and site-specific surveys, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

There are no known in situ prehistory sites within the study area, however, the site-specific surveys identified channel features of potential archaeological interest, as well as 847 seabed features of interest with regards to maritime and aviation archaeology, including nine confirmed wrecks. Features of interest were also identified in the intertidal zone during a heritage walkover such as the fragmented remains of former World War II coastal defences.

The receptors identified in the assessment include:

- Known wrecks and debris of archaeological interest;
- In situ prehistoric, maritime or aviation sites below Mean High Water Springs;
- Sub-surface archaeology and geoarchaeological / palaeoenvironmental deposits;
- Isolated finds; and
- Known and potential heritage assets.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter, taken into account during the assessment and includes the requirement to avoid historic wrecks (as far as possible). This was included as a design principle for site selection in the design of the Offshore Export Cable Corridor.

No significant effects are identified after the implementation of mitigation upon Offshore Archaeology and Cultural Heritage receptors.

The effects considered in the assessment for construction, operation and decommissioning include:

- Direct impact to known heritage assets;
- Direct impact to potential heritage assets;
- Indirect impact to heritage assets from changes to physical processes; and
- Impacts to the setting of heritage assets.

Initial assessment identified potential significant effects due to direct and in-direct impacts to known and potential heritage assets. Additional mitigation is outlined in **Volume 7, Chapter 17 Offshore Archaeology and Cultural Heritage (application ref: 7.17)** which will reduce these impacts to be **not significant**. The approach to the implementation of mitigation measures has been set out in **Volume 8, Outline Written Scheme of Investigation (Offshore) (application ref: 8.22)** which is submitted alongside the Environmental Statement and Development Consent Order application.

Further information can be found in **Volume 7, Chapter 17 Offshore Archaeology and Cultural Heritage (application ref: 7.17)**.

Onshore

Terrestrial Ecology and Ornithology

The chapter provides a characterisation of the existing environment for terrestrial ecology and ornithology based on existing data and site-specific surveys, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The identified receptors for potential impacts include:

- Statutory and non-statutory designated sites;
- All habitats, including those for;
  - Amphibians;
  - Badgers;
  - Bats;
  - Breeding and over-wintering birds;
  - Otters;
  - Other notable species;
  - Water voles;
  - Reptiles; and
  - Adjacent habitats / species during construction and operation of the Projects.

The impacts assessed are:

- Construction disturbance to statutory and non-statutory designated nature conservation sites;
- Impacts from changes in air quality during construction upon statutory and non-statutory designated nature conservation sites;
- Temporary habitat loss / fragmentation;
- Death, injury, or disturbance to species;
- Habitat and species disturbance from maintenance activities;
- Species disturbance from artificial lighting; and
- Permanent habitat loss.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment, and includes the development of an Ecological Management Plan in accordance with the **Volume 8, Outline Ecological Management Plan (application ref: 8.10)**. The Ecological Management Plan will include details of any long-term mitigation and management measures relevant to terrestrial ecology and ornithology and nature conservation.

Additional mitigation is required to reduce the impact on breeding birds, roosting bats, great crested newts, badgers and over-wintering birds during construction. These additional measures, identified in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** are also incorporated into the **Volume 8, Outline Ecological Management Plan (application ref: 8.10)** to minimise the effects of the construction of the Projects.

With the implementation of the embedded and additional mitigation, effects are assessed as **not significant** on most receptors. However, effects on breeding birds and ancient woodland located in the Bentley Moor Wood Local Wildlife Site relating to temporary changes in air quality during construction remain **significant** in the assessment but with no direct effects on the habitat within the Local Wildlife Site.

Following the implementation of embedded and additional mitigation, **no significant effects** are identified as part of the operational phase.

No significant Cumulative Effects (with other schemes) are identified in relation to terrestrial ecology and ornithology except for breeding birds during the construction phase of the Projects and other schemes locally, and potentially during the decommissioning phase if they overlap. The mitigation being proposed to reduce Cumulative Effects includes improved communication with neighbouring schemes to ensure that the construction programme minimises impacts on breeding birds by reducing localised displacement and disturbance.

Further information can be found in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)**.

Significant effects are identified on two Terrestrial Ecology and Ornithology receptors.

Significant effects are identified after implementation of mitigation upon Geology and Land Use receptors.

Geology and Land Quality

The chapter provides a characterisation of the existing environment for Geology and Land Quality based on publicly available data and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The identified receptors for potential impacts include:

- Humans (i.e. the health of construction workers and those living and working nearby);
- Aquifers and Source Protection Zones (the latter being potable groundwater abstraction sites requiring protection from polluting activities);
- Controlled waters (rivers, streams, estuaries, lakes, canals, ditches, ponds and groundwater which are protected from pollution by legislation);
- Mineral safeguarding areas;
- Buildings and utilities; and
- Agricultural land.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment, such as the protection of ground water quality, through the measures included within the **Volume 8, Outline Code of Construction Practice (application ref: 8.9)**. The Outline Code of Construction Practice includes specific measures relevant to the storage of fuels, oils, lubricants, waste water and other chemicals during the works.

Overall, there is a residual **significant effect** on the sterilisation of future mineral resources during operation. After the consideration of some additional mitigation which is outlined in **Volume 7, Chapter 19 Geology and Land Quality (application ref: 7.19)**, all other effects upon Geology and Land Quality receptors are considered not significant in Environmental Impact Assessment terms.

Further information can be found in **Volume 7, Chapter 19 Geology and Land Quality (application ref: 7.19)**.

No significant effects are identified after implementation of mitigation upon Flood Risk and Hyrdology receptors.

Flood Risk and Hydrology

The chapter provides a characterisation of the existing environment for flood risk and hydrology based on publicly available and field survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The identified receptors include:

- Surface water bodies; and
- Ground water bodies.

The assessment establishes that surface and groundwater receptors could be affected as a result of:

- Direct disturbance (during the construction phase);
- The increased supply of fine sediment and contaminants (during the construction phase);
- The accidental release of contaminants (during the construction and operation phases); and
- Changes to surface water runoff and flood risk (during the construction and operation phases).

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. This includes measures such as use of trenchless techniques such as Horizonal Directional Drilling to cross Main Rivers and avoid direct interaction with these watercourses. Where watercourses are crossed with an open cut technique a method statement would be agreed with the relevant stakeholders.

All effects are concluded to be **not significant** in Environmental Impact Assessment terms.

Further information can be found in **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)**.

Land Use

The chapter provides a characterisation of the existing environment for land use and is based on publicly available and field survey data, and an assessment of potential impacts and residual effects following the implementation of mitigation measures.

The identified receptors for potential effects include:

- The field drainage network;
- Agricultural land and soil;
- Utilities;
- Environmental Stewardship Schemes (ESS); and
- Users of recreational routes (e.g. public rights of way).

Potential impacts are identified as:

- Impacts to agricultural drainage;
- Temporary or permanent loss of agricultural land;
- Soil degradation and erosion;
- Impacts to ESS;
- Disruption to utilities;
- Disruption to users of recreational routes; and
- Soil heating.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment, such as the production of **Volume 8, Outline Drainage Strategy (application ref: 8.12)**, submitted with the Development Consent Order application. This includes the pre- and post-construction land drainage proposals based on the results of an outline drainage survey. An Outline Soil Management Plan and Outline Public Rights of Way Management Plan are included in **Volume 8, Outline Code of Construction Practice (application ref 8.9)**. This would ensure the appropriate management of soils and Public Rights of Way, including footpaths and bridleways during construction.

The assessment concluded that there are **significant effects** identified due to the temporary and permanent loss of agricultural land during construction and operation. Whilst agricultural land will be reinstated during construction within two years between Jointing Bays the amount of land temporarily lost during construction for up to six years would still result in a **significant effect**. Land around the Onshore Substation Zone will be returned where possible to agricultural use following construction, however there is no additional mitigation proposed to reduce this significant effect.

Following the consideration of mitigation and re-instatement post the construction phase, all other effects are considered to be **not significant**.

The Cumulative Effects Assessment for land use identified that there is potential for significant Cumulative Effects to arise due to the spatial overlap with the Projects and the proposed Birkhill Wood National Grid Substation and JBM Peartree Hill Solar Farm, which may cause direct and indirect impacts during the construction and operational phases.

Further information can be found in **Volume 7, Chapter 21 Land Use (application ref: 7.21)**.

Significant effects due to the permanent loss of agricultural land were identified by the Land Use assessment.

Onshore Archaeology and Cultural Heritage

The chapter characterises the existing environment for onshore archaeology based on publicly available heritage data, a setting and heritage condition walkover, targeted geophysics survey and archaeological trial trenching. Potential impacts and residual effects are then assessed following the implementation of proposed mitigation measures.

Identified receptors include:

- Known designated heritage assets;
- Known non-designated above ground heritage assets;
- Known and potential buried archaeological and geoarchaeological / paleoenvironmental remains;
- Deposits associated with designated heritage assets; and
- Known paleoenvironmental and geoarchaeological deposits.

Impacts that may occur as a result of the Projects include:

- The direct physical impacts on heritage assets;
- The indirect physical impacts on heritage assets;
- Temporary changes to the setting of heritage assets; and
- Permanent changes to the setting of heritage assets.

Embedded mitigation including route refinement and micro-siting has been informed directly by the results of surveys to ensure areas of high archaeological potential are avoided. This includes a diversion around Nunkeeling Deserted Medieval Village as well as positioning the Onshore Export Cable Corridor around anomalies of probable archaeological origin identified by surveys. The Projects also avoid all known designated heritage assets. Standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. This, alongside additional measures designed to mitigate direct and in-direct impacts on non-designated assets, are detailed within the **Volume 8, Outline Onshore Written Scheme of Investigation (application ref: 8.14)** submitted with the Development Consent Order application.

This document also contains details of the programme of ongoing archaeological surveys, including trial trenching, that will be required prior to the construction phase to inform the need for any further mitigation.

Following the implementation of **Volume 8, Outline Onshore Written Scheme of Investigation (application ref: 8.14)**, the reinstatement and enhancement of the historic landscape post construction in-line with the requirements set out in the **Volume 8, Outline Landscape Management Plan (application ref: 8.11)** and the construction of the Onshore Converter Stations in-line with the design principles set out in the **Volume 8, Design and Access Statement (application ref: 8.8)**, all effects on Onshore Archaeological and Cultural Heritage receptors are considered to be **not significant**.

Further information can be found in **Volume 7, Chapter 22 Onshore Archaeology and Cultural Heritage (application ref: 7.22)**.

No significant effects are identified on Onshore Archaeology and Cultural Heritage receptors after implementation of mitigation.

Landscape and Visual Impact Assessment

This chapter provides a characterisation of the existing environment for the landscape and visual impact assessment based on both existing data and site-specific surveys, which has established that there will be some potential impacts on landscape and visual receptors. Proposed additional mitigation measures will reduce significant effects.

Identified receptors for potential impacts as a result of the Projects are grouped into 'subareas' along the Onshore Export Cable Route, Landfall and Onshore Converter Stations and include:

- Subarea 1 (Landfall);
- Subarea 2 (Skipsea to West Road);
- Subarea 3 (West Road to the River Hull);
- Subarea 4 (River Hull to Onshore Converter Stations); and
- Subarea 5 (Onshore Converter Stations).

Subareas 1-4 have a study area of a 1km buffer around the Onshore Export Cable Corridor. Subarea 5 has a wider 5km study area due to the permanent nature of the proposals in this location. Following consultation with East Riding of Yorkshire Council, eight viewpoints are selected to inform the assessment of the Onshore Converter Stations in Subarea 5. These viewpoints are shown on **Volume 7, Chapter 23 Landscape and Visual Impact Assessment, Figure 23-2 (application ref: 7.23.1)**.

Potential impacts to these receptors include:

- Landscape effects of the Landfall, Onshore Export Cable Corridor or Onshore Converter Stations; and
- Visual effects of the Landfall, Onshore Export Cable Corridor or Onshore Converter Stations.

Embedded mitigation has been incorporated into the design of the Projects, as part of Onshore Export Cable Corridor and Onshore Converter Station site selection. This includes a commitment to reinstate all habitat between Jointing Bays, including hedgerows within two years, where possible. Embedded and standard mitigation for the topic is detailed within the chapter and taken into account during the assessment.

The **Volume 8, Outline Landscape Management Plan (application ref: 8.11)** provides details of the landscape screening, planting regime and hedgerow reinstatement to be installed during the construction phases of the Projects. However, it is recognised that mitigation planting will not be fully effective until the plants grow and mature.

Further embedded mitigation is included within an **Volume 8, Outline Code of Construction Practice (application ref: 8.9)** and in project design through the delivery of design principles outlined in the **Volume 8, Design and Access Statement (application 8.8)**.

The assessment concluded that there are significant effects during construction and the first 10 years of operation prior to the maturation and reinstatement of vegetation. Following successful implementation of the Outline Landscape Management Plan only the landscape effects of Onshore Converter Stations during operation including on the Yorkshire Wolds Important Land Area and the visual effects on viewpoints 1 and 3 would still be significant.

The Cumulative Effects Assessment for Landscape and Visual Impact Assessment identifies several schemes which may, when considered as part of the assessment baseline, give rise to Cumulative Effects that would be significant. These effects are principally at receptors in proximity to the Onshore Converter Stations.

Further information can be found in **Volume 7, Chapter 23 Landscape and Visual Impact Assessment (application ref: 7.23)**.

Significant effects are identified on some Landscape and Visual receptor.

Traffic and Transport

The Traffic and Transport chapter assesses the potential effects of the onshore elements of the Projects on the surrounding local and wider highway network. The assessment is informed by consultation with East Riding of Yorkshire Council, Hull City Council and National Highways, as well as traffic surveys.

The traffic assessment focuses on construction phase effects. There is no requirement for operational traffic assessment as operational traffic numbers generated by the Projects will be very low. The construction phase is considered to represent an adequate worst-case for any necessary traffic movements during decommissioning.

Identified traffic-related receptors of the highway network include:

- Residential properties;
- Commercial developments;
- Industrial developments; and
- Schools.

Traffic demand has been forecast by converting estimates of construction material quantities and employees needed for the Projects and converting them into estimated vehicle trips. This traffic demand is then assigned to highways serving the Projects to understand the impacts of this change in traffic.

In accordance with national guidance, a Traffic and Transport Study Area has been identified, baseline conditions established and sensitive receptors within the Traffic and Transport Study Area identified. This area was tested to identify routes that could be potentially adversely affected by the Projects' traffic generation.

> **A total of 66 highway links totaling 150km of highway network within the Traffic and Transport Study Area have been assessed for the impacts of amenity, severance, road safety and driver delay.**

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment, such as the **Volume 8, Outline Construction Traffic Management Plan (application ref: 8.13)** submitted alongside the Development Consent Order application. The Outline Construction Traffic Management Plan contains details of measures to control, monitor and enforce traffic movements and provides details of the mechanisms for managing design of accesses and offsite highway works.

The traffic and transport assessment concluded that **no significant effects** would arise after the implementation of the Outline Construction Traffic Management Plan.

No significant Cumulative Effects (with other schemes) are identified in relation to traffic and transport.

Further information can be found in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**.

Heavy traffic moving at speed

No significant effects are identified after implementation of mitigation upon Traffic and Transport receptors.

Noise

The Noise chapter assesses the potential effects of the onshore elements of the Projects on the surrounding noise sensitive receptors. The assessment has been informed by consultation with East Riding of Yorkshire Council and Hull City Council.

The noise and vibration assessment focuses on both the construction and operational phases. Noise and vibration effects can arise from construction traffic using the local highway network and from construction plant used to build the Onshore Export Cable Corridor. Operational noise effects can arise from the Onshore Converter Stations and associated plant.

The assessment of noise and vibration effects has been undertaken by collecting baseline noise measurements near to noise sensitive receptors at locations agreed with East Riding of Yorkshire Council. Using industry recognised methods, policy and guidance, predictions of noise and vibration have been made to assess the change in noise and vibration levels to determine whether significant effects would arise.

The receptors identified for potential impacts from noise and vibration include:

- Human receptors to construction road traffic noise and vibration during the day;
- Human receptors to construction works at temporary construction compounds during the day, and trenchless construction e.g. Horizontal Directional Drill activities that include 24 hour working; and
- Human receptors to noise from the Onshore Converter Stations in operation during the day and night.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the chapter and taken into account during the assessment. This includes noise management measures set out in **Volume 8, Outline Code of Construction Practice (application ref: 8.9)** which is being submitted with the Development Consent Order application.

The assessment found that additional mitigation (including noise screening, and sensitive timing of works) is required to minimise impacts at three sensitive locations, where night-time trenchless drilling methods may be required.

The assessment concluded that, following the implementation of mitigation measures described above, **no significant effects** related to noise and vibration would be expected during the construction period. Noise modelling has shown that **no significant effects** would be expected from the operation of the Onshore Converter Stations.

No significant Cumulative Effects (with other schemes) are identified in relation to noise and vibration.

Further information can be found in **Volume 7, Chapter 25 Noise (application ref: 7.25)**.

No significant effects are identified after implementation of mitigation upon Noise and Vibration receptors.

Air Quality

This chapter provides a characterisation of the existing environment for air quality based on existing data, and an assessment of the potential impacts of the construction of the Projects.

Onshore operation and maintenance, and offshore air quality impacts have been agreed as not required. The assessment has been undertaken with reference to the assessment methodology agreed with East Riding of Yorkshire Council and Hull City Council.

The receptors identified for potential impacts from air quality include:

- Human receptors within 250m of the Onshore Development Area, including:
    - The caravan parks located off Hornsea Road and Green Lane, which are the closest human receptors to the Landfall Zone;
    - The residential areas in the north and south-west of Beverley, which are the closest human receptors to the Onshore Cable Export Corridors; and
    - The residential properties in the south of Bentley and Butts Farm Caravan site to the north of Bentley, which are the closest human receptors to the Substation Zone.
- Ecological receptors within 200m of the Onshore Development Area, including:
    - Burton Bushes Site of Special Scientific Interest and Ancient Woodland, which are the closest ecological receptors to the indicative Onshore Development Area;
- Residential properties, schools, hospitals and care homes within 200m of affected roads; and
- Designated ecological sites within 200m of affected roads.

Potential impacts include:

- Construction dust and fine particulate matter;
- Emissions from road construction vehicles; and
- Emissions from transportable industrial equipment.

Embedded mitigation incorporated into the design of the Projects is detailed within the chapter and taken into account during the assessment, such as best practice dust mitigation measures set out in the **Volume 8, Outline Code of Construction Practice (application ref: 8.9)** submitted with the Development Consent Order application.

Overall, all potential impacts on human receptors are assessed as **not significant** when considered with the implementation of best practice management measures.

The impact of construction vehicle exhaust emissions on sensitive ecological habitats was undertaken and addressed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18).**

No significant Cumulative Effects (with other schemes) are identified in relation to air quality.

Further information can be found in **Volume 7, Chapter 26 Air Quality (application ref: 7.26)**.

No significant effects upon human receptors are identified after implementation of mitigation.

Wider Scheme Aspects

Human Health

This chapter considers potential impacts on population health from changes due to the Projects. The health assessment has been informed by a review of relevant public health evidence sources, including scientific literature, baseline data, health policy, local health priorities and health protection standards. The human health assessment draws upon the conclusions of other Environmental Statement chapters to conclude how the Projects can impact upon health.

Population health varies given factors such as personal choice, location, mobility and exposure. These factors that influence health are called determinants of health and they span environmental, social, behavioural, economic and institutional aspects.

The two receptor groups identified for potential impacts include the:

- General population; and
- Vulnerable group population.

Vulnerability relates to experiencing effects differently due to age, income level, health status, degree of social disadvantage or ability to access services or resources. The health assessment considers localised effects as well as effects to the wider community in East Riding of Yorkshire, Yorkshire and Humber and the city of Hull.

Potential impacts on these receptor groups include:

- Disruption or disturbance to physical activity;
- Transport modes, access and connection;
- Changes to air quality;
- Changes to water;
- Soil contamination:
- Noise disturbance;
- Workforce upskilling;
- Employment and investment;
- Public concern and understanding of electromagnetic fields;
- Climate change;
- Employment and investment; and
- Wider societal infrastructure.

Embedded mitigation incorporated into the design of the Projects, or standard mitigation for the topic is detailed within the relevant Environmental Statement topic chapter and taken into account during the assessment. **Volume 8, Outline Project Environmental Management Plan (application ref: 8.21)** sets out all procedures and measures to be followed during construction, operation, maintenance and decommissioning phases for pollution prevention for offshore health receptors. Similarly, **Volume 8, Outline Code of Construction Practice (application ref: 8.9)** and **Volume 8, Outline Construction Traffic Management Plan (application ref: 8.13)** contains control measures to minimise for example noise, air quality and visual impacts for onshore health receptors.

Overall, it is considered that there will be **no significant adverse** effects upon Human Health receptors. However, **significant beneficial** impacts on the general and vulnerable population are identified by the assessment due to the benefits provided by renewable energy generation to public health, including how it supports many aspects of life such as food safety, heating and healthcare operation.

No significant Cumulative Effects (with other schemes) are identified in relation to human health.

Further information can be found in **Volume 7, Chapter 27 Human Health (application ref: 7.27)**.

Significant beneficial effects were identified on two receptor groups by the Human Health assessment.

Socio-economics

This chapter considers direct socio-economic effects associated with the Projects and any secondary socio-economic implications. It provides a characterisation of the existing socio-economic environment based on publicly available data and considers evidence on demography, the economy, and the social infrastructure of the Humber Region, compared against UK-level performance. Potential impacts and residual effects were then assessed.

The analysis is based on sectoral evidence and industry best practice.

Receptors for potential effects are identified as the:

- Humber Region; and
- Wider UK.

Potential impacts include:

- Expenditure;
- Employment;
- Change in demographics;
- Loss of or disruption to local infrastructure;
- Disturbance (noise, air quality, visual and traffic) to social infrastructure;
- Economic activity; and
- Population and social infrastructure.

Overall, it is considered that there will be **no significant adverse** effects upon Socio-Economic receptors. The assessment identifies that **significant beneficial** effects may be realised by the Projects during construction depending on which construction scenario is undertaken.

No significant Cumulative Effects (with other schemes) are identified in relation to socio-economics.

Further information can be found in **Volume 7, Chapter 28 Socio-Economics (application ref: 7.28)**.

The socio-economic assessment identified no adverse significant effects.

Tourism and Recreation

This chapter provides a characterisation of the existing environment for tourism and recreation based on existing data, and an assessment of potential impacts which has established that there will be potential impacts to tourism and recreation receptors.

The identified receptors for potential impacts include:

- Tourism businesses;
- Tourism assets (e.g. hotels, caravans and camping facilities); and
- Users of recreational routes (e.g. cycling and trail routes).

Potential effects include:

- Impacts to the tourism economy;
- Impacts to tourism assets;
- Impacts to recreational assets, which include:
    - The National Cycle Network;
    - The Minster Way Footpath;
    - The East Riding Heritage Way;
    - The Hudson Way; and
    - Skipsea Beach.
- Impacts to marine recreation, which include:
    - Boating;
    - Angling; and
    - Scuba diving.

Embedded mitigation is incorporated into the design of the Projects and is detailed within the chapter and taken into account during the assessment, such as adopting trenchless crossing techniques at the Landfall to allow continued beach access while works take place.

Overall, most tourism and recreation receptors are considered to experience no significant effects apart from caravan and camping tourism assets during construction which could experience **significant** adverse effects as a result of nighttime noise during construction, however this would be for short durations and subject to agreement with the local planning authority. **Significant effects** after mitigation are also identified upon the Butt Farm Caravan and Camping receptor during operation as a result of landscape and visual impacts within the first 10 years of operation. This would reduce to not **significant** once the planted screening grows after 10 years.

No significant Cumulative Effects (with other schemes) are identified in relation to tourism and recreation.

Further information can be found in **Volume 7, Chapter 29 Tourism and Recreation (application ref: 7.29)**.

Tourists on a leisurely cycle

Significant adverse effects were identified upon one Tourism and Recreation receptor during the operational stage of the project.

Climate Change

This chapter considers two aspects of climate change effects. One aspect is the impact of the Projects on climate change, through an assessment of changes in greenhouse gas emissions. The other aspect is the impact that climate change will have on the Projects in terms of their resilience to the effects of climate change.

There are therefore two key receptors:

- The global atmosphere for which the Projects themselves would have an impact on climate change; and
- The Project design when it is affected by future climate change.

Both receptors can potentially be affected during construction, operation and maintenance, and decommissioning.

Embedded mitigation is incorporated into the design of the Projects and is detailed within the chapter and taken into account during the assessment.

In terms of minimising greenhouse gas emissions, embedded mitigation includes following industry guidance to eliminate, reduce, substitute and compensate for greenhouse gases from the Projects. The Applicants also follow frameworks and sustainability guidelines, for example by developing processes to ensure that resources are conserved and carbon savings can be obtained.

In terms of ensuring that the Projects are resilient to the effects of climate change, embedded mitigation includes using industry standards in the design process that will allow the design to prioritise resilience against hazards posed by climate conditions. Construction management plans such as **Volume 8, Outline Project Environmental Management Plan (application ref: 8.21)** and **Volume 8, Outline Code of Construction Practice (application ref: 8.9)** will detail health and safety protocols that will include measures to minimise the effects of extreme weather events on site workers.

Whilst the Projects will produce some greenhouse gas emissions, mainly during the construction phase, overall, it is assessed as having **significant beneficial effects** on greenhouse gas emissions in operation, with an avoidance of 91.9 million and 183.5 million tonnes of CO2 over the lifetime of one or both Projects taken forward respectively. All other effects are deemed **not significant** in Environmental Impact Assessment terms.

When accounting for a potential reduction in the generation of renewable energy due to Wake Effects at neighbouring offshore wind farms, there was still predicted to be a **significant beneficial** effect on greenhouse gas emissions from the development of the Projects.

Further information can be found in **Volume 7, Chapter 30 Climate Change (application ref: 7.30)**.

The climate change assessment identified significant beneficial effects of the Projects.

04

Next Steps and Further Information

Next Steps and Further Information

The submission of the Environmental Statement and application for the Development Consent Order and Deemed Marine Licences marks the end of the pre-application period under the Planning Act 2008. Upon receipt of the application, the acceptance stage begins, and the Planning Inspectorate will have 28 days to decide whether or not the application meets the standards required to be accepted for examination.

If accepted, the pre-examination stage will begin, and members of the public will be able to register as Interested Parties to share their views about the Projects. An Examining Authority will also be appointed during this stage, and all Interested Parties will be invited to attend a Preliminary Meeting run and chaired by the Examining Authority.

Once the examination stage of the Projects begins, the Examining Authority has up to six months to examine the application. During this stage Interested Parties are invited to provide more details of their views in writing. Key consultation documents will include the Environmental Statement and details of the principles that would be applied to the design and construction of the Projects **(see Document Map)**. These documents will be available to the public during the examination stage.

At the end of the examination stage, the Planning Inspectorate must then prepare a report on the application to the Secretary of State, including a recommendation, within three months. The Secretary of State then has a further three months to make a decision on whether to grant or refuse development consent. In the event a Development Consent Order is granted, the detailed design and development of the Projects will continue to be progressed as the Projects move further towards construction.

The Applicants' draft Development Consent Order includes provision for deemed Marine Licences. If these Licences are granted, the onward responsibility for them will lie with the Marine Management Organisation on behalf of the UK Government. Conditions of the Marine Licenses will need to be discharged by the Applicants via submission to the Marine Management Organisation in accordance with the terms of the Licences.

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Glossary

Term	Definition
Allision	The act of striking or collision of a moving vessel against a stationary object.
Aquifer	Geological strata that hold water.
Array Areas	The DBS East and DBS West offshore Array Areas, where the wind turbines, offshore platforms and array cables would be located. The Array Areas do not include the Offshore Export Cable Corridor or the Inter-Platform Cable Corridor within which no wind turbines are proposed. Each area is referred to separately as an Array Area.
Array cables	Offshore cables which link the wind turbines to the Offshore Converter Platform(s).
Aviation archaeology	The remains of crashed aircraft and archaeological material associated with historic aviation activities.
Baseline	The existing conditions as represented by the latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of the Projects.
Beach	A deposit of non-cohesive sediment (e.g. sand, gravel) situated on the interface between dry land and the sea (or other large expanse of water) and actively 'worked' by present-day hydrodynamic processes (i.e. waves, tides and currents) and sometimes by winds.
Climate change	A change in global or regional climate patterns. This usually relates to any long-term trend in mean sea level, wave height, wind speed etc, due to climate change.
Closure depth	The depth that represents the 'seaward limit of significant depth change' but is not an absolute boundary across which there is no cross-shore sediment transport.
Collision	The act or process of colliding (crashing) between two moving objects.

Term	Definition
Concurrent	Installation of monopiles or pin piles happening at the same time at the DBS Projects.
Concurrent Scenario	A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time.
Construction Buffer Zone	1km zone around the Array Areas and Offshore Export Cable Corridor, and 500m zone around the Inter-Platform Cabling Corridor. Construction vessels may occupy this zone but no permanent infrastructure would be installed within these areas.
Cumulative Effects	The combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor / resource.
Cumulative Effects Assessment (CEA)	The assessment of the combined effect of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor/resource.
Cumulative impact	The combined impact of the Projects in combination with the effects of a number of different (defined cumulative) schemes, on the same single receptor / resource.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Development Scenario	Description of how the DBS East and / or DBS West Projects would be constructed either in isolation, sequentially or concurrently.
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the value, or sensitivity, of the receptor or resource in accordance with defined significance criteria.

Term	Definition
Environmental Impact Assessment (EIA) Directive	The EU directive on the assessment of the effects of certain public and private projects on the environment (2011/92/EU as amended by 2014/52/EU).
Environmental Impact Assessment (EIA) Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Environmental Impact Assessment (EIA)	A statutory 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, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Erosion	Wearing away of the land or seabed by natural forces (e.g. wind, waves, currents, chemical weathering).
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.
Fish and Shellfish Ecology Study Area	The Fish and Shellfish Ecology Study Area for the Projects is defined as ICES Rectangles 36E9; 36F0; 37E9; 37F0; 37F1; 37F2; 38F0; 38F1; and 38F2. It covers a total of 26,858km2, and includes the Offshore Development Area with a minimum buffer distance of 7km.
Fisheries Liaison Officer	Primary contact point between the fishing community and the Applicants, with responsibility for disseminating relevant Project information.

Term	Definition
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.
Gravel	Loose, rounded fragments of rock larger than sand but smaller than cobbles. Sediment larger than 2mm (as classified by the Wentworth scale used in sedimentology).
Groundwater	Water stored below the ground in rocks or other geological strata.
Haul Road	The track along the Onshore Export Cable Corridor used by traffic to access different sections of the onshore export cable route for construction.
Health	State of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.
Heavy Goods Vehicle (HGV)	HGV is the term for any vehicle with a Gross Weight over 3.5 tonnes. This is also used as a proxy for HGVs and buses / coaches recognising the similar size and environmental characteristics of the respective vehicle types.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Horizontal Directional Drill (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the Landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.

Term	Definition
Impact	Used to describe a change resulting from an activity via the Projects, i.e. increased suspended sediments / increased noise.
In Isolation Scenario	A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation.
International Council for the Exploration of the Sea (ICES) Statistical Rectangles	Defined areas of sea used for fisheries statistics (1 degree longitude by 0.5 degree latitude, equalling approximately 30 by 30 nautical miles).
Inter-Platform Cable Corridor	The area where Inter-Platform Cables would route between platforms within the DBS East and DBS West Array Areas, should both Projects be constructed.
Inter-Platform Cables	Buried offshore cables which link offshore platforms.
Intertidal	Area on a shore that lies between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS).
Jointing Bays	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The point on the coastline at which the Offshore Export Cables are brought onshore, connecting to the onshore cables at the Transition Joint Bay (TJB) above mean high water.
Landfall Zone	The generic term applied to the entire Landfall area between Mean Low Water Spring (MLWS) and the Transition Joint Bays (TJBs) inclusive of all construction works, including the Landfall compounds, Onshore Export Cable Corridor and intertidal working area.

Term	Definition
Link Boxes	An underground metal box placed within a concrete pit where the metal sheaths between adjacent export cable sections are connected and earthed, installed with a ground level manhole to allow access to the link box for regular maintenance or fault-finding purposes.
Local Authority	The Local Authority is a body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and the Broads Authority, as set out in Section 43 of the Planning Act 2008. East Riding of Yorkshire Council is the Local Authority for the entirety of the Onshore Development Area.
Mean High Water Springs (MHWS)	MHWS is the average of the heights of two successive high waters during a 24 hour period.
Mean Low Water Springs (MLWS)	MLWS is the average of the heights of two successive low waters during a 24 hour period.
Mean Sea Level	The average level of the sea surface over a defined period (usually a year or longer), taking account of all tidal effects and surge events.
National Policy Statement (NPS)	A document setting out national policy against which proposals for NSIPs will be assessed and decided upon.
Nationally Significant Infrastructure Project (NSIP)	Large scale development including power generating stations which requires development consent under the Planning Act 2008. An offshore wind farm project with a capacity of more than 100MW constitutes an NSIP.
Nearshore	The zone which extends from the swash zone to the position marking the start of the offshore zone (~20m).
Offshore Converter Platform (OCP)	The OCPs are fixed structures located within the Array Areas that collect the AC power generated by the wind turbines and convert the power to DC, before transmission through the Offshore Export Cables to the Project's Onshore Grid Connection Points.

Term	Definition
Offshore Development Area	The Offshore Development Area for ES encompasses both the DBS East and West Array Areas, the Inter-Platform Cable Corridor, the Offshore Export Cable Corridor, plus the associated Construction Buffer Zones.
Offshore Export Cable Corridor	This is the area which will contain the Offshore Export Cables between the Offshore Converter Platforms and Transition Joint Bays at the Landfall.
Offshore Export Cables	The cables which would bring electricity from the offshore platforms to the Transition Joint Bays.
Onshore Converter Station	A compound containing electrical equipment required to transform HVDC and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network as HVAC. There will be one Onshore Converter Station for each Project.
Onshore Development Area	The Onshore Development Area for ES is the boundary within which all onshore infrastructure required for the Projects would be located including Landfall Zone, Onshore Export Cable Corridor, accesses, Temporary Construction Compounds and Onshore Converter Stations.
Onshore Export Cable Corridor	This is the area which includes cable trenches, Haul Roads, spoil storage areas, and limits of deviation for micro-siting. For assessment purposes, the cable corridor does not include the Onshore Converter Stations, Transition Joint Bays or temporary access routes; but includes Temporary Construction Compounds (purely for the cable route).
Onshore Export Cables	Onshore Export Cables take the electric from the Transition Joint Bay to the Onshore Converter Stations.

Term	Definition
Onshore Grid Connection Points	The Onshore Grid Connection Points is the location where the electricity produced by the Projects would be transferred to the national grid. There are two Onshore Grid Connection Points, one for each Project, which will be located in the same place.
Onshore Substation Zone	Parcel of land within the Onshore Development Area where the Onshore Converter Station infrastructure (including the Haul Roads, Temporary Construction Compounds and associated cable routeing) would be located.
Onward Cable Connection	Area of 400kV HVAC onshore export cable from the Onshore Converter Stations to the proposed Birkhill Wood National Grid Substation.
Other trenchless techniques	Other techniques (aside from HDD) for installation of ducts or cables where trenching may not be suitable such as micro tunnelling or auger boring.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Population health	The health outcomes of a group of individuals, including the distribution of such outcomes within the group.
Preliminary Environmental Information Report (PEIR)	Defined in the EIA Regulations as information referred to in part 1, Schedule 4 (information for inclusion in environmental statements) which has been compiled by the applicants and is reasonably required to assess the environmental effects of the development.
Primary Surveillance Radar (PSR)	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
Project Change Request 1	The changes to the DCO application for the Projects set out in Project Change Request 1 – Offshore and Intertidal [AS-141] which was accepted into Examination on 21st January 2025.

Term	Definition
Project Change Request 2	The changes to the DCO application for the Projects set out in Project Change Request 2 - Onshore Substation Zone [AS-152] which was accepted into Examination on 21st January 2025.
Radio detection and ranging (Radar)	An object-detection system which uses radio waves to determine the range, altitude, direction or speed of objects.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of Receptors include species (or groups) of animals, plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Sand	Sediment particles, mainly of quartz with a diameter of between 0.063mm and 2mm. Sand is generally classified as fine, medium or coarse.
Scoping Opinion	The report adopted by the Planning Inspectorate on behalf of the Secretary of State.
Scoping Report	The report that was produced in order to request a Scoping Opinion from the Secretary of State.
Scour protection	Protective materials to avoid sediment erosion from the base of the wind turbine foundations and offshore substation platform foundations due to water flow.
Sea level	Generally, refers to 'still water level' (excluding wave influences) averaged over a period of time such that periodic changes in level (e.g. due to the tides) are averaged out.
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.
Sediment	Particulate matter derived from rock, minerals or bioclastic matter.

Term	Definition
Sediment transport	The movement of a mass of sediment by the forces of currents and waves.
Sequential Scenario	A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first.
Setting	The NPPF identifies setting as that which encompasses an asset's surroundings in which it is experienced. The extent of setting is not fixed and can contribute both positively and negatively to the heritage significance of an asset.
Source Protection Zone I	Inner protection zone - defined as the 50-day travel time from any point below the water table to the abstraction source. This zone has a minimum radius of 50 metres.
Source Protection Zone II	Outer protection zone - defined by a 400-day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the abstraction source, depending on the size of the abstraction.
Source Protection Zone III	Source catchment protection zone - defined as the area around an abstraction source within which all groundwater recharge is presumed to be discharged at the abstraction source.
Special Area of Conservation (SAC)	Strictly protected sites designated pursuant to Article 3 of the Habitats Directive (via the Habitats Regulations) for habitats listed on Annex I and species listed on Annex II of the Directive.
Statutory consultation	The statutory consultation ran in two periods. The first period ran between 6th June and 17th July 2023, with a second period running between 4th August and 15th September 2023 to gather responses from third-parties missed during the initial consultation period. The PEIR was presented as part of this consultation.

Term	Definition
Suspended sediment	The sediment moving in suspension in a fluid kept up by the upward components of the turbulent currents or by the colloidal suspension.
Temporary Construction Compound	An area set aside to facilitate construction of the Projects. These will be located adjacent to the Onshore Export Cable Corridor and within the Onshore Substation Zone, with access to the highway.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).
Traffic and Transport Study Area	Area where potential impacts from the Projects could occur, as defined for the traffic and transport EIA topic.
Transition Joint Bay (TJB)	The Transition Joint Bay (TJB) is an underground structure at the Landfall that houses the joints between the Offshore Export Cables and the Onshore Export Cables.
Transmission infrastructure	The structures and equipment required to convey electricity.
Trenching	Open cut method for cable or duct installation.
Vehicle trips	A vehicle movement (i.e. the arrival or departure from site) for the transfer of employees or delivery of goods.
Wind turbine	Power generating device that is driven by the kinetic energy of the wind.

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