RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Preliminary Environmental Information Report

Chapter 16 – Infrastructure and Other Users

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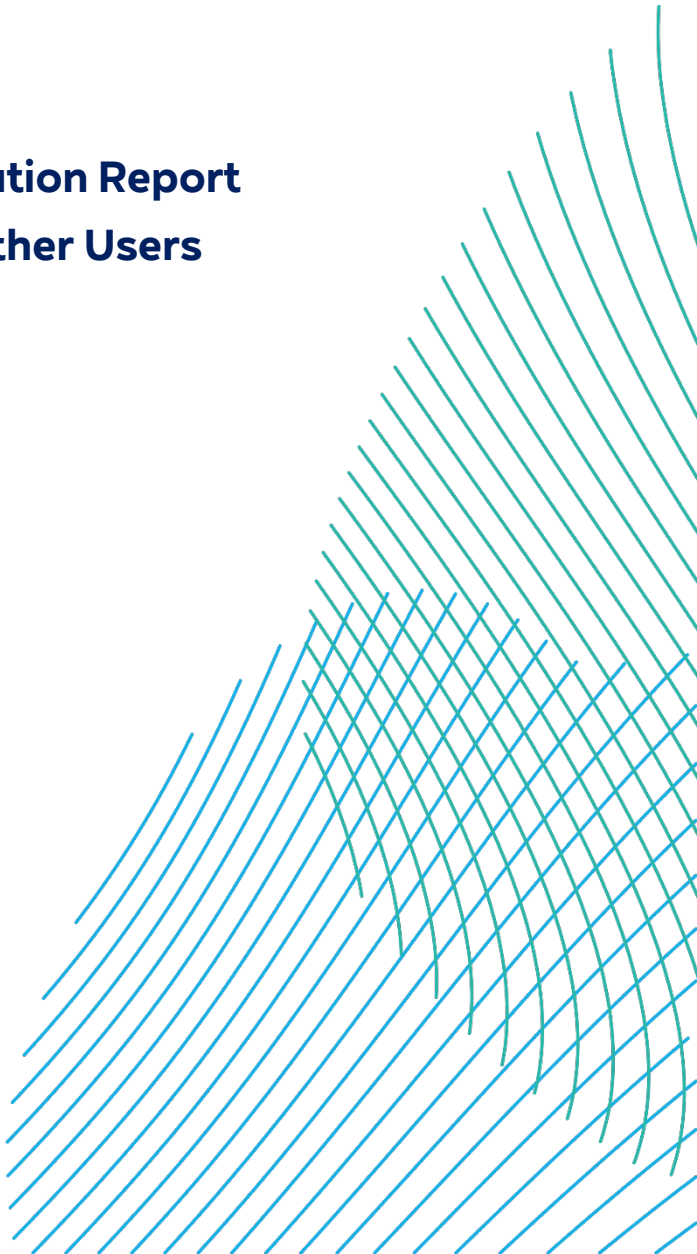

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Glossary

Term	Definition
Accommodation Platform	An offshore platform (situated within either the DBS East or DBS West array area) that will provide accommodation and mess facilities for staff when carrying out maintenance activities for the Projects.
Array Areas	The DBS East and DBS West offshore array areas, where the wind turbines and array cables will be located. The array areas do not include the offshore export cable corridor.
Array Cables	Cables which link the wind turbine generators to the offshore substation/converter/collector platform(s).
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
Electrical Switching Platform (ESP)	The electrical switching platform (if required) will provide a link to a co-ordinated east coast transmission system which is planned to run from Scotland to England, as per National Grid ESO's Holistic Design Network. This platform may be located either within one of the array areas (alongside a converter station) or mid-way along the export cable corridor (likely next to the Reactive Compensation Platform if required).
Inter-Platform Cables	Cables linking offshore platforms.
Offshore Converter Platforms (OCPs)	Offshore Converter Platforms (OCPs) will be required for the HVDC option. The OCPs are fixed structures located within the array area 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 encompasses the wind farm site and the options for the offshore transmission works.
Offshore Export Cable Corridor	This is the area which will contain the offshore export cables (and potentially the ESP and / or RCP) between the offshore substation/converter platforms and Transition Joint Bays at the landfall.
Offshore Substation Platforms (OSPs)	Offshore Substation Platforms (OSPs) will be required for the HVAC option. These are fixed structures located within the array areas that contain electrical equipment to aggregate the power from the wind turbines, followed by conversion into a more suitable voltage for transmission through the offshore export cables to the Project's onshore grid connection points.
Reactive Compensation Platform (RCP)	A Reactive Compensation Platform (RCP) will be required for a HVAC solution. The RCP will host the shunt reactors required to provide reactive compensation, in order to limit the electrical losses which occur with HVAC transmission over long distances.
Safety Zones	A statutory marine zone demarcated for the purposes of safety around a possibly hazardous installation or works/construction area.
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.

Term	Definition
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms).

Acronyms

Term	Definition
AC	Alternating Current
CCS	Carbon Capture and Storage
DBS	Dogger Bank South
DC	Direct Current
DCO	Development Consent Order
DML	Deemed Marine Licence
ES	Environmental Statement
ESP	Electrical Switching Platform
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IPMP	In-Principle Monitoring Plan
km	Kilometre
MW	Megawatt
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MoD	Ministry of Defence
NPS	National Policy Statement
NSTA	North Sea Transition Authority
OCP	Offshore Converter Platform
OSP	Offshore Substation Platform

Term	Definition
PEIR	Preliminary Environmental Information Report
PEXA	Practice and Exercise Area
RCP	Reactive Compensation Platform
SNS	Southern North Sea
UXO	Unexploded Ordnance

16 Infrastructure and Other Users

16.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the Projects on marine infrastructure and other users. The chapter provides an overview of the existing environment for the proposed Offshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.

2. The assessment should be read in conjunction with the following linked chapters:

   - **Chapter 14 Shipping and Navigation**: and
   - **Chapter 15 Aviation and Radar**.

16.2 Consultation

3. Consultation with regard to infrastructure and other users has been undertaken in line with the general process described in **Chapter 6 EIA Methodology**. The feedback received has been considered in preparing the PEIR. **Table 16-1** provides a summary of how the consultation responses received to date have influenced the approach that has been taken.

4. This chapter will be updated following consultation on PEIR in order to produce the final assessment that will be submitted with the Development Consent Order (DCO) application. Full details of the consultation process will also be presented in the Consultation Report alongside the DCO application.

Table 16-1 Consultation Responses

Comment	Project Response
Planning Inspectorate, Scoping Responses 02/09/2022	
Paragraph 469 states that there are no licenced aggregate production areas or mining sites within the study area. No further discussion is presented to support the conclusion to 'scope out' this matter in Table 2-38. Disposal sites are also stated as absent from the study area (Paragraph 470) however, Paragraph 477 identifies potential operational impacts on disposal sites. Disposal sites do not feature in Table 2-38. The rationale presented for these two matters is not clear in the Scoping Report. The Inspectorate expects the ES to be based on robust evidence to demonstrate that features are absent or would otherwise be unaffected by the Proposed Development in reaching any subsequent conclusion to exclude significant effects.	The closest licenced offshore minerals aggregates site to the Projects is the Humber 2 production area, located approximately 47km south-east of the offshore export cable corridor. Further discussion of the potential impacts on aggregate extraction is provided in section 16.6.1 of this chapter. There are no disposal sites located within the array areas or offshore export cable corridor, with the closest site being the closed Bridlington Bay B, located 5.2km north-west of the export cable corridor. Further discussion of the potential impacts on disposal sites has been undertaken and is provided in section 16.6.1 of this chapter. The operational impacts on disposal sites originally scoped in in paragraph 477 of the Scoping Report was an error in the original document. The potential for impacts on disposal sites during all stages of the Projects are discussed in section 16.6.1 of this chapter.
The Inspectorate does not agree that this matter (Potential cumulative impacts from construction, operation, and decommissioning) can be scoped out at this stage. In the absence of any detail of proposed mitigation measures referred to (i.e., development of crossing agreement or similar) the Inspectorate considers that pathways for effects remain and therefore there is potential for cumulative effects to arise. The ES should assess all impacts with the potential to result in significant cumulative effects with other development, or provide adequate information on the mitigation measures to demonstrate that	The full assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available on other nearby projects. However, for the purposes of the PEIR, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. This preliminary information regarding cumulative effects is presented in section 16.7.

Comment	Project Response
these impacts can be discounted from that assessment.	
In addition to the Northern Endurance Carbon Capture and Storage (CCS) project noted in Section 2.12.1.4 of the Scoping Report the Inspectorate is also aware (as presented on the National Infrastructure Website) of a number of other CCS Pipelines, and areas of Saline Aquifer Injection within the North Sea and associated land infrastructure. The ES should ensure to include reference to all existing or proposed CCS activities with which the Proposed Development may interact (onshore cable corridor and substations, offshore cable corridor and offshore array areas).	Other Carbon Capture and Storage infrastructure and new licensing areas have been detailed and assessed in this chapter, see section 16.5.4.
The Inspectorate notes that there is potential for wartime UXO to be located in the southern North Sea, but at Paragraph 473 it states that it is not proposed to ascertain the locations and develop any mitigation until after any DCO is granted. The Inspectorate considers that there is potential for UXO to give rise to significant effects if they are present within the scoping boundary, e.g., in relation to clearance activities there could be impact to marine mammal ecology (section 3.7) and offshore archaeology (see section 3.13). The ES should be supported by survey information to identify the potential location of UXO within the DCO boundary and an outline mitigation plan, in order to support an assessment of the worst-case scenario associated with UXO clearance.	The potential impacts to benthic and intertidal ecology, fish and shellfish, marine mammals and offshore archaeology from UXO is addressed in Chapter 9 Benthic and Intertidal Ecology, Chapter 10 Fish and Shellfish Ecology, Chapter 11 Marine Mammals and Chapter 17 Offshore Archaeology and Cultural Heritage of the PEIR. Specific surveys to identify potential locations of UXO will not be undertaken until the DCO is granted. This is to allow more detailed engineering work to be carried out on the cable routes and locations of turbines to allow a targeted survey for potential UXO to be undertaken. However, data from the geophysical surveys undertaken will be used to determine the potential for UXO within the offshore development area. As such, the ES will include an assessment of the worst-case number of potential UXO within the offshore development area and how any identified UXO will be disposed of. An outline mitigation plan for reducing the impacts of disposal where possible will be prepared in support of the ES. A marine licence application would be applied for post-consent to allow the investigation and clearance of any UXO to ensure appropriate mitigation is put in place.

Comment	Project Response
The Scoping Report states at paragraph 484 that the "EIA will be based on existing data and information gathered through consultation". There is no information presented about the methodology that will be used to assess impacts, nor is any criteria presented to identify how significance of effect will be determined. The ES should be clear on how the assessment has been undertaken, taking into account relevant guidance, and using an aspect specific methodology where possible.	Section 16.4 of this chapter presents the assessment methodology used to assess the impacts on infrastructure and other users.
Marine Management Organisation, Scoping Responses 02/09/2022	
If dredge & disposal is required, a disposal method should be provided including the estimated volume of material to be disposed of. This must be provided in order to make an assessment of the proposed activity and to allow the proposed volumes to be included on any Development Consent Order. The MMO can provide further comment on this issue once more detail on disposal activities is provided.	Noted with thanks.

16.3 Scope

16.3.1 Study Area

5. The infrastructure and other users study area has been defined on the basis of marine activities within 50km of the offshore development area that have the potential to overlap, be influenced by, or influence the Projects (see **Figure 16-1**).

6. The assessment considers existing as well as planned projects and activities, where information is within the planning system, otherwise publicly available, or has been made available through the consultation process.

16.3.2 Realistic Worst Case Scenario

16.3.2.1 General Approach

7. The realistic worst case design parameters for likely significant effects scoped into the EIA for the Infrastructure and Other Users assessment are summarised in **Table 16-2**. These are based on the project parameters described in **Chapter 5 Project Description**, which provides further details regarding specific activities and their durations.

8. In addition to the design parameters set out in **Table 16-2**, consideration is also given to the different development scenarios still under consideration and the possible phasing of the construction as set out in sections 16.3.2.2 to 16.3.2.5.

Table 16-2 Realistic Worst Case Design Parameters

	Parameter			
	DBS East in isolation (HVDC only)	**DBS West in isolation (HVAC only)**	**DBS West and DBS East concurrently and / or in sequence (HVAC + HVDC)**	**Notes and rationale**
Construction In the instance of sequential development, up to a two year lag between construction activities is possible, final overall footprint would be identical to the concurrent design scenario.				
Potential interference with other wind farms Potential interference with oil and gas operations and decommissioning activities Impacts on MoD activities Physical impacts on subsea cables and pipelines	**Array Area** Total developable array area – 494.5km² Installation of up to 100 small turbines and five offshore platforms within the array area Safety zones of 500m radius from any construction activity (to be applied for) **Offshore Export Cable Corridor** Installation of one electrical switching platform (ESP) along the offshore export cable corridor	**Array Area** Total developable array area – 494.5km² Installation of up to 100 small turbines and five offshore platforms within the array area Safety zones of 500m radius from any construction activity (to be applied for) **Offshore Export Cable Corridor** Installation of one reactive compensation platform (RCP) along the offshore export cable corridor	**Array Areas** Total developable array area – 989km² (DBS East and DBS West) Installation of up to 200 small turbines and nine offshore platforms within the array area Safety zones of 500m radius from any construction activity (to be applied for)	Assumed equal split in area between DBS East and DBS West. Assumes even split of the total 650km array cable length between DBS East and DBS West. Maximum export cable length assumes worst case that cable circuits are laid and buried in separate trenches

	Parameter			
	DBS East in isolation (HVDC only)	**DBS West in isolation (HVAC only)**	**DBS West and DBS East concurrently and / or in sequence (HVAC + HVDC)**	**Notes and rationale**
	325km array cable length with up to 20% of the cable length requiring surface laid cable protection 396km export cable length with up to 20% of the cable length requiring surface laid cable protection (2x 198km cable circuits) Approximate number of cable / pipeline crossings (all cables) – 42 *Note - Assumes 22 export cable crossings & 20 array cable crossings* **Vessel Movements** Maximum total vessels offshore on site simultaneously - 66 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of*	325km array cable length with up to 20% of the cable length requiring surface laid cable protection 40km inter-platform cable length with up to 20% of the cable length requiring surface laid cable protection 632km export cable length with up to 20% of the cable length requiring surface laid cable protection (4x 155km cable circuits) Approximate number of cable / pipeline crossings (all cables) – 70 *Note - Assumes 48 export cable crossings, 20 array cable crossings and two2 inter-platform cable crossings* **Vessel Movements**	**Offshore Export Cable Corridor** Installation of one ESP and one RCP along the offshore export cable corridor 650km array cable length with up to 20% of the cable length requiring surface laid cable protection 385km inter-platform cable length with up to 20% of the cable length requiring surface laid cable protection 1,028km export cable length cables with up to 20% of the cable length requiring surface laid cable protection (6x cable circuits, 2x 198km in length and 4x 155km in length)	rather than bundled.

	Parameter			
	DBS East in isolation (HVDC only)	**DBS West in isolation (HVAC only)**	**DBS West and DBS East concurrently and / or in sequence (HVAC + HVDC)**	**Notes and rationale**
	the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously. Assumes half of the vessel numbers required for installation of both array areas.	Maximum total vessels offshore on site simultaneously - 66 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously. Assumes half of the vessel numbers required for installation of both array areas.*	Approximate number of cable / pipeline crossings (all cables) – 134 *Note - Assumes 70 export cable crossings, 40 array cable crossings and 24 inter-platform cable crossings* **Vessel Movements** Maximum total vessels offshore on site simultaneously -132 *Note – This figure is a combination of the estimated peaks for separate tasks. It is unlikely (but possible) that each of the packages use their maximum quantity of vessels and very unlikely that this occurs simultaneously.*	

	Parameter			
	DBS East in isolation (HVDC only)	**DBS West in isolation (HVAC only)**	**DBS West and DBS East concurrently and / or in sequence (HVAC + HVDC)**	**Notes and rationale**
Operation				
Potential interference with other wind farms Potential interference with oil and gas operations and decommissioning activities Physical impacts on subsea cables and pipelines Impacts on MoD activities	**Maximum infrastructure** 100 small turbines and five offshore platforms within the array area Maximum turbine height – 450m (above MHWS) One ESP along the offshore export cable corridor Total array and inter-platform cable protection – 656,512 (488,400m² array cable protection + 168,112 inter platform cable protection) Total footprint of pipeline / cable crossing material (array + inter-platform cables) – 49,100m² Total export cable protection – 1,089,660m²	**Maximum infrastructure** 100 small turbines and five offshore platforms within the array area Maximum turbine height – 450m (above MHWS) One RCP along the offshore export cable corridor Total array and inter-platform cable protection - 790,515m² (488,400m² array cable protection + 302,115m² inter-platform cable protection) Total footprint of pipeline / cable crossing material (array + inter-platform cables) – 73,539m²	**Maximum infrastructure** 200 small turbines and nine offshore platforms within the array area Maximum turbine height – 450m (above MHWS) One RCP and one ESP along the offshore export cable corridor Total array and inter-platform cable protection - 2,139,904m² (976,800m² array cable protection + 1,163,104m² inter-platform cable protection) Total footprint of pipeline / cable crossing material	

	Parameter			
	DBS East in isolation (HVDC only)	**DBS West in isolation (HVAC only)**	**DBS West and DBS East concurrently and / or in sequence (HVAC + HVDC)**	**Notes and rationale**
	Total footprint of pipeline / cable crossing material (offshore export cable corridor)– 122,611m² Approximate 30 year design lifespan **Vessel Movements** Maximum total vessels offshore on site simultaneously –11	*Note - Four predicted inter-platform cable crossings for HVAC only scenario* Total export cable protection – 1,642, 872m² Total footprint of pipeline / cable crossing material – 294,267m² Approximate 30 year design lifespan **Vessel Movements** Maximum total vessels offshore on site simultaneously - 11	(array + inter–platform cables) - 244,915m² Total export cable protection – 2,701,040m² Total footprint of pipeline / cable crossing material – 441,400m² Approximate 30 year design lifespan **Vessel Movements** Maximum total vessels offshore on site simultaneously - 21	
Decommissioning				
No final decision regarding the final decommissioning policy for the offshore project infrastructure has yet been made. It is also recognised that legislation and industry best practice change over time. However, it is likely that offshore project infrastructure will be removed above the seabed and reused or recycled where practicable. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the worst case scenario, the impacts will be no greater than those identified for the construction phase.			

16.3.2.2 Development Scenarios

9. There are currently two possible electrical solutions being considered for DBS West, High Voltage Alternating Current (HVAC) or High Voltage Direct Current (HVDC). Due to the distance of the array area offshore, DBS East will be an HVDC project. Therefore, there are two possible electrical solutions for the Projects:

   - One HVDC project and one HVAC project; or
   - Two HVDC projects.

10. Offshore the most significant difference between an HVAC solution and an HVDC solution is that if an HVAC electrical solution is used an additional platform (reactive compensation platform (RCP)) will be required along the offshore export cable. In addition, a HVAC solution will require two additional export cable lays offshore, over and above the four lays that would be required for two HVDC projects.

11. In order to ensure that a robust assessment has been undertaken, all development scenarios and options have been considered to ensure the realistic worst-case scenario for each topic has been assessed. Further details are provided in **Chapter 5 Project Description**.

16.3.2.3 Construction Scenarios

12. The following principles set out the framework for how the Projects may be constructed (relating to both onshore and offshore works):

    - DBS East and DBS West may be constructed at the same time, or at different times;
    - If built concurrently, both Projects could be constructed in five years;
    - If built non-concurrently, either Project could be built first;
    - If built non-concurrently, each Project would require a five year period of construction;
    - If built non-concurrently, it is anticipated that there would be up to a two year lag between the start of construction for the first Project and the start of construction for the second Project; and
    - Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.

13. In order to determine which construction scenario presents the realistic worst case for each receptor and impact, the assessment considers both maximum duration effects and maximum peak effects, in addition to each Project being developed in isolation, drawing out any differences between each of the two Projects.

14. The three construction scenarios considered by the Infrastructure and Other Users assessment are therefore:

- Build DBS East or build DBS West in isolation;
- Build DBS East and DBS West concurrently – reflecting the maximum peak effects; and
- Build the Projects sequentially with a lag of up to two years – reflecting the maximum duration of effects.

15. The individual, concurrent and sequential construction scenarios all allow for flexibility to build out the Projects using a phased approach. This will allow the Projects to adapt to National Grid Electricity Transmission Operator's development plans for the onshore grid connection points. Under a phased approach the maximum timescales for individual elements of the construction have been assessed.

16. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (concurrent or sequential and the length of any gap) are identified and discussed where relevant in section 16.6. For each potential impact, only the worst case construction scenario for two Projects is presented, i.e. either concurrent or sequential. The justification for what constitutes the worst case is provided, where necessary, in section 16.6.

16.3.2.4 Operation Scenarios

17. Operation scenarios are described in detail in **Chapter 5 Project Description**. The assessment considers the following scenarios:

- Only DBS East in operation;
- Only DBS West in operation; and
- The two Projects operating concurrently with or without a lag of up to two years between each Project commencing operation.

18. If the Projects are built out using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phases for the Projects have been assessed. See section 5.1.1 of **Chapter 5 Project Description** for further information on phasing scenarios for the Projects.

19. The operational lifetime of each Project is expected to be 30 years.

16.3.2.5 Decommissioning Scenarios

20. Decommissioning scenarios are described in **Chapter 5 Project Description**. Decommissioning arrangements will be agreed through the submission of a Decommissioning Programme prior to construction, however for the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

16.3.3 Mitigation Embedded in the Design

21. This section outlines the embedded mitigation relevant to the Infrastructure and Other Users assessment, which has been incorporated into the design of the Projects (**Table 16-3**). Where other mitigation measures are proposed, these are detailed in the impact assessment (section 16.6).

Table 16-3 Embedded Mitigation Measures

Parameter	Mitigation Measures Embedded into the Project Design
Application for safety zones	An application will be made for safety zones post consent including up to 500m around ongoing activities during construction, major maintenance, and decommissioning and up to 50m for installed structures pre commissioning.
Cable burial risk assessment	Where possible, cable burial will be the preferred option for cable protection with the cable burial depth to be informed by a cable burial risk assessment and detailed within the Cable Specification Plan, which will be a condition of the DML. Any damage, destruction or decay of cables must be notified to MCA, Trinity House, Kingfisher and UKHO no later than 24 hours after discovered.
Charting of infrastructure	There will be appropriate marking of all offshore infrastructure associated with the Projects on UKHO admiralty charts.
Compliance with MGN 654	The Projects will ensure compliance with MGN 654 and its annexes, where applicable, including completion of a SAR checklist.
Guard vessel(s)	Where appropriate, guard vessels will be used to ensure adherence with safety zones or advisory passing distances.

Parameter	Mitigation Measures Embedded into the Project Design
Layout plan	A layout plan (including sub-sea cables) for the Projects will be agreed with the MMO following appropriate consultation with Trinity House and the MCA setting out proposed details of the offshore development areas.
Lighting and marking	Consultation with Trinity House, Maritime and Coastguard Agency and Civil Aviation Authority to determine appropriate lighting and marking with consideration of existing Oil and Gas assets.
Project vessel compliance with international marine regulations	Project vessels will ensure compliance with Flag State regulations including the COLREGs (IMO, 1972/77) and SOLAS (IMO, 1974).
Promulgation of information	The Projects will ensure that local Notifications to Mariners are updated and reissued at weekly intervals during construction activities and at least five days before any planned operation and maintenance works and supplemented with VHF radio broadcasts agreed with the MCA in accordance with the construction and monitoring programme approved under the relevant DML condition.
	Advance warning and accurate location details of construction, maintenance and decommissioning operations (including details of vessel routes, timings and locations), associated safety zones and advisory passing distances will be given via Kingfisher Bulletins at least 14 days prior where possible.
Traffic monitoring	Monitoring of vessel traffic will be undertaken for the duration of the construction phase and during the first three years of the operation and maintenance phase. This will be secured in DML and detailed in In-Principle Monitoring Plan (IPMP).
Unimpeded SAR access	Alignment of turbines as required under Marine Guidance Note (MGN) 654 to provide obstruction free SAR access.

16.4 Assessment Methodology

16.4.1 Policy, Legislation and Guidance

16.4.1.1 National Policy Statements

22. The assessment of potential impacts upon infrastructure and other users has been made with specific reference to the relevant National Policy Statements (NPS). The specific assessment requirements for infrastructure and other users, as detailed in the NPS, are summarised in **Table 16-4** together with an indication of the section of this chapter where each is addressed.

23. The NPS for Renewable Energy Infrastructure (EN-3) is in the process of being revised. Draft versions were published for consultation in September 2021 by Department for Business Energy and Industrial Strategy (BEIS, 2021). A review of the draft versions has been undertaken in the context of this PEIR chapter. No new requirements applicable to petroleum industry and other marine users were found within the draft EN-3 document.

24. Following the consultation in 2021 on the draft energy NPS, a new consultation opened on the 30th March 2023 on revised drafts of the energy NPSs, including EN1, EN3 and EN5. Due to the timing of this consultation, and finalisation of this PEIR we have been unable to review and take these revised draft NPS into account within these documents. However, these will be reviewed and incorporated into the final ES where relevant.

Table 16-4 NPS Assessment Requirements

NPS Requirement	NPS Reference	PEIR Section Reference
EN-3 NPS for Renewable Energy Infrastructure		
'there may be constraints imposed on the siting or design of offshore wind farms because of restrictions resulting from the presence of other offshore infrastructure or activities.'	(NPS EN-3) Section 2.6, paragraph 2.6.35	**Chapter 4 Site Selection and Assessment of Alternatives** provides the rationale for the location of the array areas and offshore cable corridor, which includes consideration of constraints associated with other offshore infrastructure.

NPS Requirement	NPS Reference	PEIR Section Reference
'where a potential offshore wind farm is proposed close to existing operational offshore infrastructure, or has the potential to affect activities for which a licence has been issued by Government, the applicant should undertake an assessment of the potential effect of the proposed development on such existing or permitted infrastructure or activities. The assessment should be undertaken for all stages of the lifespan of the proposed wind farm in accordance with the appropriate policy for offshore wind farm EIAs.'	(NPS EN-3) Section 2.6, paragraph 2.6.179	The potential impacts are assessed in section 16.6.
'applicants should engage with interested parties in the potentially affected offshore sectors early in the development phase of the proposed offshore wind farm, with an aim to resolve as many issues as possible prior to the submission of an application'	(NPS EN-3) Section 2.6, paragraph 2.6.180	Consultation with owners and operators of offshore infrastructure will be undertaken by RWE.
'Such stakeholder engagement should continue throughout the life of the proposed development including construction, operation and decommissioning phases where necessary. As many of these offshore industries are regulated by Government, the relevant Secretary of State should also be a consultee where necessary. Such engagement should be taken to ensure that solutions are sought that allow offshore wind farms and other users of the sea to successfully co-exist'.	(NPS EN-3) Section 2.6, paragraph 2.6 181	Consultation with the Planning Inspectorate has been undertaken as part of the scoping phase. The Scoping Opinion from the Planning Inspectorate in relation to the infrastructure and other users are shown in **Table 16-1.**

16.4.1.2 Other

25. In addition to the NPS, there a number of pieces of legislation, policy and guidance applicable to the assessment of infrastructure and other users. These include:

- East Inshore, North East Inshore, East Offshore and North East Offshore Marine Plans (MMO, 2014);
- European Subsea Cable UK Association (ESCA) Guideline No. 6 – The Proximity of Offshore Renewable Energy Installations and Submarine Cable Infrastructure in UK Waters (ESCA, 2016);
- The International Cable Protection Committee (ICPC) has issued a series of recommendations for marine cables, specifically:
  - Recommendations No. 2 – Recommended Routing and Reporting Criteria for Cables in Proximity to Others (ICPC, 2015);
  - Recommendations No. 3 – Criteria to be Applied to Proposed Crossings Submarine Cables and/or Pipelines (ICPC, 2014);
  - Recommendations No. 13 – The Proximity of Offshore Renewable Wind Energy Installations and Submarine Cable Infrastructure in National Waters (ICPC, 2013); and
- Oil and gas licencing rounds information (Oil and Gas Authority, 2018).

26. The guidance regarding submarine cables and offshore renewable developments and their proximity is of relevance to this chapter, given the potential for the array areas and offshore export cable corridor to be located in close proximity, or be directly crossing, other third-party infrastructure (see section 16.5 for further information). Further detail on general policy and guidance is provided in **Chapter 3 Policy and Legislative Context**.

16.4.2 Data and Information Sources

27. Sources that have been used to inform the assessment are listed in **Table 16-5.**

Table 16-5 Other Available Data and Information Sources

Data Set	Spatial Coverage	Year	Source
Offshore Cables	UK	2022	https://www.marinefind.co.uk/
Wind farms	UK and EU	2022	https://www.4coffshore.com/offshorewind/
Oil and Gas Infrastructure	UK	2022	https://ogauthority.maps.arcgis.com/home/index.html
Aggregate Sites	UK	2022	https://thecrownestate.maps.arcgis.com/home/index.html
Dredger Transit Routes	UK	2022	https://bmapa.org/issues/renewable_energy.php
Disposal Sites	UK	2022	https://data.cefas.co.uk/view/407

16.4.3 Impact Assessment Methodology

28. **Chapter 6 EIA Methodology** provides a summary of the general impact assessment methodology applied. The following sections describe the methods used to assess the likely significant effects on infrastructure and other users.

16.4.3.1 Definitions

29. For each potential impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e. magnitude) on given receptors. The definitions of sensitivity and magnitude for the purpose of the infrastructure and other users assessment are provided in **Table 16-6** and **Table 16-7**.

Table 16-6 Definition of Sensitivity

Sensitivity	Definition
High	High value activity/activity fundamental to the operator or infrastructure that is of international or national economic importance. No redundancy available in the event of impact. Asset very sensitive to the impact. For example, a gas pipeline, electrical infrastructure or telecommunication cable supporting UK or European activity or nationally important aggregates area where extraction company has no access to areas of equal quality aggregates.
Medium	Medium value activity. Impact to asset would significantly reduce operators' activities but not result in complete failure to continue operations. Limited redundancy available. Asset regionally important. Asset has limited tolerance of impact. For example, a gas pipeline, electrical infrastructure or telecommunication cable, where asset owners have some potential for redundancy planning. Aggregates areas where extraction company has some, but limited access to equal quality aggregate.
Low	Low value activity. Impact to asset would have limited implications on operator/public either due to the availability of redundancy or limited pathway for impact. Asset has some tolerance of impact. For example, an electrical or telecommunication cable with ability to undertake redundancy planning to limit impact. Aggregates area where extraction company has access to large areas of equal quality aggregate.
Negligible	Low value activity. Operators' activities would not be significantly reduced by an impact. Asset generally tolerant of impact. Limited impact to asset owners or local community in case of damage or failure.

Table 16-7 Definition of Magnitude of Impacts

Magnitude	Definition
High	Loss of resource and / or quality and integrity of a receptor; severe damage to key characteristics, features or elements. For example, accidental damage to an asset resulting in permanent or long term inoperability or complete loss of access to economically important asset.
Medium	Loss of resource, but not adversely affecting the integrity of resource; partial loss of / damage to key characteristics, features or elements. For example, damage to an asset that results in either short term, complete inoperability or long term reduced functionality. Partial loss of access to an economically important asset, or short term complete loss of access.
Low	Some measurable change in resource attributes, quality or vulnerability, minor loss, or alteration to, one (maybe more) key characteristics, features or elements. For example, accidental damage to an asset resulting in short term reduction of functionality but not complete loss of function. Short term disruption to access to an asset.
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements, and / or slight alteration to a receptor.

16.4.3.2 Significance of Effect

30. The assessment of significance of an effect is informed by the sensitivity of the receptor and the magnitude of the impact. The determination of significance is guided by the use of an impact significance matrix presented in **Chapter 6 EIA Methodology**. Definitions of each level of significance are provided in **Table 16-8**. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that is minor or negligible is not significant.

Table 16-8 Definition of Effect Significance

Significance	Definition
Major	Very large or large change in receptor condition, which is likely to give rise to important considerations at a regional or district level because the receptor contributes to achieving national, regional or local objectives, or could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which is likely to be an important consideration at a local level.
Minor	Small change in receptor condition, which may be raised as local issues, but are unlikely to be important in the decision-making process.
Negligible	No discernible change in receptor condition.
No change	No impact, therefore no change in receptor condition.

16.4.4 Cumulative Effect Assessment Methodology

31. The cumulative effect assessment (CEA) considers other plans and projects that may result in cumulation with the Projects. **Chapter 6 EIA Methodology** provides details of the general framework and approach to the CEA that will be undertaken for the Projects.

32. The full assessment of cumulative effects will be undertaken during the later stages of the EIA, once further information is available on a number of projects such as the Outer Dowsing Offshore Wind Farm, Hornsea Project Four decision and the Sheringham Shoal and Dudgeon Offshore Wind Farms examination. However, for the purposes of the PEIR, it is possible to identify a number of projects and plans which are likely to feature in that assessment and consider the extent to which cumulative effects might arise. Section 16.7 presents the following preliminary information regarding cumulative effects:

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

16.4.5 Transboundary Effect Assessment Methodology

33. For infrastructure and other users, the only potential transboundary receptors within the array areas and offshore export cable corridor are the disused UK-Germany 6 subsea cable that routes through the DBS West array area and the active Langeled gas pipeline that routes through the Projects' offshore export cable corridor. Any potential impacts to these assets are assessed in section 16.6.1.3 of this chapter. This assessment determined that, through crossing agreements being agreed with the operators of this subsea cables and pipelines, the significance of effect on subsea cables and pipelines would be minor adverse.

16.4.6 Assumptions and Limitations

34. This preliminary assessment is considered to be an interim stage in the EIA process. The results presented in the following sections are based on early design assumptions and initial assessments which will be refined and presented in the final Environmental Statement (ES) to be submitted as part of the DCO application.

35. The characterisation of the existing environment and the resulting impact assessment is based on publicly available information, purchased data or information gained directly from the relevant operators / organisations during consultation. There may be elements of uncertainty associated with the locations of some existing infrastructure and where this is the case, this will be discussed with the owners and operators and confirmed, if required, during pre-construction surveys.

16.5 Existing Environment

36. The following infrastructure and other users receptors are located within the 50km study area for this chapter:

- Offshore wind farms;
- Oil and gas infrastructure;
- Subsea cables;
- Pipelines;
- Carbon capture storage;
- Aggregate extraction;
- Disposal sites; and
- Ministry of Defence activities.

16.5.1 Offshore Wind Farms

16.5.1.1 Active / In Operation Offshore Wind Farms

37. Nearby operational offshore wind farms within 50km of the Projects (at the time of writing) include the Hornsea One and Hornsea Project Two offshore wind farms, Westermost Rough and Humber Gateway. A list of all offshore wind farms in the vicinity of the Projects is provided in **Table 16-9** and displayed in **Figure 16-2**.

16.5.1.2 Consented / Under Construction Offshore Wind Farms

38. Nearby consented offshore wind farms within 50km of the Projects (at the time of writing) include Dogger Bank A (under construction), Dogger Bank B (under construction), Sofia (under construction) and Hornsea Project Three (consented).

16.5.1.3 Offshore Wind Farms In-Planning

39. Nearby offshore wind farms within 50km of the Projects in the planning stages (at the time of writing) include the Hornsea Project Four offshore wind farm. In addition, SSE Renewables and Equinor recently announced their intention to expand the Dogger Bank Wind Farm with Dogger Bank D (Equinor, 2023), proposed to be located in the eastern portion of Dogger Bank C. Should this location be chosen as final for the project, this would place the project outside of the 50km search area for this assessment. However, it is likely that the offshore cable corridor for the Dogger Bank D will run close to the Projects. As such, while no publicly available information is available on the exact cable corridor proposed for Dogger Bank D, the project will be considered in any further assessment.

Table 16-9 Offshore Wind Farms Within 50km of the Projects Array Areas or Offshore Export Cable Corridor

Offshore Wind Farm Array Area	Closest Distance from the Projects (km)		
	DBS West	DBS East	Offshore Export Cable Corridor
Dogger Bank A (under construction)	8	7.5	23
Dogger Bank B (under construction)	17	25	35
Hornsea One (in operation)	Over 50km	44	Over 50km
Hornsea Project Two (in operation)	Over 50km	40	47
Hornsea Project Three (pre-construction)	Over 50km	46	Over 50km
Hornsea Project Four (pre-construction)	42	41	20
Humber Gateway (in operation)	Over 50km	Over 50km	43
Sofia (under construction)	37	34	Over 50km
Westermost Rough (in operation)	Over 50km	Over 50km	23

16.5.1.4 Export cables

40. The Projects' offshore export cable corridor runs parallel to the Dogger Bank A and B export cable route for approximately 90km in the worst-case scenario (see **Figure 16-2** for further context), with the majority of this route falling within the temporary construction area of the Dogger Bank A and B export cable route. The Projects' export cable corridor also crosses the Hornsea Four export cable route, approximately 8.5km from the East Yorkshire coastline at its closest point.

16.5.2 Oil and Gas Infrastructure

41. The nearest oil and gas infrastructure is associated with the Cavendish, Gordon and Esmond gas fields. There is no surface infrastructure in the arrays areas. The nearest platform (Cavendish) is 3km west of DBS East, this platform ceased production in August 2018 and was approved for decommissioning in June 2020 (Offshore Petroleum Regulator for Environment and Decommissioning, 2021). Decommissioning activities for Cavendish are scheduled to conclude in 2024 (Lepic, 2020). As of April 2022 decommissioning activities were yet to commence (INEOS, 2022).

42. There are no active wells in or adjacent to the array areas (**Figure 16-3**). Within 15km of DBS East, there are three active subsurface infrastructures (one wellhead and two manifolds).

43. Within the infrastructure and other users study area there are five active pipelines that contain either natural gas or methanol. Pipelines that run through the array areas are listed in **Table 16-10** and displayed in **Figure 16-3.** In addition, the active Langeled gas pipeline (UK to Norway) crosses the Projects offshore export cable corridor approximately 47km offshore from the coastline.

Table 16-10 Oil and Gas Pipelines Within Array Areas

Project	Pipeline	Material	Status
DBS West	Shearwater to Bacton	Gas	Active
	Esmond to Bacton		Active
	Esmond to Forbes		Abandoned
	Esmond to Gordon*		Abandoned
DBS East	Esmond to Gordon*		
	Cygnus to ETS		Active
	Cavendish		Active
	Cavendish	Methanol	Active

**Esmond to Gordon pipeline runs through both array areas*

44. Both Projects overlap with several oil and gas blocks licensed for exploration and production as listed in **Table 16-11.**

Table 16-11 Licensed Blocks Within the Array Areas

Project Element	Licence Blocks
DBS West	43/7; 43/8; 43/12b
DBS East	43/15a; 43/19a; 43/20b; 44/11d
Offshore Export Cable Corridor	43/19a; 43/11; 42/20b; 42/19; 42/18; 42/23; 42/22; 42/27

16.5.3 Subsea Cables

45. One disused subsea cable (UK-Germany 6) transits through DBS West, with no existing cables in DBS East. The proposed Eastern Link 2 (also referred to as SEGL2) HDVC power cable route is located approximately 2km north of the offshore export cable corridor for the Projects (see **Figure 16-4**). The routes for a proposed third Eastern Link HVDC cable (referred to as TGDC, routing from Fife to the south Humber area) and fourth Eastern Link HVDC cable (referred to as E4L5, routing from Peterhead to the south Humber area) currently cross the offshore export cable corridor for the Projects. Both projects are listed as being in the 'Strategic Optioneering' stage of development by National Grid (National Grid ESO, 2023b), with limited information being publicly available at the time of writing.

46. There also exists the potential for the National Grid Holistic Network Design (HND) bootstrap cable (s) to route through the offshore development area for the Projects. This HND is described as a single, integrated approach to support large scale delivery of electricity from offshore wind through the coordination of transmission infrastructure both on and offshore (National Grid ESO, 2023a). As the offshore routing for the HND is still in the early stages of planning, with publicly available information listed as 'for illustrative purposes only' at the time of writing (National Grid ESO, 2023b), it cannot yet be determined where exactly any interactions between the HND and the Projects will occur.

47. The consented route for the Viking Link HVDC interconnector power cable is located approximately 29km south of the DBS East array area. The project is due to completed by December 2023 (Offshore Energy, 2022a).

16.5.4 Carbon Capture and Storage

48. Located approximately 2.3km south-east of the offshore export cable corridor is the proposed site of Northern Endurance Carbon Capture Storage (CCS) project. The associated pipelines are proposed to run from Redcar, Teesside and from Easington, Hull. Installation of the pipelines and seabed infrastructure for the project is scheduled to commence in 2024, with the first CO_2 injection anticipated to take place in 2026 (Xodus, 2021). At the time of writing, the Projects' export cable corridor would cross the intended pipeline route to Redcar for the Northern Endurance CSS (**Figure 16-4)**.

49. In addition, a new leasing round opened by the North Sea Transition Authority (NSTA) in June 2022 includes areas of seabed overlapping the array areas and infrastructure and other users study Area (see **Figure 16-4**) (Offshore Energy, 2022b), namely the Southern North Sea (SNS) Area 1 (which overlaps with a small part the array areas) and SNS Area 3 (which overlaps the offshore export cable corridor approximately 5.6km from the coastline).

16.5.5 Aggregate Extraction

50. There are no licenced aggregate production areas or active subsurface mining sites within the offshore development area. The closest licenced offshore minerals aggregates site to the Projects is the Humber 2 production area, located approximately 47km south-east of the offshore export cable corridor. Therefore, impacts on these areas were scoped out of further assessment due to the distance from the Projects.

16.5.6 Dumping and Disposal Sites

51. There are no dumping or disposal sites located within the Projects array areas or export cable corridor. The closest open disposal site is Bridlington A (HU015), located approximately 7km north of the export cable corridor. The closest closed disposal site is Bridlington Bay B, located approximately 5.2km north-west of the export cable corridor (see **Figure 16-5**).

16.5.7 Ministry of Defence Activities

52. The following Practice and Exercise Areas (PEXA) encompass the Infrastructure and Other Users Study Area (**see Figure 16-6**):

- D323B;
- D323C;
- D323D; and
- D323F.

53. These sites are designated as RAF Danger Areas for Air Combat Training and High Energy Manoeuvres between 5,000 and 66,000 ft (BEIS, 2009). Admiralty charts also indicate the presence of a submarine exercise area within the vicinity of the offshore export cable corridor. No reference to the extent. purpose and current status of this exercise area is detailed publicly online, however.

54. As a result of both World War 1 and World War 2, there is also potential for UXO within the 50km infrastructure and other users study area and in the wider southern North Sea region. For example, there exists evidence of a World War 2 era British Armament Training Area being located in the vicinity of the proposed landfall locations at Skipsea (Ordtek, 2023).

55. Exact locations of any UXO would be determined post-consent, and if required a clearance programme will be carried out prior to construction of the Projects. Data from geophysical surveys undertaken for the Projects will be used to determine the potential for UXO within the offshore development area. As such, the ES will include an assessment of the worst-case number of potential UXO within the offshore development area and how any identified UXO will be disposed of. An outline mitigation plan for reducing the impacts of UXO disposal will be prepared for submission with the ES. A separate marine licence would be sought to cover the investigation and clearance of UXO. The topic of UXO is considered further in **Chapter 9 Benthic and Intertidal Ecology, Chapter 10 Fish and Shellfish Ecology, Chapter 11 Marine Mammals** and **Chapter 17 Offshore Archaeology and Cultural Heritage**.

16.5.8 Future Trends

56. The deployment of offshore wind in the UK is set to continue with an existing pipeline of projects in planning and further expansion expected to achieve a target of 50GW offshore wind capacity by 2030. This includes new projects within the Dogger Bank itself, with the recently announced Dogger Bank D offshore wind farm currently in the early planning phases. Therefore, offshore wind deployment in the North Sea and Dogger Bank itself is likely to increase over the next decade.

57. There are plans to further integrate the UK electrical network and the European markets through the installation of interconnector cables. This is likely to lead to an increase in electricity transmission cables across the North Sea and in the vicinity of the Dogger Bank.

58. Oil and gas exploration in the North Sea is set to continue, albeit at a slower rate than seen in previous decades, with the NSTA launching the 33rd licensing round for oil and gas exploration in September 2022 (NSTA, 2022). This licensing round includes blocks in the vicinity of the Projects. However, decommissioning of existing platforms and infrastructure is also expected to occur in the coming decades (Royal Academy of Engineering, 2013).

59. Rounds for carbon capture and storage licensing may take place in the future. A recent round was launched by the NSTA in June 2022, which included several areas in the vicinity of the Dogger Bank (Offshore Energy, 2022b). There also exists the potential for future aggregate extraction leasing rounds, held regularly by the Crown Estate (The Crown Estate, 2023), to be located in the vicinity of the Projects.

16.6 Assessment of Significance

60. It should be noted that the potential effects during the construction, operation and decommissioning phases of the Projects have been assessed together in this chapter. This is because the effects will occur at a similar magnitude across each phase of the Projects lifespan, with the sensitivity of each receptor remaining the same also.

16.6.1 Potential Effects During Construction, Operation and Decommissioning

16.6.1.1 Impact 1: Potential Interference with Other Wind Farms

61. Interference of the Projects with other wind farms could arise from the following:

- 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 within the array areas); and
- Overlap of infrastructure and potential interactions during construction.

62. Issues arising from shipping and navigation and aviation are assessed in **Chapter 14 Shipping and Navigation** and **Chapter 15 Aviation and Radar**, respectively, and are not considered further in this chapter.

16.6.1.1.1 Magnitude of Impact – DBS East or DBS West in Isolation

63. Taking into account the embedded mitigation measures outlined in section 16.3.3 including advance promulgation of information regarding activities related to the Projects and crossing and proximity agreements, the magnitude of impact will be negligible.

64. As a result of the site selection process undertaken for the Projects, there will be no overlap with any other offshore wind farm sites. The only interaction between the Projects and other offshore wind farms will be the potential crossing of the export cables for the Hornsea Project Four offshore wind farm, and the overlap of the offshore export cable corridor to the working area buffer for the Dogger Bank A and B export cable corridor. There also exists the possibility that the Dogger Bank D export cable corridor may route close to/within the Projects development area. However this cannot be confirmed at the time of writing due to the lack of publicly available information regarding this project's export cable corridor.

65. The crossing and proximity agreements will determine how cable crossings are enabled and outline the proximity arrangements of construction activities for the existing subsea cables. The resultant locations, design and construction methodologies will reduce the physical impact upon other offshore wind export cables which may affect their operation.

66. Cable owners will be consulted by RWE during the development and pre-construction phases of the Projects. All commercial and technical agreements required would be put in place ahead of the commencement of construction. Crossing and proximity agreements would be agreed post-consent during the Projects' design period.

67. Engagement with external stakeholders and the promulgation of information regarding planned vessel activities for the Projects will allow for collaboration with other wind farm developers in the use of nearby port facilities, thereby reducing the pressure on their capacity.

16.6.1.1.2 Magnitude of Impact – DBS East and DBS West Together

68. While DBS East and DBS West together would encompass a larger spatial scale than that of either Project in isolation, taking into account the embedded mitigation measures outlined in section16.3.3, the magnitude of impact will still be negligible.

16.6.1.1.3 Sensitivity of Receptor

69. Wind farm construction activities have the potential to interfere with the activities of other wind farms. Any potential disruption caused to other wind farms could impact the projects construction schedule and increase the likelihood of navigational safety issues. The sensitivity of offshore wind farms to interference is medium.

16.6.1.1.4 Significance of Effect – DBS East or DBS West in Isolation

70. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.1.5 Significance of Effect – DBS East and DBS West Together

71. As above, based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.2 Impact 2: Potential Interference with Oil & Gas and CCS Operations Including Decommissioning Activities

72. Wind farm construction, operation and decommissioning activities have the potential to interfere with oil & gas and CCS operations in the following capacity:

- Navigational safety issues (e.g. vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to existing oil and gas infrastructure);
- Aviation (e.g. emergency helicopter operations from oil and gas platforms within the Dogger Bank being disrupted by presence of turbines within the array areas); and
- Overlap of infrastructure and potential interactions during construction.

16.6.1.2.1 Magnitude of Impact – DBS East or DBS West in Isolation

73. Taking into account the embedded mitigation measures outlined in section 16.3.3, including advance promulgation of information regarding activities related to the Projects and ensuring the marking and lighting of related infrastructure is done in consideration of existing oil and gas assets, the magnitude of impact will be negligible.

74. As detailed in section 16.5.2, there are no active oil and gas platforms within the Projects array areas. The only interaction between the Projects and oil and gas infrastructure will be the potential crossing of the pipelines that run through the array areas and potential export cable route.

75. As also detailed in section 16.5.2, the Projects do not overlap with the proposed Northern Endurance Carbon Capture Storage site. While the Projects do overlap with the Southern North Sea Area 1 and 3 carbon capture leasing rounds, this overlap occurs only over a small extent of the areas (see **Figure 16-4**), with no current plans or projects having been leased in these sites. Impacts on pipelines connecting into the Northern Endurance CCS site are assessed in section 16.6.1.3 below.

76. The crossing and proximity agreements will determine how pipeline crossings are enabled and outline the proximity arrangements of construction activities to the existing pipelines. The resultant locations, design and construction methodologies will aim to reduce the physical impact upon other pipelines which may affect their operation.

77. The precise number of pipeline crossings is not yet known as the array cable layout will be determined post consent.

78. Pipeline owners will be consulted by RWE during the development and pre-construction phases of the project. All commercial and technical agreements would be put in place ahead of the commencement of construction. Crossing and proximity agreements would be agreed post-consent during the Projects design period.

79. Engagement with external stakeholders and the promulgation of information regarding planned vessel activities for the Projects will allow for collaboration with oil and gas companies in the use of nearby port facilities, therefore reducing the pressure on their capacity.

16.6.1.2.2 Magnitude of Impact – DBS East and DBS West Together

80. While construction of DBS East and DBS West together would encompass a larger spatial scale than that of either Projects in isolation, taking into account the embedded mitigation measures outlined in section 16.3.3, the magnitude of impact will still be negligible.

16.6.1.2.3 Sensitivity of Receptor

81. Wind farm construction activities have the potential to interfere with the activities of nearby oil and gas operations. Any potential disruption caused to other oil and gas operations could impact the projects construction schedule and increase the likelihood of navigational safety issues. The sensitivity of oil and gas infrastructure to interference is medium.

16.6.1.2.4 Significance of Effect – DBS East or DBS West in Isolation

82. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.2.5 Significance of Effect – DBS East and DBS West Together

83. As above, based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.3 Impact 3: Physical Impacts on Subsea Cables and Pipelines

84. Wind farm construction, operation and decommissioning activities (such as cable and foundation installation, vessel anchoring and debris clearing operations) have the potential to cause damage to the other subsea cables and pipelines in close proximity. This includes the disused UK-Germany 6 subsea cable that routes through the DBS West array area, the potential National Grid HND Bootstrap cable that may route through the array areas, and the active Langeled gas pipeline that routes through the Projects' offshore export cable corridor. Any damage caused to subsea cables/pipelines would be expensive to repair and could disrupt the telecommunications or power supply of the subsea cable operations, or disrupt the flow of product being delivered in the affected pipeline.

16.6.1.3.1 Magnitude of Impact – DBS East or DBS West in Isolation

85. Taking into account the embedded mitigation measures outlined in section 16.3.3, in addition to securing proximity and crossings agreements with operators, any impact is extremely unlikely and therefore the impact magnitude is negligible.

86. The agreements will determine how cable crossings are enabled and outline the proximity arrangements of construction activities to the existing subsea cables. The resultant locations, design and construction methodologies will aim to reduce the physical impact upon other cables which may affect their operation.

87. The precise number of cable crossings is not yet known as the array cable layout will be determined post consent and information on the routes of a number of planned interconnector cables is not available.

88. Cable owners will be consulted by RWE during the development and pre-construction phases the project. All commercial and technical agreements would be put in place ahead of the commencement of construction. Crossing and proximity agreements would be agreed post-consent during the Projects design period.

16.6.1.3.2 Magnitude of Impact – DBS East and DBS West Together

89. The magnitude of impact will be identical in the instance of DBS East and DBS West being built together (taking into account the embedded mitigation measures outlined in section 16.3.3), therefore the impact magnitude is negligible.

16.6.1.3.3 Sensitivity of Receptor

90. A worst-case scenario is assumed as being accidental damage to a subsea cable/pipeline resulting from the wind farm construction activities, reduce the cable/pipeline capacity or make the cable/pipeline operation redundant. It is therefore considered that the sensitivity of the receptor is high.

16.6.1.3.4 Significance of Effect – DBS East or DBS West in Isolation

91. Based on the negligible magnitude and high sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.3.5 Significance of Effect – DBS East and DBS West Together

92. Based on the negligible magnitude and high sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.4 Impact 4: Impacts on Disposal Sites and Aggregate Extraction Sites

93. Wind farm construction, operation and decommissioning activities (such as cable and foundation installation) have the potential to impact on the operation of disposal sites and aggregate extraction sites. This may occur through sediment dispersed by activities for the Projects settling within these sites, or vessel traffic and structures related to the Projects interfering with existing vessel traffic routes to such sites.

16.6.1.4.1 Magnitude of Impact – DBS East or DBS West in Isolation

94. The nearest open disposal site is Bridlington A (HU015), located approximately 7km north of the export cable corridor, with the closest closed disposal site is Bridlington Bay B, located approximately 5.2km north-west of the export cable corridor. The nearest licenced offshore minerals aggregates site to the Projects is the Humber 2 production area, located approximately 47km south-east of the offshore export cable corridor.

95. The assessment conducted in **Chapter 8 Marine Physical Environment** indicates that that the maximum predicted deposition resulting from a sediment plume will be 10-50mm in localised areas immediately adjacent to the foundation installation area. Outside the area of foundation installation, deposition reduces to an average of 1-5mm within 10km of the disturbance. As such, sediment deposition within the Bridlington A and Bridlington Bay B disposal sites will be imperceptible. As the nearest aggregate extraction site is 47km from the offshore export cable corridor, sediments dispersed by the Projects activities will not reach this site.

96. Given the distance between the sites, there will be no impact to the operation of disposal or aggregate extraction sites through overlap of infrastructure or disturbance to existing vessel traffic routes to these sites.

97. Given the imperceptible/lack of impact on disposal sites and aggregate extraction sites, the magnitude of impact is negligible.

16.6.1.4.2 Magnitude of Impact – DBS East and DBS West Together

98. As the distance at which sediment will be transported will remain identical for both Projects being built together, the negligible magnitude determined in section 16.6.1.4.1 above remains the same in this instance.

16.6.1.4.3 Sensitivity of Receptor

99. Any potential disruption to the operation of disposal sites through restricted access or dispersal of significant levels of sediment within their boundaries could result in adverse impacts to the running of the disposal site or a reduction in volume of the site available for disposal of material. Any potential disruption caused to aggregate extraction sites could result in some loss of earnings due to restricted access. It is therefore considered that the sensitivity of these receptors is medium.

16.6.1.4.4 Significance of Effect – DBS East or DBS West in Isolation

100. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect.

16.6.1.4.5 Significance of effect – DBS East and DBS West together

101. Based on the worst case negligible magnitude and medium sensitivity, the significance of effect would be minor adverse. No additional mitigation is considered to be required for this effect

16.6.1.5 Impact 5: Impacts on MOD Activities

102. Wind farm construction, operation and decommissioning activities, due to the presence of infrastructure related to the Projects, could disrupt military exercises planned in the designated PEXAs that the Projects' array areas and offshore export cable corridor are located within.

103. While there is a submarine PEXA listed on admiralty charts in the region, as detailed in section 16.5.7 there is no publicly available information regarding the extent, purpose and current status of this exercise area. As such, it is not possible at this time to assess how construction of the Projects would potentially impact upon this submarine PEXA. Further consultation with the MOD regarding this PEXA will continue to determine the need to consider this PEXA in the ES.

16.6.1.5.1 Magnitude of Impact – DBS East or DBS West in Isolation

104. In isolation, the construction of DBS East would overlap with four PEXAs, in comparison to only three in the instance of DBS West in isolation. All of the PEXAs the Projects array areas and offshore export cable corridor are located within are designated as RAF Danger Areas for Air Combat Training and High Energy Manoeuvres between 5,000 and 66,000ft. Given the maximum height of the turbines will be 450m above mean high water springs (MHWS), equating to approximately 1,477ft which is significantly lower than that of the lowest point of the exercise area which is 5,000ft, the potential for interaction between the Projects and any military practice exercises is minimal.

105. Taking into account the height difference between the installed turbines and the lowest point of the aircraft exercise area, any impact on MOD access to these PEXAs is extremely unlikely and therefore the impact magnitude is negligible.

16.6.1.5.2 Magnitude of Impact – DBS East and DBS West Together

106. While DBS East and DBS West being built together will cover a larger geographical area within the PEXAs, taking into account the lack of interaction between the Projects activities and PEXAs, and the height difference between the maximum height of the turbines and the lowest point of the aircraft exercise area, any impact on MOD access to these PEXAs is extremely unlikely and therefore the impact magnitude is negligible.

16.6.1.5.3 Sensitivity of Receptor

107. Given the wide-ranging geographic area of the PEXAs in the North Sea (shown in **Figure 16-5**), there is sufficient space for planned exercises to be moved to an alternate area to avoid overlap with the Projects activities. However, given that there is no spatial overlap between the exercises and the Projects given the exercises will occur above the maximum height of the turbines, there will not be a requirement for the exercises to move to an alternate area. As such, the sensitivity of the receptor is negligible.

16.6.1.5.4 Significance of Effect – DBS East or DBS West in isolation

108. Based on the worst case negligible magnitude and negligible sensitivity, the significance of effect would be negligible. No additional mitigation is considered to be required for this effect.

16.6.1.5.5 Significance of effect – DBS East and DBS West Together

109. Based on the worst case negligible magnitude and negligible sensitivity, the significance of effect would be negligible. No additional mitigation is considered to be required for this effect.

16.7 Preliminary Assessment of Cumulative Effects

110. As detailed in section 16.4.4, this section presents a preliminary assessment of cumulative effects in relation to infrastructure and other users. The final CEA will be undertaken within the ES chapter.

16.7.1 Initial Screening for Cumulative Effects

111. **Table 16-12** below details the potential cumulative effects that may occur between the Projects and other plans, projects, and activities. Only potential impacts assessed in section 16.6 where the potential for cumulative effects has been identified (minor, moderate or major) will be taken forward to the final CEA (i.e. those assessed as 'no impact' (negligible) are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 16-12 Potential Cumulative Effects

Impact (All phases)	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 1: Potential interference with other wind farms	Yes	High	Plans and projects currently in planning have potential to have cumulative effects on existing offshore wind farms, such as wind wake/productivity losses.
Impact 2: Potential interference with oil & gas and CCS operations including decommissioning activities	Yes	High	Plans and projects currently in planning have potential to have cumulative effects on existing oil and gas infrastructure and proposed CCS projects, such as a reduction in available operational area.

Impact (All phases)	Potential for Cumulative Effects	Data Confidence	Rationale
Impact 3: Physical impacts on subsea cables and pipelines	Yes	Medium	Plans and projects currently in planning have potential to have cumulative effects on existing subsea cables and pipelines, such as an increase in the number of required crossings.
Impact 4: Impacts on disposal sites and aggregate extraction sites	Yes	Medium	Plans and projects currently in planning have potential to have cumulative effects on disposal sites and aggregate extraction sites, such as vessel traffic restrictions.
Impact 5: Impacts on MOD Activities	No	Low	No likely significant effect from the Projects is predicted.

16.7.2 Plans/Projects Considered for Cumulative Impacts

112. A high-level list of plans/projects that may result in cumulative effects with the Projects is detailed in **Table 16-13**. For infrastructure and other users, a search distance of 50km from the offshore development area has been used to determine the initial list of projects considered for the CEA.

113. Plans / projects have been assigned a tier level between 1 and 7, based on the most recent guidance (see **Chapter 6 EIA Methodology**). For the final CEA at ES, this high-level list will be reviewed and screened to ensure all relevant plans / projects are considered in the final assessment. All listed plans / projects will be re-examined at ES to ensure each assigned tier remains accurate at the time of writing.

114. In addition to other offshore wind farms, the classes of projects that could potentially be considered for the cumulative assessment of infrastructure and other users includes:

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

115. With respect to these activities detailed above, the cumulative assessment considers them to be part of the baseline conditions for the surrounding area. As such, it is not expected that the Projects will contribute to cumulative effects with the existing activities in the above list, and therefore these have been have not been the subject of further assessment.

Table 16-13 High-Level List of Plans/Projects Screened for Further Assessment in the Final CEA

Tier	Plan / Project	Distance to Offshore Development Area (km)
Strategic Plans		
7	East Inshore, North East Inshore, East Offshore and North East Offshore Marine Plans	Within offshore development area
Offshore Wind Farms		
2	Dogger Bank A	7
2	Dogger Bank B	17
3	Dogger Bank C	56
6	Dogger Bank D	68 (estimated)
2	Sofia	34
3	Hornsea Project Three	46
4	Hornsea Project Four	20

Tier	Plan / Project	Distance to Offshore Development Area (km)
Carbon Capture and Storage		
3	Northern Endurance CCS	2
7	CCS North Sea Leasing Round – SNS Areas 1 & 3	Within array areas
Subsea Cables		
2	Viking Link Interconnector	29
6	Eastern Link 2 (SEGL2)	2
7	Third Eastern Link HVDC cable (TGDC)*	Crosses offshore export cable corridor
7	Fourth Eastern Link HVDC cable (E4L5)*	Crosses offshore export cable corridor
7	National Grid HND Bootstrap*	Potentially within the array areas

**Cable route not yet finalised*

16.8 Potential Monitoring Requirements

116. Monitoring requirements will be described in the In-Principle Monitoring Plan (IPMP) submitted alongside the DCO application and further developed and agreed with stakeholders prior to construction based on the IPMP and taking account of the final detailed design of the Projects. It is not anticipated, however, that any monitoring specific to infrastructure and other marine users will be required for the Projects.

16.9 Interactions

117. The impacts identified and assessed within each chapter of this report may have the potential to interact with each other. However, in this case there are no potential interactions between impacts on the infrastructure and other users described in this chapter as these are all separate, non-related receptors.

16.10 Inter-relationships

118. For infrastructure and other users, potential inter-relationships between other topics assessed within this PEIR including shipping and navigation & aviation and radar. A summary of the potential inter-relationships between these topics is provided in **Table 16-14**. Overall, no additional effects have been identified as a result of these inter-relationships that would increase the level of the impacts assessed in section 16.5.

Table 16-14 Infrastructure and Other Users Inter-Relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction, Operation and Decommissioning			
Potential interference with other wind farms	Chapter 14: Shipping and Navigation	Section 14.6.1	The presence of DBS East and DBS West construction and operation vessels, and installation of offshore infrastructure has the potential to be a navigational hazard to shipping associated with shipping related to other offshore wind farms. This may result in the diversion of vessels when in transit.
Potential interference with oil and gas	Chapter 14: Shipping	Section 14.6.1	The presence of DBS East and DBS West construction and operation vessels, and installation of offshore

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
operations including decommissioning activities	and Navigation		infrastructure has the potential to be a navigational hazard to shipping associated with oil and gas shipping. This may result in the diversion of vessels when in transit.
Impacts on MOD activities	Chapter 15: Aviation and Radar	Section 15.6.2	The presence of the installed turbines could result in an impact on the effectiveness of military radar in the area of the Projects.

16.11 Summary

119. This chapter has provided a characterisation of the existing environment for infrastructure and other users based on existing public data, which indicated the potential for interactions between the Projects and other nearby offshore wind farms, oil and gas infrastructure, carbon capture and storage sites, subsea cables & pipelines and MOD activities.

120. The assessment of the potential effects the Projects may have on these receptors determined that the sensitivity of the infrastructure and other users receptors ranged from negligible (in the case of MOD activities) to high (in the case of subsea cables and pipelines). However, through the embedded mitigation measures in-built into the Projects design envelope, it was established that the magnitude of each impact would be negligible.

121. As a result of the assessment conducted in this chapter, no significant effects on the infrastructure and other users receptors overlapping / in the vicinity of the Projects are expected to occur.

Table 16-15 Summary of Potential Likely Significant Effects on Infrastructure and Other Users

Potential Impact	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction, Operation and Decommissioning						
Potential interference with other wind farms	Offshore wind farms	Medium	Negligible	Minor Adverse	N/A	Minor Adverse
Potential interference with oil and gas operations including decommissioning activities	Oil and gas infrastructure	Medium	Negligible	Minor Adverse	N/A	Minor Adverse
Physical impacts on subsea cables and pipelines	Subsea cables and pipelines	High	Negligible	Minor Adverse	N/A	Minor Adverse
Impacts on disposal sites and aggregate extraction sites	Disposal sites and aggregate extraction sites	Medium	Negligible	Minor Adverse	N/A	Minor Adverse
Impacts on MOD activities	MOD	Negligible	Negligible	Negligible	N/A	Negligible

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RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Windmill Hill Business Park
Whitehill Way
Swindon
Wiltshire, SN5 6PB