

The Great Grid Upgrade

Sea Link

Preliminary Environmental Information Report

Volume: 1

Part 4 Offshore Scheme

Chapter 8 Shipping and Navigation

Version A

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4.8 Shipping and Navigation

4.8.1 Introduction

4.8.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents information about the preliminary environmental assessment of the likely significant shipping and navigational effects identified to date, that could result from the Proposed Project (as described in **Volume 1, Part 1, Chapter 4, Description of the Proposed Project**).

4.8.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, mitigation measures and the preliminary shipping and navigation residual significant effects that could result from the Proposed Project.

4.8.1.3 The draft Order Limits, which illustrate the boundary of the Proposed Project, are illustrated on **Figure 1.1.1 Draft Order Limits** and the Offshore Scheme Boundary is illustrated on **Figure 1.1.4 Offshore Scheme Boundary**.

4.8.1.4 This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 4, Description of the Proposed Project;**
- **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology;**
- **Volume 1, Part 1, Chapter 6, Scoping Opinion and Consultation;**
- **Volume 1, Part 4, Chapter 1, Evolution of the Offshore Scheme;**
- **Volume 1, Part 4, Chapter 7, Marine Archaeology;**
- **Volume 1, Part 4, Chapter 9, Commercial Fisheries;**
- **Volume 1, Part 4, Chapter 10 Other Sea Users; and**
- **Volume 1, Part 4, Chapter 12, Offshore Inter-Project Cumulative Effects.**

4.8.1.5 This chapter is supported by the following figures:

- **Volume 3, Figure 4.8.A-1 Shipping and navigation study area;**
- **Volume 3, Figure 4.8.A-2 Ports and navigation;**
- **Volume 2, Figure 4.8.A-3 Military practice areas;**
- **Volume 3, Figure 4.8.A-4 Recreation;**
- **Volume 3, Figure 4.8.A-5 Other navigational features;**
- **Volume 3, Figure 4.8.A-6 RNLI search and rescue;**
- **Volume 3, Figure 4.8.A-7 Search and Rescue Helicopter;**
- **Volume 3, Figure 4.8.A-8 MAIB events;**
- **Volume 3, Figure 4.8.A-9 Seasonal vessel track density;**
- **Volume 3, Figure 4.8.A-10 Busiest day;**

- Volume 3, Figure 4.8.A-11 Seasonal vessel tracks by type;
- Volume 3, Figure 4.8.A-12 Vessel tracks by vessel type;
- Volume 3, Figure 4.8.A-13 Vessel length;
- Volume 3, Figure 4.8.A-14 Vessel DWT;
- Volume 3, Figure 4.8.A-15 Vessel draught;
- Volume 3, Figure 4.8.A-16 Vessels at anchor by season;
- Volume 3, Figure 4.8.A-17 Fishing vessels by vessel length and subtype;
- Volume 3, Figure 4.8.A-18 AIS data points with status set to actively fishing by season;
- Volume 3, Figure 4.8.A-19 VMS density and sightings; and
- Volume 3, Figure 4.8.A-20 VMS by ICES sub-rectangle – fishing time by gear type.

4.8.1.6 This chapter is supported by the following appendices:

- Volume 2, Appendix 1.4.A Outline Code of Construction Practice;
- Volume 2, Appendix 1.4.F Outline Schedule of Environmental Commitments and Mitigation Measures; and
- Volume 2, Appendix 4.8.A, Navigational Risk Assessment.

4.8.2 Regulatory and Planning Context

4.8.2.1 This section sets out the legislation and planning policy that is relevant to the preliminary shipping and navigation assessment. A full review of compliance with relevant national and local planning policy will be provided within the Planning Statement that will be submitted as part of the application for Development Consent.

4.8.2.2 Policy generally seeks to minimise shipping and navigation effects from development and to avoid significant adverse effects. This applies particularly to construction, operation, maintenance and decommissioning of the Proposed Project.

Legislation

International conventions

United Nations Convention on the Law of the Sea

4.8.2.3 The United Nations Convention on the Law of the Sea (UNCLOS) (Ref 8.1) is considered the “constitution of the oceans” and represents the result of an unprecedented, and so far never replicated, effort at codification and progressive development of international law.

Convention on the International Regulations for Preventing Collisions at Sea

4.8.2.4 The Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (Ref 8.2) was designed to update and replace the Collision Regulations

of 1960 which were adopted at the same time as the 1960 SOLAS (Safety of Lives at Sea) Convention.

International Convention for the Safety of Life at Sea (SOLAS) Chapter V

- 4.8.2.5 The International Convention for the Safety of Life at Sea (SOLAS) Chapter V (Ref 8.3) is generally regarded as the most important of all international treaties concerning the safety of merchant ships.

National legislation

Marine and Coastal Access Act 2009, Section 69 Subsection (1)(c)

- 4.8.2.6 The Marine and Coastal Access Act 2009 (Ref 8.4) provides the legal mechanism to help ensure clean, healthy, safe and productive and biologically diverse oceans and seas and is the primary legislation relevant to marine development plans.

Submarine Telegraph Act (1885);

- 4.8.2.7 The Act applies to cables in UK waters and was most recently updated by the Merchant Shipping Act 1995 (Ref 8.5). This Act is designed to protect cables by making it an offence to damage a cable and restricting vessels and fishing activities within certain distances of cables.

National Policy

National Policy Statements

- 4.8.2.8 National Policy Statements (NPSs) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Proposed Project would be considered. A review of the NPS was announced in the 2020 Energy white paper: Powering our net zero future. This review was to ensure the NPSs were brought up to date to reflect the policies set out in the white paper. The below information reflects these updates currently under consultation. Table 4.8.1 Table 4.8.3 and Table 4.8.3 below provide details of the elements of NPS (EN-1) Overarching National Policy Statement for Energy (Ref 8.6), NPS for Renewable Energy Infrastructure (EN-3) (Ref 8.7) and NPS for Electricity Networks Infrastructure (EN-5) (Ref 8.8) that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the Environmental Statement (ES).

Table 4.8.1: NPS EN-1 requirements relevant to shipping and navigation (Update for consultation 2023).

NPS EN-1 section	Where this is covered in the PEIR
4.11.5 (part) “ <i>Applicants should consult the MMO (or NRW in Wales) on energy NSIP projects which would affect, or would be likely to affect, any relevant marine areas as defined in the Planning Act 2008 (as amended by s.23 of the Marine and Coastal Access Act 2009)</i> ”.	Section 4.8.3 summarises the scoping opinion and consultation received regarding shipping and navigation. Further detail on the Proposed Project scoping opinion can also

NPS EN-1 section	Where this is covered in the PEIR
4.11.7 (part) <i>“Applicants should make early contact with relevant regulators, including EA or NRW and the MMO, to discuss their requirements for EPs and other consents.”</i>	<p>be found in Volume 1, Part 1, Chapter 6, Scoping Opinion and Consultation.</p> <p>Section 4.8.3 summarises the scoping opinion and consultation received regarding shipping and navigation.</p> <p>Further detail on the Proposed Project scoping opinion can also be found in Volume 1, Part 1, Chapter 6, Scoping Opinion and Consultation.</p>
5.5.38 <i>“Where the proposed development may affect the performance of civil or military aviation CNS, meteorological radars and/or other defence assets an assessment of potential effects should be set out in the ES”.</i>	<p>The NRA identifies military Practice and Exercise areas (PEXA), see Volume 2, Appendix 4.8.A, Navigational Risk Assessment. Other effects on civil or military aviation are covered elsewhere in the PEIR.</p>

Table 4.8.2: NPS EN-3 requirements relevant to shipping and navigation (Update for consultation 2023).

NPS EN-5 section	Where this is covered in the PEIR
3.5.2... <i>“Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage.”</i>	<p>The baseline for shipping and navigation is described in section with preliminary assessment of effects presented in section 4.8.7.</p> <p>The evolution of the Proposed Project is described in further detail in Volume 1, Part 4, Chapter 1, Evolution of the Project in Marine Waters.</p>
3.6.2... <i>“Where flexibility is sought in the consent as a result, applicants should, to the best of their knowledge, assess the likely worst-case environmental, social and economic effects of the proposed development to ensure that the impacts of the project as it may be constructed have been properly assessed”.</i>	<p>The preliminary assessment of effects has considered a worst case effect on other sea users based on current project design information.</p>

Table 4.8.3: NPS EN-5 requirements relevant to shipping and navigation (Update for consultation 2023).

NPS EN-5 section	Where this is covered in the PEIR
<p>2.13.15 <i>“The sensitivities of many coastal locations and of the marine environment as well as the potential environmental, community and other impacts in neighbouring onshore areas, must be considered in the identification onshore connection points”.</i></p> <p>2.13.17 <i>“Onshore connection locations for offshore transmission must seek to minimise environmental and other impacts, both onshore and in the marine environment and including to local communities”.</i></p>	<p>Shipping and navigation characteristics in near-shore locations are described in section 4.8.7.</p>
<p>2.10.15 (part) in relation to Electric and Magnetic Fields (EMFs) <i>“The Applicant should have considered the following factors:</i></p> <ul style="list-style-type: none"> <li data-bbox="395 864 1007 1077">• <i>height, position, insulation and protection (electrical or mechanical as appropriate) measures subject to ensuring compliance with the Electricity Safety, Quality and Continuity Regulations 2002”.</i> 	<p>See Volume 1, Part 1, Chapter 4, Description of the Proposed Project. EMFs are also considered in section 4.8.9.</p>

National Planning Policy Framework

4.8.2.9 The National Planning Policy Framework (NPPF) (Ref 8.9) has the potential to be considered important and relevant to the Secretary of State (SoS) consideration of the Proposed Project. Table 4.8.4 below provides details of the elements of the NPPF that are relevant to this chapter, and how and where they are covered in the PEIR or will be covered within the ES.

Table 4.8.4: NPPF requirements relevant to shipping and navigation.

NPPF section	Where this is covered in the PEIR
<p>Paragraph 40 <i>“Local planning authorities have a key role to play in encouraging other parties to take maximum advantage of the pre-application stage. They cannot require that a developer engages with them before submitting a planning application, but they should encourage take-up of any pre-application services they offer. They should also, where they think this would be beneficial, encourage any applicants who are not already required to do so by law to engage with the local community and, where relevant, with statutory and</i></p>	<p>Statutory and non-statutory consultees have been invited to consultation meetings to give their input into the Proposed Project from a shipping and navigation perspective. Shipping and navigation consultation is summarised in section 4.8.3, and full details are given in Volume 2, Appendix 4.8.A,</p>

NPPF section	Where this is covered in the PEIR
<i>non-statutory consultees, before submitting their applications”.</i>	Navigational Risk Assessment.
<i>Paragraph 170 “In coastal areas, planning policies and decisions should take account of the UK Marine Policy Statement and marine plans. Integrated Coastal Zone Management should be pursued across local authority and land/sea boundaries, to ensure effective alignment of the terrestrial and marine planning regimes”.</i>	The UK Marine Policy Statement and marine plans have been considered, see Table 4.8.5.

Marine Planning Policy

4.8.2.10 The following marine plans have been considered relevant to a study of shipping and navigation and has informed the assessment of preliminary effects in this chapter are as follows:

- The UK Marine Policy Statement (MPS) was adopted in 2011 and provides the policy framework for the preparation of marine plans and establishes how decisions affecting the marine area should be made (Ref 8.10);
- East Inshore and East Offshore Marine Plan (Ref 8.11); and
- South East Inshore Marine Plan (Ref 8.12).

Table 4.8.5: Marine Planning Policies relevant to shipping and navigation.

Marine Plan	Where this is covered in the PEIR
The UK MPS	Section 4.8.7 sets out information relevant to ports and shipping, as well as recreation. A preliminary assessment of effects on the above is presented in section 4.8.9. Further details relevant to this assessment are provided in Volume 2, Appendix 4.8.A, Navigational Risk Assessment
East Inshore and East Offshore Marine Plan	IMO routing measures are discussed in section 4.8.7.6. Potential impacts and mitigation measures are discussed in section 4.8.8 and section 4.8.9. Further details relevant to this assessment are provided in Volume 2, Appendix 4.8.A, Navigational Risk Assessment.

Marine Plan	Where this is covered in the PEIR
South East Inshore Marine Plan	<p>Ports and harbours are considered in section 4.8.7.3.</p> <p>IMO routeing systems are discussed in section 4.8.7.6.</p> <p>Potential impacts and mitigation measures are discussed in section 4.8.8 and section 4.8.9.</p> <p>Further details relevant to this assessment are provided in Volume 2, Appendix 4.8.A Navigational Risk Assessment.</p>

Local Planning Policy

- 4.8.2.11 The intertidal area of the Offshore Scheme lies within the jurisdiction of Suffolk County Council, East Suffolk Council, Suffolk Coastal Local Plan, Kent County Council and within the boundary of Thanet District Council Local Plan and Dover District Local Plan. This chapter considers the Offshore Scheme which extends to Mean High Water Springs (MHWS) only, and therefore Local Plans are outside of the scope of this shipping and navigation chapter. Local Plans state that marine areas to MHWS are instead covered by the Marine Plans (see section 4.8.2.10 above).

4.8.3 Scoping Opinion and Consultation

Scoping

- 4.8.3.1 A Scoping Report (Ref 8.13) for the Proposed Project was issued to the Planning Inspectorate (PINS) on 24 October 2022 and a Scoping Opinion (Ref 8.14) was received from the SoS on 1 December 2022. Table 4.8.6 sets out the comments raised in the Scoping Opinion and how these have been addressed in this PEIR or will be addressed within the ES. The Scoping Opinion takes account of responses from prescribed consultees as appropriate.

Table 4.8.6: Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
5.7.1	The Scoping Report seeks to scope this matter out [<i>Displacement resulting in increased vessel-to-vessel collision risk between third-party vessels during construction, maintenance and decommissioning phases</i>] on the grounds that the project vessels would have a "limited temporal and spatial presence". However, the Scoping Report does not include any	<p>This effect was included in stakeholder consultation and treated accordingly in the shipping and navigation assessment. See Volume 2, Appendix 4.8.A, Navigational Risk Assessment (section 4.8.A.7).</p> <p>Recommendations have been made to address potential risks associated with all vessel collisions (see section 4.8.9).</p>

ID	Inspectorate's comments	Response
	<p>supporting evidence on the number of vessels likely to be required for the different phases of the Proposed Development or the number of third-party vessels that could be displaced. In addition, the advice from the Maritime and Coastal Agency (MCA) is that no matters should be scoped out of assessment prior to the completion of the Navigation Risk Assessment (NRA) and further consultation (see Appendix 2 of this Opinion). It is the Inspectorate's view that scoping this matter out at this stage is premature. Accordingly, the ES should include an assessment of this matter or information demonstrating agreement with the relevant consultation bodies and the absence of a likely significant effect.</p>	
5.7.2	<p>The Scoping Report states that the 10 nautical mile (NM) buffer around the offshore scoping boundary reflects the Zol of the Proposed Development but does not explain why. The ES should clearly justify why the final extent of the study area reflects the Zol of the Proposed Development.</p>	<p>Vessel movement patterns at 10 NM from a given location have a negligible effect on the probability of collision at that location, therefore 10 NM is considered to be a reasonable basis for NRA. The study area is described in section 4.8.6.</p>
5.7.3	<p>While the Scoping Report identifies potential impacts from the Proposed Development in broad terms, the advice from the Maritime and Coastguard Agency (MCA) identifies additional specific impacts which should be covered in assessments:</p> <ul style="list-style-type: none"> • impacts on navigational safety; • visual intrusion and noise; • impacts on risk management and emergency responses including search and rescue; • risk to drifting recreational craft in poor weather or tidal conditions; and • displacement of small craft into the routes of larger commercial vessels. <p>These impacts should be assessed in the ES unless otherwise agreed</p>	<p>This shipping and navigation assessment presented throughout Volume 2, Appendix 4.8.A, Navigational Risk Assessment and in this chapter covers collision risk, navigational safety, risk management and emergency responses including search and rescue, risk to craft in poor weather and all sea states, potential displacement of craft, and any other potential impacts to all shipping categories including small craft.</p> <p>Recommendations have been made to address potential risks affecting all vessel types (see section 4.8.9)</p> <p>Detailed acoustic or visual intrusion impact, above the general disruption of the project presence falls outside</p>

ID	Inspectorate's comments	Response
	with the MCA, in which case evidence of such agreement must be provided in the ES.	the scope of this assessment and is identified as not relevant from MCA and other stakeholders. Visual intrusion and noise is however discussed in Volume 1, Part 4, Chapter 10 Other Sea Users.
5.7.4	The MCA has provided advice on the appropriate methodology to be used in the assessment of under keel clearance (see Appendix 2 of this Opinion). The ES should explain how this methodology has been followed unless otherwise agreed with the MCA, in which case evidence of such agreement must be provided in the ES.	Under-keel clearance has been discussed with the MCA and appropriately addressed as part of the NRA (Volume 2, Appendix 4.8.A, Navigational Risk Assessment). Recommendations have been made to address potential risks associated with under-keel clearance (see section 4.8.9).
5.7.5	The advice from the MCA (see Appendix 2 of this Opinion) identifies the need for a Burial Protection Index (BPI) study and possibly an anchor penetration study. The Applicant should seek to agree with relevant consultation bodies which studies/risk assessments are necessary to support the assessment of likely significant effects in the ES and report them accordingly. The Applicant's attention is also drawn to the advice from the MCA that, in the event that cable protection is required, a reduction of 5% in the surrounding depths (with reference to Chart Datum) is acceptable. The ES should explain how the risk of reduced under keel clearance has been addressed and identify how it would be kept within an acceptable range with supporting evidence from any discussions with the MCA and Trinity House.	BPI study has not been carried out. Collision Risk Burial Assessment (CBRA) and Burial Assessment Study (BAS) have been undertaken which present Anchor Strike Risk based on Anchor Penetration Studies in the public domain. Note that the BAS has included scenarios which are caveated on the different installation techniques which may be suitable to the corridor to mitigate risks from Anchor Strike (as per CBRA), but without a final installation technique identified (to be decided by Marine Installation Contractor after consent and procurement phases are completed), this document will not be definitive. The assessment presented in this chapter and in the associated NRA (Volume 2, Appendix 4.8.A, Navigational Risk Assessment) is based upon a risk based burial approach, with recommended target burial depth, to ensure minimal reduction in depth as far as practicable. The burial risk assessment includes anchor penetration assessment and burial protection requirements and approach.

ID	Inspectorate's comments	Response
		Recommendations have been made to address potential risks associated with under-keel clearance (see section 4.8.9).

Consultation and Project Engagement

- 4.8.3.2 In order to inform the shipping and navigation appraisal, consultation with key relevant maritime stakeholders was undertaken. The consultation meetings and consultees are summarised in Table 4.8.7. The full detail regarding the comments raised during the sessions can be found in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**.
- 4.8.3.3 As a recreational stakeholder, the Cruising Association (CA) was also provided with project information and invited to comment on shipping and navigation considerations for the Proposed Project and attend the recreational session but did not attend. Additionally, Sandwich Port and Haven has been identified as a relevant stakeholder for shipping and navigation and has been invited to comment of the Proposed Project.
- 4.8.3.4 It is also noted that consultation between National Grid and shipping and navigation stakeholders has been ongoing throughout the EIA process for the Proposed Project and has helped to refine the routing of the Offshore Scheme. This input has also been factored into the assessment in this chapter.

Table 4.8.7: Consultation meetings

Date	Meeting	Location	Attendees
24 April 2023	Statutory bodies	Remote meeting	Maritime and Coastguard Agency (MCA) UK Chamber of Shipping (CoS) Trinity House (TH)
28 April 2023	Port and harbour authorities	Remote meeting	Lowestoft and Ipswich (L&I) Harwich Haven Authority (HHA) Port of London Authority (PLA) Ramsgate (R) Port of Felixstowe (PoF)
8 June 2023	Recreation	Remote meeting	Royal Yachting Association (RYA)
30 June 2023	Sandwich Port and Haven	Remote meeting	Sandwich Port and Haven (SPH)

- 4.8.3.5 Some key issues raised are summarised as follows:
- Requests from ports and harbours (in particular the Port of London Authority) to communicate the presence of the cable installation vessel at all times during the

construction phase, so that relevant ports and harbour authorities in the region would know when and where the works would be taking place on a given day during the construction phase;

- Harwich Haven Authority are deepening their deep-water channel at the moment (current vessel limit is 15.9 m draught and are looking at vessels up to 17 m draught), certain vessels using the region are greatly restricted in their ability to manoeuvre and will be having to use that deep water track as well, so this is a consideration for the risk assessment;
- Port of London Authority stated that they are currently dredging to maintain a 20 m depth for future proofing in their channels;
- Harwich Haven Authority noted that pilots board approximately one mile east of the charted Sunk pilot boarding station diamond;
- Harwich Haven Authority and Port of London stated that it is uncommon that vessels will anchor unexpectedly or outside of designated anchorage, and that this is not a common practice;
- At the statutory consultation session for the NRA, Harwich Haven Authority commented that they were not previously aware of rock berms, and anything that would affect the depth of vessels needs to be flagged with them. Harwich Haven Authority stated that it's a concern at the approach to their channel as well. Rock placement in the vicinity of the anchorage areas could also cause an issue for anchoring and create additional risk to vessels anchoring in this area;
- The RYA noted that their area of main interest is the shallow waters along the coasts at each landfall, and in particular the Kent landfall, and highlighted the importance of minimising impact on under-keel clearance and charting the as-built Project locations;
- Sandwich Port and Haven noted that the approach channel to the River Stour changes frequently and is migrating northwards across Pegwell Bay towards the cliffs over time, and so potential reduction in water depth is a key area of interest to this stakeholder; and
- Sandwich Port and Haven noted that the cable-laying vessel may disrupt navigation in the Ramsgate Channel as it will limit the area for boats to go in this tidal region of shallow water.

4.8.3.6 This input from the consultees has been incorporated into the assessment in section 4.8.8 and section 4.8.9, and **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**.

4.8.4 Approach and Methodology

4.8.4.1 **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** sets out the overarching approach which has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the baseline conditions, sensitivity of the receptors and magnitude of effects and sets out the significance criteria that have been used for the preliminary shipping and navigation assessment.

Guidance Specific to the Shipping and Navigation Assessment

4.8.4.2 The preliminary shipping and navigation assessment has been carried out in accordance with the following good practice guidance documents:

- International Maritime Organisation (IMO) Revised Guidelines for Formal Safety Assessment (FSA) for Use in the Rule-Making Process (MSC-MEPC.2/Circ. 12/Rev.2) (Ref 8.15);
- Maritime and Coastguard Agency (MCA) MGN 654 (M+F) Offshore Renewable Energy Installations (OREI) safety response (Ref 8.16);
- IALA Recommendation R1039, Edition 3.0, The Marking of Man-Made Structures (Ref 8.17);
- IALA Guideline G1162, Edition 1.1, The Marking of Offshore Man-Made Structures, Dec 2021 (Ref 8.18); and
- Maritime and Coastguard Agency (MCA) MGN 661 (M+F) Navigation - safe and responsible anchoring and fishing practices (Ref 8.19).

Baseline Data Gathering and Forecasting Methods

4.8.4.3 A Navigational Risk Assessment (NRA) has been produced to support this PEIR chapter and can be found in **Appendix 4.8.A, Navigational Risk Assessment**. This Appendix should be consulted for further detail regarding this assessment. The NRA assesses changes in navigational risk associated with activities and infrastructure of the Proposed Project.

4.8.4.4 To determine the baseline conditions within the study area a desktop study was conducted from a variety of data sources relevant to shipping and navigation. The data sources used are set out in Table 4.8.8.

4.8.4.5 A key data source for the assessment was Automatic Identification System (AIS) data which was used to assess the patterns and intensity of shipping activity in the vicinity of the Offshore Scheme in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**. A full year of AIS data was selected, from 1 March 2022 to 28 February 2023 to cover all seasons. The AIS records were supplied by the industry standard commercial AIS data supplier with all standard parameters (longitude, latitude, vessel Maritime Mobile Service Identity (MMSI) number, status, speed, course, heading and timestamp) and the following additional parameters: deadweight tonnage (DWT), vessel length, vessel draught and vessel type.

Table 4.8.8: Data sources

Title	Source	Year(s) analysed
Navigational features		
Royal Yachting Association (RYA) UK Coastal Atlas of Recreational Boating	RYA	2019
Marine Themes Administrative and Transport Themes	OceanWise	2023
Admiralty charts	UKHO	2022

Title	Source	Year(s) analysed
Admiralty Sailing Directions Dover Strait Pilot (13th Edition) NP28	UKHO	2020
The Shell Channel Pilot (8th Edition)	IMRAY	2017
Admiralty Sailing Directions: North Sea (West) Pilot (11th Edition) NP54	UKHO	2018
Disposal sites	CEFAS	2021
UK wrecks and obstructions data	UKHO	2021
Oil and gas surface structures and pipelines data	NSTA	2023
Offshore renewables lease data	Crown Estate	2022
KIS-ORCA cables data	ESCA	2021
Emergency response & marine incidents		
RNLI lifeboat station locations and SARH base locations	RNLI, Department of Transport	2020
RNLI Return to Service and SARH taskings data	RNLI, Department of Transport	2008-2020 2016-2021
Marine Accident Investigation Branch (MAIB) incidents	MAIB	1992-2021
Marine Traffic Study		
Automatic Identification System (AIS) data	Marine Traffic	2022-2023
Vessel Monitoring System data (VMS)	MMO	2017-2021 2016-2019 2011-2019
Sightings/surveillance data	MMO	2011-2019
Port and harbour authority websites and documentation	Various	2023

Assessment Criteria

- 4.8.4.6 **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** sets out the assessment methodology and the use of specific terminology within an EIA approach and requires the determination of sensitivity of receptors and assessment of the magnitude of impact. However, the MCA MGN 654 - Offshore Renewable Energy Installations (OREI) Safety Response (Ref 8.16) specifies that impacts to shipping and navigation receptors must be assessed via a Formal Safety Assessment (FSA) process (Ref 8.15). Therefore, the FSA approach is instead applied in this chapter and in the associated NRA (**Volume 2, Appendix 4.8.A, Navigational Risk Assessment**).

4.8.4.7 A FSA process provides a systematic method for evaluating and controlling risk, within a structured framework. This process is presented in full in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**.

4.8.4.8 Baseline shipping patterns and navigational features along with stakeholder consultations provide the basis for establishing potential hazards to shipping and navigation. The associated consequences are then characterised in their severity and likelihood in consideration of existing or embedded risk control measures. Risk level is then determined against a risk matrix to establish acceptability. Additional control or mitigation measures are subsequently identified to provide a reduction in risk. The residual effects are then assessed to determine risk acceptability in accordance with the principles of ALARP (As Low As Reasonably Practicable). Where necessary or appropriate, the identified additional mitigation measures are assessed to determine/justify a basic ALARP position. Further detail of the assessment approach can be seen in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**.

Sensitivity

4.8.4.9 The overarching PEIR approach as detailed in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** requires determination of the sensitivity and value of receptors. This is captured within the concept of likelihood in the FSA approach.

Magnitude

4.8.4.10 The overarching PEIR approach as detailed in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology** requires determination of magnitude of impact. This is captured within the FSA concept of consequence severity.

Significance of effects

4.8.4.11 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**, the general approach taken to determining the significance of effect in this preliminary assessment is only to state whether effects are likely or unlikely to be significant, rather than assigning significance levels.

4.8.4.12 However, the FSA process requires that the acceptability of risks, associated with the identified hazards, are determined and addressed such that they are subsequently reduced to a tolerable or ALARP level. There are three possible risk categorisations: broadly acceptable, tolerable (If ALARP) and unacceptable. These levels provide an equivalent to the likely significance of impact (see Table 4.8.9):

- Impacts that are deemed to be unacceptable or not within ALARP, are considered to be likely to be significant in EIA terms; and
- Impacts deemed to be broadly acceptable or tolerable if ALARP, are considered to be unlikely to be significant in EIA terms.

4.8.4.13 The risk level determined via the FSA is captured against the 'likely significance of effect' part of Table 4.8.12. A qualitative judgement is made to provide a determination of "Likely to be Significant" or "Unlikely to be Significant", in accordance with the approach methodology. This is also captured in the same section.

4.8.4.14 It should be noted that the determination of ALARP is based on the implementation of any recommendations and additional risk reduction measures identified in section 4.8.8. Where recommendations are implemented or otherwise resolved and

closed out satisfactorily, no further assessment or determination of risk level or significance level is required.

Table 4.8.9: FSA tolerability rankings against EIA significance

FSA Tolerability	Definition	Significance in EIA terms
Broadly Acceptable (Low Risk)	Generally regarded as acceptable and adequately controlled. At these risk levels the opportunity for further reduction is limited.	Unlikely to be Significant
Tolerable if ALARP (Moderate Risk)	Typical of the risks from activities which people are prepared to tolerate to secure benefits. There is however an expectation that such risks are properly assessed, appropriate mitigation measures are in place, residual risks are as low as reasonably practicable (ALARP) and that risks are periodically reviewed to monitor if further controls are appropriate.	Unlikely to be Significant
Unacceptable (High Risk)	Generally regarded as unacceptable whatever the level of benefit associated with the activity. Significant risk mitigation or design modification required to reduce to tolerable (ALARP).	Likely to be Significant

Assumptions and Limitations

- 4.8.4.15 AIS data forms the basis of the Marine Traffic Study conducted in support of this assessment in **Appendix 4.8.A, Navigational Risk Assessment**, however small fishing and recreation vessels are likely to be underestimated in AIS data. In order to mitigate this, analysis of VMS data has also been included in this chapter to capture a fuller picture of small fishing and recreation vessels. It should however be noted that VMS data does not cover vessels of < 12 m in length, and in the case of the MMO fishing activity by ICES rectangle data, does not include vessels of < 15 m in length. RYA Coastal Atlas data support the study of recreational activity in the region.
- 4.8.4.16 The risk assessment in the FSA is based on worst-case consequence outcomes. This means that where, for example, loss of a crew member is possible, if very unlikely, the risk level directly reflects this consequence outcome. This assumption also translates to the worst-case magnitude in terms of the PEIR approach and methodology.

4.8.4.17 However, no such direct comparison can be made between sensitivity and likelihood or any other concept in the FSA and the PEIR approach. It is therefore necessary to use qualitative judgement to conservatively translate the results of the FSA with the PEIR approach. Although this limitation prevents direct reconciliation of the FSA results with the PEIR approach, the significant effects established here are conservatively based on appreciable worst-case scenarios. In addition, the FSA process recommends further risk reductions on this conservative basis and implementation of these can be considered to appropriately address the significant effects.

4.8.5 Basis of Assessment

4.8.5.1 This section sets out the assumptions that have been made in respect of design flexibility maintained within the Proposed Project and the consideration that has been given to alternative scenarios and the sensitivity of the preliminary assessment to changes in the construction commencement year.

4.8.5.2 Details of the available flexibility and assessment scenarios are presented in **Volume 1, Part 1, Chapter 4 Proposed Project Description** and **Part 1, Chapter 5 PEIR Approach and Methodology**.

Flexibility Assumptions

4.8.5.3 The main preliminary assessments have been undertaken based on the description of the Proposed Project provided in **Volume 1, Part 1 Chapter 4 Description of the Proposed Project**. To take account of the flexibility allowed in the Proposed Project, consideration has been given to the potential for preliminary effects to be of greater or different significance should any of the permanent or temporary infrastructure elements be moved within the Limits of Deviation (LoD) or draft order Limits.

4.8.5.4 The assumptions made regarding the use of flexibility for the main assessment, and any alternatives assumptions are set out in Table 4.8.10 below.

Table 4.8.10: Flexibility assumptions

Element of flexibility	Proposed Project assumption for initial preliminary assessment	Flexibility assumption considered
Lateral LoD marine HVDC cable	The extent of the draft Order Limits for the Proposed Project (Offshore Scheme Boundary).	The worst-case scenario assessed for the Offshore Scheme is one bundled HVDC (x2) and one fibre optic cable in once trench. This bundled scenario maybe placed anywhere within the Offshore Scheme Boundary.

Coordination Including Co-Location

- 4.8.5.5 The Proposed Project includes an option for co-location with National Grid Ventures proposed Nautilus and LionLink interconnector projects as explained in **Volume 1, Part 1, Chapter 5 PEIR Approach and Methodology**.
- 4.8.5.6 details where the option of co-location is relevant to the preliminary shipping and navigation assessment and how this option has been assessed and reported in section 4.8.9 preliminary assessment of effects.

Table 4.8.11: Consideration of co-location

Element of coordination	How it has been considered within the preliminary assessment
Suffolk landfall	Sea Link Only Four ducts (one per cable and one spare).
	Sea Link (with co-location) Up to ten ducts.

Sensitivity Test

- 4.8.5.7 It is likely that under the terms of the draft DCO, construction could commence in any year up to five years from the granting of the DCO which is assumed to be 2026. Consideration has been given to whether the preliminary effects reported would be any different if the works were to commence in any year up to year five. Where there is a difference this is reported in section 4.8.9 preliminary assessment of effects.

4.8.6 Study Area

- 4.8.6.1 The Offshore Scheme (which refers to the collective parts of the Proposed Project within marine waters and is the subject of this chapter) makes landfall in Suffolk up to Mean High Water Springs (MHWS) and runs to landfall in Kent up to MHWS, between approximately 120-121 km in length and located entirely within UK territorial waters. The worst-case scenario for the Offshore Scheme is one bundled HVDC (x2) and one fibre optic cable in one trench. Full details of the Proposed Project can be found in **Volume 1, Part 1, Chapter 4 Description of the Proposed Project**.
- 4.8.6.2 The shipping and navigation study area comprises a 10 nautical mile (NM) buffer (equivalent to an 18.5 km buffer) around the Offshore Scheme. This wide study area reflects the large potential zone of influence (Zol) of the Project in respect to shipping and navigation receptors and provides comprehensive local context to relevant routes and vessel traffic movements within and in proximity to the Offshore Scheme.
- 4.8.6.3 Interactions between the Offshore Scheme and commercial fisheries and other sea users are covered in depth within other chapters of this PEIR, namely **Volume 1, Part 4, Chapter 9 Commercial Fisheries** and **Part 4, Chapter 10 Other Sea Users**. These chapters should be read in conjunction with this chapter.

4.8.7 Baseline Conditions

- 4.8.7.1 The baseline conditions within the study area are summarised below with regard to:
- Identification of key navigational features;
 - Emergency response;
 - Maritime incidents; and
 - Marine Traffic Study (MTS).
- 4.8.7.2 A full description of the baseline conditions relevant to the Offshore Scheme is set out in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment**.

Key Navigational Features

Ports and harbours

- 4.8.7.3 As set out in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment** and displayed in **Figure 4.8.A-2 Ports and navigation**, there are four ports and harbour authority areas which overlap with the shipping and navigation study area, these are:
- Harwich Haven Authority area (approximately 1.2 km from the west of the Offshore Scheme Boundary at its closest point at KP 22);
 - The Port of London Authority area (approximately 9 km to the west of the Offshore Scheme Boundary at its closest point at KP 90);
 - Ramsgate Port (1.1 km to the north of the Offshore Scheme Boundary at the Kent landfall); and
 - Sandwich Port and Haven harbour area (the Kent landfall of the Offshore Scheme Boundary is located within the Sandwich Port and Haven harbour area which has a section of shallow flats in the Haven area, and the final 2.4 km of the Offshore Scheme Boundary crosses through the harbour area). Consultation with Sandwich Port and Haven identified that the approach channel to the River Stour changes frequently and is migrating northwards across Pegwell Bay towards the cliffs over time.
- 4.8.7.4 In relation to the wider region (outside of the study area), the Offshore Scheme passes to the east of Harwich and Felixstowe ports, then passes the mouth of the Thames Estuary and ports within the River Thames and River Medway, before making landfall to the south of Ramsgate, and approximately 19 km to the north of the Dover harbour area. Much of the regional shipping traffic is likely to pass through the study area routing to and from these ports and their facilities. As such, these are also relevant port and harbour authorities for the Offshore Scheme.
- 4.8.7.5 The following navigational features have been considered and are presented in **Figure 4.8.A-2 Ports and navigation**:
- IMO routing;
 - Anchorage areas;
 - Pilot boarding stations and grounds; and
 - Navigational aids including buoys, beacons and navigation lines.

IMO Routeing

- 4.8.7.6 The Sunk is a deep (a small area of exceptional depth) which forms a common access to Harwich Haven and the Thames Estuary (**Figure 4.8.A-2 Ports and navigation**). It is an extremely busy area for shipping, and therefore two Precautionary Areas and a number of TSS have been established across this region to control traffic and reduce the risk of collisions (Ref 8.20).
- 4.8.7.7 The Sunk Vessel Traffic Service (VTS) covers the two Sunk Precautionary Areas (Inner and Outer), as well as the associated TSSs and approach routes (Ref 8.20) (**Figure 4.8.A-2 Ports and navigation**). Within the VTS area, all vessels of 300 gross tonnage (gt) and over are required to comply with the VTS rules.
- 4.8.7.8 The Offshore Scheme enters the region of Sunk routing measures at approximately KP 33 and exits at KP 64 (**Figure 4.8.A-2 Ports and navigation**). The Offshore Scheme Boundary runs through five IMO routeing measures areas, all associated with the Sunk:
- Sunk Inner Precautionary Area (KP 33-36);
 - Sunk Outer Precautionary Area (KP 36-57);
 - Sunk Area to be Avoided (KP 43-44.5);
 - Sunk Traffic Separation Zone (KP 57-58); and
 - Long Sand Head Two-way Route (KP 58-63).
- 4.8.7.9 In addition to this, there are multiple further IMO Routeing Measures within the study area, associated either with Sunk, Northern Approaches to the Thames Estuary or Long Sand Head, as well as The Strait of Dover and Adjacent Waters TSS and an "Area to be Avoided" for the Dover Straits in the southern portion of the study area (**Figure 4.8.A-2 Ports and navigation**).

Anchorage

- 4.8.7.10 As detailed in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment** and displayed in **Figure 4.8.A-2 Ports and navigation**, the two anchorages of particular interest to the Offshore Scheme are the Sunk deep water anchorage area and the Tongue Deep Water Anchorage Area. The Sunk deep water anchorage area intersects marginally with the Offshore Scheme Boundary at its south-western boundary between KP 30-35. Following the next stage of project design, the Offshore Scheme Boundary will be refined to avoid this intersection with The Sunk deep water anchorage. The Tongue Deep Water Anchorage area is located 1.2 km at the closest point to the Offshore Scheme between KP 84-85 and was highlighted during consultation as a significant location by stakeholders. Depths within this anchorage as well as neighbouring the Tongue Hazardous Anchorage area are reported as being mostly in excess of 15 m (Ref 8.20).
- 4.8.7.11 There are a further 10 anchorage areas located within the study area, not including 23 unnamed small craft mooring areas which are all located inshore.

Aids to navigation

- 4.8.7.12 There are 271 Aids to Navigation (106 beacons, 162 buoys and three light vessels) located within the study area. Additional lighted turbines were noted within the study

area that designate the boundary of windfarms (Greater Gabbard, London Array and Thanet) (**Figure 4.8.A-2 Ports and navigation**).

- 4.8.7.13 Two “Navigation lines” and three “Routes” intersect the Offshore Scheme Boundary. They all lead to/from Ramsgate Port between KP 105-110.

Pilotage

- 4.8.7.14 In terms of pilotage, a number of pilot stations and boarding areas are present within the study area, some in close proximity to the Offshore Scheme:

- The Haven Pilot Station lies within the Harwich Haven Authority area and is located approximately 4 km to the west of the Offshore Scheme Boundary at KP 25;
- There is a pilot station located within the Sunk Inner anchorage area to the west of the Offshore Scheme, approximately 9.7 km away at the closest point at KP 33;
- The Sunk Pilot Station associated with the Sunk TSS is located approximately 1.1 km to the south of the Offshore Scheme Boundary at approximately KP 35. Harwich Haven Authority noted at consultation that pilot boarding usually occurs approximately 1 mile east of the marked Sunk pilot station diamond to give them enough sea room before the pilot gets on the bridge;
- The Tongue pilot station is located approximately 250 m to the east of the Offshore Scheme at KP 87.5;
- The NE Spit pilot station is located 4.2 km to the west at KP 95;
- The North East Goodwin pilot station is located 930 m the west of the Offshore Scheme Boundary at KP 105; and
- A pilot boarding area associated with the Port of Ramsgate (the Ramsgate Compulsory Pilotage Area) extends 3 miles from West Pier Light in Ramsgate Harbour (51° 19'.66N, 1° 25'.29E) between the bearings 065° and 145° and overlaps with the Offshore Scheme Boundary from approximately KP 108-112.

Military Practice Areas

- 4.8.7.15 Eight PEXAs intersect the study area, and one (X5119: Kentish Knock) intersects the Offshore Scheme Boundary covering an area of approximately 0.2 km² just before KP 55 at its north-western boundary (**Figure 4.8.A-3 Military practice areas**).

Recreation

- 4.8.7.16 Recreational traffic can be seen routeing around the coastline close inshore, as well as to and from the Thames Estuary (**Figure 4.8.A-4 Recreation**). There are designated General Boating Areas (GBA) at the Suffolk and Kent landfalls of the Offshore Scheme. Generally, boating intensity is lower further offshore, although there is increased intensity around KP 50. There is a discernible area of increased intensity coming to/from the Port of Ramsgate from KP 85 onwards.

Other navigational features

- 4.8.7.17 **Volume 2, Appendix 4.8.A, Navigational Risk Assessment** and **Figure 4.8.A-5 Other navigational features** present other infrastructure and navigational features within the study area and wider region.

- 4.8.7.18 There are a number of offshore windfarms in proximity to the Offshore Scheme. The Greater Gabbard (in operation), North Falls (pre-planning application), London Array (in operation), Galloper (in operation) and the Thanet offshore windfarm (in operation) overlap with the 10 NM study area. A number of windfarm export cable agreement areas associated with Thanet and East Anglia Three and One also intersect the Offshore Scheme Boundary.
- 4.8.7.19 Greater Gabbard is located 6.35 km east of the Offshore Scheme Boundary, North Falls approximately 3.5 km east of the Offshore Scheme Boundary, London Array is 1.18 km west, Galloper is 12 km to the east and Thanet offshore windfarm is 0.62 km to the east.
- 4.8.7.20 Windfarms are further described within **Volume 1, Part 4, Chapter 10 Other Sea Users**.
- 4.8.7.21 Ten active subsea power and telecom cables pass through the Offshore Scheme Boundary, associated both with offshore infrastructure and cross-channel links to mainland Europe. These are further described in **Volume 2, Appendix 4.8.A, Navigational Risk Assessment** and **Volume 1, Part 4, Chapter 10 Other Sea Users**.
- 4.8.7.22 There are a number of open and closed disposal sites which intersect the Offshore Scheme Boundary, see **Volume 1, Part 4, Chapter 10 Other Sea Users** for further detail.
- 4.8.7.23 There are no aggregates, evaporites or mining site agreements located within the Offshore Scheme Boundary but there are aggregates agreements present within the wider study area, three of which are located within 1 km of the Offshore Scheme Boundary (see **Volume 1, Part 4, Chapter 10 Other Sea Users**).
- 4.8.7.24 There are 34 charted wrecks identified from UKHO data within the Offshore Scheme Boundary, and over 1,500 within the study area. **Volume 1, Part 4, Chapter 7, Marine Archaeology** should be consulted for further detail regarding wrecks.
- 4.8.7.25 Sandwich Port and Haven highlighted the Ramsgate Channel as a region of interest during the construction phase, noting that the cable-laying vessel may disrupt navigation in the Ramsgate Channel as it will limit the area for boats to go in this tidal region of shallow water.

Emergency Response

RNLI

- 4.8.7.26 The RNLI has six regions; the study area overlaps with the 'North and East' and 'South East' regions (**Figure 4.8.A- 6 RNLI search and rescue**). There are five lifeboat stations within the study area: Southwold and Aldeburgh on the Suffolk coast and Margate, Ramsgate and Walmer on the Kent coast.

SARH

- 4.8.7.27 As part of the MCA, HM Coastguard initiates and coordinates Search and Rescue (SAR) response around the UK. The study area lies between the Search and Rescue Helicopter (SARH) bases of Humberside to the north (approximately 196 km away at the closest point), St Athan to the west (approximately 316 km away) and Lydd to the south (approximately 37 km away) (**Figure 4.8.A-7 Search and Rescue Helicopter**).

The study area sits fully within the radii of action of three SARH bases (Lydd, Lee-on-Solent and Humberside).

Maritime incidents

- 4.8.7.28 A review of previous marine incidents within the study area can give an indication of the general level of marine incident risk in this region, which may be relevant during the construction phase of the Offshore Scheme. This section considers:
- RNLI Return to Service (launches in response to incidents);
 - SARH taskings; and
 - Marine Accident Investigation Branch (MAIB) incidents.
- 4.8.7.29 The RNLI keeps a record of call-outs to marine incidents. Those in the study area between 2008 and 2020, which were deemed not to be false alarms or hoaxes, are shown in **Figure 4.8.A-6 RNLI search and rescue**. A total of 2,392 unique incidents, were recorded between 2008 and 2020. Of those incidents, 22.2% were due to machinery failure, and 74.7% (1,788 incidents) were within 5 km of shore.
- 4.8.7.30 There were 103 SARH taskings in the study area between April 2016 and March 2021 (**Figure 4.8.A-7 Search and Rescue Helicopter**). One (1) incident occurred within the Offshore Scheme Boundary, near the Kent landfall, within 500 m of shore.
- 4.8.7.31 MAIB works with the Department of Transport and investigates marine accidents involving all vessels within UK waters. The full dataset from 1992-2021 was analysed for this NRA. **Figure 4.8.A-8 MAIB events** shows that incidents have occurred across the study area, with a higher concentration of occurrences in the southern portion. There were 744 incidents recorded within the study area, the most frequent cause of which was collision with another vessel (35.6% of all incidents), of which 63% of cases were vessels with a non-UK flag.

Marine Traffic Survey

AIS data

- 4.8.7.32 The MTS uses vessel traffic data including Automatic Identification System (AIS) and Vessel Monitoring System (VMS) data to establish baseline vessel traffic conditions in the study area, analysing such aspects as vessel type, size and status, as well as a section focussing on fishing traffic. A full year of AIS data has been selected, from 1 March 2022 to 28 February 2023, to cover four contiguous seasons. Key findings are summarised here; for full results of the MTS, refer to **Appendix 4.8.A Navigational Risk Assessment**.
- 4.8.7.33 A total of 85,106 AIS vessel tracks were recorded across the four-season study period within the study area. There were:
- 21,861 tracks in spring (March - May);
 - 28,029 tracks in Summer (June - August);
 - 19,364 tracks in autumn (September - November); and
 - 15,852 tracks in winter (December - February).

- 4.8.7.34 July 2022 was the busiest month with the most tracks at 9,784, while December was the month with the least tracks at 5,169 tracks. Most categories of vessel type remain relatively constant throughout the seasons, with the exception of recreational vessel activity which is significantly higher in the summer months (8,685 tracks) than in the other seasons.
- 4.8.7.35 The predominant vessel type in the study area is "cargo/tanker", which makes up 53.2% of vessel traffic across all seasons, and is split relatively evenly over the four seasons, with between 11,000 - 12,000 tracks per season. The reason for these vessel patterns is likely to be due to the year-round nature of international shipping activity, and due to the importance of clement weather conditions for recreational vessel activity.
- 4.8.7.36 Seasonal AIS vessel track densities are displayed in **4.8.A-9 Seasonal vessel track density**. The patterns of vessel traffic are similar across the seasons, with high intensities of traffic coming into/out of the ports of Felixstowe/Harwich and ports within the River Thames and Medway. There is an additional area of high density in the south-eastern portion of the study area associated with the Dover Straits. Summer vessel traffic out of the port of Ramsgate is also relatively high relative to other seasons. Spring and summer vessel traffic density is higher across all vessel types than autumn and winter.
- 4.8.7.37 As shown in **Figure 4.8.A-12 Vessel tracks by vessel type**, high levels of cargo vessel and tanker traffic is present throughout the majority of the study area, using defined routes to/from ports in the wider region. Between KPs 10 and 100 the Offshore Scheme Boundary intersects with busy cargo/tanker traffic routes, leaving KP 20-30 and KP 60-80 relatively free of cargo and tanker traffic. Coastal portions of the study have low levels of cargo and tanker traffic in comparison with offshore areas.
- 4.8.7.38 Passenger vessel traffic is low in comparison to other vessel types within the study area, but it is present across the study area (**Figure 4.8.A-12 Vessel tracks by vessel type**). There are defined portions of the study area that experience more passenger vessel traffic than others, crossing the Offshore Scheme between KP 10-20, KP 40-50, and KP 90-100, likely associated with UK-Europe ferry services and ports in the wider region.
- 4.8.7.39 Recreational vessel traffic is also present across the study area. Intensity is higher in coastal areas, but there is also evidence of UK-Europe vessel traffic activity, and there are no stretches of the Offshore Scheme that could be said to show no activity. As shown in **Figure 4.8.A-12 Vessel tracks by vessel type**, it is possible however to say that recreational vessel activity tends to be mainly in the spring and summer months.
- 4.8.7.40 Offshore industry vessels can be seen coming to/from ports such as Harwich/Felixstowe and Ramsgate to offshore installations within the study area and wider region (**Figure 4.8.A-12 Vessel tracks by vessel type**). There is distinct offshore industry (including renewables) vessel traffic routeing across the Offshore Scheme between KP 20-50 (likely associated with windfarms located to the east of the Offshore Scheme including Greater Gabbard, Galloper and North Falls), as well as relatively high levels between KP 90-110.
- 4.8.7.41 "Other" vessel traffic is present across the study area, and while there are areas of lower vessel traffic activity, the only portion of the Offshore Scheme that experiences relatively little "other" vessel traffic is between approximately KP 15-25 (**Figure 4.8.A-12 Vessel tracks by vessel type**).

- 4.8.7.42 The spatial distribution of vessels at anchor correlate broadly to charted anchorage areas, notably to the east and north of KP 20-40 and west of KP 80-90 (**Figure 4.8.A-16 Vessels at anchor by season**). There is also an area where vessels appear to anchor regularly around the Kent coast, west of KP 100. These anchorage areas show similar characteristics irrespective of the season.
- 4.8.7.43 Further details of vessel traffic broken down by vessel length, vessel deadweight tonnage (DWT) and draught are set out in **Volume 2, Appendix 4.8.A Navigational Risk Assessment**.

Fishing

- 4.8.7.44 Combined AIS and VMS data indicate that fishing vessels are present across the study area, however they are relatively sparse in relation to the Offshore Scheme until approximately KP 75 (**Figure 4.8.A-17 Fishing vessels by vessel length and subtype**). After this, there appears to be more fishing vessel activity, mainly by vessels in the smaller length classes (<30 m). There appears to be a pattern of transit of north-south routeing which intersects the Offshore Scheme at approximately KP 40 and again at KP 75.
- 4.8.7.45 The majority of fishing vessels appear to be coming into/from the port of Ramsgate, with 41.8% of fishing vessels marking Ramsgate as their previous port, and 42% marking it as their next port. “Trawlers” and “fishing” vessels are the principal subtype of fishing vessel recorded in AIS data within the study area. “Fishing” subtype vessels are mostly travelling to/from Ramsgate, while “trawlers” subtype vessels may be coming into/out of other ports outside of the study area.
- 4.8.7.46 **Figure 4.8.A-20 VMS by ICES sub-rectangle - fishing time by gear type** shows mean time spent fishing by demersal, pelagic and dredge gear types from VMS data. The study area sees low levels of time spent using dredges and pelagic trawl or seine, but higher levels of numbers of demersal trawl or seine, particularly in the south-eastern portion of the study area. Between KP 30 - 40 of the Offshore Scheme there are moderate levels of time spent fishing using demersal trawl or seine, but these levels remain relatively low (an average of 50 - 100 minutes) compared to further south offshore.

Future Baseline

- 4.8.7.47 This baseline has used current and existing information to form this appraisal. Due to uncertainties including the possible future effects of Brexit and the COVID-19 pandemic, it is difficult to predict how this current baseline may change in terms of the magnitude and spatial distribution of shipping activity, and in terms of different types of shipping activity such as fishing or recreation. Additionally, further development of the marine region in terms of future offshore infrastructure including wind farms and oil and gas infrastructure may affect the shipping and navigational baseline presented here. **Volume 1, Part 4, Chapter 10 Other Sea Users** should be referred to, to understand any potential future offshore developments which may be awarded and constructed in the region.

4.8.8 Mitigation

4.8.8.1 As set out in **Volume 1, Part 1, Chapter 5, PEIR Approach and Methodology**, mitigation measures typically fall into one of the three categories: embedded measures; control and management measures; and mitigation measures.

Embedded Measures

4.8.8.2 Embedded measures have been integral in reducing the shipping and navigation effects of the Proposed Project. Measures that that have been incorporated are:

- Sensitive routeing and siting of infrastructure and temporary works;
- Commitments made within **Appendix 1.4.F Outline Schedule of Environmental Commitments and Mitigation Measures**; and
- Early stakeholder consultations.

Control and Management Measures

4.8.8.3 The following measures have been included within **Appendix 1.4.A Outline Code of Construction Practice** relevant to the control and management of impacts that could affect shipping and navigational receptors:

- GM02 - As-built locations of cable and external protection will be supplied to UKHO (Admiralty) and Kingfisher (KIS-ORCA);
- LVS02 - All project vessels must comply with the International Regulations for Preventing Collisions at Sea (1972) (Ref 8.2), regulations relating to International Convention for the Prevention of Pollution from Ships (the MARPOL Convention 73/78) with the aim of preventing and minimising pollution from ships and the international Convention for the Safety of Life at Sea (SOLAS) (Ref 8.3);
- SN01 - A risk based burial approach will be used where cables will be buried to a minimum depth of lowering (DOL) to the top of the cable of 0.5 m (in areas of bedrock), with a target DOL for the Proposed Project of approximately of 1.5 m to 2.5 m, assessing cable protection risk factors such as sediment type, shallow geology, sediment mobility, fishing activity, shipping movements and anchor deployment along the route;
- SN02 - Relevant information will be communicated to other sea users via Notices to Mariners (NtM), Radio Navigation Warnings Navigational Telex (NAVTEX) and/or broadcast warnings;
- SN03 - All Project vessels will display appropriate marks and lights and will always broadcast their status on AIS;
- SN04 - Temporary aids to navigation will be used as required to guide vessels around areas of installation activity;
- SN05 - A compass deviation report will be produced prior to installation;
- SN06 - Guard vessel(s), using RADAR with Automatic RADAR Plotting Aid (ARPA) to monitor vessel activity and predict possible interactions, will be employed to work alongside the installation vessel(s) during cable installation works;

- CF01 - A Fisheries Liaison Officer (FLO) and fisheries working group(s) will be maintained throughout installation to ensure project information is effectively disseminated, dialogue is maintained with the commercial fishing industry and access to home ports is maintained during the main fishing season;
- MPE03 - Cable protection features (e.g. rock placement, mattresses and grout bags) will be installed only where considered necessary for the safe operation of the Project; and
- GG02 - The project design will be compliant with the guidelines and policies relating to electromagnetic fields stated in National Policy Statement EN-5, including the International Commission on Non-Ionizing Radiation Protection guidelines (1998).

Mitigation Measures

4.8.8.4 Mitigation measures are additional topic and site-specific measures which have been applied to mitigate or offset any likely significant effects. Mitigation measures included that are relevant to shipping and navigational receptors are:

- MSNs (Merchant Shipping Notes);
- Compliance with MGN661 Navigation - Safe and responsible anchoring and fishing practices - In line with guidance provided by the UKHO and International Convention for the Safety of Life at Sea (SOLAS) it is recommended that fishing vessels should avoid trawling over installed subsea infrastructure;
- Notification of regular runners including ferry operators - Engagement with regular runners and specifically ferry operators ensures awareness of the installation details which minimises disruption;
- Vessel Traffic Service (VTS) – Existing shore-side systems which range from the provision of simple information messages to ships, such as position of other traffic or meteorological hazard warnings, to extensive management of traffic within a port or waterway;
- Adverse Weather Guidelines - Issued by Ports in response to forecast bad weather. Potentially limits collisions, disruption and sub-surface interactions by deterring vessels from navigating anchoring fishing etc near hazards in bad weather; and
- Operations Weather Envelope limits - Installation operations monitor weather conditions and evaluate critical minimum operational envelope for relevant activities.

4.8.9 Preliminary Assessment of Effects

4.8.9.1 The preliminary assessment of the effects of the Offshore Scheme described in this section considers the embedded, control and management and mitigation measures described in section 4.8.8.

4.8.9.2 For the sensitivity test outlined in section 4.8.5, preliminary effects reported would not be any different if the works were to commence in any year up to year five.

4.8.9.3 Table 4.8.12 presents the preliminary assessment of shipping and navigation effects.

4.8.9.4 The preliminary effects reported below are the same for the Proposed Project on its own, and the Proposed Project with co-location.

Table 4.8.12: Preliminary assessment of shipping and navigation effects.

Preliminary assessment	
Receptor	Passing vessels (all categories)
Potential Impact	Collisions leading to loss of life and major damage to equipment
Proposed Project phase	Construction (Installation/Commissioning) and decommissioning
Duration	Marine cable installation: 0 km to 7 km per day for cable-lay, rates may be higher than 7 km per day for other activities. Landfalls: Approximately 1 year
Mitigation	SN02, SN03, SN04, SN06, LVS02.
Preliminary sensitivity	Low (Remote)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Vessel frequently using established routes and areas affected by the Offshore Scheme
Potential impact	Disruption to multiple vessels using established routes and areas due activities of the Offshore Scheme
Proposed Project phase	Construction (Installation/Commissioning) and decommissioning
Duration	Marine cable installation: 0 km to 7 km per day for cable-lay, rates may be higher than 7 km per day for other activities Landfalls: Approximately 1 year
Mitigation	SN02, SN06, CF02
Preliminary sensitivity	Very High (Likely)
Preliminary magnitude	Small (Low)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because, given the small temporal and spatial footprint of the Offshore Scheme construction activities, the worst-case outcome (significant delays and disruptions) is not

Preliminary assessment	
	considered to constitute large or medium scale changes to prevailing vessel activities, accepted disruption thresholds or lead to a breach of planning policy.
Receptor	Anchoring vessels
Potential Impact	Vessel drags anchor across exposed cable
Proposed Project phase	Construction (Installation/Commissioning) and decommissioning
Duration	Marine cable installation: 0 km to 7 km per day for cable-lay, rates may be higher than 7 km per day for other activities
Mitigation	SN02, SN04, SN06
Preliminary sensitivity	Medium (Unlikely)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Fishing vessels
Potential Impact	Gear snagging
Proposed Project phase	Construction (Installation/Commissioning) and decommissioning
Duration	Marine cable installation: 0 km to 7 km per day for cable-lay, rates may be higher than 7 km per day for other activities
Mitigation	SN02, SN06, CF02
Preliminary sensitivity	Medium (Unlikely)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Passing vessels (all categories)
Potential Impact	Collisions leading to loss of life and major damage to equipment
Proposed Project phase	Operation and maintenance phases
Duration	Maintenance activities during the lifetime of the cable
Mitigation	SN02, SN03, SN04, SN06, LVS02

Preliminary assessment	
Preliminary sensitivity	Low (Remote)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Vessel frequently using established routes and areas affected by the Offshore Scheme maintenance activities
Potential impact	Disruption to multiple vessels using established routes and areas due maintenance activities of the Offshore Scheme
Proposed Project phase	Operation and maintenance phases
Duration	Foreseen maintenance activities during the lifetime of the cable
Mitigation	SN02, SN06
Preliminary sensitivity	Low (Remote)
Preliminary magnitude	Small (Low)
Preliminary likely significance of effect	Unlikely to be Significant (Broadly Acceptable)
Confidence in prediction	High confidence is given to this prediction because, given the expected small temporal and spatial footprint of the foreseen Offshore Scheme maintenance activities, the worst-case outcome, delays, is not considered to constitute large or medium scale changes to prevailing vessel activities, accepted disruption thresholds or lead to a breach of planning policy.
Receptor	Anchoring vessels
Potential Impact	Vessel drags anchor across exposed cable
Proposed Project phase	Operation and maintenance phases
Duration	Lifetime of the cable
Mitigation	GM02, SN01, MPE03
Preliminary sensitivity	Medium (Unlikely)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Fishing vessels

Preliminary assessment	
Potential Impact	Gear Snagging
Proposed Project phase	Operation and maintenance phases
Duration	Lifetime of the cable
Mitigation	SN01, CF01, MPE03
Preliminary sensitivity	Low (Remote)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Deep draught vessels
Potential Impact	Reduction in Under-Keel Clearance
Proposed Project phase	Operation and maintenance phases
Duration	Lifetime of the cable
Mitigation	GM02, SN01
Preliminary sensitivity	Medium (Unlikely)
Preliminary magnitude	Large (High)
Preliminary likely significance of effect	Unlikely to be Significant (ALARP)
Confidence in prediction	High confidence is given to this prediction because the worst-case outcome of vessel collision is loss of life, and the assessment is based on complete baseline data.
Receptor	Vessels navigating with magnetic compass
Potential Impact	EMF Interference with marine navigational equipment
Proposed Project phase	Operation and maintenance phases
Duration	Lifetime of the cable
Mitigation	SN05, GG02
Preliminary sensitivity	Low (Remote)
Preliminary magnitude	Medium (Medium)
Preliminary likely significance of effect	Unlikely to be Significant (Broadly Acceptable)
Confidence in prediction	High confidence is given to this prediction because formal safety assessment found the associated risks to be 'Broadly Acceptable' and therefore requiring no further consideration. Additionally, the worst-case outcome; minor navigational impairments, does not constitute large or medium scale changes to prevailing

Preliminary assessment

vessel activities, accepted thresholds or lead to a breach of planning policy.

Recommendations to Address Significant Effects

4.8.9.5 As part of the FSA process, additional risk reduction measures have been identified to ensure that risks, and therefore significant effects, are reduced to tolerable levels or ALARP and otherwise appropriately managed. Therefore, the significant effects identified in Table 4.8.12 above can be considered as appropriately addressed provided that the following recommendations are implemented or otherwise closed out satisfactorily.

4.8.9.6 The recommendations are captured in the NRA (**Volume 2, Appendix 4.8.A, Navigational Risk Assessment**) and accompanying hazard log, and are listed as follows:

- Communication plans should include protocols or provision establishing effective communication between VTS and TSS operators to ensure ongoing awareness of Offshore Scheme installation fleet locations during the operation among all relevant parties, and in particular to cover the proximity of the installation operation to the Sunk TSS and the associated designated anchorages. The communication plans should also cover appropriate communications with Harwich Haven and Sandwich Port and Haven authorities;
- Construction planning for the landfall activities should take into account availability of small craft channels such that disruption to this vessel class is minimised as far as possible;
- UKHO Temporary/Preliminary Notices to be issued to ports, harbours and pilots, and any other appropriate parties prior to post-lay/as-built survey such that the basic positions of the cable are established and awareness among mariners can be raised immediately;
- The use of temporary aids to navigation for exposed cable sections should be considered to reduce the risk of interactions with fishing gear vessel anchors particularly near designated anchorages. Details, extent and requirements of the markers should be confirmed/established with Trinity House;
- Risk assessment of maintenance activities (excluding inspections) should be undertaken to determine the collision risk level and suitable controls on a case-by-case basis such that both collision risk and disruption to maintenance activities are minimised; and
- Cable protection measures should take due consideration of fishing activity in the baseline data such that those sections of the cable buried or protected within fishing grounds will minimise risk to gear snagging.

4.8.10 Transboundary Effects

4.8.10.1 A transboundary effect is any significant adverse effect on the environment resulting from human activity, the physical origin of which is situated wholly or in part within an area under the jurisdiction of another State.

- 4.8.10.2 All works associated with the Proposed Project fall within the UK jurisdiction (12 NM). Given the distance of the Proposed Project from French waters (approximately 25 km), no significant transboundary effects have been identified. Predicted disturbance from the Proposed Project is short term and local and are therefore not anticipated to be sufficient to influence shipping and navigation receptors outside UK waters, and subsequently cause transboundary effects.
- 4.8.10.3 Furthermore, the PEIR has concluded no significant effects for shipping and navigation receptors in UK waters.

4.8.11 Summary

- 4.8.11.1 The preliminary assessment of likely significant effects presented to shipping and navigation by the Offshore Scheme, has been determined via Formal Safety Assessment (FSA), as part of a Navigational Risk Assessment (**Volume 2, Appendix 4.8.A, Navigational Risk Assessment**). The assessment is based on extensive navigational baseline data, compiled via a study of historical shipping and navigation data, using a wide range of sources and includes participation from a number of stakeholders including the Maritime Coastguard Agency (MCA), Trinity House, Port of London Authority (PLA), Harwich Haven Port Authority and others. The assessment identifies and captures a number of hazards, potential hazardous outcomes, existing control measures and recommendations for further risk reduction, the full detail of which is captured in a hazard log for traceability.
- 4.8.11.2 The assessment determined that all risks to shipping and navigation associated with the offshore scheme are either broadly acceptable or tolerable if ALARP. As such, the risks and therefore any significant effects are considered to be tolerable and ALARP, provided that the recommendations for further risk reduction are implemented or otherwise closed out satisfactorily.
- 4.8.11.3 As part of the PEIR approach and methodology, this PEIR chapter establishes the sensitivity, magnitude, and likely significance of the effects. The outcomes from the FSA serve as a basis, combined with qualitative judgment, to determine these effects, ultimately resulting in the identification of no significant effects (see Table 4.8.12). Given the comprehensive methodology of the FSA, including expert stakeholder involvement and the conservatively assumed worst-case basis used, a high confidence is given to the assessment of each of the effects.
- 4.8.11.4 It should also be noted that the existing embedded mitigation measures, control and management measures and implementation of recommendations for further risk reduction are all required to be in place to ensure that the risks to shipping and navigation, and therefore the significant effects, are appropriately addressed and reduced to ALARP.

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