The Great Grid Upgrade

Sea Link

Sea Link

Volume 6: Environmental Statement

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Version History			
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March 2025	A	Final	For DCO submission
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7. Shipping and Navigation

7.1 Introduction

7.1.1 This chapter of the Environmental Statement (ES) presents information about the environmental assessment of the likely significant shipping and navigation effects that could result from the Proposed Project (as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**).

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

7.1.3 The Order Limits, which illustrate the boundary of the Proposed Project, are illustrated on **Application Document 2.2.1 Overall Location Plan**.

7.1.4 This chapter should be read in conjunction with:

- **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project;**
- **Application Document 6.2.1.5 Part 1 Introduction Chapter 5 Approach and Methodology;**
- **Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and Consultation;**
- **Application Document 7.5.2 Offshore Construction Environmental Management Plan;**
- **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice;**
- **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments (REAC);**
- **Application Document 6.3.4.7.A ES Appendix 4.7.A, Navigational Risk Assessment;**
- **Application Document 6.2.4.6 Part 4 Marine Chapter 6 Marine Archaeology;**
- **Application Document 6.2.4.8 Part 4 Marine Chapter 8 Commercial Fisheries;**
- **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users;** and
- **Application Document 6.2.4.11 Part 4 Marine Chapter 11 Offshore Inter-Project Cumulative Effects.**

7.1.5 This chapter is supported by the following appendices:

- **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment;** and
- **Application Document 6.3.4.7.B ES Appendix 4.7.B Electromagnetic Deviation Study.**

7.2 Regulatory and Planning Context

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

7.2.2 Policy generally seeks to minimise shipping and navigation effects from development and to avoid significant adverse effects.

Legislation

United Nations Convention on the Law of the Sea

7.2.3 The United Nations Convention on the Law of the Sea (UNCLOS) (United Nations (UN), 1982) 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

7.2.4 The Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organisation (IMO), 1972/77) 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

7.2.5 The International Convention for the Safety of Life at Sea (SOLAS) Chapter V (SOLAS, 1974, as amended) is generally regarded as the most important of all international treaties concerning the safety of merchant ships.

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

7.2.6 The Marine and Coastal Access Act 2009 (Marine and Coastal Access Act, 2009) 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)

7.2.7 The Act applies to cables in UK waters and was most recently updated by the Merchant Shipping Act 1995 (Submarine Telegraph Act, 1885). 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

7.2.8 National Policy Statements (NPS) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Proposed Project would be considered. Table 7.1, Table 7.2 and Table 7.3 below provides details of the elements

of NPS for Energy (EN-1) (Department for Energy Security & Net Zero, 2023) NPS for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero, 2023) and NPS for Electricity Networks Infrastructure (EN-5) (Department for Energy & Net Zero, 2023) that are relevant to this chapter.

Table 7.1 NPS EN-1 requirements relevant to shipping and navigation

NPS EN-1 section	Where this is covered in the ES
4.5.7…"*Applicants are encouraged to approach the marine licensing regulator (MMO in England and Natural Resources Wales in Wales) in pre-application, to ensure that they are aware of any needs for additional marine licenses alongside their Development Consent Order application*".	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 7.3, and full details are given in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
4.5.9…"*Applicants are encouraged to refer to Marine Plans at an early stage, such as in pre-application, to inform project planning, for example to avoid less favourable locations as a result of other uses or environmental constraints".*	Marine Plans are considered in Table 7.5 of this document.
5.4.35…"*Applicants should include appropriate avoidance, mitigation, compensation and enhancement measures as an integral part of the proposed development*".	Best practice regarding shipping and navigation and recommended mitigation measures to limit disturbance, during construction as well as operation, maintenance and decommissioning phases, is discussed in Section 7.10.

Table 7.2 NPS EN-3 requirements relevant to shipping and navigation

NPS EN-3 section	Where this is covered in the ES
2.8.179…*" To ensure safety of shipping, applicants should reduce risks to navigational safety to as low as reasonably practicable (ALARP)"*	The reduction of risk to ALARP is discussed in Section 7.9.
2.8.184… *"Applicants should engage with interested parties in the navigation sector early in the pre-application phase of the proposed offshore wind farm or offshore transmission to help identify mitigation measures to reduce navigational risk to ALARP, to facilitate proposed offshore wind development. This includes the MMO or NRW in Wales, MCA, the relevant General Lighthouse Authority, such as Trinity House, the relevant industry bodies (both national and local) and any*	Consultation sessions to discuss shipping and navigation were conducted with the MCA, Trinity House, the RYA and relevant ports and harbour authorities. Section 7.3 summarises the scoping opinion and consultation received regarding shipping and navigation.

NPS EN-3 section	Where this is covered in the ES
representatives of recreational users of the sea, such as the Royal Yachting Association (RYA), who may be affected. This should continue throughout the life of the development including during the construction, operation and decommissioning phases."	Further detail on the Proposed Project scoping opinion and consultation can also be found in **Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and Consultation**, and **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
2.8.187…*"Prior to undertaking assessments, applicants should consider information on internationally recognised sea lanes, which is publicly available".*	IMO Routing Measures are considered in Section 7.7.
2.8.188… "*Applicants should refer in assessments to any relevant, publicly available data available on the Maritime Database".*	A variety of publicly available datasets have been utilised in the shipping and navigation assessment. These are listed in Section 7.3.4.
2.8.189… "*Applicants must undertake a Navigational Risk Assessment (NRA) in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders*."	An NRA has been produced, see **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
2.8.193… *"Where there is a possibility that safety zones will be sought, applicant assessments should include potential effects on navigation and shipping."*	While Statutory Safety Zones are not envisaged to be required by this Project, a longer-term Safety Zone may be required at any wet stored cable end, but if so, this would have a permanent Guard Vessel. Recommended Restricted Zones will be in place around construction vessels, as is standard practice. This is noted in Section 7.8.
2.8.195… "*Applicants should undertake a detailed Navigational Risk Assessment, which includes Search and Rescue Response Assessment and emergency response assessment prior to applying for consent."*	An NRA has been produced, see **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.** Emergency Response and Search and Rescue considerations are discussed in Section 7.7.

Table 7.3 NPS EN-5 requirements relevant to shipping and navigation

NPS EN-5 section	Where this is covered in the ES
2.13.21 *"…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."*	Potential impacts to marine users relating to shipping and navigation at the landfall in Pegwell Bay are considered in Section 7.9.
2.13.23 "…*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*."	Potential impacts to marine users relating to shipping and navigation at the landfall in Pegwell Bay are considered in Section 7.9.

National Planning Policy Framework

7.2.9 The National Planning Policy Framework (NPPF) as revised in December 2024 (Ministry of Housing, Communities & Local Government, 2024) sets out national planning policies that reflect priorities of the Government for operation of the planning system and the economic, social, and environmental aspects of the development and use of land. The NPPF has a strong emphasis on sustainable development, with a presumption in favour of such development. The NPPF has the potential to be considered important and relevant to the SoS' consideration of the Proposed Project.

7.2.10 Table 7.4 below provides details of the elements of the NPPF that are relevant to this chapter, and how and where they are covered in the ES.

Table 7.4 NPPF requirements relevant to shipping and navigation

NPPF section	Where this is covered in the ES
Paragraph 41 "*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 non-statutory consultees, before submitting their applications*".	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 7.3, and full details are given in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
Paragraph 183 *"In coastal areas, planning policies and decisions should take account of the UK Marine Policy Statement and marine plans.*	The UK Marine Policy Statement and marine plans have been considered, see Table 7.5.

NPPF section	Where this is covered in the ES
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".	

Marine Planning Policy

7.2.11 The following marine plans are relevant to shipping and navigation and have informed the assessment of preliminary effects in this chapter:

- The UK Marine Policy Statement (MPS), which 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 (HM Government, 2011);
- East Inshore and East Offshore Marine Plan (Department for Environment, Food and Rural Affairs, 2014); and
- South East Inshore Marine Plan (Department for Environment, Food and Rural Affairs, 2021).

Table 7.5 Marine Planning Policies relevant to shipping and navigation

Marine Plan	Where this is covered in the ES
The UK MPS ensures that marine resources are used in a sustainable way by ensuring biodiversity is protected and conserved by using the precautionary principle and relying on sound evidence.	Section 7.7 sets out information relevant to ports and shipping, as well as recreation. An assessment of effects on the above is presented in Section 7.9. Further details relevant to this assessment are provided in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
East Inshore and East Offshore Marine Plan ensures biodiversity is protected and conserved between Flamborough Head and Felixstowe.	Ports and harbours and IMO routeing measures are considered in Section 7.7. Potential impacts and mitigation measures are discussed in Section 7.9, Section 7.8 and Section 7.10. Further details relevant to this assessment are provided in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.** Additionally, **Application Document 9.94 Planning Statement Addendum** submitted at Deadline 4 considers these policies further.
South East Inshore Marine Plan ensures biodiversity is protected and conserved between Felixstowe and Dover.	Ports and harbours and IMO routeing measures are considered in Section 7.7. Potential impacts and mitigation measures are discussed in Section 7.9, Section 7.8 and Section 7.10.

Marine Plan	Where this is covered in the ES
	Further details relevant to this assessment are provided in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

Local Planning Policy

7.2.12 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.

7.2.13 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 7.2.11 above).

7.3 Scoping Opinion and Consultation

Scoping

7.3.1 A Scoping Report (National Grid, 2022) for the Proposed Project was issued to the Planning Inspectorate (PINS) on 24 October 2022 and a Scoping Opinion was received from the Secretary of State (SoS) on 1 December 2022 (**Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and EIA Consultation**). Table 7.6 sets out the comments raised in the Scoping Opinion and how these have been addressed in this ES. The Scoping Opinion takes account of responses from prescribed consultees as appropriate. **Application Document 5.1 Consultation Report** and **Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and EIA Consultation** provides responses to the comments made by the prescribed consultees at scoping stage and how each comment has been considered.

Table 7.6 Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
5.7.1	The Scoping Report seeks to scope this matter out [*Displacement resulting in increased vessel-to-vessel collision risk between third-party vessels during construction, maintenance and decommissioning phases*] on the grounds that the project vessels would have a "limited temporal and spatial presence". However, the Scoping Report does not include any supporting evidence on the number of vessels likely to be required for the different phases of	This effect was included in discussion during stakeholder consultation and subsequently scoped in and considered in the shipping and navigation assessment in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment**. Recommendations have been made to address potential risks associated with all vessel collisions (see Section 7.9).

ID	Inspectorate's comments	Response
	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.	
5.7.2	The Scoping Report states that the 10 nautical mile (NM) buffer around the offshore scoping boundary reflects the ZoI of the Proposed Development but does not explain why. The ES should clearly justify why the final extent of the study area reflects the ZoI of the Proposed Development.	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 7.6.
5.7.3	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: • 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. These impacts should be assessed in the ES unless otherwise agreed with the MCA, in which case evidence of such agreement must be provided in the ES.	This shipping and navigation assessment presented throughout **Application Document 6.3.4.7.A ES Appendix 4.7.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. Recommendations have been made to address potential risks affecting all vessel types (see Section 7.8 and Section 7.10) Detailed acoustic or visual intrusion impact, above the general disruption of the project presence falls outside the scope of this assessment. Visual intrusion and noise is however discussed in **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users.**
5.7.4	The MCA has provided advice on the appropriate methodology to be used in	Under-keel clearance has been discussed with the MCA and

ID	Inspectorate's comments	Response
	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.	appropriately addressed as part of the NRA (**Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment**). Recommendations have been made to address potential risks associated with under-keel clearance (see Section 7.8 and Section 7.10).
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.	The Cable Burial Risk Assessment (CBRA) undertaken is based upon the Carbon Trust guidance, which was a development of its predecessor, the Burial Protection Index (BPI) method. The CBRA has been applied to the following Burial Assessment Study (BAS) and the protection protocol. Note that as a final installation technique has not yet been identified (to be decided by Marine Installation Contractor after consent and procurement phases are completed), the Project Description (**Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**), informed by the BAS has included scenarios which are caveated on the different installation techniques which may be utilised by the Project to mitigate risks. The assessment presented in this chapter and in the associated NRA (**Application Document 6.3.4.7.A ES Appendix 4.7.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. Recommendations have been made to address potential risks associated with under-keel clearance (see Section 7.8 and Section 7.10).

Statutory Consultation

7.3.2 Statutory consultation for the Proposed Project took place between 24 October and 18 December 2023. A summary of relevant feedback received during statutory consultation relating to shipping and navigation is provided below. Further details on how consultation responses have informed the assessment can be found in **Application Document 5.1 Consultation Report**.

- The MCA emphasised the issue of under-keel clearance, stating that water depth must not be reduced by more than 5% along any section of the cable with respect to Chart Datum. Any locations where this may not be the case should be discussed and agreed with the MCA and relevant Statutory Harbour Authorities. Reduction in under-keel clearance is identified as potential impact in Section 7.9.
- The MCA stated that the matter of potential effects on magnetic compasses through EMFs is considered in terms of impact on navigation safety. This potential impact is noted in Section 7.9.
- The MCA recommended ongoing engagement with the Sunk VTS (Vessel Traffic Service) User Group. Communication is identified as a key recommendation in Section 7.10.
- Harwich Haven Authority states that exclusion zones must not be put in place in the Sunk area or channel. National Grid confirms that no exclusion zones would be sought for either installation or operation of the cable system in these areas.
- Harwich Haven Authority also requests that safety zones not impede vessel traffic movements in the Sunk area or pilot boarding operations. The Proposed Project confirms that Safety Zones are not planned to be implemented within the Sunk region. A longer-term Safety Zone may be required at any wet stored cable end, but if so, this would have a permanent Guard Vessel. Rolling 500 m radius Recommended Restricted Zones (RRZs) will be in place around construction vessels which is noted as an embedded mitigation in Section 7.8.
- Harwich Haven Authority requested that no cable joints are in the Sunk area. This suggestion has been factored into routing and noted as an additional mitigation measure in Section 7.10.
- Harwich Haven Authority states that cable depth must consider a maximum draught of 20 m plus 10 % under-keel clearance, as such, minimum depth required is 22 m below chart datum. This is noted in Section 7.9.
- Harwich Haven Authority suggest that no project vessels which are Restricted in their Ability to Manoeuvre (RAM) are to operate in the wider Sunk area when visibility is below nautical 2 miles, which is to be avoided where possible. This is noted as an additional mitigation measure in Section 7.10.
- Harwich Haven Authority requested that the Offshore Scheme run north of the Storm buoy and W1 buoy. The route was subsequently revised to route north of these two buoys. This is also noted in Section 7.9 and discussed in more detail in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**
- Port of London Authority states that the Proposed Project should avoid disruption to the NE Spit pilot station. The pilot station is identified as being 3.9 km from the Offshore Scheme at the closest point in Section 7.7, and discussed in more detail in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

- Port of Ramsgate expressed concern about potential future impact to commercial ferries. Additional mitigation is recommended to address this in Section 7.10.

Further Engagement

7.3.3 A further targeted consultation exercise on the main changes to the Proposed Project introduced after the 2023 statutory consultation, was undertaken between 8 July and 11 August 2024. Additional consultation was conducted with key shipping and navigation stakeholders. Key comments are listed below, with further detail available in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

- Trinity House stated their main concerns were around the Sunk W1 buoy, Sunk Centre buoy and Gull buoy, which are significant marks in the area. They also highlighted that relevant Statutory Harbour Authorities who provide Aids to Navigation should also be consulted. Key Aids to Navigation which are in proximity to the Offshore Scheme are specified in Section 7.7.
- Trinity House state that they do not always consider buoys suitable mitigation for exposed cables as they would need to be placed very close to the cable to be effective and could create an additional hazard for surface navigation, and therefore further discussions on this matter are needed if this is identified. This need to consult with Trinity House in this event is noted in Section 7.10.
- Trinity House recommends a coordinated plan between ports, pilots and other interested parties for controlling project vessels during Proposed Project surveying and construction. The need for robust communication protocols and plans is highlighted as a key mitigation measure in this chapter, see Section 7.10.
- Trinity House noted that usually buoys are placed 200 m distance from cables or pipelines but consider the Proposed Project cable route being 151 m north of the Sunk W1 buoy to be acceptable, but would not wish to see it any closer, in order to protect both the buoy and the cable. This is noted as an embedded mitigation in Section 7.8.
- Harwich Harbour Authority requests that no Restricted Ability to Manoeuvre (RAM) works conducted by the Proposed Project should run concurrently with RAM works already planned by other project developers in the Sunk area, and requests communication between such parties and that this requirement is written into the Development Consent Order. The Proposed Project will aim to minimise concurrent RAM activities but cannot entirely preclude them as this could result in significant delays that are outside of the Proposed Project's control. This is noted as a mitigation in Section 7.10.
- UK Chamber of Shipping stated that their primary concerns relate to the duration of the construction period in particular in regard to disruption to the Sunk Traffic Separation Scheme (TSS) and increased collision risk, impact upon under-keel clearance, and interaction and alignment with other cables in the area, but that none of these issues are insurmountable. These issues are discussed in Section 7.9.

Summary of Scope of Assessment

7.3.4 Interactions between the Offshore Scheme and commercial fisheries and other sea users are covered in depth within other chapters of this ES, namely **Application Document 6.2.4.8 Part 4 Marine Chapter 8 Commercial Fisheries** and **Application**

Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users. These chapters should be read in conjunction with this chapter.

7.4 Approach and Methodology

7.4.1 **Application Document 6.2.1.5 Part 1 Chapter 5 EIA Approach and Methodology** sets out the overarching approach which has been used in developing the environmental assessment. 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 shipping and navigation assessment.

Guidance Specific to the Shipping and Navigation Assessment

7.4.2 The 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) (IMO, 2018);
- Maritime and Coastguard Agency (MCA) MGN 654 (M+F) Offshore Renewable Energy Installations (OREI) safety response (MCA, 2021b);
- IALA Recommendation R1039, Edition 3.0, The Marking of Man-Made Structures (IALA, 2021a);
- IALA Guideline G1162, Edition 1.1, The Marking of Offshore Man-Made Structures, Dec 2021 (IALA, 2021b); and
- Maritime and Coastguard Agency (MCA) MGN 661 (M+F) Navigation - safe and responsible anchoring and fishing practices (MCA, 2021a).

Baseline Data Gathering and Forecasting Methods

7.4.3 A Navigational Risk Assessment (NRA) has been produced to support this ES chapter and can be found in **Application Document 6.3.4.7.A ES Appendix 4.7.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.

7.4.4 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 7.7.

7.4.5 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 **Application Document 6.3.4.7.A ES Appendix 4.7.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 7.7 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
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

7.4.6 **Application Document 6.2.1.5 Part 1 Chapter 5 EIA 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 (MCA, 2021b) specifies that impacts to shipping and navigation receptors must be assessed via a Formal Safety Assessment (FSA) process (IMO, 2018). Therefore, the FSA approach is instead applied in this chapter and in the associated NRA (**Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment**).

7.4.7 An FSA process provides a systematic method for evaluating and controlling risk, within a structured framework. This process is presented in full in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

7.4.8 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 **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

Sensitivity of shipping and navigation receptors

7.4.9 The overarching PEIR approach as detailed in **Application Document 6.2.1.5 Part 1 Chapter 5 EIA Approach and Methodology** requires determination of the sensitivity and value of receptors. This is captured within the concept of likelihood (or frequency) in the FSA approach.

Magnitude of shipping and navigation effects

7.4.10 The overarching PEIR approach as detailed in **Application Document 6.2.1.5 Part 1 Chapter 5 EIA Approach and Methodology** requires determination of magnitude of impact. This is captured within the FSA concept of consequence severity.

Significance shipping and navigation effects

7.4.11 As set out in **Application Document 6.2.1.5 Part 1 Chapter 5 EIA 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.

7.4.12 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 Table 7.8):

- 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.

7.4.13 The risk level determined via the FSA is captured against the 'likely significance of effect' part of Table 7.8. 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.

7.4.14 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 7.8 and Section 7.10. 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 7.8 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

7.4.15 AIS data forms the basis of the Marine Traffic Study conducted in support of this assessment in **Application Document 6.3.4.7.A ES Appendix 4.7.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.

7.4.16 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 ES approach and methodology.

7.4.17 However, no such direct comparison can be made between sensitivity and likelihood or any other concept in the FSA and the ES approach. It is therefore necessary to use qualitative judgement to conservatively translate the results of the FSA with the ES approach. Although this limitation prevents direct reconciliation of the FSA results with the ES 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.

7.5 Basis of Assessment

7.5.1 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 assessment to changes in the construction commencement year.

7.5.2 Details of the available flexibility and assessment scenarios are presented in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project** and **Application Document 6.2.1.5 Part 1 Chapter 5 Approach and Methodology**.

Flexibility Assumptions

7.5.3 The environmental assessments have been undertaken based on the description of the Proposed Project provided in **Application Document 6.2.1.4 Part 1 Introduction 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 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 Order Limits.

7.5.4 The assumptions made regarding the use of flexibility for the main assessment, and any alternatives assumptions are set out in Table 7.9 below.

Table 7.9 Flexibility assumptions

Element of flexibility	How it has been considered within the assessment?
Lateral Limits of Deviation marine HVDC cable	The worst-case scenario assessed for the Offshore Scheme is two HVDC conductors and one fibre optic cable bundled in a single trench. These bundled cables maybe installed anywhere within the Offshore Scheme Boundary.

Sensitivity Test

7.5.5 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 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 7.11.

7.6 Study Area

7.6.1 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, is approximately 122 km in length and located entirely within UK territorial waters. The worst-case scenario for the Offshore Scheme is two HVDC cables and one fibre optic cable bundled together in one trench. Full details of the Proposed Project can be found in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project.**

7.6.2 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 (ZoI) of the Proposed 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. This 10 NM buffer was presented to shipping and navigation stakeholders and accepted during consultation workshops, and is a standard Study Area for this type of assessment.

7.7 Baseline Conditions

7.7.1 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).

7.7.2 A full description of the baseline conditions relevant to the Offshore Scheme is set out in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment**.

Key Navigational Features

Ports and harbours

7.7.3 As set out in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment** and displayed in **Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**, there are five ports and harbour authority areas which overlap with the shipping and navigation Study Area, these are:

- Sizewell C Harbour Authority area (approximately 3.5 km to the north of the Offshore Scheme Boundary at its closest point at KP1);
- Harwich Haven Authority area (approximately 2.2 km from the west of the Offshore Scheme Boundary at its closest point at KP 24);
- The Port of London Authority area (approximately 9 km to the west of the Offshore Scheme Boundary at its closest point at KP 95;
- Ramsgate Port (1.1 km to the north of the Offshore Scheme Boundary at KP 117); 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 approximately 2.4 km of the Offshore Scheme Boundary crosses through the harbour area from KP 118.5). 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.

7.7.4 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 including London Gateway Port, Port of Tilbury and Medway Port, 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 routeing to and from these ports and their facilities. As such, these are also relevant port and harbour authorities for the Offshore Scheme.

7.7.5 It is also noted that London Gateway Port has statutory dredging powers within certain areas within the Thames Estuary through to the Sunk area. This does not overlap with the Sea Link Order Limits however this extent does fall partially within the Study Area.

~~7.7.5~~7.7.6 The following navigational features have been considered and are presented in **Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**:

- IMO routeing;

- Anchorage areas;
- Pilot boarding stations and grounds; and
- Navigational aids including buoys, beacons and navigation lines.

IMO routeing

~~7.7.6~~7.7.7 The Sunk is a ‘deep’ (a small area of exceptional depth) which forms a common access to Harwich Haven and the Thames Estuary (**Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). It is an extremely busy area for shipping, and therefore two Precautionary Areas (IMO designated areas where ships must navigate with particular caution) and a number of Traffic Separation Schemes (TSS) have been established across this region to control traffic and reduce the risk of collisions (UKHO, 2020).

~~7.7.7~~7.7.8 The Sunk Vessel Traffic Service (VTS) covers the two Sunk Precautionary Areas (Inner and Outer), as well as the associated TSSs and approach routes (UKHO, 2020) (**Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). Within the VTS area, all vessels of 300 gross tonnage (gt) and over are required to comply with the VTS rules.

~~7.7.8~~7.7.9 The Offshore Scheme enters the region of Sunk routing measures at approximately KP 33 and exits at KP 64 (**Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). The Offshore Scheme Boundary runs through five IMO routeing measures areas, all associated with the Sunk:

- Sunk Inner Precautionary Area (KP 35-38);
- Sunk Outer Precautionary Area (KP 38-59);
- Sunk Area to be Avoided (KP 45-47);
- Sunk Traffic Separation Zone (KP 59.5-60); and
- Long Sand Head Two-way Route (KP 60-66).

~~7.7.9~~7.7.10 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 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**).

Anchorages

~~7.7.10~~7.7.11 As detailed in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment** and displayed in **Figure 6.4.4.7.A.2 Ports and Navigation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**, the two anchorages of particular relevance to the Offshore Scheme are the Sunk deep water anchorage area and the Tongue Deep Water Anchorage Area.

7.7.117.7.12 The Offshore Scheme runs close to the Sunk deep water anchorage area along its south-western corner, remaining less than 500 m from it between KP 33-39. The Offshore Scheme avoids overlap with the anchorage area; the distance from the Offshore Scheme and the Sunk deep water anchorage area is 15 m at the closest point at KP 35.

7.7.127.7.13 The Tongue Deep Water Anchorage and Tongue Hazardous Anchorage areas are located 1.4 km at the closest point to the west of the Offshore Scheme between KP 82-88 and was highlighted during consultation as a significant location by stakeholders. Depths within this anchorage area are reported as being mostly in excess of 15 m (UKHO, 2020).

7.7.137.7.14 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.

7.7.147.7.15 Attention is drawn in particular to the potential anchorage point south of Ramsgate Port which is under 670 m to the north of KP 116.5.

Aids to navigation

7.7.157.7.16 There are 271 Aids to Navigation (AtoN) (106 beacons, 162 buoys and three light vessels) identified 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 6.4.4.7.A.2 Ports and Navigation** in in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). There are 3 AtoN located within the Offshore Scheme:

- Sunk W1 buoy (falls within the Offshore Scheme at KP 38.5);
- Unnamed intermittent/seasonal Special buoy (falls within Offshore Scheme at KP 112.5); and
- Unnamed intermittent/seasonal Special buoy (falls within Offshore Scheme at KP 114).

7.7.167.7.17 Stakeholder consultation has also drawn particular attention to the following AtoN:

- Storm buoy (400 m from Offshore Scheme Boundary at KP 35.5);
- Sunk Centre light vessel (less than 10 m from Offshore Scheme Boundary at KP 46); and
- Gull buoy (2 m from the Offshore Scheme Boundary at KP 108.5).

7.7.177.7.18 For full detail on AtoN within close proximity to the Offshore Scheme, please refer to **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

7.7.187.7.19 Two ‘Navigation lines’ and three ‘Routes’ intersect the Offshore Scheme Boundary. They all lead to/from Ramsgate Port between KP 108-112.

Pilotage

7.7.197.7.20 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 5.5 km to the west of the Offshore Scheme Boundary at KP 27;

- There is a pilot station located within the Sunk Inner anchorage area to the west of the Offshore Scheme, approximately 9.8 km away at the closest point at KP 35.5;
- The Sunk Pilot Station associated with the Sunk TSS is located approximately 2 km to the south of the Offshore Scheme Boundary at approximately KP 37. 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 in close proximity at approximately 80 m to the east of the Offshore Scheme at KP 90;
- The NE Spit pilot station is located 3.9 km to the west at KP 97;
- The North East Goodwin pilot station is located 6.9 m the west of the Offshore Scheme Boundary at KP 102;
- The Ramsgate pilot station is charted 1.7 km to the west of the Offshore Scheme at KP 107; 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 110-115.

Military practice areas

~~7.7.20~~7.7.21 Eight military Practice and Exercise Areas (PEXAs) intersect the Study Area, and one (X5119: Kentish Knock) intersects the Offshore Scheme Boundary covering an area of approximately 0.04 km^2 at KP 56.5 at its north-western boundary (**Figure 6.4.4.7.A.3 Military Practice Areas** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**).

Recreation

~~7.7.21~~7.7.22 Recreational traffic can be seen routeing around the coastline close inshore, as well as to and from the Thames Estuary (**Figure 6.4.4.7.A.4 Recreation** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). 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 52. There is a discernible area of increased intensity coming to/from the Port of Ramsgate from KP 85 onwards.

Other navigational features

~~7.7.22~~7.7.23 **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment** and **Figure 6.4.4.7.A.5 Other Navigational Features** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2** present other infrastructure and navigational features within the Study Area and wider region.

~~7.7.23~~7.7.24 There are a number of offshore windfarms in proximity to the Offshore Scheme. The Greater Gabbard (in operation), North Falls (DCO 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.

~~7.7.24~~7.7.25 Greater Gabbard is located 6.6 km east of the Offshore Scheme Boundary, North Falls approximately 3.3 km east of the Offshore Scheme Boundary, Galloper is 12 km to the east, London Array is 1.2 km west, and Thanet offshore windfarm is 740 m to the east.

~~7.7.25~~7.7.26 Windfarms are further described within **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users.**

~~7.7.26~~7.7.27 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 **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment** and **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users.**

~~7.7.27~~7.7.28 There are a number of open and closed disposal sites which intersect the Offshore Scheme Boundary, see **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users** for further detail.

~~7.7.28~~7.7.29 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 **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users**).

~~7.7.29~~7.7.30 There are 34 charted wrecks identified from UKHO data within the Offshore Scheme Boundary, and over 1,500 within the Study Area. **Application Document 6.2.4.6 Part 4 Marine Chapter 6 Marine Archaeology** should be consulted for further detail regarding wrecks.

~~7.7.30~~7.7.31 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

~~7.7.31~~7.7.32 The RNLI has six regions; the Study Area overlaps with the ‘North and East’ and ‘South East’ regions (**Figure 6.4.4.7.A.6 RNLI Search and Rescue** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). 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

~~7.7.32~~7.7.33 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 6.4.4.7.A.7 Search and Rescue Helicopter** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). The Study Area sits fully within the radii of action of three SARH bases (Lydd, Lee-on-Solent and Humberside).

Maritime incidents

7.7.337.7.34 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.

7.7.347.7.35 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 6.4.4.7.A.6 RNLI Search and Rescue** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**. 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.

7.7.357.7.36 There were 103 SARH taskings in the Study Area between April 2016 and March 2021 (**Figure 6.4.4.7.A.7 Search and Rescue Helicopter** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**). One incident occurred within the Offshore Scheme Boundary, near the Kent landfall, within 500 m of shore.

7.7.367.7.37 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 6.4.4.7.A.8 MAIB Events** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2** 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

7.7.377.7.38 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 **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

7.7.387.7.39 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).

~~7.7.39~~7.7.40 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.

~~7.7.40~~7.7.41 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.

~~7.7.41~~7.7.42 Seasonal AIS vessel track densities are displayed in **Figure 6.4.4.7.A.9 Seasonal Vessel Track Density** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 1 of 2**. 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.

~~7.7.42~~7.7.43 As shown in **Figure 6.4.4.7.A.12 Vessel Tracks by Vessel Type** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**, 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 105 the Offshore Scheme Boundary intersects with busy cargo/tanker traffic routes, leaving KP 20-35 and KP 65-80 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.

~~7.7.43~~7.7.44 Passenger vessel traffic is low in comparison to other vessel types within the Study Area, but it is present across the Study Area (**Figure 6.4.4.7.A.12 Vessel Tracks by Vessel Type** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**). There are defined portions of the Study Area that experience more passenger vessel traffic than others, crossing the Offshore Scheme between KP 15-18, KP 46-51, and KP 86-103, likely associated with UK-Europe ferry services and ports in the wider region.

~~7.7.44~~7.7.45 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 6.4.4.7.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.

~~7.7.45~~7.7.46 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 6.4.4.7.A.12 Vessel Tracks by Vessel Type** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**). There is distinct offshore industry (including renewables) vessel traffic routeing across the Offshore Scheme between KP 25-55 (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.

7.7.467.7.47 "Other" vessel traffic is present across the Study Area, and while there are areas of lower vessel traffic activity, the only portions of the Offshore Scheme that experience relatively little "other" vessel traffic are between approximately KP 18-25 and KP 50-55 (**Figure 6.4.4.7.A.12 Vessel Tracks by Vessel Type** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**).

7.7.477.7.48 The spatial distribution of vessels at anchor correlate broadly to charted anchorage areas, notably to the east and north of KP 25-45 (overlapping with the Sunk deep water anchorage area) and west of KP 80-90 (overlapping with the Tongue deep water anchorage area) (**Figure 6.4.4.7.A.16 Vessels at Anchor by Season** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**). There is also an area where vessels appear to anchor regularly around the Kent coast, west of KP 95-100. These anchorage areas show similar characteristics irrespective of the season.

7.7.487.7.49 Further details of vessel traffic broken down by vessel length, vessel deadweight tonnage (DWT) and draught are set out in **Application Document 6.3.4.7.A ES Appendix 4.7.A Navigational Risk Assessment.**

Fishing

7.7.497.7.50 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 80 (**Figure 6.4.4.7.A.17 Fishing Vessels by Vessel Length and Subtype** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**). 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 40-45 and again at KP 55-60.

7.7.507.7.51 AIS data shows that vessels spent some limited time in spring with status set to ‘actively fishing’ directly over the cable route between KP 40-50 within the Sunk TSS, and at approximately KP 80-90 and to the east of the Tongue anchoring designation (**Figure 4.7.A-6.4.4.7.A.18 AIS data points with Status set to Actively Fishing by Season** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2**).

7.7.517.7.52 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.

7.7.527.7.53 **Figure 6.4.4.7.A.20 VMS by ICES sub-rectangle - fishing time by Gear Type** in **Application Document 6.4.4.7.A Navigational Risk Assessment - Figures Part 2 of 2** 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 35-45 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

~~7.7.53~~7.7.54 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. **Application Document 6.2.4.9 Part 4 Marine Chapter 9 Other Sea Users** should be referred to, to understand any potential future offshore developments which may be awarded and constructed in the region.

7.7.55 Of additional consideration is the potential for the ports in this area, including Harwich Haven Authority, Port of London Authority, London Gateway Port, Port of Medway, Port of Tilbury and others, to set out plans for expansion in the future in order to serve larger draught vessels, and therefore undertake dredging campaigns in the region to open up such routes into the Thames Estuary.

7.8 Proposed Project Design and Embedded Mitigation

7.8.1 The Proposed Project has been designed, as far as possible, following the mitigation hierarchy in order to, in the first instance, avoid or minimise shipping and navigation impacts and effects through the process of design development, and by embedding measures into the design of the Proposed Project.

7.8.2 As set out in **Application Document 6.2.1.5 Part 1 Introduction Chapter 5 EIA Approach and Methodology**, mitigation measures typically fall into one of the three categories: embedded measures; control and management measures; and mitigation measures.

Embedded Measures

7.8.3 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 **Application Document 7.5.3.2 Appendix B Register of Environmental Actions and Commitments.**
- Early and continued stakeholder consultations.
- Route design refined to run north of the W1 buoy.
- Presence of Vessel Traffic Service (VTS) in region – 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.
- Establishment of operations weather envelope limits for the construction operations. Installation operations should monitor weather conditions and evaluate critical minimum operational envelope for relevant activities.
- Issuance of Adverse Weather Guidelines as required - 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.

- 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.
- Rolling 500 m radius Recommended Restricted Zones will be in place around construction vessels, to protect both construction vessels (restricted in their ability to manoeuvre) and passing vessels from collision, as is standard practise. Recommended Restricted Zones would be established with communication to stakeholders and advanced notice to all and in liaison with Harwich and Sunk VTS.
- Designing rock berms to reduce snagging risk.
- Cable burial depth and protection is of particular concern in Pegwell Bay with regards to reduction in under-keel clearance and subsequent effect on navigation, as this is a region of shallow water depths, a changing approach channel and challenging navigation. This therefore needs to be taken into account in design and construction, to ensure the project is minimising the risk of introducing seabed hazards in this region.
- The Proposed Project cable will not be routed any closer to the Sunk W1 buoy than the 151 m distance that is currently planned, in order to protect both the buoy and the cable, as agreed with Trinity House.
- As per the 'Relevant Representation of NGET in respect of the North Falls Offshore Windfarm DCO', the Proposed Project agrees that 'The parties will continue to engage during pre-construction and construction with other cable installation projects in the vicinity of the Sunk pilot boarding station. The purpose of this engagement will be to coordinate as far as practicable marine activities which may overlap in time, in order to minimise the impact on shipping and the North Falls construction programme and the construction programme for Five Estuaries Offshore Wind Farm and Sea Link. This will also include, where appropriate, joint engagement with relevant stakeholders (HHA, PLA, Sunk VTS) to help inform and plan construction activities.'
- If a cable repair joint in required during the operational lifetime of the cable, as far as practicable this will be avoided within the Sunk area, but if such a scenario is unavoidable, the Project shall consider potential collision risk and minimize time spent during maintenance in this region as much as possible.

Control and Management Measures

7.8.4 The following measures have been included within **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice** relevant to the control and management of impacts that could affect shipping and navigation 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), 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);

- 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 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;
- MPE02 - The minimum depth of lowering (DOL) to the top of the cable is 0.5 m (in areas of bedrock), with a target DOL for the Proposed Project approximately 1 m to 2.5 m, to be achieved where possible dependant on the seabed geology; and
- 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.

7.9 Assessment of Impacts and Likely Significant Effects

7.9.1 The assessment of the effects of the Offshore Scheme on shipping and navigation receptors described in this section considers the embedded, control and management measures described in Section 7.8.

Table 7.10 Summary of impact pathways and maximum design scenario

Potential Impact	Maximum Design Scenario
Construction	
Collisions with passing vessels leading to loss of life and major damage to equipment	Project vessels are expected to include cable lay vessels, cable barges, trenching vessels, rock placement vessels, guard vessels and specialised support vessels.

Potential Impact	Maximum Design Scenario
	Vessel transit speeds – 4 knots to 12 knots. Vessel operational speeds – 0 km to 7 km per day. Number of crossings - 10 marine in-service power and fibre optic with 9 known developments also likely to cross the Offshore Scheme. Construction works would be expected to start in 2026 and be functionally completed by the end of 2031. Possibility of multiple cable joints which would each take 5 – 7 days to complete.
Disruption to multiple vessels using established routes and areas due activities of the Offshore Scheme	Vessel transit speeds – 4 knots to 12 knots. Vessel operational speeds – 0 km to 7 km per day. Number of crossings - 10 marine in-service power and fibre optic with 9 known developments also likely to cross the Offshore Scheme. Construction works would be expected to start in 2026 and be functionally completed by the end of 2031. Possibility of multiple cable joints which would each take 5 – 7 days to complete.
Vessel drags anchor across exposed cable	As a worst case, the cable is expected to be exposed between lay and protection for a maximum of 5-7 days.
Fishing gear snagging on exposed cables	As a worst case, the cable is expected to be exposed between lay and protection for a maximum of 5-7 days.
Reduction in Under-Keel Clearance	Any temporary reduction in under-keel clearance during installation: there may be some temporary reduction in some areas of the Offshore Scheme.
Operation & Maintenance	
Collisions with passing vessels leading to loss of life and major damage to equipment	The Offshore Scheme is designed for a lifespan of approximately 40-60 years. The cable system installation is designed such that a regular maintenance regime is not required to maintain the integrity of the cable. However, monitoring may indicate that localised lengths along the cable may require maintenance. Cable repairs may be required at any time however these are expected to be rare.
Disruption to multiple vessels using established routes and areas due maintenance activities of the Offshore Scheme	

Potential Impact	Maximum Design Scenario
Vessel drags anchor into cable	Shallower burial locations due to the variability of geotechnical considerations, may be possible at some locations along the Offshore Scheme.
Fishing vessel gear snagging	Placement of remedial rock berms. Rock berms will be 7 m wide (no lowering) at the base giving a total area of loss of 0.084 km^2 over a length of 12 km. 0.017 km^2 rock backfill over a length of 38 km (between KP35 to KP 58, and between KP81.5 to KP96.5). Rock bags/concrete mattresses measuring 0.3 m x 3.0 m x 6.0 m or 0.45 m x 3.0 m x 6.0 m. Assumed to be five per HDD exit at both landfalls. 0.05 km^2 from concrete mattresses/rock berm protection at cable crossings. There are ten in-service cable crossings that will require protection (maximum footprint of 0.005 km^2 per crossing). The maximum number of expected cable joint locations is expected to be two. These locations should be fishing gear friendly but still present a higher risk of fishing gear snagging.
Reduction in Under-Keel Clearance	~~2.5 % of the cable exceeds 5°. This occurs at the Kent end of the cable where it the water is particularly shallow over several km.~~As set out in the CBRA, the cable's main protection strategy is via Depth of Lowering. Therefore it is not expected that under-keel clearance will be reduced except at cable crossing locations where rock berms may be required. Additionally, ports have requested that specific dredge depths are safeguarded in specific areas, therefore Depth of Lowering may need to be increased in these areas to achieve this. Expected locations where under-keel clearance may be reduced due to cable crossings, and the PLA Areas of Safeguarded Depth, are set out in **Application Document 9.74 Shipping and Navigation Under-Keel Clearance Marine Engineering Technical Note [REP1A-038]** .
EMF Interference with marine navigational equipment	Expected EMF interference is detailed in the **Application Document 6.~~3.4.7.B ES Appendix 4.7.B~~5 Electromagnetic ~~Deviation Study~~ Field Compliance Report [APP-289].**

Potential Impact	Maximum Design Scenario
Decommissioning	
Collisions with passing vessels leading to loss of life and major damage to equipment	There is a total estimated duration of decommissioning of two years. It is not yet determined if redundant cables could be recovered for recycling or left in-situ (in whole or in part). The maximum design scenario could be considered to be full removal of the marine cable, although this would be expected to require fewer vessels than in the construction phase.
Disruption to multiple vessels using established routes and areas due activities of the Offshore Scheme	There is a total estimated duration of decommissioning of two years. It is not yet determined if redundant cables could be recovered for recycling or left in-situ (in whole or in part). The maximum design scenario could be considered to be full removal of the marine cable, although his would be expected to require fewer vessels than in the construction phase.
Vessel drags anchor across exposed cable	It is not yet determined if redundant cables could be recovered for recycling or left in-situ (in whole or in part). The maximum design scenario could be considered to be full removal of the marine cable, which could be temporarily exposed at certain points during recovery depending on the method used.
Fishing vessel gear snagging	It is not yet determined if redundant cables could be recovered for recycling or left in-situ (in whole or in part). The maximum design scenario could be considered to be full removal of the marine cable, which could be temporarily exposed at certain points during recovery depending on the method used.

Construction and Decommissioning Phase

Collisions leading to loss of life and major damage to equipment

7.9.2 All phases of the Offshore Scheme require the use of large construction vessels, barges or otherwise large slow-moving vessels that may be constrained by their operations and hence restricted in their ability to manoeuvre. The presence of stationary barges and vessels involved in the preparation of landfall arrangements, or vessels associated with the progressive cable installation will therefore present an obstacle to all passing traffic, and hence may increase the risk of collisions in the area. Vessel collisions can occur between passing vessels and the installation operation vessels or between two or more third party vessels due to for example the restriction in sea room caused by the operation.

7.9.3 There are a number of key locations where risk of collision is a greater focus:

- where the Offshore Scheme routes through the Sunk Traffic Separation Scheme (TSS);
- where the Offshore Scheme passes in close proximity to the Sunk pilot station;
- where the Offshore Scheme passes in close proximity to the Tongue pilot station; and
- where the Offshore Scheme routes through shallow and inshore waters, where there is greater presence of smaller and recreational vessels, in particular from KP 108 to the Kent landfall as the Offshore Scheme routes through the Ramsgate compulsory pilotage area, through the Ramsgate Channel and within Pegwell Bay.

7.9.4 The Kent landfall passes through Sandwich Port and Haven Commissioners harbour area. Communication in advance of and during construction is key within this region of very shallow water, which can be exposed at low tide. This is an area of difficult navigation for vessels entering/exiting the River Stour, therefore vessels may be constrained in their movements and routes through the area. Recreational boaters have had incidents with cable installation activities here in the past (on Nemo project).

7.9.5 Sizewell C (SCZ) is a consented Nuclear Power Station facility which is currently under construction approximately 3.5 km north of the Sea Link Offshore Scheme, and includes a Main Development Site (MDS) and its own Harbour Authority Area. This site and construction will include works which will require vessels to pass through the Offshore Scheme area to reach the Sizewell C Main Development Site. The construction may overlap temporally with Sea Link construction works, and so Sizewell C-bound vessels will therefore potentially be required to route around Sea Link vessels during the installation activities.

7.9.6 Should a collision incident occur, it is most likely to result in minor damage to vessels, no harm to people and no substantial commercial effects. Mitigations will be embedded to minimise the time installation or decommissioning vessels spend in any given area or location, via cable route design and installation and decommissioning method optimisations. As requested by Harwich Haven Authority during consultation, cable joints within the Sunk area will be minimised as far as practicable to further reduce the installation vessel time spent here during cable lay, and therefore reduce collision risk.

7.9.7 Mitigation measures such as Notice to Mariners (NtM), Notification of Regular Runners, guard vessel patrol, Sécurité broadcasts on VHF, stakeholder consultations, and communication efforts between harbour authorities and marine organizations will increase awareness of the operations among vessels in the area and therefore represent robust risk reduction measures.

7.9.8 As identified during stakeholder consultation, enhanced operational communication protocols will be developed to ensure the Sunk VTS User Group members as well as all other relevant parties (including VTS operators, SHAs (Statutory Harbour Authorities), Competent Harbour Authorities (CHAs) and other relevant stakeholders) are appropriately informed of the operation activities and aware of the installation positions and schedules. This will take the form of a Navigation Installation Plan (NIP).

7.9.9 North Falls (export cables), NeuConnect, and Five Estuaries projects are expected to intersect the Offshore Scheme including crossings. Project vessels for the Sizewell C construction activities are expected to also route across the Offshore Scheme route. In the event that simultaneous operations occur during installation, maintenance or

decommissioning activities for the Project and other offshore developments, the Project will have project vessel management procedures and planned protocols to minimize disruption to third-party vessels which may lead to increased collision risk. In particular, Harwich Haven Authority identified the need to minimize concurrent Restricted Ability to Manoeuvre (RAM) operations with other planned offshore projects. This will be avoided where possible through communication and coordination with such projects.

7.9.10 Communication planning or protocols will also incorporate recommendations from Harwich Haven to avoid RAM vessel operations in the Sunk area when visibility is below 2 nautical miles where practicable, and from Sandwich Port and Haven who recommend promulgating information to small vessels using harbour facilities via Harbour Masters as inexperienced mariners may be at risk of collision with installation vessels, in particular at the Ramsgate Channel where leisure crafts are prevalent. In line with discussions with Harwich Haven Authority during consultation, the Offshore Scheme passes through the Sunk north of the W1 buoy and further from the Sunk pilot station, minimising collision risk with vessels engaged in pilot boarding activities at the Sunk pilot boarding station.

7.9.11 Based on the embedded control and management measures identified, the impact of vessel collisions on all vessel types leading in the worst case scenario to loss of life, potential pollution, and major damage to equipment is of Low (Remote) sensitivity, and assessed as Major (High) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Disruption to established vessel routes and areas

7.9.12 Some disruption to routine vessel routeing and any other scheduled activity is expected during the construction phases. The vessels used during these phases potentially include stationary barges and other vessels that are restricted in their ability to manoeuvre. The operation will present temporary obstacles, and other vessels routinely operating in the area may be required to deviate from their planned routes or plan for longer transits in order to cross the cable path or otherwise avoid the obstruction. Should temporary disruption occur, commercial consequences could be possible.

7.9.13 Due to the presence of Harwich, Felixstowe, Ramsgate, the Sizewell C Harbour Authority Area, Port of London and other ports in the wider area, this region is a very busy shipping area. Although the Offshore Scheme has been refined based on consultation with users of the Sunk TSS to minimise disruption, the construction and decommissioning operations still present potential for disruption through restricting sea room in the TSS. The Offshore Scheme also passes near to a number of pilot stations and Aids to Navigation (AtoN), in particular the Storm buoy, Sunk pilot station, Sunk W1 buoy, Sunk centre light vessel, Tongue pilot station, Ramsgate pilot station and Gull buoy, as well as directly through the Ramsgate compulsory pilotage area, all of which may be at risk of potential disruption. Trinity House stated their main concerns were around the Sunk W1 buoy, Sunk Centre buoy and Gull buoy, which are significant marks in the area.

7.9.14 Passenger craft and smaller craft may also be significantly disrupted in the inshore areas due to the limited sea room and the potentially stationary obstacles required for activities associated with the landfalls. It is noted that the disruption may be particularly pronounced at the Kent landfall where the exit pit location is expected to be within very shallow water depths and potentially within the Sandwich Port and Haven Authority area. Disruption may also be expected in particular in the Ramsgate Channel east of

the Kent landfall where sea room is restricted, as identified through consultation with Sandwich Port and Haven.

7.9.15 The Port of Ramsgate has expressed concern about potential future disruption to commercial ferries which may route out of the port.

7.9.16 Trinity House noted that usually buoys are placed 200 m distance from cables or pipelines but consider the Proposed Project cable route being 151 m north of the Sunk W1 buoy to be acceptable, but would not wish to see it any closer, in order to protect both the buoy and the cable. The Project has therefore committed to not moving the cable any closer than 151 m to the Sunk W1 buoy.

7.9.17 London Gateway Port has highlighted that the presence of a 500 m radius rolling Safety Zone (Recommended Restricted Zone or RRZ) around the cable lay vessel as it moves through the Sunk TSS during the construction phase could represent a temporary block to vessel traffic, potentially causing disruption to vessel routeing and some delays for vessels moving through the Sunk TSS, noting the importance of precise timing through the Sunk due to dynamic tidal conditions and defined time windows to route to and from ports in the Thames Estuary.

~~7.9.17~~7.9.18 Sizewell C will also have significant cross routes during its construction phase, and it is expected that vessels routeing to and from Sizewell C Harbour Authority Area will transit through the Offshore Scheme Boundaries and may overlap temporally with ~~theconstruction~~the construction phase. Disruption is expected to be minor, as all installation activities will be transient through the areas where Sizewell C traffic will transit, and there will be no extended disruption at any one point, so will not require a permanent change to the proposed routes. However, mitigation measures will be required.

~~7.9.18~~7.9.19 As identified during stakeholder consultation, enhanced operational communication protocols will be developed to ensure the Sunk VTS User Group members as well as all other relevant parties (including VTS operators, SHAs, CHAs and other relevant stakeholders) are appropriately informed of the operation activities and aware of the installation positions and schedules. Safety Zones (RRZ) around construction vessels would be established with communication to stakeholders and with liaison and advance notice to the key ports. Additionally, protocols will be established for communication between these parties and the installation vessels to ensure that the location of operations is always identified. This will enable better planning to help mitigate disruption and facilitate effective communication and management of the affected vessels during the construction and decommissioning phases. This will take the form of a Navigation Installation Plan (NIP).

~~7.9.19~~7.9.20 Mitigations will be embedded to minimise the time installation or decommissioning vessels spend in any given area or location, via cable route design and installation and decommissioning method optimisations. As requested by Harwich Haven Authority during consultation, cable joints within the Sunk area will be minimised as far as practicable to further reduce the installation vessel time spent here during cable lay, and therefore reduce potential disruption.

~~7.9.20~~7.9.21 North Falls (export cables), NeuConnect, and Five Estuaries projects are expected to intersect the Offshore Scheme including crossings. Project vessels for the Sizewell C construction activities are expected to also route across the Offshore Scheme route. In the event that simultaneous operations occur during installation, maintenance or decommissioning activities for the Project and other offshore developments, the Project will have project vessel management procedures and

planned protocols to minimize disruption to established vessel routes and areas. Harwich Haven Authority identified the need to minimize concurrent Restricted Ability to Manoeuvre (RAM) operations with other planned offshore projects. This will be avoided where possible through communication and coordination with such projects.

~~7.9.21~~7.9.22 In line with discussions with Harwich Haven Authority during consultation, the Offshore Scheme passes through the Sunk north of the W1 buoy and further from the Sunk pilot station, minimising the potential disruption of vessels engaged in pilot boarding activities at the Sunk pilot boarding station.

~~7.9.22~~7.9.23 To minimise disruption to small craft in the inshore areas, construction planning activities will assess the availability of small craft channels such that disruption might be minimised to this vessel class.

~~7.9.23~~7.9.24 Based on the embedded control and management measures identified, the impact of Offshore Scheme operations on all vessel types leading to disruption to established vessel routes and areas is of Very High (Likely) sensitivity and assessed as Minor (Low) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Vessel drags anchor across exposed cable

~~7.9.24~~7.9.25 During the construction phase, there is a risk that a third-party vessel will drop anchor or lose its holding ground in adverse weather and subsequently drag its anchor over a section of exposed cable prior to any required protection being installed. In the case of an anchor snagging incident, it is possible, in the worst case, that smaller vessels could suffer a risk of foundering should they not be able to free themselves.

~~7.9.25~~7.9.26 There are a number of key locations along the Offshore Scheme where anchor snagging is of particular focus:

- the Offshore Scheme passes very close to the designated Sunk deep water anchorage area between KP 33-39;
- the planned cable route is approximately 2 km from the Sunk pilot station at the closest point at KP 37;
- the Offshore Scheme passes close to the Tongue Deep Water and Tongue Hazardous anchorages at KP 82-88; and
- the Tongue pilot station is located approximately 80 m to the east of the Offshore Scheme at KP 90.

~~7.9.26~~7.9.27 The close proximity of the Offshore Scheme to these locations presents an increased risk of damage by accidental anchor drop, anchoring outside of the anchorage area or dragging of anchors across the cable, due to bad weather and or poor anchor penetration. It should also be noted such incidents may include some of the largest vessels in the world. Consequences could therefore also include commercial effects as well as potential for pollution incidents.

~~7.9.27~~7.9.28 After consultation with Harwich Haven Authority, the Offshore Scheme has been refined to pass north of the Sunk W1 buoy. This results in increased distance from the Sunk pilot station, reducing the risk of interactions between project construction vessels and vessels visiting the pilot station. However, the Offshore Scheme's increased proximity to the Sunk deep water anchorage area represents an increase in risk of anchor dragging throughout the life of the Proposed Project.

7.9.287.9.29 Consultation with ports and harbour authorities confirmed that unplanned anchoring around the Sunk is very rare and not normal practice, with no incidents in recent memory recalled. Sandwich Port and Haven also identified that anchoring in the middle of Pegwell Bay is also very rare.

7.9.297.9.30 The risk-based cable burial approach and route selection process serve to reduce risks to both the cable and shipping by minimising vulnerabilities, which include pre-lay preparations and reducing the time between cable lay and burial.

7.9.307.9.31 Raising awareness of the operation details and associated hazards among the harbours, ports and pilots such as via NtMs and other communications, will provide appropriate risk reduction.

7.9.317.9.32 Industry guidelines, in particular MGN 661, are in place to deter vessels from anchoring in the vicinity of cables and other seabed hazards. The use of Aids to Navigation will be considered where sections of the cable are expected to be exposed for significant lengths of time prior to burial, while noting that during consultation Trinity House stated that they do not always consider buoys suitable mitigation for exposed cables. Marking requirements will be according to recommendations and approvals from Trinity House.

7.9.327.9.33 Based on the embedded control and management measures identified, the potential impact of anchor snagging on all vessel types is of Medium (Unlikely) sensitivity and assessed as Minor (Low) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Fishing gear snagging

7.9.337.9.34 Fishing vessels whose gear becomes snagged on the cable prior to burial or protection may sustain extensive damage or suffer foundering during the construction phases of the Offshore Scheme. Pre-lay preparation such as ploughing may also result in the creation of berms and rock displacement which presents additional seabed hazards to fishing gear.

7.9.347.9.35 Fishing vessel presence is generally low or sparse across much of the Offshore Scheme. Key areas of fishing vessel presence are identified from the baseline (section 7.7) as being:

- between KP 35-45 of the Offshore Scheme there are low-moderate levels of time spent fishing using demersal trawl or seine, and moderate density of vessels travelling under 6 knots in VMS data;
- from KP 80-90 where AIS data showed that vessels spent some limited time in spring with status set to ‘actively fishing’; and
- from KP 80 onwards to close to the Kent landfall (KP 118) small-medium fishing vessels are present in AIS data, mainly routeing to and from the Port of Ramsgate.

7.9.357.9.36 Consequences for interactions with fishing gear could include damage to vessels, potential harm to people, commercial effects, as well as potential for pollution incidents.

7.9.367.9.37 To mitigate the risk of fishing gear interactions during the construction and decommissioning phase, several measures have been or will be implemented. These include the appointment of a Fisheries Liaison Officer (FLO) throughout the construction period, the planned issuance of Kingfisher notifications and Notice to Mariners (NtMs), and the provision of other relevant marine warnings.

~~7.9.37~~7.9.38 The presence of guard vessels monitoring temporarily unprotected or unburied cable sections is expected to significantly reduce the likelihood of fishing gear interactions during construction and decommissioning phases. Industry guidance on fishing in the vicinity of cables and subsea infrastructure further deters fishing in close proximity.

~~7.9.38~~7.9.39 UKHO temporary or preliminary notices will be issued to relevant parties such that the basic location of the cable is captured prior to post-lay/as-built survey so awareness among mariners is further increased and industry guidance on fishing in the vicinity of cables and other associated seabed hazards offers maximum effectiveness.

~~7.9.39~~7.9.40 Cable protection including rock berms will be designed to reduce snagging risk.

~~7.9.40~~7.9.41 The use of aids to navigation will be considered where sections of the cable are expected to be exposed for significant lengths of time prior to burial, with the prior approval of Trinity House.

~~7.9.41~~7.9.42 Based on the embedded control and management measures identified, the impact of fishing gear snagging on all vessel types leading to damage or foundering is of Medium (Unlikely) sensitivity and assessed as Minor (Low) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Operation and Maintenance Phase

Collisions leading to loss of life and major damage to equipment

~~7.9.42~~7.9.43 The cable system installation is designed such that a regular maintenance regime is not required to maintain the integrity of the cable. However, monitoring may indicate that localised lengths along the cable may require maintenance. Cable repairs may be required at any time however these are expected to be rare. During the operational lifetime of the cable a number of inspections to examine integrity are foreseen.

~~7.9.43~~7.9.44 A preliminary inspection, maintenance and repair (IMR) programme as the basis for preventative maintenance may comprise of the following:

- Initial DOL monitoring survey 12 months after commissioning and handover to operations.
- Regular monitoring surveys at 12-24 months duration to establish any areas where DOL hot spots may develop and where integrity of cable is critical (eg. Shipping channels, crossings), and inform the maintenance programme. Establish that the seabed conditions and DOL have reverted to equilibrium and reduce the frequency of inspections.
- Reduced interval surveys to ensure DOL is maintained (may be as much as 5-year interval).

~~7.9.44~~7.9.45 Such inspections and maintenance activities require slow-moving vessels, constrained by their operations, and hence restricted in their ability to manoeuvre. The presence of these vessels or any other required for maintenance activities associated with the cable, may present an obstacle to passing traffic and hence an incremental increase in the risk of collision.

~~7.9.45~~7.9.46 The collision risk is likely to be greater in higher density sections of the Offshore Scheme or areas of restricted searoom and therefore the following key areas are highlighted:

- In and around the Sunk TSS;
- The Ramsgate Channel; and
- Pegwell Bay.

7.9.467.9.47 Additionally, a significant number of regular vessel transits are expected to cross the Offshore Scheme, routeing to and from Sizewell C Harbour Authority Area to attend construction works there.

7.9.477.9.48 The location of the River Stour approach channel and available depth across Pegwell Bay changes significantly over time according to natural processes. This presents the potential for varying degrees of space for vessels using the area depending on the location or timing of any maintenance activities.

7.9.487.9.49 Should a collision incident occur, it is most likely to result in minor damage to vessels, no harm to people and no substantial commercial or environmental effects . Mitigation measures, including various promulgations and communications such as NtM, port communications and Notification of Regular Runners, ensure that awareness of the operations among many of the vessels using the area will be suitably raised.

7.9.497.9.50 However, guard vessel patrol may not be in place during inspection activities, and it cannot be presumed that all vessels using the locations will be aware of the presence of the maintenance vessels or their schedule of activities.

7.9.507.9.51 A case-by-case risk assessment will be made where maintenance activities, in addition to inspection, are required. This will ensure that details of unforeseen maintenance activities are considered such that any substantial increase in collision risk can be addressed without undue restrictions on normal activities.

7.9.517.9.52 Based on the embedded control and management measures identified, the impact on all vessel types leading to loss of life and major damage to equipment is of Low (Remote) sensitivity and assessed as Major (High) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Disruption to established vessel routes and areas

7.9.527.9.53 The cable system installation is designed such that a regular maintenance regime is not required to maintain the integrity of the cable. However, monitoring may indicate that localised lengths along the cable may require maintenance. Cable repairs may be required at any time however these are expected to be rare. During the operational lifetime of the cable, a number of inspections to examine integrity are foreseen. The presence of these vessels, or any other required for maintenance activities associated with the cable, may present an obstacle to passing traffic and hence an incremental increase in the risk of disruption. Additionally, a section of unburied cable may be at the Kent landfall and may therefore present a seabed hazard in the Sandwich Flats and Sandwich Port and Haven authority area for the lifetime of the Offshore Scheme.

7.9.537.9.54 The risk of disruption is likely to be greater in higher density sections of the cable route or areas with restricted sea room, and therefore the following key areas are highlighted as being of particular risk of disruption:

- In and around the Sunk TSS;
- The Ramsgate Channel; and
- Pegwell Bay.

7.9.547.9.55 Sizewell C will also have significant cross routes during its construction phase, and it is expected that vessels will transit across the Sea Link Offshore Scheme. Disruption is expected to be minor, as inspection and maintenance activities are anticipated to be limited in their temporal and spatial extent.

7.9.557.9.56 The location of the River Stour approach channel and available depth across Pegwell Bay changes significantly over time according to natural processes. This presents the potential for varying degrees of space for vessels using the area depending on the location or timing of any maintenance activities.

7.9.567.9.57 Mitigation measures, including various promulgations and communications such as NtM, port communications and Notification of Regular Runners, ensure that awareness of the operations among many of the vessels using the area will be suitably raised.

7.9.577.9.58 Any seabed hazard at the Sandwich Flats will be appropriately marked, included in the appropriate navigational charts and managed by Sandwich Port and Haven authorities and their procedures.

7.9.587.9.59 However, guard vessel patrol may not be in place during inspection activities, and it cannot be presumed that all vessels using the locations will be aware of the presence of the maintenance vessels or their schedule of activities.

7.9.597.9.60 Nonetheless, most of this traffic is unlikely to experience significant disruption in the unlikely case where they are required to navigate around maintenance vessels or marked seabed hazards, this being standard navigational practise for most of these vessel categories, with the likelihood of no harm to people, and no significant commercial or environmental effects. They are likely to be aware of the cable and any protection due to UKHO charting and marking of the infrastructure elements and locations.

7.9.607.9.61 Based on the embedded control and management measures identified, the impact of disruption to established vessel routes and areas on all vessel types leading to loss of life and major damage to equipment is of Low (Remote) sensitivity and assessed as Minor (Low) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Broadly Acceptable).**

Vessel drags anchor across exposed cable

7.9.617.9.62 During the operational phase, there is a risk that a third-party vessel will drop anchor or lose its holding ground in adverse weather and subsequently drag its anchor over a section of cable and come into difficulty. In the case of such an anchor snagging incident, in the worst-case scenario it is possible that smaller vessels could suffer a risk of foundering should they not be able to free themselves.

7.9.627.9.63 There are a number of key locations along the Offshore Scheme where anchor snagging is of particular focus:

- the Offshore Scheme passes very close to the designated Sunk deep water anchorage area between KP 33-39;
- the planned cable route is approximately 2 km from the Sunk pilot station at the closest point at KP 37;
- the Offshore Scheme passes close to the Tongue Deep Water and Tongue Hazardous anchorages at KP 82-88; and

- the Tongue pilot station is located approximately 80 m to the east of the Offshore Scheme at KP 90.

7.9.637.9.64 The close proximity of these locations to the Offshore Scheme presents an increased risk of damage by accidental anchor drop or dragging of anchors due to bad weather and or poor anchor penetration. It is noted that such incidents could include some of the largest vessels in the world. Consequences could therefore also include commercial effects as well as potential for pollution incidents.

7.9.647.9.65 After consultation with Harwich Haven Authority, the Offshore Scheme has been refined to pass north of the Sunk W1 buoy. This results in increased distance from the Sunk pilot station, reducing the risk of interactions between project maintenance vessels and vessels visiting the pilot station. However, the Offshore Scheme's increased proximity to the Sunk deep water anchorage area represents an increase in risk of anchor dragging throughout the life of the Proposed Project.

7.9.657.9.66 However, the cable shall be buried and otherwise protected where necessary along the vast majority of its length. The target burial depth, protection measures and locations have been determined as far as practicable via risk-based cable burial approach. As such this hazard shall be appropriately minimised.

7.9.667.9.67 Additionally, industry guidance on safe anchor and fishing practices and provision of as-built locations of the cable and external protections to UKHO (Admiralty) and Kingfisher (KIS-ORCA), combine to reduce snagging risks significantly. VTS is also in place at ports to inform and deter vessels from anchoring near the cable. During the operational phase, cable locations will be marked on navigational charts and will be familiar to many regular users of the area. Industry guidelines, in particular MGN 661, are in place to deter vessels from anchoring in the vicinity of cables and other seabed hazards.

7.9.677.9.68 Based on the embedded control and management measures identified, the impact on all vessel types leading to foundering is of Medium (Unlikely) sensitivity and assessed as Major (High) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Fishing gear snagging

7.9.687.9.69 Fishing vessels whose gear becomes snagged on the cable or protections may sustain extensive damage or suffer foundering during all phases of the Offshore Scheme. Cable lay activities may also result in the creation of berms and rock displacement which presents additional seabed hazards to fishing gear.

7.9.697.9.70 Fishing vessel presence is generally low or sparse across much of the Offshore Scheme. Key areas of fishing vessel presence are identified from the baseline (section 7.7) as being:

- between KP 35-45 of the Offshore Scheme there are low-moderate levels of time spent fishing using demersal trawl or seine, and moderate density of vessels travelling under 6 knots in VMS data;
- from KP 80-90 where AIS data showed that vessels spent some limited time in spring with status set to 'actively fishing'; and
- from KP 80 onwards to close to the Kent landfall (KP 118) small-medium fishing vessels are present in AIS data, mainly routeing to and from the Port of Ramsgate.

~~7.9.70~~7.9.71 Consequences for interactions with fishing gear could include damage to vessels, potential harm to people, commercial effects, as well as potential for pollution incidents.

~~7.9.71~~7.9.72 However, the cable will be buried along the majority of the route. Further protection measures are also foreseen on a case-by-case basis as the design detail is developed. All external protection measures shall be designed to minimise the risk of snagging insofar as possible. Regular inspections and maintenance (as required) is intended to be conducted to ensure the cable remains in good condition and suitably protected throughout its operational life. Industry guidance recommends avoidance of demersal fishing over cables and other safe practises relating to seabed hazards. This embedded mitigation, combined with the provision of as-built locations of the cable, any seabed hazards and external protection to UKHO and Kingfisher (KIS-ORCA) represents substantial risk reduction. In addition, the appointment of a FLO during the construction phase provides substantial assurance that fishermen will be aware of the cable locations following the installation.

~~7.9.72~~7.9.73 The baseline data (section 7.7) shows that fishing activity is already currently quite low across the Offshore Scheme, and as-built charting and promulgation of the cable location is likely to prevent an increase to fishing in the immediate vicinity of the cable in the future.

~~7.9.73~~7.9.74 Nonetheless, detailed cable protection measures will be determined with due consideration of the key areas of fishing vessel presence identified above and in the baseline study (Section 7.7).

~~7.9.74~~7.9.75 Based on the embedded control and management measures identified, the impact of fishing gear snagging on all vessel types leading to damage or foundering is of Low (Remote) sensitivity and assessed as Major (High) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP).**

Reduction in under-keel clearance

~~7.9.75~~7.9.76 Cable burial protections, displacement of rocks and the creation of berms and other seabed disturbances during installation may present hazards due to reductions in under-keel clearance along the Offshore Scheme. Reductions in under-keel clearance increase the risk of grounding with a rock berm or other protection feature, which may result in injury and or major vessel damage consequences, as well as commercial consequences and potential for pollution.

~~7.9.76~~7.9.77 The HDVC cable shall be buried along the vast majority of the Offshore Scheme as informed by a detailed Cable Burial Risk Assessment, with a minimum depth of lowering (DOL) to the top of the cable of 0.5 m (in areas of bedrock).

~~7.9.77~~7.9.78 In line with MCA guidance, it is not planned to reduce the existing navigable water depth by more than 5% along any section of the cable (with respect to Chart Datum~~). It is therefore expected that under-keel clearance is only reduced at a very small number of locations, which are anticipated to be located close into shore.~~), as the main method of cable protection for Sea Link is lowering below the seabed. However, at some cable crossing locations in shallow water the Project may reduce water depth more than 5% with regard to Chart Datum. In line with MCA guidance, the Project has raised these potential locations with the MCA and have identified them within **Application Document 9.74 Shipping and Navigation Under-Keel Clearance Marine Engineering Technical Note [REP1A-038],** and with further detail in **Applicant Document 9.96 Water Depth Baseline Study – Shipping and Navigation Technical**

Note which was submitted at Deadline 4, and will discuss further with the MCA on these locations.

7.9.787.9.79 The Offshore Scheme runs within a generally shallow marine area which is frequented by a large number of vessels with large draughts.

7.9.797.9.80 Vessels with deep draughts are expected to exercise particular diligence and care through the adoption of good passage planning techniques and procedures. However smaller vessels using may be at increased risk of grounding or allision with any unburied cable sections and or protection measures close to the landfalls.

7.9.807.9.81 There are three regions of the Offshore Scheme which are of particular focus regarding the issue of under-keel clearance, according to the outcome of the NRA:

- Sunk TSS and Sunk region, including the approach to Harwich Haven;
- The approaches to the Port of London surrounding the NE Spit buoy; and
- Pegwell Bay and the Kent landfall.

7.9.82 Additionally, the Port of London Authority has provided the Project with a shapefile of their three Areas of Safeguarded Depth, which are:

- "Sunk Pilot Boarding Station area" where 22 m below Chart Datum must be preserved;
- "Long Sand Head Two-Way Route crossing area" where 12.5 m below Chart Datum must be preserved; and
- "North East Spit area" where 12.5 m below Chart Datum must be preserved.

7.9.83 These Areas of Safeguarded Depth have also been discussed and agreed with Harwich Haven Authority, London Gateway Port and the MCA. It has also been agreed that the ports also require an additional 0.5 m 'over dredge' on top of the depth thresholds established above.

7.9.84 The ports' position is that these specific depths are required to avoid restricting current port activity, as well as restricting the opportunity to expand the ports in the Thames Estuary in accepting larger draught vessels in future, both of which would have a commercial impact.

7.9.85 National Grid is working to agree these water depth requirements. National Grid agrees in principle to safeguarding the specified water depths in the majority of these three areas, and is undertaking further analysis to ensure that the engineering design can achieve sufficient depths in sections where the current water depth is shallower than the threshold requested to be preserved. National Grid is working to secure this commitment in the appropriate place.

7.9.817.9.86 Regarding the Sunk region, the cable route has been refined in consultation with the PLA, Harwich Haven Authority, Felixstowe, MCA and other key stakeholders, with the aim for the cable to be located in the deepest waters possible through the Sunk to avoid reduction to water depth.

~~7.9.82 Harwich Haven Authority states that cable depth must consider a maximum draught of 20 m plus 10 % under-keel clearance, as such minimum depth required is 22 m below chart datum.~~

7.9.837.9.87 Cable burial depth and protection is of particular concern in Pegwell Bay with regards to reduction in under-keel clearance and subsequent effect on navigation, as

the River Stour approach channel which crosses Pegwell Bay is dynamic and not guaranteed, has varying depth, and is migrating over time towards the northern cliffs of Pegwell Bay. This therefore needs to be taken into account in design and construction, to ensure the project is minimising the risk of introducing seabed hazards in this region.

~~7.9.84~~7.9.88 The use of Horizontal Directional Drilling to bring the cable to land from under the seabed limits the potential for reductions in under-keel clearance to the exit pit locations. However, this means that a cable protection structure or arrangement may be in place within the Sandwich Flats at Pegwell Bay, at the Kent landfall, which is an area of very shallow water depth which can be exposed at low tide. The protection structure may therefore present a hazard to vessels entering and exiting Sandwich Port and Haven Authority area and using the flats generally, which may be compounded by the depth variation and the migrating approach channel at the mouth of the River Stour.

~~7.9.85~~7.9.89 During stakeholder consultation, Harwich Haven Authority requested to be kept expressly informed of any reductions in depth and required protection measures which may affect the approaches to the Harwich deep water channel. Sandwich Port and Haven also identified potential under-keel clearance issues related to variable depths and the migrating River Stour mouth channel. The Port of London Authority has also identified areas where they require specific under-keel clearance to be preserved. London Gateway Port has emphasized the importance of preserving the specified water depths within the three Areas of Safeguarded Depth. It is therefore recommended that Harwich Haven Authority, Sandwich Port and Haven, London Gateway Port and the Port of London Authority are kept informed of seabed hazards, any reductions in under-keel clearance in key areas, and changes as they develop.

~~7.9.86~~7.9.90 Similarly, anticipated reductions in water depth greater than 5%, especially near areas like cable crossings, shorelines, key navigation routes, or areas where ships have limited room to maneuver, will be discussed with relevant stakeholders (like Statutory Harbour Authorities (SHA), Competent Harbour Authorities (CHA), and the MCA.

~~7.9.87~~7.9.91 Mitigations serving to notify mariners and marine authorities of the location of the cable and its protections will reduce the likelihood of grounding and other impacts. Additionally, subsurface hazards will be marked and relevant authorities informed. Other mitigations such as post-lay survey and provision of the as-built locations of cable and external protection to UKHO and KIS-ORCA increase awareness of the locations for all vessels and minimise the risk substantially. The Applicant agrees with the PLA's Areas of Safeguarded Depth, and is working to secure this via a Requirement in the DCO in order to preserve the specific dredge depths in the three key areas and meet the port stakeholders' requirement that future ports expansion is therefore not impacted. Based on the embedded control and management measures identified, the impact of under-keel clearance on all vessel types in the worst case scenario leading to foundering or substantial commercial impact to ports is of Medium (Unlikely) sensitivity, and assessed as Major (High) Magnitude, which is then reduced to Moderate (Medium) Magnitude once additional measures are applied. The EIA significance is considered to be **Unlikely to be significant (Tolerable if ALARP)**.

EMF interference with marine navigational equipment

~~7.9.88~~7.9.92 Given the transmission characteristics of the Project Marine Scheme, it is feasible that a zone of potential magnetic compass deviation from electro-magnetic field (EMF) effects could persist along the Offshore Scheme. A worst case of more than 5 degrees compass deviation in shallow areas is possible. This may present some disruption to navigation across the cable lifetime.

7.9.897.9.93 Vessels may be affected by compass deviation when navigating in the vicinity of the cable and where the interference is most pronounced i.e., in shallow water/inshore. Complete reliance on magnetic compass navigation is considered very unlikely for any vessel in a given situation and location. Vessels relying solely on a magnetic compass for navigation are likely to navigate by visual landmarks in shallow water and inshore areas. However, poor visibility and challenging sea states may nonetheless result in misrouting towards otherwise obscured hazards or objects. This could result in damage to vessels or infrastructure, with associated commercial implications, harm to people, and the possibility of resulting in a pollution incident.

7.9.907.9.94 Mitigation such as optimising cable configuration, separation distances to minimise compass deviation and burial, as far as practicable, will reduce the likelihood and severity of compass deviation effects. Additionally, magnetic compass deviation effects are limited to the immediate vicinity of the of the Offshore Scheme, so effects on the limited number of vessels expected to rely solely on magnetic equipment will be short lived, and only likely to result in minor course deviations.

7.9.917.9.95 SHAs will be informed of identified compass deviations as part of on-going stakeholder communications.

7.9.927.9.96 Based on the embedded control and management measures identified, the impact of EMF interference with marine navigational equipment on all vessel types leading in the worst case scenario to foundering is of Medium (Remote) sensitivity, and assessed as Moderate (Medium) Magnitude. The EIA significance is considered to be **Unlikely to be significant (Broadly Acceptable)**.

7.10 Additional Mitigation and Enhancement Measures

7.10.1 Mitigation measures are additional topic and site-specific measures that have been applied to mitigate or offset any likely significant effects. Mitigation measures included that are relevant to shipping and navigation receptors are secured within **Application Document 7.5.3.2 Appendix B Register of Environmental Actions and Commitments** and listed below:

- Notification of regular runners including ferry operators. Engagement with regular runners and specifically ferry operators ensures awareness of the installation details which minimises disruption.
- Communication plans, namely a Navigation Installation Plan (NIP) will be established with clear protocols to ensure effective communication and coordination between all relevant shipping and navigation stakeholders, including SHAs (Statutory Harbour Authorities), Competent Harbour Authorities (CHAs, Vessel Traffic Services (VTS), and Traffic Separation Scheme (TSS) operators. This will maintain ongoing awareness and coordination of Offshore Scheme installation fleet activities and awareness of their locations during construction, among all relevant parties. Special attention will be given to the routeing of the installation operation through the Sunk TSS and when in proximity to the Sunk Deep Water anchorage area and the Sunk pilot station, as well as when routeing in proximity to the Tongue anchorages and pilot station. Communication plans will include key stakeholders such as Harwich Haven, Port of London Authority, London Gateway Port and Sandwich Port and Haven authorities, in particular on the topic of any expected change in under-keel clearance or anticipated introduction of seabed hazards.

- Communication plans will, where necessary, identify areas of high potential magnetic compass deviations to relevant stakeholders.
- Communication plans will pay particular focus to operations within Pegwell Bay as this is a region of very shallow water and challenging navigation for vessels entering and exiting the River Stour and may also have a high presence of amateur or inexperienced recreational boaters.
- Simultaneous operations with other offshore projects will be avoided where possible. Where simultaneous operations do occur, the Project will have project vessel management procedures and planned protocols to minimize disruption and potential risks.
- Coordination of planned operations within the Sunk region, to avoid concurrent Restricted Ability to Manouevre (RAM) operations (such as cable lay and burial) with other projects in the Sunk area where possible, in particular regarding the North Falls and Five Estuaries Wind Farm projects.
- Restricted Ability to Manoeuvre operations in the Sunk area will be avoided where practicable in visibilities of below 2 nautical miles.
- Construction planning for the landfall activities will 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 will be considered to reduce the risk of interactions with fishing gear vessel anchors particularly near designated anchorages. Details, extent and requirements of the markers will be confirmed/established with Trinity House.
- Risk assessment of maintenance activities (excluding inspections) will 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.
- Cable protection measures will take due consideration of key areas of fishing activity identified in the baseline data, such that those sections of the cable identified as being buried or protected within such areas will minimise risk to gear snagging.
- Minimising the amount of time the cable stays unprotected and exposed to potential interactions with anchoring vessels or fishing gear (anchor drag or gear snagging), during construction.
- Avoiding disruption to the Sunk anchorage area and Sunk pilot boarding area during construction by minimising time spent in this region during construction and avoiding cable joints in this area where possible.
- Avoiding disruption to the Sunk anchorage area Sunk pilot boarding station, Tongue anchorages and Tongue pilot station during operation by considering appropriate cable burial depth and protection measures, and aiming for minimal reduction in under keel clearance, as well as carefully considering the location of cable joints.

- Any seabed hazard at the Sandwich Flats will be appropriately marked, included in the appropriate navigational charts and managed by Sandwich Port and Haven authorities and their procedures.
- Anticipated reductions in water depth greater than 5% will be discussed with the MCA and other relevant stakeholders such as Statutory Harbour Authorities (SHA) and Competent Harbour Authorities (CHA).

7.11 Residual Effects and Conclusions

7.11.1 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 (**Application Document 6.3.4.7.A ES Appendix 4.7.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 consultation with a number of stakeholders including the Maritime and 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.

7.11.2 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.

7.11.3 Broadly, the assessment identifies the need for a well-coordinated communication strategy, and proactive planning of operations, to ensure safe and efficient operations with minimal disruption to shipping and navigation.

7.11.4 In terms of whether effects reported would be any different if the works were to commence in any year up to year five after the granting of the DCO, there are a few points of consideration. In keeping with current trends, vessel traffic may get busier year-on year, however this region already experiences very high levels of vessel traffic, so this trend would nonetheless be managed as detailed. The Port of Ramsgate noted the possibility of ferries activity increasing from their port. This has been taken into account into the assessment of impacts. There is also the possibility of unpredictable changes within that five-year timespan, for instance the future cumulative impact of additional large offshore projects in this region receiving consent. However, these risks would nonetheless be managed with the controls and mitigations put in place. Assessment of cumulative impacts would discuss any future impacts of such projects, see **Application Document 6.2.4.11 Part 4 Marine Chapter 11 Offshore Inter-Project Cumulative Effects**.

7.11.5 As part of the ES approach and methodology, this ES 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 7.11). 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.

7.11.6 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.

7.12 Transboundary Effects

7.12.1 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.

7.12.2 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.

Table 7.11 Summary of shipping and navigation effects

Phase	Receptor	Sensitivity	Impact	Effect		Mitigation Measures	Residual Effect	
				Magnitude	Significance		Magnitude	Significance
Construction and decommissioning	Passing vessels (all categories)	Low (Remote)	Collisions leading to loss of life and major damage to equipment, commercial and environmental impacts	Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning Limited Visibility measures	Major (High)	Unlikely to be Significant (ALARP)
Construction and decommissioning	Vessel frequently using established routes and areas affected by the Offshore Scheme	Very High (Likely)	Disruption to multiple vessels using established routes and areas due activities of the Offshore Scheme, with commercial impacts	Minor (Low)	Unlikely to be Significant (ALARP)	Comms. Planning UKHO Temp / Prelim Notices	Minor (Low)	Unlikely to be Significant (ALARP)

Phase	Receptor	Sensitivity	Impact	Effect		Mitigation Measures	Residual Effect	
				Magnitude	Significance		Magnitude	Significance
Construction and decommissioning	Anchoring vessels	Medium (Unlikely)	Vessel drags anchor across exposed cable, commercial and environmental impacts	Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning UKHO Temp / Prelim Notices	Major (High)	Unlikely to be Significant (ALARP)
Construction and decommissioning	Fishing vessels	Medium (Unlikely)	Gear snagging, commercial and environmental impacts	Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning Cable protection considers Fishing Gear UKHO Temp / Prelim Notices	Major (High)	Unlikely to be Significant (ALARP)
Operation and maintenance phases	Passing vessels (all categories)	Low (Remote)	Collisions leading to loss of life and major damage to equipment, commercial and environme	Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning Maint. activity risk assess.	Major (High)	Unlikely to be Significant (ALARP)

Phase	Receptor	Sensitivity	Impact	Effect		Mitigation Measures	Residual Effect	
				Magnitude	Significance		Magnitude	Significance
			ntal impacts			Limited Visibility measures		
Operation and maintenance phases	Vessel frequently using established routes and areas affected by the Offshore Scheme maintenance activities	Low (Remote)	Disruption to multiple vessels using established routes and areas due maintenance activities of the Offshore Scheme, with commercial impacts	Minor (Low)	Unlikely to be Significant (Broadly Acceptable)	Comms. Planning	Minor (Low)	Unlikely to be Significant (Broadly Acceptable)
Operation and maintenance phases	Anchoring vessels	Medium (Unlikely)	Vessel drags anchor across exposed cable, commercial and environmental impacts	Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning UKHO Temp / Prelim Notices	Major (High)	Unlikely to be Significant (ALARP)

Phase	Receptor	Sensitivity	Impact	Effect		Mitigation Measures	Residual Effect	
				Magnitude	Significance		Magnitude	Significance
Operation and maintenance phases	Fishing vessels	Low (Remote)	Gear snagging, commercial and environmental impacts	Major (High)	Unlikely to be Significant (ALARP)	Cable protection considers Fishing Gear	Major (High)	Unlikely to be Significant (ALARP)
Operation and maintenance phases	Deep draught vessels Ports and navigational features	Medium (Unlikely)	Reduction in Under-Keel Clearance, commercial and environmental impacts	~~Moderate (Medium)~~ Major (High)	Unlikely to be Significant (ALARP)	Comms. Planning Engineering review	Moderate (Medium)	Unlikely to be Significant (ALARP)
Operation and maintenance phases	Vessels navigating with magnetic compass	Medium (Remote)	EMF Interference with marine navigational equipment, commercial and environmental impacts	Moderate (Medium)	Unlikely to be Significant (Broadly Acceptable)	Comms. Planning	Moderate (Medium)	Unlikely to be Significant (Broadly Acceptable)

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