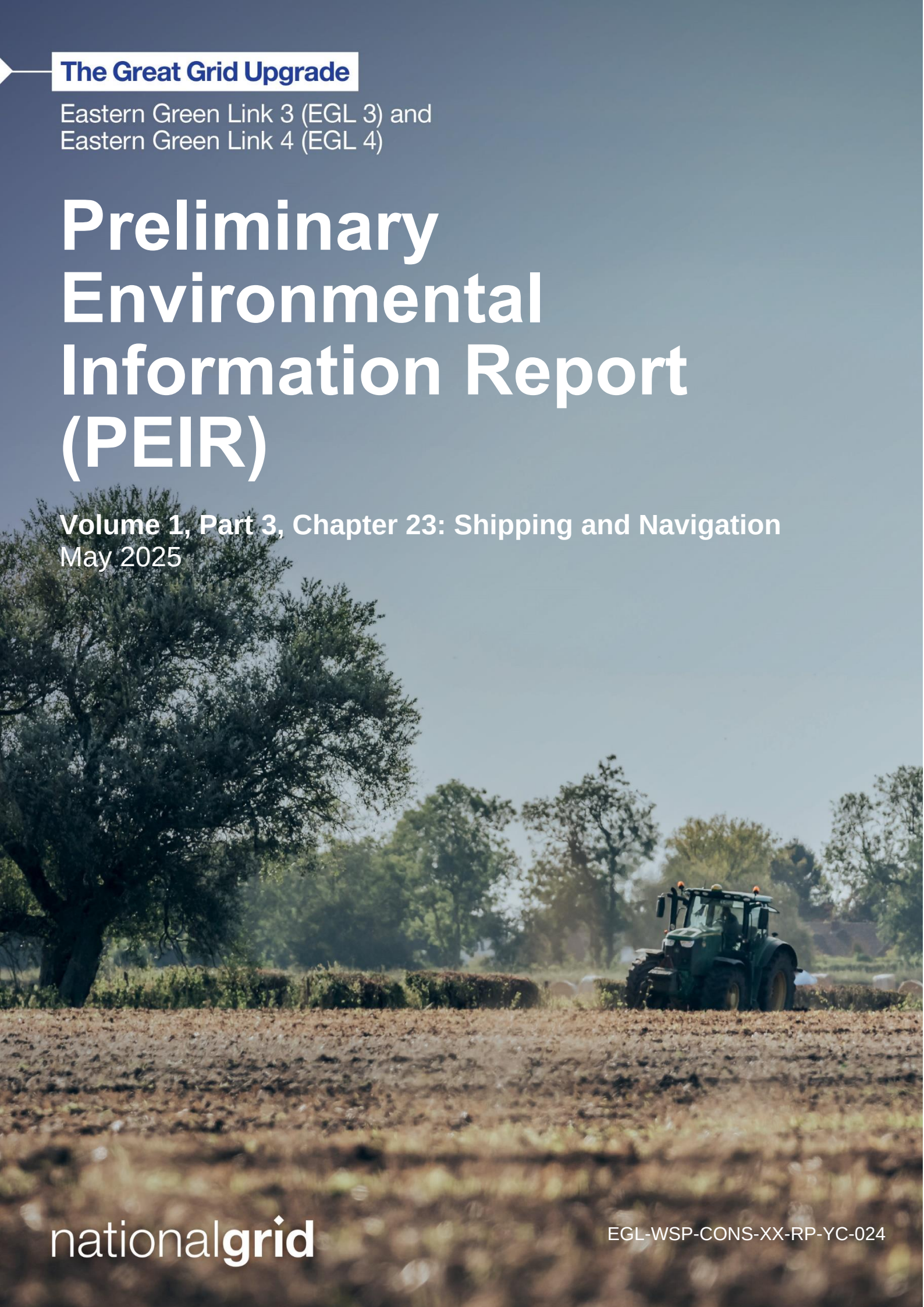
The Great Grid Upgrade

Eastern Green Link 3 (EGL 3) and
Eastern Green Link 4 (EGL 4)

Preliminary Environmental Information Report (PEIR)

Volume 1, Part 3, Chapter 23: Shipping and Navigation

May 2025



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23. Shipping and Navigation

23.1 Introduction

23.1.1 This chapter presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken to date for the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) English Offshore Scheme, with respect to Shipping and Navigation, including commercial and recreational vessel activity and navigational features. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description of the Projects provided in **Volume 1, Part 1, Chapter 4: Description of the Projects.**

23.1.2 This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, environmental measures, and the preliminary Shipping and Navigation effects that could result from the English Offshore Scheme during the construction and operation (and maintenance) phases. Specifically, it relates to the English offshore elements of EGL 3 and EGL 4 (the English Offshore Scheme) seaward of Mean High Water Springs (MHWS).

23.1.3 This chapter should be read in conjunction with:

- **Volume 1, Part 3, Chapter 19: Intertidal and Subtidal Benthic Ecology,** which will assess the potential impacts of invasive and non-native species (INNS) on marine benthos introduced from ships hulls or via material introduced into the marine environment as part of construction activities;
- **Volume 1, Part 3, Chapter 24: Commercial Fisheries** which will identify and assess the potential impact to commercial fishing activity beyond what is covered in this assessment (including the use of Vessel Monitoring System (VMS) data); and
- **Volume 1, Part 3, Chapter 25: Other Marine Users** which will identify and assess the wider potential impact to other marine users (including recreational boating) beyond collision risk and potential disruption. Reference has been made to third-party assets within the Shipping and Navigation assessment due to their status as navigational features, however the assessment of any effects to these assets is referenced within the Other Marine Users chapter.

23.1.4 This chapter is supported by the following figures:

- **Volume 3, Part 3, Figure 23-1: Average Vessel Hours (2023 – 2024) - All Vessels;**
- **Volume 3, Part 3, Figure 23-2: Royal Yachting Association UK, Coastal Atlas of Recreational Boating; and**
- **Volume 3, Part 3, Figure 23-3: Shipping and Navigation Navigational Features.**

23.1.5 This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.5.C: Outline Construction Environmental Management Plan;**
- **Volume 1, Part 1, Appendix 1.2.A: Regulatory and Planning Context;**
- **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**;
- **Volume 2, Part 3, Appendix 3.23.A: Navigational Risk Assessment;** and
- **Volume 2, Part 1, Appendix 1.4.A: Electromagnetic Field (EMF) Study.**

23.1.6 As set out in **Volume 1, Part 1, Chapter 1: Introduction**, cable installation and some associated activities beyond 12 NM are exempt under the MCAA. This chapter presents an assessment of the cable route from MHWS at the Anderby Creek Landfall to the border with Scottish adjacent waters. This is to provide a holistic view of the English Offshore Scheme and any associated impacts, however consent is not being sought for the exempt cable and only cable protection and dredging for sand wave levelling would be included in the deemed Marine Licences (dML) beyond 12 NM.

Limitations

23.1.7 The information provided in this Preliminary Environmental Information Report (PEIR) is preliminary, the final assessment of potential significant effects will be reported in the Environmental Statement (ES). The PEIR has been produced to fulfil National Grid Electricity Transmission plc's consultation duties, in accordance with Section 42 of the PA2008 and enable consultees to develop an informed view of the preliminary potential significant effects of the English Offshore Scheme.

23.1.8 This chapter has been produced using both purchased data and publicly available data, of which the assumption has been made that the data is accurate. Data used as part of this assessment will be reviewed and updated as necessary ahead of the ES submission.

23.1.9 The AIS data is likely to be under representative for smaller vessels due to legal requirements exempting vessels under 15 m in length. This is most likely to impact fishing vessels and recreational craft. To mitigate this limitation, VMS data was incorporated into the assessment for smaller fishing vessels (over 12 m but under 15 m) and the Royal Yachting Association (RYA) Coastal Atlas has been used to identify vessel density of recreational craft.

Preliminary significance conclusions

23.1.10 For ease of reference, a summary of the significant and potential significant effects from the preliminary Shipping and Navigation assessment is provided in **Table 23-1.** All other effects in relation to Shipping and Navigation have been assessed as not significant. Further details of the methodology behind the assessment, and a detailed narrative of the assessment itself are provided within the sections below.

Table 23-1 – Preliminary Summary of Residual Significance of Effects

Receptor and summary of predicted effects	Frequency of occurance[1]	Severity of consequence[2]	Significance[3]	Summary rationale
Vessels – Disturbance to existing shipping and fishing activity	Very probable	Severe	Moderate (potentially significant)	The significance is moderate due to the potential risk for reputational damage that may result from disturbance to shipping and fishing activity. This is due to the English Offshore Scheme crossing multiple shipping lanes on the approaches to the Humber estuary, and crossing fishing grounds within English waters.
Vessels – Reduction in under-keel clearance	Probable	Significant	Moderate (potentially significant)	The significance is moderate due to the reduction in water depth by greater than 5% in areas of nearshore infrastructure crossings which is the recommended threshold stated in guidance from the Maritime and Coastguard Agency (MCA) and would require further discussion.

Receptor and summary of predicted effects	Frequency of occurance[1]	Severity of consequence[2]	Significance[3]	Summary rationale
Navigational features – Project vessels blocking navigational features	Very probable	Severe	Moderate (potentially significant)	The significance is moderate due to the potential risk for reputational damage that may result from blocking access to navigational features. This is due to the English Offshore Scheme crossing multiple shipping lanes on the approaches to the Humber estuary, crossing fishing grounds within English waters, being in the vicinity of a deep water anchorage and multiple oil and gas exclusion zones.

1. The frequency of occurrence of a risk is defined using the criteria set out in **Section 23.9** and is defined as extremely remote, remote, probable, very probable and frequent.
2. The severity of consequence of a risk resulting from activities relating to the development is defined using the criteria set out in **Section 23.9** and is defined as Minor, Significant, Severe, Serious and Catastrophic
3. The significance of the environmental effects is based on the combination of the frequency of occurrence and the severity of consequence of a risk and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 23.9**.

23.2 Relevant technical guidance

23.2.1 The legislation and planning policy which has informed the assessment of effects with respect to Shipping and Navigation is provided within **Volume 1, Part 1, Appendix 1.2.A: Regulatory and Planning Context**. Further information on policies relevant to the English Offshore Scheme is provided in **Volume 1, Part 1, Chapter 2: Regulatory and Policy Overview.** A preliminary marine plan assessment is provided as **Volume 2, Part 1, Appendix 1.2.B: Marine Plan Assessment.** Relevant technical guidance, specific to Shipping and Navigation, that has informed this PEIR and will inform the assessment within the ES, is summarised below.

Technical guidance

23.2.2 A summary of the technical guidance for Shipping and Navigation is given in **Table 23-2.**

Table 23-2 – Technical Guidance Relevant to the Shipping and Navigation Assessment

Technical guidance document	Context
International Maritime Organisation (IMO) Guidelines for Formal Safety Assessment (FSA) – MSC-MEPC.2/Circ.12/Rev.2 (IMO, 2018,REF 23.1)	International guidelines detailing the recommended methodology for safety assessments considering life, health, the marine environment and property.
Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (Merchant and Fishing) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021a,REF 23.2)	Guidance that highlights issues that need to be considered during assessments to impacts on navigational safety caused by OREIs (this guidance is used in the absence of any specific to the nature of the English Offshore Scheme).
MCA MGN 661 (Merchant and Fishing) Navigation - Safe and Responsible Anchoring and Fishing Practices (MCA, 2021b,REF 23.3)	Guidance which highlights the importance of submarine cables and pipelines on the seabed specifically during anchoring and fishing activity.
Methodology for Assessing the Marine Navigational Safety Risks & Emergency Response of Offshore Renewable Energy Installations (MCA, 2023,REF 23.4)	Methodology recommendations for assessing marine navigational safety risks for OREIs (this guidance is used in the absence of any specific to the nature of the English Offshore Scheme).

23.3 Consultation and engagement

Overview

23.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 5.9** of **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**.

Scoping Opinion

23.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 05 September 2024. A summary of the relevant responses received in the Scoping Opinion in relation to Shipping and Navigation and confirmation of how these have been addressed within the assessment to date is presented in **Table 23-3.** All Scoping Opinion comments have been addressed.

Table 23-3 – Summary of EIA Scoping Opinion Responses for Shipping and Navigation

Consultee	Consideration	How addressed in this PEIR
The Planning Inspectorate	**Interference with marine navigation equipment - construction and decommissioning** The Scoping Report states that there is no risk of electromagnetic forces from the cable that are likely to cause interference with marine navigation equipment during the construction and decommissioning, and proposes to scope out this matter. The Planning Inspectorate considers that interference with marine navigation equipment would be limited to the operation phase of the Proposed Development. The Planning Inspectorate agrees that potential significant effects during construction and decommissioning are unlikely and is content for this matter to be scoped out.	Interference with marine navigational equipment has been scoped out for the construction and decommissioning phases but has been scoped in for the operational phase of the English Offshore Scheme as defined in **Section 23.7** .The impact to marine navigational equipment during operation has been assessed in **Section 23.15** and concludes that the effects are Not Significant.
The Planning Inspectorate	**Study area** The Scoping Report states that the 5 nautical mile (NM) buffer around the scoping boundary is sufficient to characterise the relevant baseline conditions for the assessment but does not explain why. The ES should clearly justify why the final extent of the study area reflects the Zone of Influence (ZoI) of the Proposed Development and, where	Justification of the study area extents are included in **Section 23.4**.

Consultee	Consideration	How addressed in this PEIR
	possible, it should be agreed with the relevant consultation bodies.	
The Planning Inspectorate	**Figures** Figures have been provided to illustrate the Automatic Identification System (AIS) vessel density in relation to the offshore scoping boundary. However, the resolution of the figures is not particularly clear. The Applicant should ensure that any ES figures are of an appropriate scale and any shading allows each element on the figure to be clearly distinguishable and include clear keys/ legends and labels.	Figures are of an appropriate resolution and scale and are included in **Volume 3, Part 3, English Offshore Scheme**.
The Planning Inspectorate	**Assessment methodology** The ES should clearly set out how the risk assessment approach leads to an assessment of significance of effects that is consistent/ compatible with the method and terminology used in the ES, for which the intended approach is set out in **Chapter 21 (Section 21.6)** of the Scoping Report.	The assessment methodology aligns with the proposed methodology outlined in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**.
The Planning Inspectorate	**Implications for other assessments in the ES** This aspect chapter should cross-refer to the relevant assessments of the ES, including assessments which consider the potential for vessel movements which could facilitate the spread of INNS (e.g. through ballast water, accidents, and spillages) or which displace shipping traffic into designated wildlife sites.	Assessment chapters have been cross-referenced where relevant in the assessment presented in **Section 0**.

Technical engagement

23.3.3 Technical engagement with consultees in relation to Shipping and Navigation is ongoing. A summary of the technical engagement undertaken to date (until March 2025) is outlined in **Table 23-4.**

Table 23-4 – Technical Engagement on the Environmental Aspect Assessment

Consultee	Consideration	How addressed in this PEIR
Associated British Ports (ABP) Humber	Meeting held 11 February 2025. It was confirmed the Vessel Traffic System (VTS) and seven day look ahead Environmental Measures proposed would be useful for ABP Humber regarding planning pilotage requirements.	Both measures have been included in the Environmental Measures table and applied where necessary (**Section 23.6**).
Maritime and Coastguard Agency (MCA), Trinity House (TH), Northern Lighthouse Board (NLB) and Chamber of Shipping (CoS)	Meeting held with all parties 31 July 2024. It was asked by TH if the Projects vessels blocking navigations features includes interaction with buoys. TH also confirmed previous positive experiences had come from open communication between projects, regulators and port authorities. The MCA confirmed the cable crossing locations would be of interest regarding 5% reduction in navigable depth.	Interaction with buoys is considered as part of the assessment for blocking navigational features (**Section 23.16**) Early and frequent communication has been considered as part of the Environmental Measures table and applied when necessary (**Section 23.6**). Reduction in under-keel clearance is considered as part of the assessment (**Section 23.6**).
Ossian Floating Offshore Wind Farm	Meeting held 07 August 2024, discussion around similar routes between the Projects was held and need emphasised for assessment of cumulative effects.	Cumulative effects have not been considered in this assessment due to the design stage of the Projects (**Section 23.9**), however these will be considered in the ES.
National Federation of Fishermen's Organisations (NFFO)	Meeting held 03 March 2025, discussion around inclusion of turning space in advisory safety zones to ensure this area was communicated to fisheries.	The environmental measure surrounding advisory safety zones do not mention a turning space, but also they do not prescriptively specify the size of the zone. This would be prescribed on a case by case basis depending on the

Consultee	Consideration	How addressed in this PEIR
		vessel and the activity being undertaken.
Royal Yachting Association (RYA)	Meeting held 31 July 2024, it was recommended that the RYA Coastal Atlas is used as a data source for the assessment.	The RYA Coastal Atlas has been used to provide an overview of recreational vessel usage in **Section 23.5**.
Scottish Fisherman's Federation	Meeting held 30 October 2024, it was requested the Environmental Measures relating to notification to fisheries explicitly referred to the Kingfisher Information Service - Offshore Renewable & Cable Awareness (KIS-ORCA) service.	The KIS-ORCA service has been mentioned in the relevant Environmental Measure (**Section 23.6**).
All stakeholders listed	A HAZID workshop for English waters was held on 13 November 2024. All comments made in the workshop related to the Navigational Risk Assessment (NRA), which forms the basis of this assessment.	A summary of changes as a result of the HAZID workshop have been provided in the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**).

23.3.4 Consultation is ongoing with all consultees listed in **Table 23-4** to provide ongoing project progress updates for the English Offshore Scheme and invite feedback on how these may affect the assessment.

23.4 Data gathering methodology

Study area

23.4.1 The study area for Shipping and Navigation includes the draft Order Limits plus an additional 5 NM buffer either side of the draft Order Limits (10 NM in total). This is considered a precautionary maximum zone of influence that considers all shipping patterns and navigational features that may interact with any phase of the life cycle of the English Offshore Scheme. This buffer has been selected through previous project experience (and is therefore considered industry standard) and has been discussed with and accepted by relevant stakeholders as appropriate for the assessment.

Tidal River Works

23.4.2 In addition to the English Offshore Scheme, works are proposed within tidal rivers. As described in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the works consist of the following:

- Tidal river crossing of the River Nene and the River Welland by Horizontal Directional Drilling (HDD) or trenchless solution beneath the bed of the rivers; and
- Option for the construction of a Temporary Quay on the River Nene.

23.4.3 In respect to the Tidal River Crossings and in accordance with Article 35 of the 2011 Exempted Activities Order, these activities are considered a 'bored tunnel' and exempt from needing a Marine Licence, as works would be carried wholly under the seabed with no interaction, and no potential for significant adverse effects on the marine environment. Therefore, these works would not be included in the dMLs. Impacts relating to the drill entry and exit above MHWS are assessed in relevant chapters of the English Onshore Scheme in **Volume 1, Part 2 English Onshore Scheme**.

23.4.4 The River Nene Temporary Quay is an option being explored within the Projects design, for delivery of components for the English Onshore Scheme. At this stage feasibility of the temporary quay is still being explored and insufficient information is available to complete a preliminary assessment. If taken forward the ES will include a full assessment of effects of the temporary quay. **Section 23.18** outlines the further work that would be undertaken to inform the assessment.

Desk study

23.4.5 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 23-5.**

Table 23-5 – Data Sources used to Inform the Shipping and Navigation Assessment

Organisation	Data source	Data provided
MariTrace	Purchased from MariTrace.	5-minute time series AIS data of shipping activities from 01/12/2023 to 30/11/2024 (12 months of data).
Royal Yachting Association (RYA) (RYA, 2019,REF 23.5)	UK Coastal Atlas of Recreational Boating 2.1	AIS dataset of recreational vessel activity.
European Marine Observation and Data Network (EMODnet) (EMODnet, 2024,REF 23.6)	EMODnet website	Coarse-grained vessel density maps.
Royal National Lifeboat Institution (RNLI) (RNLI, 2024, REF 23.7)	RNLI Returns of Service dataset	RNLI 2019-2023 datasets including Returns of Service, lifeboat stations and support centres.
Marine Accident Investigation Branch (MAIB) (MAIB, 2025,REF 23.8)	MAIB Data Portal	MAIB incident reports and occurrences.
Marine Themes Vector Data	Purchased from FIND Mapping.	Marine Themes Vector data tiles including anchorage areas, marine use areas, aquaculture, navigational

Organisation	Data source	Data provided
		lines, navigational routes, beacons and buoys.
Admiralty Charts	Admiralty	Admiralty charts via a Web Mapping Service (WMS) feed.

Survey work

23.4.6 No additional survey work was undertaken for Shipping and Navigation due to the level of information already collated for the study area being proportionate to the scale of the English Offshore Scheme's impacts.

23.5 Overall baseline

Current baseline

23.5.1 The below baseline is a summary of what is also provided in the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**), which utilises the same data to characterise the baseline environment from a risk assessment perspective. Further detail, including additional maps and images, is captured within the NRA.

Shipping

23.5.2 Within the study area, AIS data indicates that there are three main shipping lanes or areas (it should be noted that only vessels over 12 m in length are required by law to have AIS capability, and therefore vessels may be operational in the study area but not captured in the AIS data).

23.5.3 The majority of vessel traffic is concentrated around the landfall area and is oriented towards the Humber estuary, with vessels travelling in an east/west or southeast/northwest direction. Vessel densities in this area are over 500 vessel hours per year in the Traffic Separation System (TSS). Another shipping lane can be observed crossing the study area and heading northwest, connecting to the northeast of England (**Volume 3, Part 3, Figure 24-1 Commercial Fisheries Study Area**). A final area is observed heading to and from Middlesborough, which transects the study area in an east-west direction.

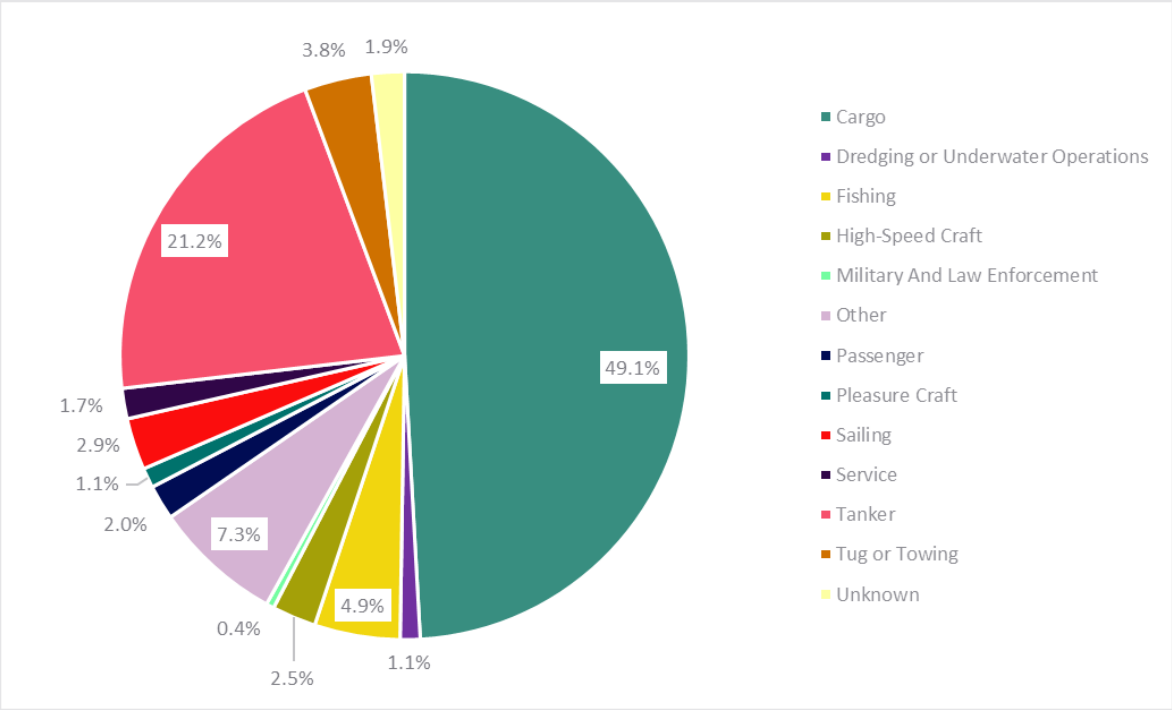
23.5.4 There is an increase in density in the nearshore area parallel to the coast, which is largely due to high-speed craft travelling in and out of the Humber estuary.

23.5.5 Further hotspots are observed in anchorages, oil and gas fields and aggregate extraction areas, which the English Offshore Scheme routes avoid.

23.5.6 Seasonal analysis of the AIS data was conducted. Vessel densities of between 25 to 50 hours are observed monthly at the River Humber Approaches TSS which remain consistent throughout the year. Shipping lanes leading to and from the TSS were also consistently used for the full year. Elsewhere in the study area, vessel density is low at less than one hour for the northern section, with increasing vessel tracks in summer compared to the winter months. Hotspots of between 5 and 25 vessel hours remained year-round near oil and gas installations, with the Breagh Gas Field being the largest in size.

23.5.7 For further analysis, all data points within the study area were collated and split by vessel type (**Plate 23-1**). Cargo vessels were the main category observed (49.1% of all vessels), followed by tankers (21.2%). Both vessel types are concentrated in the south of the study area, with the majority of traffic travelling in and out of the Humber estuary.

Plate 23-1: Vessel Type Distribution in the English Offshore Scheme



23.5.8 Fishing vessel density was consistently spread throughout the study area but in low densities of less than 1 vessel hour apart from several hotspots located largely in the south of the study area. All fishing hotspots identified were located outside of the 12 NM boundary, except for at the location of the TSS (which can be assumed to be due to transiting in and out of the Humber estuary rather than fishing). Fishing vessels made up 4.9% of the total vessels in the AIS data, noting however that not all fishing vessels broadcast AIS at all times (particularly when engaged in fishing activities (UC Santa Cruz, 2022 (REF 23.9)), and smaller fishing vessels are likely to be underrepresented in the data, where AIS equipment carriage is not mandatory. These vessels commonly stay around inshore waters.

23.5.9 Tug and towing vessels were also located across the study area in low densities (less than 1 vessel hour per year), with activity concentrated crossing the study area in the middle and south.

23.5.10 Passenger vessels accounted for 2% of all vessels, with density centred around two ferry routes that bisect the study area. The first route is Hull to Rotterdam (operated by P&O Ferries) which departs from the Port of Hull twice a day, and the second is Newcastle to Ijmuiden (operated by DFDS) which departs Newcastle twice a day also.

23.5.11 Service vessels accounted for 1.7% of the total vessel distribution, all activity was concentrated around operational offshore wind farms or oil and gas fields in the south of the study area or in the northeast, represented by transits between ports and oil and gas developments further offshore.

23.5.12 Military vessels operated in low densities (0.4%) around the Donna Nook Firing Range in the vicinity of the landfall.

23.5.13 Sailing vessels and pleasure craft consisted of 2.9% and 1.1% of all vessel distribution, however due to the legal size requirements for AIS equipment this is likely to be an underestimation of true density. The RYA Coastal Atlas has been used to better assess the use of the study area by these vessel types. As the majority of the study area is further offshore, only the nearshore section is utilised by sailing vessels transiting from the Humber estuary in a southeast direction (**Volume 3, Part 3, Figure 23-2: Royal Yachting Association UK, Coastal Atlas of Recreational Boating**). Multiple sailing clubs operate in the Humber, as well as south of the landfall at Skegness and Saltfleet Haven at the landfall which hosts an RYA affiliated club. Additional ports of use for vessels headed in this direction (but to a lesser extent) are Bridlington and Scarborough.

23.5.14 Maritime incident data was also used to inform of any navigational risks in the study area. Data from both the RNLI details that the most frequent reason for utilisation of their services in the study area was 'Machinery failure' (13.19%), 'Thought to be in trouble' (10.99%), and 'Person missing' (9.34%). Data from the MAIB shows that within the study area incidents are concentrated in the approaches to the Humber estuary and typically affect merchant vessels (images showing locations of incidents are contained within the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**). The most common incident was damage or loss to equipment, but there was a flooding event involving pleasure craft in close proximity to the landfall and two grounding or stranding events to the north and south of the landfall (recreational and small commercial respectively). There were far fewer incidents offshore, however these varied from damage to equipment, accident to person and contact (defined as interaction between vessels). Investigations were also conducted for incidents involving poor visibility.

Navigational Features

23.5.15 Navigational features are areas that are marked on nautical charts for mariner's information, either as aids to navigation or areas to be aware of or avoided. These include ports and port areas, anchorage areas, extraction areas, military practice or firing areas, no anchorage areas, wind farms, spoil grounds, cables, pipelines, TSS, anchorages, aids to navigation, pilot boarding stations, oil and gas infrastructure and charted wrecks or obstructions.

23.5.16 At the landfall, the Donna Nook firing range is located in the northern section of the study area. Triton Knoll Offshore Wind Farm is located partially within the study area, with other wind farms including Lincs, Inner Dowsing, Humber Gateway and Race Bank located in the vicinity. Multiple aggregate extraction sites are also found within the study area within the 12 NM limit. The English Offshore Scheme avoids all identified wind farm areas and extraction sites but would cross several export cables (assessed in **Volume 1, Part 3, Chapter 26: Other Marine Users**).

23.5.17 The approaches to the ports operated by ABP Humber are encompassed by the study area, including the River Humber Approaches TSS. The TSS has channels heading northeast, east and southeast which funnels traffic into the Humber estuary. The TSS ends within the limits of the ABP Humber Harbour Area, and is contained entirely within the port's Vessel Traffic Service (VTS) limits. There are 16 navigational buoys and three beacons also located in the nearshore area, with the majority located on approach to the Humber estuary (as shown in **Volume 3, Part 3, Figure 23-3: Shipping and Navigation Navigational Features**).

23.5.18 The Humber Deep Water Anchorage Area is located at Sand Hole east of the TSS, containing multiple anchorages in the approaches to the Humber.

23.5.19 Continuing north, the study area crosses planned Carbon Capture and Storage pipelines (Endurance), export cables for wind farms in various stages of development (including Hornsea 4, Dogger Bank B and Sofia), multiple Offshore Safety Zones for oil and gas activity (marked by buoys), the Breagh Gas Field and several military practice areas (Staxton and Druridge Bay).

Future baseline

23.5.20 Shipping activity within the vicinity of the draft Order Limits is expected to increase due to the planned development of North Sea OREIs, which would require higher levels of vessel traffic during the construction and operational phases of their life cycle. Other planned projects in the North Sea, such as Carbon Capture and Storage (CCS) and other cable projects, would also result in an increase in vessel activity during their respective construction phases. The number of vessels in the North Sea is also predicted to increase based on recent trends, with densities increasing by 37% overall between 2013 and 2017 (Robbins *et al.*, 2022,REF 23.10).

23.6 Environmental measures

23.6.1 As set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, the environmental measures are characterised as design measures or control and management measures. A range of environmental measures would be implemented as part of the English Offshore Scheme and will be secured in the DCO as relevant. **Table 23-6** outlines how these design and control measures would influence the Shipping and Navigation assessment.

Table 23-6 – Summary of the Environmental Measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction			
Vessels	Construction vessels for the English Offshore Scheme would have advisory safety zones which would recommend vessels to avoid.	For safety purposes, all vessels would be requested to maintain a minimum distance from construction vessels to prevent interactions.	NRA secured through the dML.
		Timely and efficient communication would be given to sea users in the area via Notices to Mariners (NtM), Kingfisher Bulletins, Radio Navigation Warnings Navigational Telex (NAVTEX and Navigational Areas (NAVAREA) warnings and /or broadcast warnings	Secured through the dML as part of the DCO.

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		Procedures would be in place to minimise disruption near high density shipping areas. e.g. avoidance of anchoring near busy areas, passage planning of installation vessels, emergency response plan etc.	NRA secured through the dML.
		Channels of communication would be established and maintained between the English Offshore Scheme, commercial fishing interests and relevant Port Authorities.	NRA secured through the dML.
		A Fisheries Liaison Officer (FLO) and fisheries working group(s) would 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. Details of the FLO will be included in the Construction Fisheries Liaison and Coexistence Plan.	NRA secured through the dML.
		7 day look-ahead to be provided for ABP Humber to inform the port of planned project vessel movements.	NRA secured through the dML.
		Communication with VTS in port areas to keep updated and update other marine users on vessel movements. Communication strategy to be developed with ABP Humber.	NRA secured through the dML.
		Co-ordination of SIMOPs with other developers and offshore activities to be undertaken prior to commencement of operations.	NRA secured through the dML.
Vessels	Construction vessels would be slow moving or stationary for periods of time, increasing the risk of collision.	Project vessels would comply with the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) as amended, particularly with respect to the display of lights, shapes and signals. The masters of other vessels are expected to be familiar with and comply with the COLREGS.	Secured through the dML as part of the DCO.
		Co-ordination of SIMOPs with other developers and offshore activities to be undertaken prior to commencement.	NRA secured through the dML

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		Pilotage within Port Authority Limits as required by the Port Authority.	NRA secured through the dML
		Communication with VTS in port areas to keep updated and update other marine users on vessel movements. Communication strategy to be developed with ABP Humber.	NRA secured through the dML.
		For safety purposes, all vessels would be requested to maintain a minimum distance from construction vessels to prevent interactions.	NRA secured through the dML.
		Pollution events as the result of a collision would be managed through the Projects Emergency Response Plan, Marine Pollution Contingency Plan and specifically the Shipboard Oil Pollution Emergency Plan (SOPEP).	CEMP and MPCP secured through the dML. SOPEP legal requirement.
Vessels	During the period between cable lay and burial/installation of cable protection measures, the uncovered cable is at a higher risk of interaction with other vessels through anchor strike.	Guard vessel(s), using RADAR with Automatic RADAR Plotting Aid (ARPA) to monitor vessel activity and predict possible interactions, would be employed to work alongside the installation vessel(s) during cable installation works and to protect any temporary cable exposures during installation.	Secured through the dML as part of the DCO.
		Cable jointing operations to be planned away from high shipping activity where possible.	NRA secured through the dML
		Timely and efficient communication would be given to sea users in the area via Notices to Mariners (NtM), Kingfisher Bulletins, Radio Navigation Warnings Navigational Telex (NAVTEX and Navigational Areas (NAVAREA) warnings and /or broadcast warnings.	Secured through the dML as part of the DCO.
Vessels	Cable protection measures may reduce navigable depth.	Cable protection would only be installed where considered necessary for the safe operation of the English Offshore Scheme. This includes the repair of cables due to accidental damage, where depth of lowering	CEMP secured through the dML

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		is not achieved and at infrastructure crossings.	
		Cable Burial Risk Assessment (CBRA) to be undertaken to identify appropriate target depth of burial based on geology, water depths and AIS data. This would reduce the chance of interaction with other marine users, and as per the CBRA recommendations deeper burial or cover would be implemented in areas of high shipping activity to further reduce this risk.	Design secured through the DCO.
		Guard vessel(s), using RADAR with Automatic RADAR Plotting Aid (ARPA) to monitor vessel activity and predict possible interactions, would be employed to work alongside the installation vessel(s) during cable installation works and to protect any temporary cable exposures during installation.	Secured through the dML as part of the DCO.
		Timely and efficient communication would be given to sea users in the area via Notices to Mariners (NtM), Kingfisher Bulletins, Radio Navigation Warnings Navigational Telex (NAVTEX and Navigational Areas (NAVAREA) warnings and /or broadcast warnings	Secured through the dML as part of the DCO.
Operation			
Vessels	Interference with navigational equipment may be caused due to EMF from the cables.	HVDC poles would be bundled to minimise the effects of EMF.	Design secured through the DCO.
		The intention is to bury the cables in the seabed, except in areas where trenching is not possible e.g. where ground conditions do not allow burial or at infrastructure crossings.	Design secured through the DCO.

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Vessels	Interaction with the English Offshore Scheme once operational, such as through an anchor strike.	As-built locations of cable and external protection would be supplied to UKHO (Admiralty), The Crown Estate and Kingfisher (KIS-ORCA)	Secured through the dML as part of the DCO.
		Cables would be marked on Admiralty Charts and fisherman's awareness charts (paper and electronic format).	Secured through the dML as part of the DCO.
		CBRA to be undertaken to identify appropriate target depth of burial based on geology, water depths and Automatic Identification Systems (AIS) data. This would reduce the chance of interaction with other marine users, and as per the CBRA recommendations deeper burial or cover would be implemented in areas of high shipping activity to further reduce this risk.	Design secured through the DCO.

23.7 Scope of the assessment

Spatial scope and study area

23.7.1 The spatial scope of the assessment of Shipping and Navigation covers the area of the English Offshore Scheme contained within the draft Order Limits, together with the study area as described in **Section 23.4**. The study area for Shipping and Navigation is shown on **Volume 3, Part 3, Figure 23-1: Average Vessel Hours (2023 – 2024) All Vessels**.

Temporal scope

23.7.2 The temporal scope of the assessment of Shipping and Navigation is consistent with the period over which the English Offshore Scheme would be carried out. It assumes construction of the English Offshore Scheme would commence at the earliest 2028 and cover a period of 6 years of total construction time. Operation would commence in 2033 with periodical maintenance required during the operational phase of the English Offshore Scheme. It is assumed that maintenance and repair activities could take place at any time during the life span of the English Offshore Scheme.

23.7.3 The English Offshore Scheme is expected to have a life span of more than 40 years. If decommissioning requires cessation of operation and removal of infrastructure at this point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of two years. The English Offshore Scheme could also remain operational for a period after the 40 years or be taken out of service and left within the

draft Order Limits after 40 years. Acknowledging the complexities of completing a detailed assessment for decommissioning works up to 40 years in the future, based on the information available, the Projects have concluded that impacts from decommissioning would be no greater than those during the construction phase. Furthermore, should decommissioning take place it is expected that an assessment in accordance with the legislation and guidance at the time of decommissioning would be undertaken.

Identification of receptors

23.7.4 The principal Shipping and Navigation receptors that have been identified as being potentially subject to significant effects are summarised in **Table 23-7**.

Table 23-7 – Shipping and Navigation Receptors Subject to Potential Effects

Receptor	Reason for consideration
Commercial vessels	Any commercial vessel operating within the study area has the potential to be impacted by the English Offshore Scheme and the vessels associated with it. These include cargo, dredging or underwater operations, fishing, military and law enforcement, passenger, service, tanker and tug or towing vessels.
Recreational vessels	Any recreational vessel operating within the study area has the potential to be impacted by the English Offshore Scheme and the vessels associated with it. These include pleasure craft and sailing vessels.
Navigational features	Any navigational feature within the study area that may be affected by the English Offshore Scheme. These include ports and port areas, anchorage areas, extraction areas, military practice or firing areas, no anchorage areas, wind farms, spoil grounds, cables, pipelines, TSS, anchorages, aids to navigation, pilot boarding stations, oil and gas infrastructure and charted wrecks or obstructions.

Potential effects considered within this assessment

23.7.5 The effects on Shipping and Navigation receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 23-8.** These potential significant effects have been identified through a Hazard Identification (HAZID) workshop held with stakeholders to ensure all potential hazards (defined for this assessment as a potential source of marine incidences and collisions to the existing baseline of other marine users) have been encompassed in the assessment.

Table 23-8 – Shipping and Navigation Receptors Scoped in for Further Assessment

Receptor	Likely significant effects
Vessels (both recreational and commercial)	Increased risk of vessel collisions Disturbance to existing shipping and fishing patterns Accidental anchor strike or drag onto exposed submarine cable

Receptor	Likely significant effects
	Accidental fishing gear snagging onto exposed submarine cable or cable protection measure Reduction in under-keel clearance Interference with marine navigational equipment during the operational phase
Navigational features	Project vessels blocking navigational features

23.7.6 The receptors/effects detailed in **Table 23-9** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 23-9 – Summary of Effects Scoped out of the Shipping and Navigation Assessment

Receptors/potential effects	Justification
Vessels - interference with marine navigational equipment during the construction and decommissioning phases	There is no risk of electromagnetic forces causing magnetic compass deviations in the construction and decommissioning phases

23.8 Key parameters for assessment

Realistic worst-case design scenario

23.8.1 The assessment has followed the Rochdale Envelope approach as outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects** and **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology of the PEIR.** The assessment of effects has been based on the description of the Projects and parameters outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects**. However, where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided below with regards to Shipping and Navigation along with the reasons why these parameters are considered worst-case. The preliminary assessment for Shipping and Navigation has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario, based on details within the Rochdale Envelope (e.g., different infrastructure layout within the draft Order Limits), to that assessed here be taken forward in the final design plan.

23.8.2 In relation to Shipping and Navigation the following assumptions are made regarding the Projects' design parameters in order to ensure a realistic worst-case assessment has been undertaken.

- With regards to both construction and operation activities it is assumed that the rates of progress as described in **Table 23-10** would be used. This has been considered as an expected worst-case scenario based on previous project experience. Further detail is provided in the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**).

Table 23-10 – Rates of Progress for the English Offshore Scheme (Worst Case Indicative Estimates)

Marine campaign	Rate of progress (m/hr unless otherwise stated)
Pre and post lay survey	3,000
Pre-Lay Grapnel Run (PLGR)	1,500
Boulder clearance	200
Sandwave pre-sweeping	200
Out of service cable removal	1 day per asset
Cable lay	200
Cable burial	150
Cable jointing	10
HDD punch out and cable pull in	6 days per pull in
External protection for in service cable and pipeline crossings	1 crossing per day
Remedial rock placement	200
Operation and maintenance surveys	1,000

Consideration of construction scenarios

23.8.3 As detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the timing of construction activities set out within this PEIR is indicative. To allow for any unexpected circumstances and a realistic worst case assessment, the impact assessment for the English Offshore Scheme considers the following construction scenario to ensure the worst-case scenario for Shipping and Navigation can be identified and assessed:

- EGL 3 and EGL 4 are constructed sequentially, with one project commencing after the start of the other. This may result in construction activities overlapping, occurring in series or having a gap between EGL 3 and EGL 4. This represents the worst-case scenario due to the potential for an extended construction programme, prolonging impacts to vessels and other marine users. Construction would be within the 6 year period mentioned in **Section 23.7.**

23.9 Assessment methodology

Overview

23.9.1 The generic project-wide approach to the assessment methodology is set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, and specifically in **Sections 5.4** to **5.6**. However, whilst this has informed the approach that has been used in this Shipping and Navigation assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Shipping and Navigation assessment. Details are provided below.

23.9.2 The methodology for the Shipping and Navigation assessment is based on the NRA methodology (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**) but has been adapted to align with the PEIR approach for an assessment of significance of effect. In turn the NRA methodology is informed by IMO and MCA guidance for completing risk assessments for developments in the marine environment. This is considered the industry standard approach, and the NRA methodology was presented to stakeholders during the HAZID workshop.

23.9.3 The NRA assess risk using a combination of frequency of occurrence and severity of consequence, which in turn is then defined as levels of 'tolerability' (which in turn are reduced to As Low As Reasonably Practicable (ALARP), once the Environmental Measures have been applied). This has been adapted to 'significance' to align with the wider PEIR.

Severity of consequence

23.9.4 The severity of consequence is defined in relation to impacts on human safety, ships, displacement of vessels, business/reputational impacts and environmental impacts. These have all been considered together to create the severity of consequence definition.

Table 23-11 – Severity of Consequence

Severity of consequence	Definition
Minor	Single or minor injuries Single local equipment damage Temporal displacement of vessel (hours) No negative publicity No perceptible impact to reputation. Minor environmental emissions, no spill response needed
Significant	Multiple minor injuries Multiple local equipment damage Temporal displacement of vessel (days) Minor reputational risks Local negative publicity Tier 1 response - local assistance needed
Severe	Multiple or severe injuries Non-severe ship and equipment damage Temporal displacement of vessel (weeks) Moderate reputational risks Regional negative publicity Tier 2 response - may not require external assistance
Serious	Single fatality or multiple severe injuries Severe damage to ship and equipment Temporal displacement of vessel (months)

Severity of consequence	Definition
	National reputational risks and negative publicity Tier 2 response - will require external assistance
Catastrophic	Multiple fatalities Total loss of ship and equipment Permanent displacement of vessels International reputational risks and negative publicity Tier 3 response - national assistance needed

Frequency

Table 23-12 – Frequency of Occurrence

Description	Definition
Extremely Remote	Likely to occur once in the lifetime of the Projects (assumed as 50 years) or less
Remote	Likely to occur once a decade
Probable	Likely to occur once per year
Very Probable	Likely to occur once per month
Frequent	Likely to occur once per week or more

Significance of effect

23.9.5 **Table 23-13** below details the risk matrix, which is used to determine the significance of the impact in the assessment of the English Offshore Scheme across the construction and operational stages. The significance criteria is then defined as major, moderate, minor or negligible.

Table 23-13 – Risk matrix – significance evaluation

Frequency of occurrence	Severity of consequence: Minor	Significant	Severe	Serious	Catastrophic
Extremely Remote	Negligible (not significant)	Negligible (not significant)	Minor (not significant)	Minor (not significant)	Minor (not significant)
Remote	Negligible (not significant)	Minor (not significant)	Minor (not significant)	Moderate (potentially significant)	Moderate (potentially significant)
Probable	Minor (not significant)	Minor (not significant)	Moderate (potentially significant)	Moderate (potentially significant)	**Major (significant)**
Very Probable	Minor (not significant)	Moderate (potentially significant)	Moderate (potentially significant)	**Major (significant)**	**Major (significant)**
Frequent	Moderate (potentially significant)	Moderate (potentially significant)	**Major (significant)**	**Major (significant)**	**Major (significant)**

Preliminary assessment of cumulative effects

23.9.6 At the current stage of the Projects (PEIR stage), design information for the Projects is insufficient to allow for a robust cumulative assessment to be undertaken. Furthermore, given the current position in relation to baseline data collection, with much of the environmental surveys still to be undertaken during 2025, the baseline identified at this PEIR stage cannot be taken as a complete picture of the potential presence and significance of sensitive receptors. Therefore, a cumulative assessment has not been undertaken at this stage; however, **Volume 1, Part 4, Chapter 28: Cumulative Effects**, presents the long and short lists of 'other developments' which will be considered at the ES stage, and the methodology which allowed for the identification of these other developments, to allow consultation bodies to form a view and provide comment on the other developments included. The long-list will be reviewed and if necessary, updated, in the lead up to the ES, as the Projects design further evolves and in response to any comments raised at statutory consultation.

23.10 Preliminary assessment of increased risk of vessel collisions – construction and operational phases

23.10.1 During both the construction and operational phases (maintenance specifically in the operational phase, as once operational there would be no additional vessel presence), the presence of vessels working on the English Offshore Scheme would increase the risk of a potential collision with another vessel transiting the area. This includes all activities in both phases, including, but not limited to, seabed preparation, cable installation, cable jointing, remedial cable protection and installing crossing infrastructure. During both phases, the vessels would be slow moving or stationary at some points depending on the activity – rates of progress are discussed **Table 23-10**, with the slowest activity noted as cable jointing where the vessel is almost stationary (this results in the highest risk level for this activity as shown in the Risk Matrix in the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**)). Transiting vessels may have to alter planned routes to avoid construction vessels, which could create pinch points in areas of increased vessel density such as in close proximity to shipping lanes. Larger construction vessels, such as the cable lay vessel (CLV) would also have limited manoeuvrability during these operations, making any evasive manoeuvres to avoid potential collisions more challenging. The potential effect of a vessel collision could range from damage to the vessel to loss of life. Damage to the vessel could lead to leaks in the offshore environment, which can in turn lead to accidents and spillages that have the potential to lead to pollution events. This is considered further in **Volume 1, Part 3, Chapter 19: Intertidal and Subtidal Benthic Ecology** and **Volume 1, Part 3, Chapter 20: Fish and Shellfish.**

23.10.2 At the landfall, the potential for a cable lay barge to be used also increases the overall risk of vessel collisions due to both the extended period of time the vessel is present at the HDD exit point and through the potential for use of anchors to moor the barge in place, creating a larger working area. The potential for additional vessels in the area to support the construction works further increases the risk of collision. Whilst most vessel traffic is not present in the nearshore area, recreational vessels are known to use the area to transit further south after exiting the Humber estuary.

23.10.3 The areas of greatest potential risk are in the vicinity of the Humber estuary, where shipping density is most concentrated throughout the study area. The approaches to the TSS cross perpendicular to the English Offshore Scheme, which would reduce the amount of time transiting vessels are in area for but still poses a risk for collision.

23.10.4 Based upon the above assessment, the frequency of this impact has been assessed as probable during the slowest activities as a worst case scenario, the severity has been assessed as catastrophic, resulting in an overall effect of Major and Significant in EIA terms.

23.10.5 As stated in the Environmental Measures, all vessels would communicate with all relevant stakeholders prior to the commencement of any construction or maintenance activities via a Notice to Mariners, which would include the requested advisory safety zone around the vessels to ensure safe working. Additional procedures would be put in place by the installation contractor in areas of high vessel traffic (such as in the vicinity of the TSS) to reduce the risk of collision, such as avoidance of anchoring in areas of increased traffic. Communication with ABP Humber, including a seven day look ahead, would be implemented to ensure pilots have visibility of the vessel's movements and can therefore plan accordingly regarding traffic entering the ABP Humber area. Simultaneous operations (SIMOPS) would be developed with any other project undergoing works at the same time as the English Offshore Scheme, which would allow

for discussion and co-ordination of operations to minimise disruption to all projects and to other vessels. All vessels during both phases would comply with COLREGs to reduce risk of collision.

23.10.6 Based upon the above assessment, the frequency of this impact has been assessed as **extremely remote** and the severity **catastrophic**, resulting in an overall effect of **Minor** and **Not Significant** in EIA terms after all Environmental Measures are considered.

23.11 Preliminary assessment of disturbance to existing shipping and fishing patterns – construction and operation phases

23.11.1 There is potential that the English Offshore Scheme would cause disturbance to existing shipping and fishing patterns, especially if a sequential installation of both EGL 3 and EGL 4 takes place (which has been considered as the worst case scenario for this assessment). Areas of greater vessel density for all vessel types were located in the south of the study area on the approaches to the Humber estuary, and the draft Order Limits transect the approaches to the TSS at the mouth of the Humber as well as two ferry routes and areas of known fishing activity. Vessel traffic to and from other developments is also expected to increase as a number of other OREIs in the vicinity move into the construction or maintenance phase.

23.11.2 Due to the presence of the CLV and other support vessels, other vessels in the area may have to re-route or reduce speed to avoid the construction activities. Depending on the re-route selected, this may push additional vessels into the Greater Wash Special Protection Area for longer than usual journey times. Additional fuel may also be required to make the longer journey, at a cost to the affected vessel. The disturbance would however be temporary and would move with the vessel, as it would be limited to the advisory safety zone set around the vessel during its operations. The length of time the disturbance would last is dependent on construction activity, weather and operational progress due to the seabed conditions. Further details on disturbance levels assessed per project activity during the construction and operation phase are presented in the Risk Matrix in Appendix A of the NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**)). Ongoing disturbance may result in potential reputational damage due to the inconvenience caused to other marine users during the construction phase. Once construction is complete, there would be no further disturbance to shipping and fishing during the operational phase, apart from during operation and maintenance surveys or when a cable repair is required. During these activities, the risks are the same as for the corresponding activity during construction.

23.11.3 Based upon this assessment, the frequency of this impact is frequent, and the severity is severe, resulting in an overall effect of major and significant in EIA terms.

23.11.4 As stated in the Environmental Measures (**Table 23-6**), early consultation with key stakeholders (such as ferry operators) would be undertaken to inform them of planned works and allow them to plan for the disruption to minimise the impact to their operations. This would also be communicated via Notice to Mariners, regular VTS communications and through a 7 day look ahead to ABP Humber to plan pilotage requirements around the schedule where necessary. SIMOPs would be developed with other developers to reduce the disturbance to each project and collectively to other marine users. Fishers co-operation agreements would be arranged where required as fishing grounds may be temporarily unavailable for the duration of the period of each project phase in the relevant area. Where possible, cable jointing activities would also be planned away from areas of high shipping activity to minimise disruption, as this

activity would require the vessel to be stationary or very slow moving for an extended period of time (rate of progress is estimated to be 10m/hr as shown in **Table 23-10**).

23.11.5 Based upon the above assessment, the **frequency** of this impact has been assessed as **very probable** and the **severity severe** as a worst case scenario (due to the potential reputational risks), resulting in an overall effect of **Moderate** and **Potentially Significant** in EIA terms after all Environmental Measures are considered.

23.12 Preliminary assessment of accidental anchor strike or drag

23.12.1 Risk of accidental anchor strike or drag is highest during the English Offshore Scheme's operational phase, however there is a low risk that during the cable lay and burial activities of the construction phase that emergency anchoring by either project or external vessels could strike the cable before burial can take place.

23.12.2 Cable exposures may occur due to mobile sediment or scour, which can increase the risk of an accidental anchor strike or drag due to the lack of protection. Vessel anchors also have the potential to strike the cable during anchor deployment in areas of surface lay. It is considered unlikely that an anchor would be deployed in deeper waters and away from designated anchorage areas, which is the where the majority of the draft Order Limits are located.

23.12.3 There is the potential that third-party asset repair or inspection campaigns could accidentally strike or drag the cable when anchoring, however as crossing agreements would be in place to set out an agreed working arrangement, this is considered unlikely.

23.12.4 Anchor strikes or drags can lead to damage to the cable, which can lead to outages of power supply and subsequent reputational impacts due to an issue with providing required electricity. This is considered one of the highest risks to the English Offshore Scheme during the operational phase (as shown in the Risk Matrix in the NRA, **Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**).

23.12.5 Based upon this assessment, the frequency of this impact has been assessed as probable, and the severity assessed as catastrophic (from a business and reputational effects perspective), with a resultant major risk level (significant in EIA terms).

23.12.6 To mitigate the risk of an accidental anchor strike or drag, a CBRA has been completed which details the burial requirements for the cable to maintain an acceptable level of risk. This takes into account seabed conditions and existing shipping movements, which indicate where areas of deeper burial are needed to mitigate any accidental anchor deployment in the vicinity of the English Offshore Scheme. Additionally, through the use of best practice when designing the rock protection scouring would be minimised. This has been assessed as Not Significant in **Volume 1, Part 3, Chapter 18: Coastal and Marine Physical Processes**, meaning the likelihood of cable exposure through scour is low.

23.12.7 During construction, there may be a delay between cable lay and cable burial which would leave the cable at risk of an anchor strike. The cable would be identified to other marine users by either guard vessels or temporary marker buoys, and notices regarding the area of exposed cable would be communicated via Notice to Mariners, KIS-ORCA notifications NAVTEX and NAVAREA warnings. Both measures would highlight the area of unburied cable and reduce the risk of an anchor strike or drag incident.

23.12.8 Once the construction phase has finished, the as-laid coordinates of the cable would be communicated to the UKHO and KIS-ORCA for inclusion in relevant charts and plotters.

This would inform other users of the English Offshore Scheme for the duration of its operating life. During this phase, any cable exposures would be notified to other marine users as soon as possible to prevent an anchor strike using the same formats as during the construction phase.

23.12.9 Based upon the above assessment, the **frequency** of this impact has been assessed as **extremely remote** and the **severity catastrophic** (from a business and reputational effects perspective), resulting in an overall effect of **Minor** and **Not significant** in EIA terms after all Environmental Measures are considered.

23.13 Preliminary assessment of accidental fishing gear snagging

23.13.1 Fishing gear has the potential to interact with the English Offshore Scheme in areas of surface lay, where use of towed gear such as bottom trawls can catch on the cable causing damage to the asset itself and a potential loss or damage of fishing gear. **Volume 1, Part 3, Chapter 24: Commercial Fisheries** concludes that there would only be temporary restricted access to fishing grounds during both the construction and operational phase (only during survey, maintenance or repair activities where a vessel is required on site), meaning there is a potential for fishing gear (particularly bottom drift netting) to snag during deployment in the vicinity of the English Offshore Scheme.

23.13.2 Based upon this assessment, the frequency of this impact has been assessed as probable and the severity catastrophic resulting in an overall effect of major and significant in EIA terms.

23.13.3 During the construction phase (and for any maintenance works), a Fisheries Liaison Officer (FLO) would be in place to facilitate agreement between the fishing community and the English Offshore Scheme. The FLO would communicate planned operations and schedules to local fishers so the area under construction can be avoided, through local consultation and notices on KIS-ORCA. This would also encompass smaller fishing vessels who do not carry AIS equipment. Where there is the potential for a section of cable that is yet to be buried to need marking as ‘exposed’ to other marine users, guard vessels may be used to identify the area to be avoided and prevent accidental gear snagging. Once operational, the as-laid coordinates would be shared with the UKHO to plot on charts and with KIS-ORCA so it’s visible on fishers’ plotters for awareness.

23.13.4 Based upon the above assessment, the **frequency** of this impact has been assessed as **extremely remote** and the **severity catastrophic** (from a business and reputational effects perspective), resulting in an overall effect of **Minor** and **Not Significant** in EIA terms after all Environmental Measures are considered.

23.14 Preliminary assessment of reduction in under-keel clearance

23.14.1 Reduction in under-keel clearance would be caused by the deployment of cable protection measures along the route where required. This could include infrastructure crossing locations, or in areas where burial is not able to be achieved due to seabed conditions. This is considered a risk during the construction phase once the protection measures have been deployed, and continues throughout the operational phase and through to decommissioning if the cable protection is not removed. There is an MCA requirement that seeks to keep a reduction in water depth (chart datum) to less than 5%.

23.14.2 The majority of the draft Order Limits are contained within deeper waters (>30 m), so any reduction in water depth and subsequently under-keel clearance are unlikely to cause any effects to any vessel types transiting the area. The shallowest section where cable protection measures would be deployed is in the nearshore area on approach to the Anderby Creek Landfall. The proposed crossings rock berm height would be a maximum of 1.5 m above the seabed, and there are at least 28 crossings located in less than 30 m water depth which could therefore lead to a water depth reduction of more than 5%. The shallowest crossing is located at 8.6 m water depth (Viking Link). This would lead to a reduction of water depth of 17.4%, which is considered by the MCA to have the potential to impact navigation.

23.14.3 The vessels operating in the shallowest area are typically restricted to high-speed craft (recreational vessels), which have a small draft as standard due to the smaller vessel size and are therefore unlikely to be impacted by any reductions in water depth at the crossing locations. There is an area of peak tanker activity in the nearshore area, with vessel hours peaking at a level between 75-100 hours per year within the draft Order Limits boundary. The closest crossing to the area of increased activity is located approximately 650 m away from the edge of the activity area. The nearshore crossing locations are planned directly west of an area to be avoided (which contains multiple wrecks), and so therefore it is considered unlikely that any large vessels would be transiting close to the western half of the English Offshore Scheme. However, the eastern side of the English Offshore Scheme may be impacted by the reduction in water depth due to the level of tanker activity in the region – the larger drafts of these vessels could prevent them from transiting over the crossings based on the rock berm design.

23.14.4 Based on this assessment, the frequency of this impact has been assessed as very probable and the severity significant, resulting in an overall effect of Moderate and Potentially Significant in EIA terms.

23.14.5 The Environmental Measures include provisions for cable protection only where it is necessary, therefore reducing the potential for water depth to be reduced. Once construction is complete, the as-laid coordinates would be provided to the United Kingdom Hydrographic Office (UKHO) for charting, after which all vessels traversing the area would be aware of any potential depth changes as a result of the English Offshore Scheme. The depth reduction may require vessels to avoid the areas where rock berms have been installed, which may require tankers in the area to alter their transit or holding patterns based on the AIS data used for the assessment.

23.14.6 There is the potential for additional mitigation to be applied to minimise the under-keel clearance reduction, and additional assessment regarding vessel usage over each crossing location would be undertaken once exact final rock berms are designed for each crossing (discussed further in **Section 23.18**).

23.14.7 Based upon the above assessment, the **frequency** of this impact has been assessed as **probable** and the **severity significant**, resulting in an overall effect of **Moderate** and **Potentially Significant** in EIA terms after all Environmental Measures are considered.

23.15 Preliminary assessment of interference with marine navigational equipment

23.15.1 Emissions of EMF during the operational phase have the potential to interfere with marine navigational equipment due to deviations in magnetic compasses and interference with inertial navigation. Inertial navigation systems (INS) used alongside global positioning systems (GPS) to navigate are not expected to be impacted by the English Offshore Scheme as these systems have negligible sensitive EMF. This is owing to marine gyrocompasses (used in INS) remaining unaffected by external magnetic fields as modern INS equipment generally uses laser technology and resonating quartz devices which are self-contained.

23.15.2 The operational cable would emit an EMF, which may have a small, localised effect in magnetic compasses. The degree to which it may affect magnetic compasses is dependent on several factors including cable separation distance, armoured cable design and water depth. The English Offshore Scheme cables would be bundled in a single trench and buried where appropriate, therefore reducing the potential for compass deviation. EMF calculations have been provided in **Volume 2, Part 1, Appendix 1.4.A Electromagnetic Field (EMF) Study** and have assumed burial at 1 m depth. These calculations indicate that over 99.5% of the draft Order Limits resulted in compass deviations of less than 3 degrees; small sections exceeding this are located in shallow waters, where water depth is below 3 m. MCA guidance for compass deviation is that there must be no more than a 3 degree electromagnetic variation for 95% of the cable route and for the remaining 5% of the cable route there must be no more than a 5 degree electromagnetic variation in water depths of 5m and deeper. The calculations provided indicate that this guidance is met. The assessment does not suggest any additional mitigation is required to reduce the impact to any marine navigational equipment. The NRA (**Volume 2, Part 3, Appendix 3.23.A Navigation Risk Assessment**) has therefore assessed that 0.5% of the English Offshore Scheme, located only in shallow water in the vicinity of the Anderby Creek Landfall, would be the proposed frequency of interference with marine navigational equipment. Due to the nearshore location of the potential interference, any vessels affected would be able to navigate using coastal landmarks and therefore have a reduced reliance on navigational equipment should anything be affected by EMF. Therefore, as a result of the low level of proposed interference (which has been mitigated through early stage project design such as cable bundling and burial), no additional environmental measures have been proposed.

23.15.3 Based upon the above assessment, the **frequency** of this impact has been assessed as **remote** and the **severity minor**, resulting in an overall effect of **Negligible** and **Not Significant** in EIA terms.

23.16 Preliminary assessment of project vessels blocking navigational features

23.16.1 Project vessels have the ability to block navigational features throughout all activities in the construction and operational phases (where a vessel is involved, such as maintenance). Navigational features include anchorages, approaches to ports, TSS and buoys. The English Offshore Scheme does not enter ABP Humber's port area but does enter the VTS limits for approximately 4 km. The closest anchorage is located approximately 5.5 km east of the edge of the English Offshore Scheme, east of the TSS. Multiple routes to the TSS, and therefore the entrance to the Humber estuary, are crossed by the English Offshore Scheme. The risk of blocking navigational features is restricted to the south of the English Offshore Scheme, as once the English Offshore Scheme heads further offshore the encounters with navigational features are reduced.

23.16.2 Due to the advisory safety zones required by the CLV during construction (expected to be 500 m but this could vary depending on area and activity), access to the TSS via one of the navigational channels could be blocked. There are multiple channels available, however these would require vessels to re-route to be able to access the approach, which would lead to disruption frequency of more than once a day. The distance between the anchorage and the English Offshore Scheme should be sufficient to allow vessels to access it regardless of location of the CLV and associated support vessels. The CLV may also block buoys signifying exclusion areas for oil and gas activities, however these would also be charted, and the exclusion zone is not large enough to block complete access to the oil and gas exclusion zones for any project vessels that may need to enter.

23.16.3 Based on this assessment, the frequency of the impact has been assessed as frequent and the severity severe, resulting in an overall effect of major and significant in EIA terms.

23.16.4 As discussed in the Environmental Measures, early consultation with stakeholders, alongside regular communication with vessels and other marine users (including through Notice to Mariners and the ABP Humber seven day look ahead) would ensure that everyone in the area is aware of the construction phase of works (and any maintenance works planned) and can plan accordingly to adjust routes to avoid the advisory safety zone. SIMOPs with other projects in the area would also aim to minimise blocking any navigational features by planning each project's operations so that access is not completely revoked for the period of the activity. Installation contractor procedures would also aim to reduce the time spent near navigational features where possible by avoidance of anchoring where vessel density is high and creating passage plans for installation vessels.

23.16.5 Based upon the above assessment, the **frequency** of this impact has been assessed as **very probable** and the **severity severe** (due to potential impact to business and reputation), resulting in an overall effect of **Moderate** and **Potentially Significant** in EIA terms after all Environmental Measures are considered.

23.17 Transboundary effects

23.17.1 The English Offshore Scheme lies wholly in UK waters. Any vessels from other countries that may transit through the study area have been considered as part of the assessment and given the approximate distance of 130 km to the UK EEZ boundary, any displacement of vessels caused by construction activities would be contained to UK waters. As a result, there is no potential for international transboundary impacts.

23.18 Further work to be undertaken

23.18.1 The information provided in this PEIR is preliminary, the final assessment of potential significant effects will be reported in the ES. This section describes the further work to be undertaken to support the Shipping and Navigation assessment presented in the ES.

Baseline

23.18.2 A review of all data used to characterise the baseline in the PEIR will be undertaken to ensure all data is still the most recent publicly available dataset for inclusion in the ES.

Assessment

23.18.3 The assessments undertaken for the PEIR will be reviewed following stakeholder consultation feedback and further design refinement. The following assessments will then be updated:

- Shipping and Navigation assessment (specifically regarding under-keel clearance, where an assessment of each rock berm with the potential to reduce navigable depth will be assessed once the design has been finalised); and
- NRA.

23.18.4 Additional study would be required to assess the impact of the temporary quay on the River Nene. This would involve an assessment of the AIS data along the river, and identify the relevant effects the construction and use of the quay would have on other users in the area.

Further environmental measures

23.18.5 Further consultation with relevant statutory consultees would be undertaken to define the scope and extents of the environmental measures set out in the assessment above. If, following stakeholder consultation feedback, further design refinement and further assessment and/or additional measures are required, these will be detailed as part of the ES.

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