Immingham Green Energy Terminal

TR030008

Volume 6

6.2 Environmental Statement

Chapter 12: Marine Transport and Navigation

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

September 2023

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

Immingham Green Energy Terminal

Development Consent Order 2023

6.2 Environmental Statement

Chapter 12: Marine Transport and Navigation

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12.1 Introduction

12.1.1 This chapter of the Environmental Statement ("ES") presents the baseline analysis and findings of the assessment of the likely significant effects of the Project on Marine Transport and Navigation.

12.1.2 As interrelationships exist with other assessments in relation to potential safety and commercial effects on marine transport and navigation, reference should be made to the following chapters of the ES **[TR030008/APP/6.2]**:

- **Chapter 22: Major Accidents and Disasters**
- **Chapter 23: Socio-Economics**

12.1.3 This chapter is supported by the following figures **[TR030008/APP/6.3]** and appendices **[TR030008/APP/6.4]**:

- **Figure 12.1:** General Overview of Humber Estuary
- **Figure 12.2:** Detailed Overview of Site
- **Figure 12.3:** Vessel Tracks by Type
- **Figure 12.4:** Vessel Tracks (Recreational)
- **Figure 12.5:** Vessel Densities
- **Appendix 12.A:** Navigational Risk Assessment ("NRA")
- **Appendix 12.B:** Ship Navigation Simulation Study

12.1.4 The marine transport and navigation assessment is supported by other topic chapters in the ES, including metocean data generated for the assessment reported in **Chapter 16: Physical Processes [TR030008/APP/6.2]**.

12.2 Consultation and Engagement

12.2.1 An Environmental Impact Assessment ("EIA") scoping exercise was undertaken in August 2022 to establish the form and nature of the marine transport and navigation assessment, and the approach and methods to be followed.

12.2.2 The Scoping Report (**Appendix 1.A [TR030008/APP/6.4]**) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the Project on marine transport and navigation. A Scoping Opinion was adopted by the Secretary of State on 10 October 2022 **[TR030008/APP/6.4]**.

12.2.3 Statutory Consultation took place between 9 January and 20 February 2023 in accordance with the Planning Act 2008 ("2008 Act"). The Applicant prepared a Preliminary Environmental Information Report ("PEI Report"), which was publicised at the consultation stage.

12.2.4 Through consideration of the responses to the first Statutory Consultation, the developing environmental assessments and through ongoing design-development and assessment, a series of changes within the Project were identified. A second Statutory Consultation took place between 24 May and 20 July 2023 in accordance with the 2008 Act and a PEI Report Addendum was publicised to support the consultation.

12.2.5 The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments raised via the formal scoping opinion (**Appendix 1.B [TR030008/APP/6.4]**) and in response to the formal consultation and other pre-application engagement is summarised in **Table 12-1**. The full responses to consultation comments are included within the **Consultation Report [TR030008/APP/5.1]**.

Table 12-1: Consultation Summary Table on Marine Transport and Navigation

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
Scoping Report August 2022	Planning Inspectorate	The main data sources from which information would be obtained to inform the current and future marine transportation and navigational baseline should be agreed with relevant consultation bodies, where possible.	Standard data sources on vessel activity and historical maritime incidents have been presented in **Section 12.6**. Stakeholder consultation has been carried out to verify and validate the baseline data, and discuss data gaps and limitations, e.g., small vessel activity.
		No details are provided on the assessment methodology to be used to determine likely significant effects, and this method should be clearly set out and justified based on evidence in the ES to demonstrate any conclusions reached.	**Section 12.4** describes the assessment methodology used in the NRA **[TR030008/APP/6.4]** and the ES **[TR030008/APP/6.2]**.
PEI Report (Statutory Consultation) January 2023	MCA	To address the ongoing safe operation of the marine interface during both the construction and operational phases of the project, the MCA would like to point the developers in the direction of the Port Marine Safety Code (PMSC) and its Guide to Good Practice. From the Guide to Good Practice, section 7 Conservancy, a Harbour Authority has a duty to conserve the harbour so that it is fit for use as a port. The harbour authority also has a duty of reasonable care to see that the harbour is in a fit condition for a vessel to be able to use it safely. Section 7.8 Regulating harbour works covers this in more detail.	The assessment work has been carried out in compliance with the Port Marine Safety Code ("PMSC") and its Guide to Good Practice ("GtGP"). The Port of Immingham as the Statutory Harbour Authority ("SHA") and Humber Estuary Services ("HES") as the Competent Harbour Authority ("CHA") are key stakeholders, along with external users of the Harbour.
		We note that during the formal safety risk assessment process undertaken as part of the Navigational Risk Assessment (NRA), more detailed and specific mitigation measures will be evaluated through the use of vessel simulations and consultation with stakeholders at a local hazard review workshop. The objective of the NRA will be to ensure all residual navigational risks are either broadly acceptable or tolerable with suitable risk controls in place. The NRA, when finalised will be appended to the ES. The MCA welcomes this approach.	Noted.

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
	CLdN Ports Killingholme Limited	The consultation materials do not include a NRA, although we note you intend to do this in due course. We would draw your attention to the fact that the majority of the services calling at CLdN Ports Killingholme operated at fixed schedules. Construction vessel movements, construction zones and other construction operations should not interfere with the operation of scheduled services. This includes scheduled services taking priority over construction vessels, such as barges removing dredged material. Please inform us when you propose to undertake a full HAZID. We request that you provide information on navigational impacts and the NRA in due course.	An NRA has been undertaken for the Project and is contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]**. The NRA considers the consequences and impacts of the proposed Project on navigation, both during the construction and its consequent operation. The scope of the EIA includes the appraisal of new and existing vessel activity arising as a result of the construction of the new marine infrastructure. We note the references to concerns regarding impact on scheduling of existing services. Vessels moving to and from the Port of Immingham are managed by the Port of Immingham Statutory Harbour Authority and Humber Statutory Harbour Authority (operating as Humber Estuary Services, "HES"). Both authorities have a legal duty to carefully manage all marine movements to facilitate the safe and efficient functioning of the harbour areas. The marine scheduling activities for the Port of Immingham, and all other port facility harbour authorities on the Humber have to dovetail with the overarching marine scheduling role of HES. The process of arranging and managing shipping movements seeks to ensure the equitable use of available port infrastructure and revolves around the efficient timetabling and scheduling of vessel movements.
		We would expect to see information and assessment of the impacts of up to 400 new vessel movements per annum anticipated during the operational phase, giving consideration to the type/size of vessels calling at the Project, and whether any sailing speed restrictions will apply to other services sailing	Following the first Statutory Consultation, the jetty design was revised varying the two berth design to a single berth. Following this change in berth design the maximum forecast vessel arrivals for the jetty are now 292 vessels per annum of which up to 12 per year would be ammonia carriers. The

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
		past the new berths, including extension eastwards of Immingham Oil Terminal of the existing 5 knot speed restrictions.	maximum forecast throughput for the jetty has been assumed as a reasonable worst case assumption for both the navigational risk assessment ("**NRA**") and for the environmental impact assessment ("**EIA**") which have been undertaken for the Project. A total of 27 simulation runs were conducted based on a two berth layout, but adapted to cover the most challenging manoeuvres for a single berth layout which was also being considered as an option at the time of the runs. Subsequent to completing the simulation study, the final Project design was reviewed by HR Wallingford and it was confirmed that the conclusions for the simulation (in respect of the layout option in line with the IOT) were applicable to the final design. The NRA is contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]**. We note that CldN participated in the workshops for the HAZID and NRA.
		We request that you provide information on navigational impacts and NRA in due course. We are able to provide responses to that prior to any application. We also request to participate in any HAZID workshops.	The Terminal would be able to accommodate vessels of length up to 250m and draught up to 14m. These vessels will require tugs for berthing, as well as line handling/mooring vessels as required. The assessments undertaken for the Project take into account the type and size of vessels calling at the new jetty. The effect of the Project on future marine traffic is assessed with regards to any additional identified hazards, embedded controls that are already in place on the Humber, and potential future control/mitigation measures in the NRA and in this chapter. Marine congestion is managed by Humber Vessel Traffic Service ("VTS") as part of the wider port movements planning / live traffic plan. The existing 5 knot

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			speed limit for Immingham Oil Terminal ("IOT") will be extended to the east to cover the Project berth. A maximum speed limit of 5 knots will apply to vessels passing the Project berth when a vessel is mooring, moored or unmooring (the same as at IOT). The statutory harbour authorities are together required to ensure the safety of navigation and marine operation and in accordance with the requirements of the Port Marine Safety Code, have a duty to review and approve current and proposed controls and processes to ensure that the safety of navigation is maintained. We note CldN's request to be involved in the NRA/HAZID workshops. The navigational assessments undertaken for the Project included a HAZID workshop and risk ranking process in which CLdN participated. The completed NRA is contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]** of this ES. The NRA reports on the workshop, which was undertaken and takes into account the comments within the Hazard Log, which informs the EIA which has been undertaken and is presented in this chapter.
	DFDS Seaways	The IERRT structure is omitted in every visual representation in the Project materials. The IERRT DCO may now be at the pre-application stage again, but the omission of the proposed structure misleadingly underplays the possibility of marine congestion in the area during both construction and operation should the two projects go ahead and the consequential safety risks in the vicinity of the jetty on the marine side of the Project.	The IERRT application is an entirely separate project, which is at the examination stage and is not yet consented. Consequently, there is no reason why it would need to be depicted visually on the application materials for the Project. The construction and operation of IERRT has been taken into account in the navigational risk assessment ("NRA") which has been undertaken for the Project. The NRA is

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]**. The cumulative effects of the Project with the proposed IERRT project have been assessed and is set out in **Chapter 25: Cumulative and In-Combination Effects** [**TR030008/APP/6.2**].
		The Project proposes to use the IMO's FSA methodology and PMSC to complete the NRA. The Project consultation materials describe this methodology as 'best practice' for port marine operations and the preferred approach of the MCA. This only serves to bolster our concern that using mixed methodologies in the IERRT proposals is a flawed approach, which we expressed in our response to the supplementary consultation to the IERRT. It is unclear why the Applicant would use different methodologies across these two projects and we suggest they reconsider their approach to IERRT.	The Project is a separate project to IERRT. However, both projects apply the same risk assessment approach which follows the Port Marine Safety Code and its associated Guide to Good Practice on Port Marine Operations. The methodology used for the assessment are set out this chapter.
		We have further concerns that marine navigation has not been considered cumulatively, in particular tug availability which is likely to be made more in demand by the Project. If tugs are not so readily available to service the vessel movements on the IERRT and the Project this will add to marine congestion and create delays in the vicinity.	The concerns expressed relating to tug availability are noted. As you know, marine navigational planning is a complex process requiring the review of multiple input scenarios to ensure that the passage of merchant vessels is afforded the most expeditious solution. The role of Vessel Traffic Services therefore is an integral part of that process. The provision of towage on the Humber is wholly driven by market forces and it is reasonable to assume – and indeed has been proven in the past – that should demand for additional towage become apparent, tug providers will increase vessel resourcing accordingly.

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			A 150m safety (exclusion) zone will apply to passing vessels from the berth line. The position of the berth has been aligned with IOT which also has a 150m exclusion zone, to ensure the channel width available to passing vessels is maintained. Simulations have been carried out to successfully demonstrate there is adequate space for passing vessels. This has been assessed within the NRA, including a HAZID Workshop attended by existing port users.
HAZID Workshop, carried out as part of the NRA May 2023	Various	Representatives from the Port of Immingham, Humber Estuary Services (HES), pilots, Svitzer, SMS Towage, HR Wallingford, Associated Petroleum Terminals (APT), Air Products and CLdN, provided input into the potential hazards, scenarios, causes, and controls (mitigation measures) for marine operations during the construction and operational phases of the project.	The completed NRA is included as **Appendix 12.A** to this ES **[TR030008/APP/6.4]**. This reports on the workshop and takes into account the comments within the Hazard Log, which informs the Impact Assessment presented in **Section 12.8**.
2nd Statutory Consultation June 2023	MCA	I can confirm that the MCA has no further comments in light of these changes to our original response as per attached. The site is within SHA limits, and they have responsibility for the safety of navigation within their waters during construction and the ongoing safe operation of the site. We note the intention to undertake a NRA for the proposals. The NRA should incorporate the final design and should be discussed and agreed with the SHA. The project should be carried out in accordance with the PMSC and its GtGP. The developers should work with the SHA to update the MSMS for the project in accordance with the code.	The SHA and CHA have been consulted and involved in the Project. All design changes and amendments have been discussed and approved by the SHA/CHA. The final design (as set out in **Chapter 2: The Project**) has been incorporated into the NRA; the assessment of the jetty design's impact on the safety of navigation aligns with the SHA's approach for managing navigational safety and meets the PMSC's requirement for assessing risk and maintaining the Marine Safety Management System ("MSMS"). The SHA's MSMS is internally audited on an annual basis, and an external assurance audit is undertaken every three years against the requirements of the PMSC and GtGP. The Applicant has stated compliance with the PMSC to the UK Government

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			and is listed on the .gov Port Marine Safety Code compliant ports webpage as a port submitting compliance, which is a requirement of the PMSC.
	CLdN	We made comments in reply to the PEIR consultation in relation to: 1. The approach to assessment of vessel calls, with only 12 of the potential 400 annual vessel calls being associated with other developments and uses which are not identified or assessed; 2. The absence of any navigation risk assessment or supporting information: and 3. A request to be involved in navigational risk assessments/HAZID workshops. We believe our comments in February response including in relation to uncertainty around future transport effects and sailing speed restrictions remain. We would also expect revised navigational risk assessment and HAZID to be undertaken.	1. Vessel calls Following the first Statutory Consultation, the jetty design was revised varying the two berth design to a single berth. Following this change in berth design the maximum forecast vessel arrivals for the jetty are now 292 vessels per annum of which up to 12 per year would be ammonia carriers. The maximum forecast throughput for the jetty has been assumed as a reasonable worst case assumption for both the navigational risk assessment ("NRA") and for the environmental impact assessment ("EIA") which have been undertaken for the Project. A total of 27 simulation runs were conducted based on a two berth layout, but adapted to cover the most challenging manoeuvres for a single berth layout which was also being considered as an option at the time of the runs. Subsequent to completing the simulation study, the final Project design was reviewed by HR Wallingford and it was confirmed that the conclusions for the simulation (in respect of the layout option in line with the IOT) were applicable to the final design. The NRA is contained within Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]. We note that CldN participated in the workshops for the HAZID and NRA. 2. Absence of NRA or supporting information

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			As explained above, an NRA has been undertaken for the Project and is contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]**. TheNRA considers the consequences and impacts of the proposed Project on navigation, both during the construction and its consequent operation. The scope of the EIA includes the appraisal of new and existing vessel activity arising as a result of the construction of the new marine infrastructure. We note the references to concerns regarding impact on scheduling of existing services. Vessels moving to and from the Port of Immingham are managed by the Port of Immingham Statutory Harbour Authority and Humber Statutory Harbour Authority (operating as Humber Estuary Services, "HES"). Both authorities have a legal duty to carefully manage all marine movements to facilitate the safe and efficient functioning of the harbour areas. The marine scheduling activities for the Port of Immingham, and all other port facility harbour authorities on the Humber have to dovetail with the overarching marine scheduling role of HES. The process of arranging and managing shipping movements seeks to ensure the equitable use of available port infrastructure and revolves around the efficient timetabling and scheduling of vessel movements. 3. Impacts from reduced sailing speeds in vicinity of the Project The Terminal would be able to accommodate vessels of length up to 250m and draught up to 14m. These vessels will require tugs for berthing, as well as line

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			handling/mooring vessels as required. The assessments undertaken for the Project take into account the type and size of vessels calling at the new jetty. The effect of the Project on future marine traffic is assessed with regards to any additional identified hazards, embedded controls that are already in place on the Humber, and potential future control/mitigation measures in the NRA and in this ES chapter. Marine congestion is managed by Humber Vessel Traffic Service ("VTS") as part of the wider port movements planning / live traffic plan. The existing 5 knot speed limit for Immingham Oil Terminal ("IOT") will be extended to the east to cover the Project berth. A maximum speed limit of 5 knots will apply to vessels passing the Project berth when a vessel is mooring, moored or unmooring (the same as at IOT). The statutory harbour authorities are together required to ensure the safety of navigation and marine operation and in accordance with the requirements of the Port Marine Safety Code, have a duty to review and approve current and proposed controls and processes to ensure that the safety of navigation is maintained. 4. NRA/HAZID workshops We note CldN's request to be involved in the NRA/HAZID workshops. The navigational assessments undertaken for the Project included a HAZID workshop and risk ranking process in which CLdN participated. The completed NRA is contained within **Appendix 12.A: Navigational Risk Assessment [TR030008/APP/6.4]** of this ES. The NRA reports on the workshop, which was

Reference / Date	Consultee	Summary of Response	How comments have been addressed in this chapter
			undertaken and takes into account the comments within the Hazard Log, which informs the EIA which has been undertaken and is presented in this ES Chapter.
	DFDS Seaways	**Navigational Safety – methodologies** The IGET proposes to use the IMO FSA methodology and the PMSC to complete the NRA. The IGET consultation materials describe this methodology as 'best practice' for port marine operations and the preferred approach of the MCA. This only serves to bolster our concern that using mixed methodologies in the IERRT proposals is a flawed approach, which we expressed in our response to the supplementary consultation to the IERRT. It is unclear why the Applicant would use different methodologies across these two projects and we suggest they reconsider their approach to IERRT.	The Project is a separate project to IERRT. However, both projects apply the same risk assessment approach which follows the Port Marine Safety Code and its associated Guide to Good Practice on Port Marine Operations. The methodology used for the assessment is set out in this chapter.
		Marine navigation and congestion – exclusion zone We understand that facilities handling potentially hazardous products, such as IGET, may be required to operate an exclusion zone for vessels and other operations taking place in the vicinity. There is a reference within the topic "Marine Transport and Navigation" on page 29 on the Applicant's PEIR Addendum to "required safety zones" which we assume relates to such a requirement but cannot find any greater detail on this issue in the application documents. Depending on the extent and nature of any such "safety / exclusion zones" the operation of such zones may have a material impact on other operations taking place at the Port of Immingham and on vessel movements on the Humber. The Applicant should therefore provide a detailed assessment of any such "safety / exclusion zones" before its application is progressed any further so that interested parties and existing port users can assess and comment on any potential impact.	A 150m safety (exclusion) zone will apply to passing vessels from the berth line. The position of the berth has been aligned with IOT which also has a 150m exclusion zone, to ensure the channel width available to passing vessels is maintained. Simulations have been carried out to successfully demonstrate there is adequate space for passing vessels. This has been assessed within the NRA, including a HAZID Workshop attended by existing port users.

12.2.6 Having regard to the information presented within the Scoping Report (**Appendix 1.A [TR030008/APP/6.4]**), no impacts were scoped out.

12.3 Legislation, Planning Policy and Guidance

12.3.1 **Table 12-2** presents the legislation, policy and guidance relevant to the Marine Transport and Navigation assessment and details how their requirements have been met in the assessment.

Table 12-2: Relevant legislation, policy and guidance regarding Marine Transport and Navigation

Legislation/Policy/Guidance	Consideration within the ES Report
Department for Transport ("DfT") Port Marine Safety Code, and relevant sections of the Guide to Good Practice (Ref 12-1)	
The Port Marine Safety Code sets out a national standard for every aspect of port marine safety. Its aim is to enhance safety for everyone who uses or works in the UK port marine environment. Although not mandatory, it is endorsed by the UK Government and representatives from across the maritime sector and, there is a strong expectation that all harbour authorities will comply. The Code is intended to be flexible enough that any size or type of harbour or marine facility will be able to apply its principles in a way that is appropriate and proportionate to local requirements.	The guidance on risk assessment has been adopted to ensure all marine risks are consulted upon and formally assessed so that they can be eliminated or reduced to ("ALARP") in accordance with good practice, and a MSMS implemented based on the risk assessment. This guidance has informed the identification of potential impacts and risks in **Section 12.8**.
International Maritime Organization's ("IMO") Revised Guidelines for Formal Safety Assessment (Ref 12-2)	
The Maritime Safety Committee, at its seventy-fourth session (30 May to 8 June 2001), and the Marine Environment Protection Committee, at its forty-seventh session (4 to 8 March 2002), approved the Guidelines for FSA for use in the IMO rule-making process. These have been amended several times with the latest being MSC-EPC.2/Circ.12/Rev.2, 9 April 2018	Provides a methodology for identifying and evaluating hazards/risks associated with marine operations, as well as appropriate mitigation measures, in a transparent and consistent manner. This guidance has informed the identification of potential impacts and risks in **Section 12.8**.
The Pilotage Act (Ref 12-3)	
The Pilotage Act requires CHAs to keep under consideration the pilotage services that may be required to secure the safety of ships. This Act gives a CHA the powers to make pilotage compulsory within their pilotage district and levy charges for the use of a pilot, grant pilotage exemption certificates and authorize pilots within their district. The Act also requires the Secretary of State to maintain a list of CHAs and	In line with the Act, in its capacity as CHA, HES has issued pilotage directions for the Humber. The pilotage requirements for vessels visiting the Humber, including the vessels that will visit the Project, have been considered within the assessment.

Legislation/Policy/Guidance	Consideration within the ES Report
empowers the Secretary of State to authorize other bodies to grant deep sea pilotage certificates in respect of such part of the sea falling outside the harbour of any CHA.	

12.4 Assessment Methodology

12.4.1 A formal assessment of marine transport and navigational hazards/risks has been undertaken within the NRA/ES in line with the Port Marine Safety Code (PMSC) (Ref 12-1) and the associated 'A Guide to Good Practice on Port Marine Operations' (**Table 12-4**), and the International Maritime Organization (IMO) Formal Safety Assessment (FSA) methodology (Ref 12-2). Further details can be found within the NRA (**Appendix 12.A [TR030008/APP/6.4]**).

12.4.2 Each hazard has been risk ranked in terms of consequence versus frequency using definitions for the Project agreed with ABP, as detailed in **Table 12-3** and **Table 12-4**, respectively. Consequences have been assessed according to the following four criteria:

a. People (human life)

b. Property (port and shipping infrastructure damage)

c. Planet (environment)

d. Port (reputation/business/amenity loss)

12.4.3 For each hazard scenario eight outcomes are therefore determined. This is comprised of four outcomes from the 'worst credible' description and four outcomes from the 'most likely' description for each receptor. These outcomes are identified from the frequency and consequence criteria determined post-HAZID. The outcome categories are assigned through the matrix shown in **Plate 12-1** and these categories are used to calculate risk as above.

Table 12-3: Severity of Consequence Ranking Definitions

Rank	Description	Definition			
		People	Property	Planet	Port (Business)
1	Negligible	No injury	Negligible (£0 - £10,000)	None (No incident - or a potential incident/near miss)	None
2	Minor	Minor injury(s)	Minor (£10,000 - £750,000)	No Measurable Impact (An incident or event occurred, but no discernible environmental impact - Tier 1 but no pollution control measures needed)	Minor (Little local publicity. Minor damage to reputation. Minor loss of revenue, £0 - £750,000)

Rank	Description	Definition			
		People	Property	Planet	Port (Business)
3	Moderate	Serious injury(s) (MAIB/RIDDOR reportable injury)	Moderate (£750,000 - £4M)	Minor (Incident results in pollution with limited/local impact - Tier 1, Harbour Authority pollution control measures deployed)	Moderate (Negative local publicity. Moderate damage to reputation. Moderate loss of revenue, £750,000 - £4M)
4	Major	Single fatality	Serious (£4M - £8M)	Significant (Has the potential to cause significant damage and impact - Tier 2, pollution control measures from external organisations required)	Serious (Negative national publicity. Serious damage to reputation. Serious loss of revenue, £4M - £8M)
5	Extreme	Multiple fatalities	Major (> £8M)	Major (Potential to cause catastrophic and/or widespread damage - Tier 3, requires major external assistance)	Major (Negative national and international publicity. Major damage to reputation. Major loss of revenue, > £8 M)

Table 12-4: Frequency of Occurrence Ranking Definitions

Rank	Description	Definition	Indicative Return Period
1	Rare	The impact of the hazard is realized but should very rarely occur (within the lifetime of the entity)	> 1,000 years
2	Unlikely	The impact of the hazard might occur but is unlikely (within the lifetime of the entity)	100 – 1000 years
3	Possible	The impact of the hazard could very well occur, *but it also may not* (within the lifetime of the entity)	10 – 100 years
4	Likely	It is quite likely that the impact of the hazard will occur (within the lifetime of the entity)	1 – 10 years

Rank	Description	Definition	Indicative Return Period
5	Almost Certain	The impact of the hazard will occur (within lifetime of entity)	< 1 year

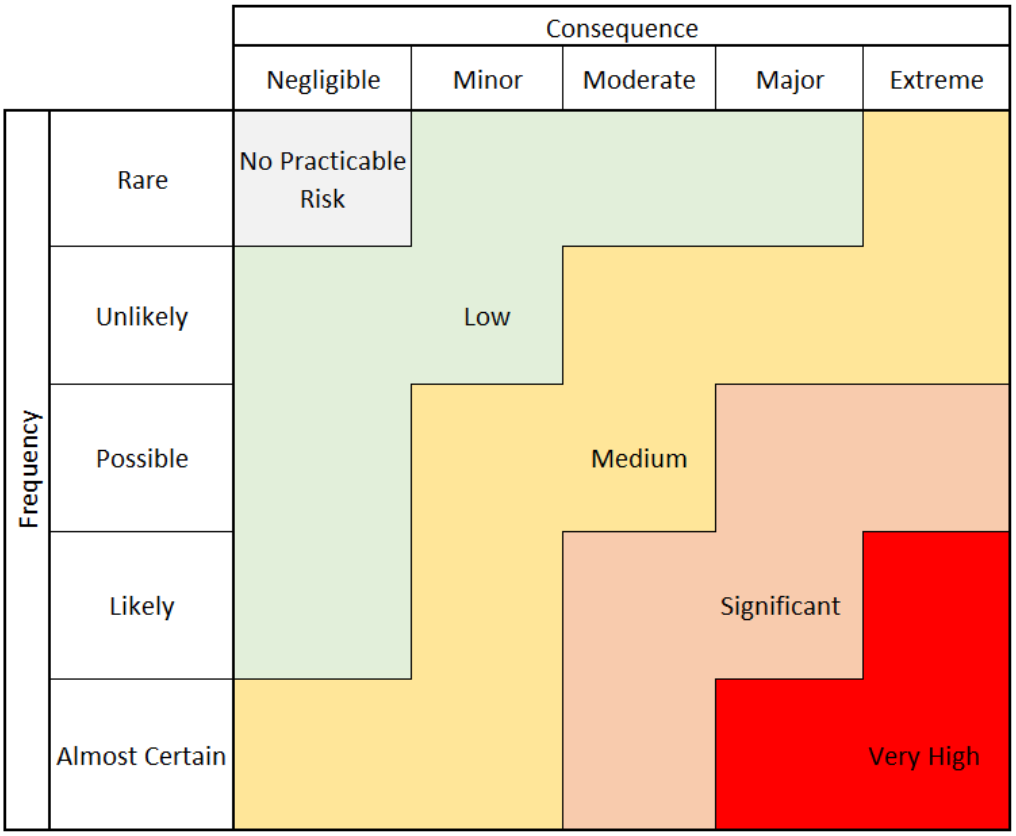
12.4.4 Hazard scenarios were assessed in terms of both most likely and worst credible outcomes, to reflect the range of potential outcomes arising from an incident.

12.4.5 For each hazard, embedded mitigation in the form of existing safety measures in place at the Port, or planned for the Project, were documented and taken into account within the risk rankings.

12.4.6 The assessment was informed by a HAZID workshop involving marine risk specialists, Project and Port personnel, and Port users.

12.4.7 The overall risk ranking (frequency vs. consequence) determined the hazard's position within the risk matrix shown in **Plate 12-1**.

Plate 12-1: Risk Matrix



12.4.8 The outcome of the risk assessment was compared with ABP's risk tolerability criteria for each of the four receptors, and formally approved at a meeting of the ABP Harbour Authority Safety Board ("HASB") (see NRA, **Appendix 12.A [TR030008/APP/6.4]**). In the context of marine safety, the overriding objective identified in the PMSC is to reduce risk to a point which is ALARP. Therefore, if a risk is intolerable, it is imperative that controls are applied until the risk is both ALARP and tolerable.

12.4.9 For the purposes of this assessment, impacts that are deemed to be intolerable, or not within ALARP parameters, are considered to be significant in EIA terms; impacts deemed to be tolerable and ALARP are deemed as not significant in EIA terms.

Data and Information Sources

12.4.10 Current baseline conditions have been determined by a desk-based review of available information. The main desk-based sources of information that have been reviewed to inform the current baseline description within the vicinity of the Project include:

a. Automatic Identification System (AIS) data
b. Marine accident/incident data
c. Information from Admiralty charts and publications
d. Information from ABP Humber publications

Automatic Identification System ("AIS") data

12.4.11 Up to date AIS vessel tracking data has been used to characterise baseline marine traffic. The full dataset is comprised of the 12 months from 1 September 2021 to 31 August 2022, to cover seasonal variations. There was a small amount of downtime noted over the 12 months of approximately 3%; numbers have been scaled up to account for this where appropriate.

12.4.12 AIS equipment (Class A) is required to be fitted on all vessels of 300 gross tonnage (GT) and upwards engaged on international voyages, cargo vessels of 500GT and upwards not engaged on international voyages, passenger vessels irrespective of size, built on or after 1 July 2002, and fishing vessels of 15m length and above. Smaller vessels (e.g., fishing vessels less than 15m in length and recreational craft) are not required to broadcast on AIS, but may do so voluntarily typically using Class B units. Both Class A and B vessels are included in the AIS dataset that has been used.

12.4.13 The AIS data have been analysed and divided into the following vessel categories:

a. Port service craft (e.g., pilot vessels, port tenders etc)
b. Vessels engaged in dredging or underwater operations
c. Tugs
d. Offshore support vessels (e.g., wind farm, oil and gas)

e. Passenger vessels

f. Cargo vessels (e.g., general cargo vessels, ro-ro cargo vessels and bulk carriers etc)

g. Tankers (e.g., oil tankers, chemical tankers, and gas carriers)

h. Fishing

i. Recreational

j. Unspecified/Other (e.g., military, patrol boats, survey vessels, lifeboats, etc)

Maritime accidents/incidents

12.4.14 To characterise maritime incidents occurring within the study area, available data have been analysed from the following three sources using consistent time periods:

a. ABP Humber MarNIS (Port Risk Management software) incident data: complete dataset from 2012 to 2021 inclusive.

b. Royal National Lifeboat Institution ("RNLI"): complete dataset of all callouts from 2012 to 2021 inclusive.

c. Marine Accident Investigation Branch ("MAIB"): complete dataset from 2012 to 2021 inclusive.

Admiralty Charts and Sailing Directions

12.4.15 Navigational features have been considered in this assessment and have been identified using information from UK Hydrographic Office ("UKHO") Admiralty Charts 104, 3497 and 1188. These charts are used by mariners as part of the passage planning process and to plot progress during a passage and so contain all relevant navigational information. More details can be found in the Admiralty Sailing Directions NP54 (12th edition 2021) issued by UKHO (Ref 12-5).

Vessel Simulations

12.4.16 Vessel simulations were carried out at HR Wallingford's UK Ship Simulation Centre over three days between 11 and 13 April 2023, attended by port personnel and external stakeholders. A total of 27 simulation runs were conducted based on a two berth layout, but adapted as far as possible to cover the most challenging manoeuvres for a single berth layout which had been decided prior to the runs.

12.4.17 Two layouts were modelled: Layout 1 based on a 150m exclusion zone aligned with IOT, and Layout 5 with an additional setback to allow a 250m exclusion zone. Layout 5 was prioritised as the most challenging, however Layout 1 was also tested, which matches the alignment of the final berth design. Subsequent to completing the study, the final design was reviewed by HR Wallingford and it was confirmed that the conclusions with respect to Layout 1 were applicable to the final design.

12.4.18 Overall, the simulation runs did not raise any major problems or causes for concern for vessels arriving or departing the Project, or the neighbouring IOT jetties. For passing traffic, it was demonstrated that vessels will be able to pass safely to the north of the Project based on existing protocols. The simulation results were considered within the risk assessment. Full details of the vessel simulations are provided within **Appendix 12.B [TR030008/APP/6.4]**.

Limitations and Assumptions

12.4.19 This assessment has been undertaken based on the Project design and project methodology, as detailed in **Chapter 2: The Project** and **Chapter 3: Need and Alternatives** of the ES **[TR030008/APP/6.2]** and any relevant constraints identified in **Chapter 22: Major Accidents and Disasters of the ES [TR030008/APP/6.2]**.

12.4.20 The AIS vessel tracking data used in the baseline assessment does not fully cover all vessel movements, such as smaller fishing vessels and recreational vessels that are not required to broadcast on AIS. This has been consulted upon with Port personnel and identified to be a small fraction of the overall traffic. This has been taken into account within the risk assessment.

12.5 Study Area

12.5.1 For this assessment, the study area covers all the area over which potential direct and indirect consequences of the Project are predicted to arise during the construction and operational periods.

12.5.2 The study area has been defined as the area comprising the Humber Estuary bounded on the west by the Humber Bridge and on the east by the Humber Estuary Services Statutory Harbour Authority (“SHA”) limit for the Humber Estuary. This study area encompasses the marine works associated with the Project, the main route to and from the Project location, and considers the total utilisation of the Humber Estuary to determine the implications on vessel traffic management.

12.5.3 **Figure 12.1 [TR030008/APP/6.3]** gives an overview of the study area.

12.5.4 **Figure 12.2 [TR030008/APP/6.3]** gives a zoomed-in view of the Site Boundary and key surrounding features.

12.5.5 The Site Boundary extends approximately 0.6nm from the southern side of the Humber.

12.6 Navigational Baseline Conditions

Current Baseline

12.6.1 The following sections review the baseline information for marine traffic and transport within the study area. The following elements are covered in the baseline:

a. Statutory responsibilities and management procedures

b. Visual aids to navigation

c. Vessel services

d. Vessel traffic management

e. Marine traffic analysis

f. Marine accidents and incidents

Statutory responsibilities and management procedures

12.6.2 The Project, if consented, will be located fully within an extended Port of Immingham SHA area where the Applicant is the SHA. In this capacity, the Applicant is responsible with a set of powers and duties which include the management and regulation of the safety of navigation and marine operations in its SHA area.

12.6.3 HES also run by ABP but as a separate statutory function, is the SHA for the wider Humber Estuary and CHA with respect to pilotage for the Humber Estuary and the ABP docks and other port facilities within the wider Estuary. As the CHA, HES has the power to issue Pilotage Directions that prescribe which vessels require a Pilot or Pilot Exemption Certificate ("PEC") holder when navigating within the CHA area.

12.6.4 VTS is provided for the Humber Estuary in line with the guidance as laid out in MCA MGN 401 (Amendment 3) (Ref 12-8), and is formally identified with a VTS designation within Merchant Shipping Notice ("*MSN") 1796 (Amendment 2) Vessel Traffic Services (VTS) - Designation of VTS Stations in the United Kingdom* for the benefit of the compliance with regulations 6 and 7 of the Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004 (Ref 12-9). Humber VTS maintains a vessel traffic picture through the AIS and Radar providing information on weather, vessel movements and marine safety to vessels navigating in the VTS area. All sea-going vessels are required to report to Humber VTS when entering and leaving the VTS area and at designated reporting points identified on navigational charts.

12.6.5 The Applicant is also the Local Lighthouse Authority ("LLA") for the Port of Immingham's SHA area by virtue of the Merchant Shipping Act 1995. As LLA, the Applicant is responsible for the provision and maintenance of Aids to Navigation ("AtoN"). The Applicant is required to report any defects to AtoN and consult on any proposed changes, additions or removal of AtoN with Trinity House Lighthouse Authority as the General Lighthouse Authority for England and Wales.

12.6.6 Both the Port of Immingham and HES have committed to meeting the requirements of the PMSC. The PMSC requires that ports operate a MSMS which is based on a comprehensive and a continuously updated set of risk assessments. The MSMS details how the ports fulfil their duties as SHAs and meet the marine safety requirements prescribed by the PMSC.

Visual Aids to Navigation

12.6.7 Visual aids to navigation within the study area conform to the standards of the International Association of Marine Aids to Navigation and Lighthouse Authorities ("IALA") and Trinity House.

12.6.8 Lateral markers are used to denote the navigable section of the estuary, the main navigable channel, and smaller channel, Foul Holme Channel. Leading lights are positioned on the Immingham Bulk Terminal identifying the main channel for transiting vessels.

12.6.9 A number of aids to navigation are surrounding the facilities nearby which include channel lights denoting the terminals and edge of the channel particularly noticeable on the Oil Terminal and Immingham Bulk Terminal.

Vessel Services

12.6.10 Pilotage in the Humber Estuary and the Port of Immingham is provided by HES. Pilotage Directions define the Humber Pilotage Area and the requirements for compulsory pilotage within it (Ref 12-6). The directions also lay down requirements under which PECs are issued and administered in the area.

12.6.11 Vessels subject to compulsory pilotage within the compulsory pilotage area include:

a. All vessels of greater than 60m length.

b. Any vessel less than 60m carrying a bulk cargo of dangerous substances as defined and categorised in the Dangerous Substances in Harbour Areas Regulations (Ref 12-7).

c. Vessels over 100 m moving between tidal estuary berths which includes the moving of mooring lines.

12.6.12 Towage is provided by a range of service providers with the main companies being SMS Towage and Svitzer who offer a range of tugs with different bollard pull capacities.

12.6.13 The vessel's size, type and draught dictate the minimum tugs that are required. Of particular note for the study area, all tankers visiting Immingham Oil Terminal ("IOT") up to 150,000 Dead Weight Tonnage ("DWT") and gas tankers over 20,000 DWT require two tugs from the Sunk Spit Buoy for the passage to the berth.

12.6.14 Tankers up to 50,000 DWT require three tugs for berthing, four tugs are required for berthing tankers 50,000 to 150,000 DWT and five for any vessels greater than 150,000 DWT.

12.6.15 Vessels visiting the IOT Finger Pier are accompanied by the tug which is on standby at the pier.

Vessel Traffic Management

12.6.16 A VTS, which is located at the Humber Marine Control Centre ("HMCC") in Grimsby, operates a 24-hour service for all river users. The objectives of VTS are safe use of the waterway, efficiency of traffic movement, and protection of the marine and adjacent environment. The system is compulsory for all sea-going vessels when entering the Humber VTS area.

12.6.17 The service provides AIS coverage throughout the VTS area and radar tracking within the area bounded by the Humber Bridge and the seaward limits of the VTS area. In addition, every two hours the VTS service broadcasts information to mariners regarding the weather, tidal information and navigational warnings.

DfT Port Statistics

12.6.18 Statistics published by the DfT indicate that the Humber Estuary is one of the busiest waterways in the UK with the main Humber Ports of Hull, Goole, Grimsby and Immingham accounting for the majority of cargo handled on the River Humber. Grimsby and Immingham handled just over 50 million tonnes of freight cargo in 2021, second only to London in the UK. The Port of Hull handles nearly 10 million tonnes of cargo per year and Goole around 2 million tonnes.

Marine Traffic Analysis

12.6.19 This section presents an analysis of all vessels, based on 12 months of AIS data for the period 1 September 2021 – 31 August 2022, intersecting a gate drawn across the river perpendicular to the Site Boundary. More detailed traffic analysis is presented in the NRA (**Appendix 12.A [TR030008/APP/6.4]**).

12.6.20 Tracks intersecting the gate were analysed using Anatec's *AIS Time Analyser* program. This calculated the time and direction of passage at the point at which vessels crossed the gate. This program analyses each individual track intersection, and therefore, vessels making more than one transit in a single day have been counted on each transit.

12.6.21 **Figure 12.3 [TR030008/APP/6.3]** shows the AIS vessel tracks intersecting the gate for a typical month, colour-coded by vessel type.

12.6.22 It can be seen that the Site Boundary is in a stretch of the river which is transited by a range of vessels including port service craft (e.g., pilot boats), tankers, tugs and vessels engaged in dredging or underwater operations. The vessels recorded crossing the Site Boundary were mostly tugs of smaller lengths (less than 60 m), used to assist tankers and cargo vessels for manoeuvring in the area.

12.6.23 There were several types of tankers recorded in the study area. These included tank barges, oil/chemical tankers, product tankers, Liquified Petroleum Gas ("LPG") carriers. Tank barges and product tankers were recorded transiting to IOT Finger Berth, LPG carriers were recorded transiting to South Killingholme Jetty and Immingham Gas Terminal, oil/chemical tankers were observed near Western Jetty, IOT and within Immingham Dock.

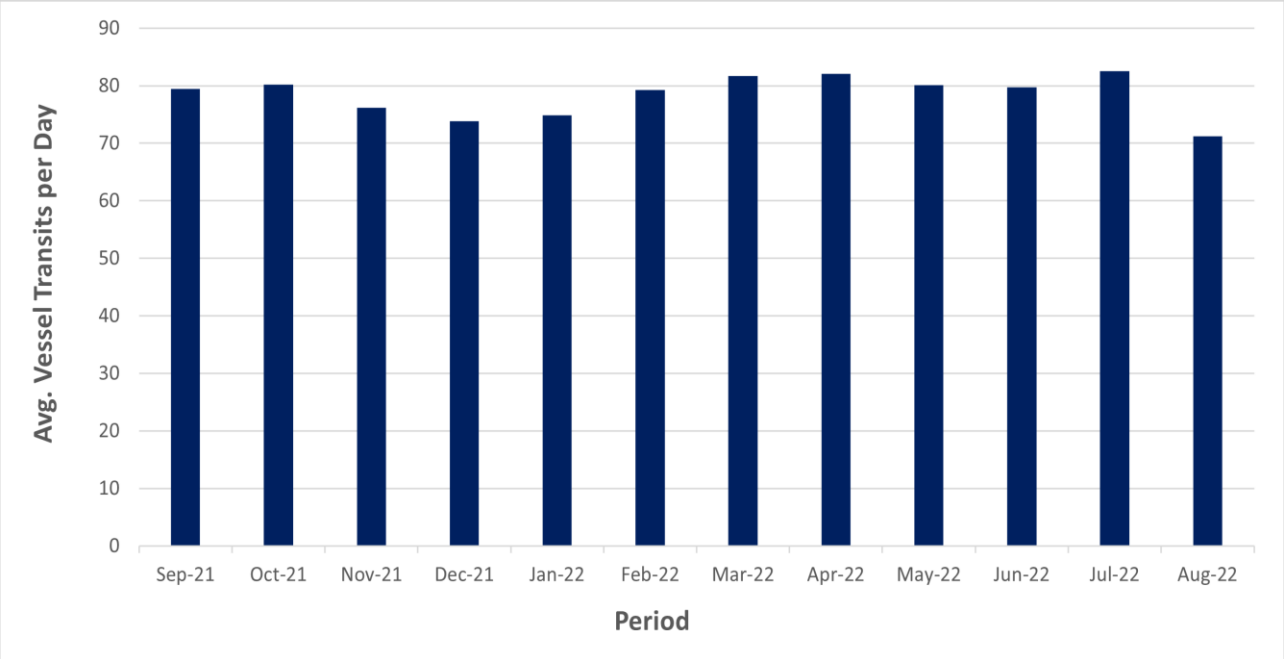
12.6.24 The majority of the cargo vessels (i.e., bulk carriers, container carriers, general cargo, and ro-ro cargo carriers), were recorded transiting to Immingham Outer Harbour and Humber Sea Terminal, with some using the Foul Holme Channel to transit to Hull.

12.6.25 Passenger vessels comprised of ferries from Hull to Rotterdam and Killingholme to Netherlands. Vessels involved in dredging/underwater operations were most prominent in River Humber adjacent to the West Jetty and HIT. Offshore support vessels were mostly crew transfer boats transiting to Humber Gateway Wind Farm.

12.6.26 Among port service crafts, research vessels were recorded transiting the Site Boundary, Immingham Dock and Humber International Terminal ("HIT"), and pilot vessels were mostly observed transiting north of the Site Boundary.

12.6.27 **Plate 12-2** presents the average vessel transits per month intersecting the gate during the study period.

Plate 12-2: Monthly Vessel Transits (12 Months)



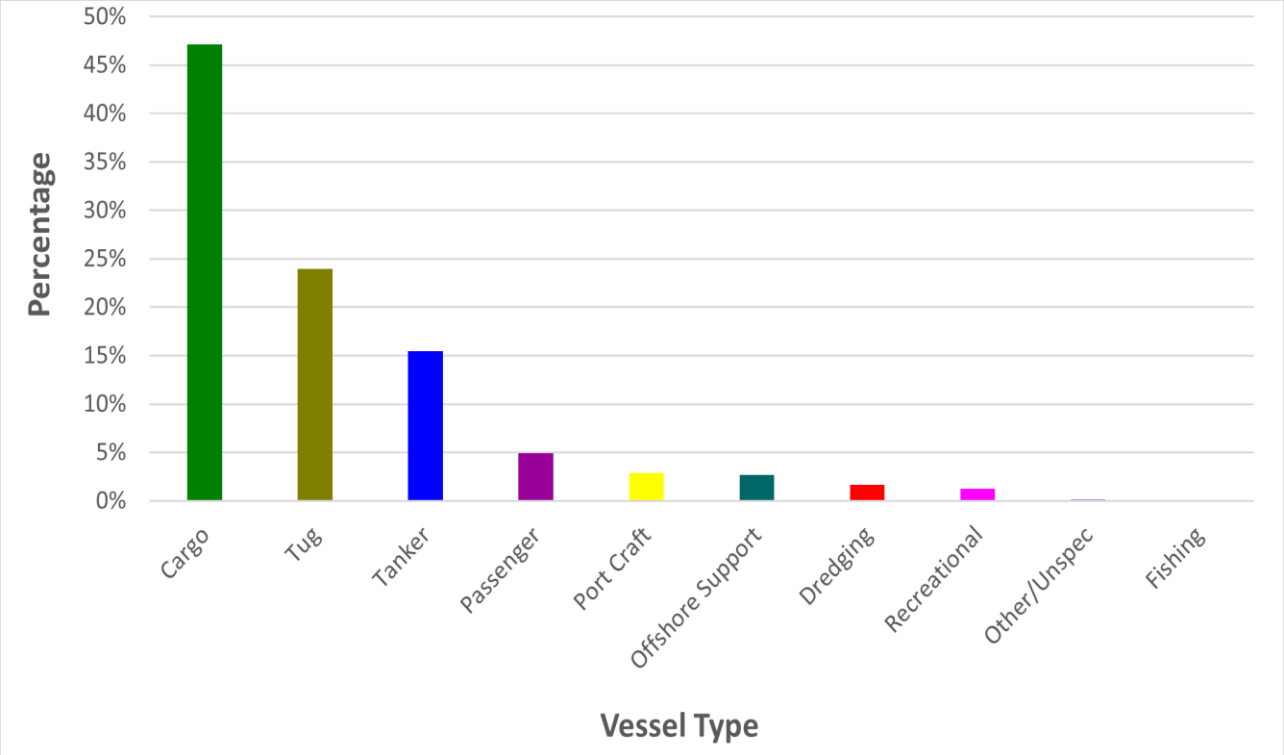
12.6.28 An average of 78 vessel transits per day crossed the gate during the 12-month study period[1]. The busiest months were March, April and July 2022 with an average of 82 transits per day each month. August 2022 was the least busy with an average of 71 transits per day.

12.6.29 An average of ten vessel transits per day were recorded crossing the Project structure including the 150m exclusion zone.

12.6.30 **Plate 12-3** shows the distribution of vessels recorded crossing the gate by type during the 12-month period.

[1] If each unique vessel is only counted once per day crossing the gate, the average unique vessel crossings per day is 56.

Plate 12-3: Vessel Type Distribution Crossing Gate (12 Months)



12.6.31 The most common vessel types recorded crossing the gate were cargo vessels (47%), followed by tugs (24%), tankers (15%) and passenger vessels (5%). Port service crafts and offshore support vessels each accounted for 3%, while recreational vessel transits accounted for 1% of the distribution. Other/unspecified and fishing vessels contributed less than 1% of the overall vessel type distribution. The vessel movements for each type representing over 1% of the total traffic during the 12-month study period have been discussed in the NRA (**Appendix 12.A [TR030008/APP/6.4]**).

12.6.32 The most common vessel types recorded crossing the Project infrastructure, including the 150 m exclusion zone, were tugs (69%), followed by tankers (16%), cargo vessels (8%) and port service crafts (5%). Only smaller vessels crossed south of the berth, with larger vessels tending to pass through the northern edge of the exclusion zone.

12.6.33 It is reiterated that small fishing vessels (below 15m in length) and recreational craft may be under-represented by the AIS data due to carriage requirements.

Recreational Navigation

12.6.34 The Humber Estuary has approximately 1,000 permanent berths and 120 visitor berths for recreational craft. The majority of recreational activity occurs during the summer months and predominantly on the weekend. There are no recreational facilities based at the Port of Immingham.

12.6.35 Established recreational vessel destinations in the Humber Estuary include: Hull Marina which has accommodation for 310 boats and 20 visitors; Goole Boathouse which offers 140 moorings and South Ferriby marina which provides accommodation for 100 boats plus 20 visiting vessels. In addition, there are various creeks around the estuary providing further capacity, namely Tetney Haven (Humber Mouth Yacht Club) where small numbers of moorings are available, Stone Creek (located on the north side of the river opposite Immingham), Hessle Haven and Barrow Haven, which both provide anchorages.

12.6.36 During the 12-month AIS study period, recreational activity peaked in July and August, with two vessel transits per day on average, during each month. In winter, there was an average of less than one vessel per week. **Figure 12.4 [TR030008/APP/6.3]** shows the 12 months of recreational vessel tracks recorded on AIS.

Vessel Densities

12.6.37 This section presents a vessel density plot (heat map) based on the year of AIS tracks intersecting a grid of cells encompassing the Project.

12.6.38 The density grid for the 12-month AIS dataset is presented **in Figure 12.5 [TR030008/APP/6.3]**. It represents a vessel density heat map based upon the number of AIS tracks intersecting 100m x 100m grid cells.

12.6.39 A high-density route was observed through the main channel, crossing the northern (outer) edge of the Site Boundary used by vessels transiting to / from Immingham, as well as the Foul Holme channel. The inner (southern) part of the Site Boundary had limited traffic due to the shallow water depths and presence of the nearby IOT infrastructure.

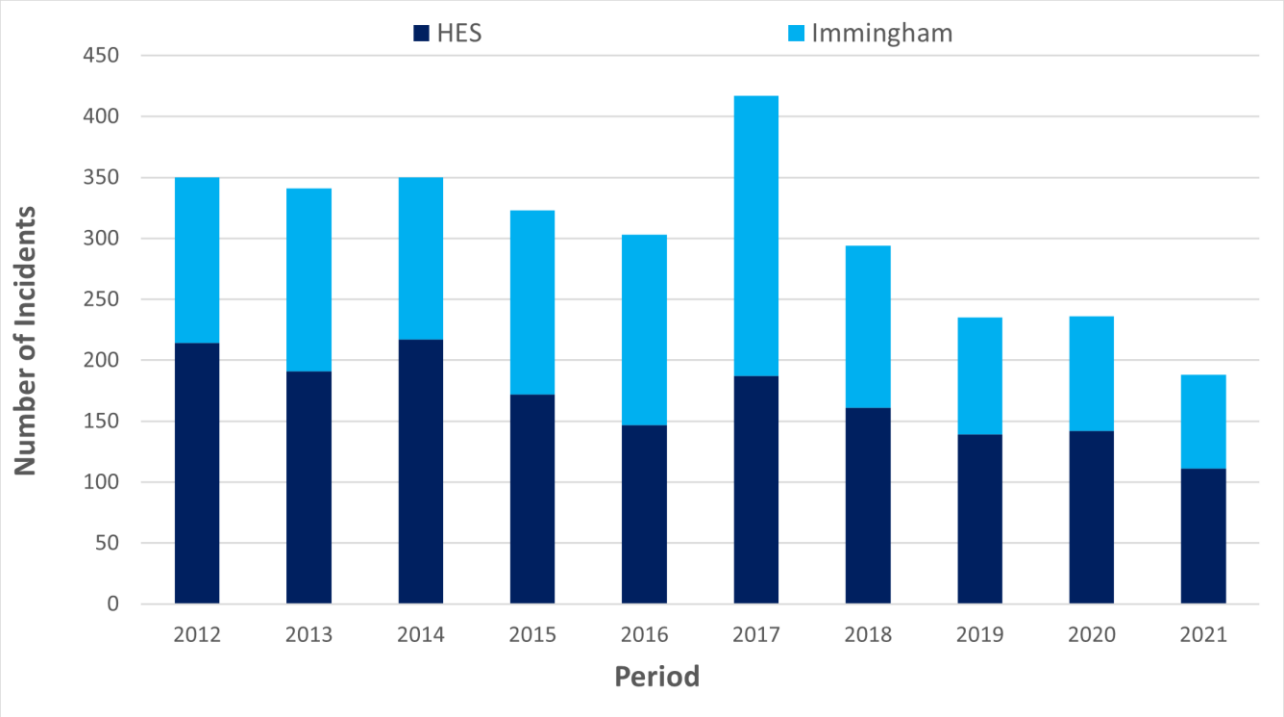
Historical Maritime Incidents

12.6.40 This section presents a summary of the maritime incidents within the study area over a ten-year period, based on three sources; MarNIS (ABP Humber), RNLI, and MAIB. A more in-depth analysis has been undertaken in the NRA (**Appendix 12.A [TR030008/APP/6.4]**.

MarNIS (2012 to 2021 inclusive)

12.6.41 **Plate 12-4** shows a summary of yearly fluctuations within the study area, based on the MarNIS data.

Plate 12-4: Number of Incidents based on MarNIS Data



12.6.42 An average of 304 incidents per year were recorded by the MarNIS. The overall trend is downwards although not in a straight-line, for example, there was an increase in 2017 due to pilot ladder defects and weighted heaving lines being a focus area for the port, resulting in increased reports.

12.6.43 The most common incident reported for both HES and Immingham was equipment failure in vessels, 54% and 41% respectively. The next most common was impact with port infrastructure.

12.6.44 It is noted that the number of incidents recorded in MarNIS is much higher than the other sources due to reporting requirements, including near misses being logged.

12.6.45 **Table 12-5** summarises the seven MArNIS incidents recorded in the past 10 years within the marine boundary of the Project.

Table 12-5: Incidents within the marine boundary of the Project

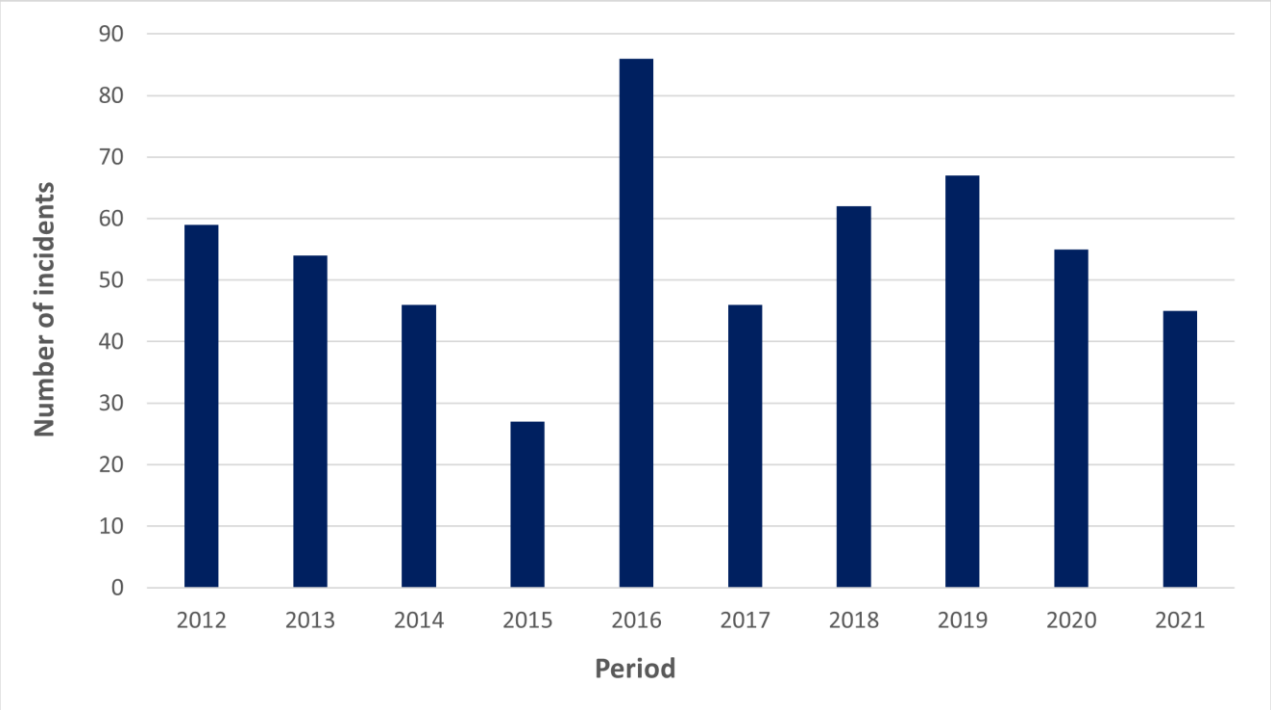
ID	Date	Category of Incident
1	24/05/2013	Grounding
2	23/10/2013	Suspicious floating object
3	24/02/2017	Damaged cargo
4	26/04/2018	Equipment failure (vessel)
5	19/06/2020	Equipment failure (vessel)

ID	Date	Category of Incident
6	01/04/2021	Striking with ship (moored)
7	20/07/2021	Equipment failure (vessel)

RNLI (2012 to 2021 inclusive)

12.6.46 **Plate 12-5** shows a summary of yearly fluctuations within the study area, based on RNLI data.

Plate 12-5: Number of Incidents based on RNLI Data

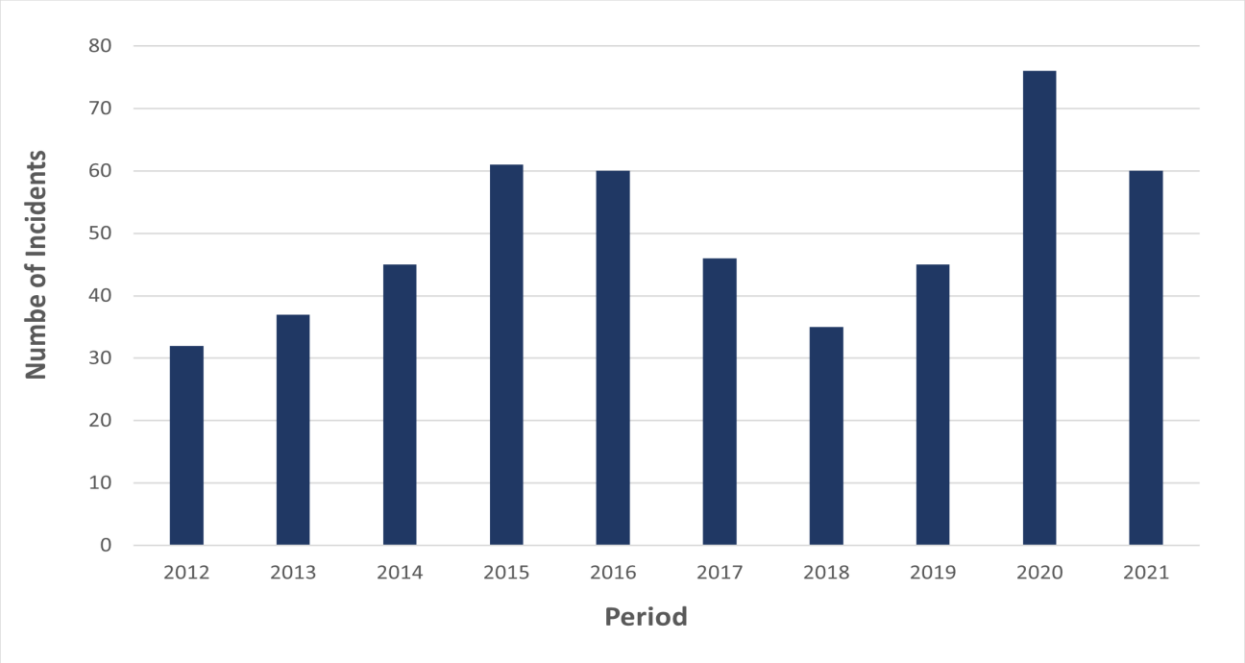


12.6.47 An average of 55 incidents per year were recorded by the RNLI. Most of the recorded incidents were due to equipment failure, grounding, sailing failure (recreational activity) and collision. The incidents that were recorded in proximity to the Project were responded to by the Humber Lifeboat Station. The Cleethorpes station was also involved in responses to incidents farther east, near Grimsby.

MAIB (2012 to 2021 inclusive)

12.6.48 **Plate 12-6** shows a summary of yearly fluctuations within the study area, based on the MAIB data.

Plate 12-6: Number of Incidents based on MAIB Data



12.6.49 An average of 50 incidents per year were recorded by the MAIB. Most of the recorded incidents were due to grounding, equipment failure, collision with port infrastructure and loss of control.

Future Baseline

12.6.50 General economic growth over the assumed 50-year lifetime of the Project (giving the greatest potential for changes to traffic levels), as well as increased vessel traffic due to specific developments, could increase the number of vessel movements to and from the Humber (and in particular, Immingham). This has been assessed in the NRA (**Appendix 12.A [TR030008/APP/6.4]**), noting that the Port has spare capacity relative to historical peaks in vessel arrivals.

12.6.51 Cumulative impacts on commercial and recreational navigation could arise as a result of other coastal and marine developments and activities in the Humber Estuary. These are considered as part of the cumulative impacts and in-combination effects assessment in **Chapter 25: Cumulative and In-Combination Effects** of the ES **[TR030008/APP/6.2]**.

12.7 Development Design and Impact Avoidance

Mitigation Measures

12.7.1 The Project has been designed, as far as possible, to avoid and minimise impacts and effects to marine transport and navigation through the process of design development, and by embedding mitigation measures into the design.

12.7.2 Embedded mitigation also includes controls which are already active and applied by the Harbour Authority within the Port of Immingham or by HES in relation to marine operations in the study area.

12.7.3 Mitigation measures proposed at the HAZID workshop have also been adopted by the Project, such as to revise and extend existing controls where necessary, such as port plans and procedures.

12.7.4 **Table 12-6** provides a list of the mitigation measures.

Table 12-6: List of Mitigation Measures (Risk Controls)

ID	Control	Description
1	Updated port controls, plans and procedures	Existing port documents including the Port Marine Safety Management System (MSMS), Humber Passage Plan (HPP), and Humber Emergency Plan (HEP), will be updated to take into account the Project.
2	Updated Admiralty publications	Information about the Project will be provided to UKHO in a timely manner to allow Charts, Sailing Directions, and Admiralty List of Radio Signal (ALRS), to be updated.
3	Pilotage / PEC	Gas carriers to the Project will be subject to HES pilotage requirements. A significant proportion of vessels passing the Project will also be subject to Pilotage requirements or have Pilotage Exemption Certificate (PEC) holders onboard.
4	Towage	Towage support in terms of the number and power of tugs appropriate to the size of the gas carrier and weather conditions will be provided by tugs from the Sunk Spit Buoy for the passage to the berth, as well as assisting departure. General availability of towage will also help provide assistance in the event of a mooring breakout.
5	VTS	Adherence of vessels to Humber Vessel Traffic Services requirements and instructions. Humber VTS will help control vessel movements and avoid dangerous encounter situations, e.g., involving construction vessels.
6	Aids to Navigation (AtoNs)	The marine works shall be appropriately lit as soon as there are items which pose a hazard to navigation. Once operational, aids to navigation shall be provided and maintained so that the structure and berth can be identified. The safe navigation of all vessels in the Humber is aided by numerous existing AtoNs.
7	AIS Equipment	The vast majority of vessels using the Humber broadcast on AIS and therefore can be tracked by other vessels for collision avoidance, as well as by the VTS. The majority of Project vessels, including gas carriers and construction barges, will broadcast on AIS.
8	Passage Planning	Project vessels will have in place appropriate passage plans as well as adhering to the Humber Passage Plan when applicable.
9	Traffic Management	Vessels will be sequenced as per the Humber Passage Plan to help avoid encounters and prevent overtaking, e.g., an IOT vessel will be brought in ahead of the Project vessel to allow both to be berthed at High Water.
10	COLREGS	Vessels will adhere to the Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS).

ID	Control	Description
11	Availability of secondary channel	There is a secondary channel (Foul Holme) that can be used by certain vessels within a set tidal range.
12	Circulation of Information	Information will be circulated about the Project to users of the Humber via Notices to Mariners and river warnings broadcast by the VTS every 2 hrs (or more frequently if required) which consist of maritime safety information, and designated no-go zones. Temporary construction information not on Admiralty charts could be marked by other means, e.g., Portable Pilot Unit (PPU).
13	Stakeholder liaison	Stakeholder engagement and liaison will be held with recreational and fishing representatives to make them aware of the Project and related vessel activities during the different phases.
14	Communications between Project/Port	Discussion of upcoming activities shall take place with the personnel at Immingham, HES and where relevant, the Pilots and IOT.
15	Hydrographic surveys	The current programme of surveying at the Port of Immingham shall be updated to include the Project. The results of the survey shall be provided to the UKHO for use in navigational charts and compared with previous surveys to inform potential requirements for maintenance dredging.
16	Weather limits	The maximum weather limits for operations shall be assessed and set for all activities. These shall be monitored against real time and forecasted weather conditions throughout the construction process. In addition, operational weather limits shall also be considered for vessels using the terminal during the operational phase.
17	Weather monitoring	Weather forecasting and monitoring shall be carried out and compared with the allowable weather limits for reliable planning and assessment of risk regarding the weather operating limits, which will vary between phases and activities, e.g., construction vs. normal operation.
18	Tidal Limits	Tidal limits will apply to certain activities (analogous to weather limits).
19	Speed limits	A maximum speed limit of 5 knots will apply to vessels passing the Project berth when a vessel is mooring, moored or unmooring. (the same as at IOT). VTS will monitor for unsafe speeds, including during construction work. Sanctions may be used against repeat offenders, e.g., removal of PEC.
20	Berth design	The Project berth will be aligned with IOT (including the exclusion zone) to maintain the width of the channel to the north (noting most vessels already avoid the planned exclusion zone).
21	Simulations	A real-time ship navigation simulation study has been carried out to demonstrate vessels can navigate safely to/from the Project facility, and that adverse effects are not imposed on other Port users. Further simulations to be carried out, if identified to be necessary, to inform detailed operational requirements.

ID	Control	Description
22	Safety zone	A minimum 150m exclusion zone will apply to passing vessels from the berth line. A suitable construction safety zone will also be designated.
23	Fendering / bollard design	These will be designed to be fit for purpose, and suitable to accommodate range of vessels using berth.
24	Shoreside maintenance program	A regular program of maintenance for infrastructure including mooring bollards/hooks, shall be implemented to ensure that the facility is maintained and fit for use.
25	Mooring study and plans	A mooring study shall be completed for the proposed mooring arrangements at the berth to confirm that there are appropriate moorings available to moor vessels for the operational wind limits and the expected tidal flows.
26	Load monitoring	Monitoring will be in place to detect any ranging of a berthed vessel prior to a potential breakout. Prior consultation with the jetty will be required before a vessel adjusts its mooring.
27	Gas carrier design standards and industry guidance	These vessels have a range of inherent safety features as well as industry guidance which help to prevent or mitigate incidents, such as a potential release.
28	CCTV	CCTV will be used to monitor the jetty area.
29	Minimising personnel exposure	Measures to minimise exposure in the event of release of a toxic substance, e.g., ammonia, will be considered, e.g., remote jetty operations and toxic refuges.
30	Emergency plans, exercises and response resources	These will be in place, as appropriate, for each phase. For example, construction contractors shall have tier 1 oil spill response equipment to ensure any pollution events can be contained.
31	Harbours Works Consent	This is consent required from HES before any construction activity can commence. This will follow on from a contractor approval process.
32	Contractor RAMS and SMS	Contractors shall have Risk Assessment Method Statement (RAMS) and Safety Management System (SMS) covering all of the construction activities which shall be reviewed by the Harbour Authority prior to the commencement of activities.
33	CDM Regulations	The Construction (Design and Management) Regulations 2015 will be adhered to, to help protect employee health during construction projects.
34	Standard Operating Procedures (SOP)	Suitable procedures will be in place during construction work
35	Vessel Checks	Checks will be carried out to make sure construction vessels are fit for purpose.

ID	Control	Description
36	Non-Routine Towage (NRT) Assessments	These will be carried out when necessary to assess the risks and establish requirements, e.g., if pilotage is required, number of tugs, radius of towage, tidal restrictions, etc. Covered in HES Towage Guidelines.
37	Designated Point of Contact	During construction activities, there will be a designated PoC to provide appropriate information and respond to emergency situations. This role shall be the main line of communication between the works and the SHA.
38	Safety Vessel	A safety vessel will be ready and on standby during construction activities. The availability of a safety vessel in the area of the marine works shall provide for rapid response to emergency situations and an overview of the activity being conducted; during Construction.
39	Dropped Object Procedure	A dropped object procedure will be in place to report and respond to any drop incidents.
40	Construction Surveys	Pre & post-construction surveys will be carried out to confirm that under keel clearences remain unchanged (in case of unreported incidents).
41	Loading/unloading plan	Equipment and materials being delivered by barge shall have plans specifying the order and method of loading and unloading at the marine works site.

12.8 Potential Impacts and Effects

12.8.1 This section assesses the potential marine transport and navigational hazards as a result of the construction and operation of the Project. The hazards that are considered in this assessment are taken from the Hazard Log of the NRA (**Appendix 12.A [TR030008/APP/6.4]**), which has more information on the assessment process and results.

12.8.2 Hazard scenarios, listed in **Table 12-7,** have been assessed in terms of their most likely and worst credible outcomes for each of the four criteria: people, property, planet, and port.

Table 12-7: List of Hazards

ID	Hazard Title
Construction Phase	
C1	Allision of the Project Works Craft with Port Infrastructure
C2	Allision of Passing Vessel with the Project Marine Works
C3	Collision of Passing Vessel with the Project Works Craft at or near construction site
C4	Collision of the Project Vessel during Navigation within the wider Humber
C5	Collision during Towage Operations

ID	Hazard Title
C6	Increased Collision Risk between other vessels due to Displacement away from the Construction Site
C7a	Increased Grounding Risk for Other Vessels due to Displacement from the Project Construction Area
C7b	Grounding Risk for the Project Works Craft
C8	Payload related incidents
Operational Phase	
O1	Collision risk due to Increased Traffic
O2	Collision risk due to Maintenance Dredging
O3a	Collision between Maneuvering Vessel at the Project and Passing Vessel
O3b	Allision between Passing Vessel and Berthed Vessel at the Project
O4a	Allison of Maneuvering Vessel with Port Infrastructure
O4b	Allision of Passing Vessel with the Project Infrastructure
O5	Mooring Breakout
O6	Increased Collision Risk between Other Vessels due to Displacement from the Project
O7	Increased Grounding Risk for Other Vessels due to Displacement from the Project

Construction

12.8.3 This section assesses the potential hazards as a result of the construction of the Project.

12.8.4 During the construction phase, there will be marine works involving various vessel activities including jack-up barges and capital dredging, as detailed in **Chapter 2: The Project [TR030008/APP/6.2]**.

12.8.5 The following potential impacts/risks have been identified for the construction phase of the Project:

C1: Allision of the Project Works Craft with Port Infrastructure

12.8.6 Manoeuvring of craft in close proximity to marine structures has the potential for contact with infrastructure during site development.

12.8.7 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Minor (low-speed) impact with jetty resulting in limited damage, and possibility of slight injury and/or minor spill.

b. Higher speed impact resulting in severe damage to vessel / jetty, causing pollution and loss of life.

12.8.8 The most likely scenario was deemed to have a frequency of Likely with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.9 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.10 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C2: Allision of Passing Vessel with the Project Marine Works

12.8.11 Tanker on passage to/from the IOT has the potential to make contact with the marine works.

12.8.12 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Minor impact with marine works resulting in limited damage to vessels / works, and possibility of slight injury and/or minor spill. Inspections and minor repairs required leading to delay.

b. Higher speed impact resulting in severe damage to vessel and/or marine works causing pollution and loss of life.

12.8.13 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Negligible (Port).

12.8.14 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.15 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C3: Collision of Passing Vessel with the Project Works Craft

12.8.16 As passing vessels (commercial, recreational or fishing) are manoeuvring around or in close proximity to the works there is the potential for collision with craft associated with the Project.

12.8.17 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Minor impact with works craft resulting in limited damage to vessels, and possibility of slight injury and/or minor spill.

b. Higher-speed collision between vessels resulting in severe damage, causing pollution and loss of life.

12.8.18 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.19 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.20 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C4: Collision of the Project Vessel during Navigation

12.8.21 Vessel collision (commercial, recreational or fishing) with works craft, e.g., capital dredger, whilst transiting to/from the Project or during activities within the disposal site (if required), i.e., in the wider River Humber area.

12.8.22 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Collision between works vessel and third-party vessel resulting in limited damage to one or both, and possibility of slight injury and/or minor spill.

b. Collision between works vessel and third-party vessel resulting in severe damage, causing pollution and loss of life.

12.8.23 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.24 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.25 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C5: Collision during Towage Operations

12.8.26 If materials for Project are transported through the use of barges, there is potential for collision with commercial or recreational vessels in the area.

12.8.27 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Collision between works vessel (tug and/or barge) and third-party vessel resulting in limited damage, and possibility of slight injury and/or minor spill.

b. Collision between works vessel (tug and/or barge) and third-party vessel resulting in severe damage causing pollution and loss of life.

12.8.28 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.29 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.30 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C6: Increased Collision Risk between other vessels due to Displacement away from the Construction Site

12.8.31 Other (third-party) vessels using the port have increased vessel-to-vessel collision risk with each other due to displacement caused by the Project.

12.8.32 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Limited displacement due to reduced sea room causing closer encounters with potential for minor collision between two vessels, and possibility of slight injury and/or minor spill.

b. Reduced sea room leads to a major collision incident between two passing vessels with resulting severe damage, causing pollution and loss of life.

12.8.33 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.34 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.35 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C7a: Increased Grounding Risk for Other Vessels due to Displacement from the Project Construction Area

12.8.36 Other (third-party) vessels using the port have increased grounding risk due to displacement away from the Construction Site.

12.8.37 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Limited displacement due to reduced sea room causing a proportion of vessels to pass marginally closer to shallow water or to have reduced under keel clearance due to part of transit.

b. Vessel displaced to a greater extent, possibly following an encounter, leading to grounding, resulting in severe damage, pollution and loss of life.

12.8.38 The most likely scenario was deemed to have a frequency of Unlikely with consequences of Negligible (People), Negligible (Property), Negligible (Planet) and, Negligible (Port).

12.8.39 The worst credible scenario was deemed to have a frequency of Rare with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.40 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C7b: Grounding Risk for the Project Works Craft

12.8.41 There is a risk of grounding for works craft doing construction work for the Project.

12.8.42 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Work vessel hull touches bottom or underwater infrastructure associated with project causing limited damage and possibility of slight injury and/or minor spill.

b. Work vessel grounds resulting in severe damage, pollution and loss of life.

12.8.43 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.44 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.45 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

C8: Payload Related Incidents

12.8.46 If lifting operations are required from barges/vessels associated with the Project, there is potential for incidents to arise from dropped items or affected vessel stability.

12.8.47 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Dropped object which is reported and recovered (if appropriate).

b. Unreported dropped object causing temporary under water hazard, e.g., reducing under keel clearance below chart datum, until detected during survey. Transiting vessel interacts with underwater hazard resulting in severe damage, pollution and loss of life.

12.8.48 The most likely scenario was deemed to have a frequency of Likely with consequences of Negligible (People), Minor (Property), Negligible (Planet) and, Negligible (Port).

12.8.49 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.50 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

Operation

12.8.51 This section assesses the potential hazards as a result of the operation of the Project.

12.8.52 The Terminal would operate 24 hours a day, seven days a week and 365 days a year. The Terminal would have capacity to accommodate up to 292 vessel calls per year and it is anticipated that up to 12 of these calls would be ammonia carriers associated with the hydrogen production facility.

12.8.53 During the operational phase, periodic maintenance dredging of the berthing pocket of the jetty may be required. The overall volumes of the maintenance dredging associated with the Project would be very small (if required at all) compared to that of the capital dredge.

12.8.54 The following potential impacts have been identified for the operational phase of the Project:

O1: Collision Risk due to Increased Traffic

12.8.55 Vessel-to-vessel collision risk increases (over baseline) due to the additional vessels (ammonia, CO_2 and other bulk liquids) transiting to/from the Project being involved in a collision with other vessel traffic using the port (e.g., commercial, dredging, recreational or fishing).

12.8.56 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Collision between Project vessel and 3rd party vessel resulting in limited damage to one or both, and possibility of slight injury and/or minor spill.

b. Collision between a project vessel and a 3rd party vessel resulting in more serious damage. Worst-case outcome of ammonia release and loss of life.

12.8.57 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.58 The worst credible scenario was deemed to have a frequency of Rare with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.59 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O2: Collision Risk due to Maintenance Dredging

12.8.60 Collision risk could potentially be increased (over baseline) due to increased maintenance dredger transit to/from the dredge pocket or during dispersal operations leading to encounters with other marine traffic (commercial, recreational or fishing).

12.8.61 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Collision between maintenance dredger vessel and 3rd party vessel resulting in limited damage to one or both, and possibility of slight injury and/or minor spill.

b. Collision between a maintenance dredger and a 3rd party vessel resulting in more serious damage. Worst-case outcome of spill and loss of life.

12.8.62 The most likely scenario was deemed to have a frequency of Possible with consequences of Minor (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.63 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.64 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O3a: Collision between Manoeuvring Vessel at the Project and Passing Vessel

12.8.65 Vessel manoeuvring near the Project berth is involved in a collision with passing vessel (commercial, recreational, or fishing).

12.8.66 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Collision between project vessel near berth and 3rd party vessel resulting in limited damage to one or both vessels, and possibility of slight injury and/or minor spill.

b. Collision between project vessel near berth and a passing vessel resulting in severe damage, ammonia release and loss of life.

12.8.67 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.68 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.69 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O3b: Allision between Passing Vessel and Berthed Vessel at the Project

12.8.70 This hazard can occur if a passing vessel (commercial, recreational, or fishing) contacts a vessel berthed at the Project. For example, tanker heading to/from IOT.

12.8.71 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Glancing impact between passing vessel and berthed vessel resulting in limited damage to one or both vessels, and possibility of slight injury and/or minor spill.

b. Higher energy impact resulting in severe damage, ammonia release, oil spill and loss of life.

12.8.72 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.73 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.74 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O4a: Allision of Manoeuvring Vessel with Port Infrastructure

12.8.75 Manoeuvring vessel, dredging vessel or tug associated with the Project in contact with port infrastructure, e.g., the Project berth or nearby structures such as IOT, as a result of collision avoidance, adverse weather, nature of the operation or interaction with a passing vessel.

12.8.76 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Minor (low-speed) impact resulting in limited damage to fender and/or vessel, and possibility of slight injury and/or minor spill.

b. Higher speed impact resulting in severe damage to vessel / structure, ammonia release and loss of life.

12.8.77 The most likely scenario was deemed to have a frequency of Likely with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Negligible (Port).

12.8.78 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.79 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O4b: Allision of Passing Vessel with the Project

12.8.80 Passing vessel (commercial, recreational, or fishing) contacts the Project infrastructure. For example, tanker heading to/from IOT.

12.8.81 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Glancing impact between passing vessel and the Project resulting in limited damage, and possibility of slight injury and/or minor spill.

b. Higher energy impact resulting in severe damage, oil spill and loss of life.

12.8.82 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.83 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.84 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O5: Mooring Breakout

12.8.85 This hazard can occur if a vessel breaks away from its mooring position.

12.8.86 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Vessel ranges from berth but is re-secured with or without tug assistance. Potential for minor contact with berth / fender, and delay in discharge time.

b. Vessel completely breaks mooring with risk of heavy contact with jetty, and/or drifting into channel with risk of escalation, e.g., collision, contact or grounding. Severe damage causing ammonia release and loss of life if breakout occurs during cargo transfer, and/or event escalates.

12.8.87 The most likely scenario was deemed to have a frequency of Likely with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.88 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.89 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O6: Increased Collision Risk between Other Vessels due to Displacement from the Project

12.8.90 Other (third-party) vessels using the port have increased vessel-to-vessel collision risk with each other due to displacement caused by the Project.

12.8.91 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Limited displacement due to reduced sea room causing closer encounters with potential for minor collision between two vessels.

b. Reduced sea room leading to a high-speed collision between two passing vessels causing severe damage, pollution and loss of life.

12.8.92 The most likely scenario was deemed to have a frequency of Possible with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.93 The worst credible scenario was deemed to have a frequency of Unlikely with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.94 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

O7: Increased Grounding Risk for Other Vessels due to Displacement from the Project

12.8.95 Other (third-party) vessels using the port have increased risk of grounding due to displacement caused by the Project.

12.8.96 The identified most likely and worst credible scenarios for this hazard are respectively:

a. Limited displacement due to reduced sea room causing a proportion of vessels to pass marginally closer to shallow water or to have reduced under keel clearance during part of transit.

b. Vessel displaced to a greater extent, possibly following an encounter, leading to vessel grounding, severe damage, pollution and loss of life.

12.8.97 The most likely scenario was deemed to have a frequency of Unlikely with consequences of Negligible (People), Minor (Property), Minor (Planet) and, Minor (Port).

12.8.98 The worst credible scenario was deemed to have a frequency of Rare with consequences of Extreme (People), Extreme (Property), Extreme (Planet) and, Extreme (Port).

12.8.99 Based on the embedded and planned risk controls, this risk is considered to be tolerable and ALARP, and **insignificant** in EIA terms.

Decommissioning

12.8.100 The DCO will not make any provision for the decommissioning of the main elements of the marine infrastructure above and below water level. This is because the jetty, jetty head, loading platforms and access ramps would, once constructed, become part of the fabric of the Port estate and would, in simple terms, continue to be maintained so that it can be used for port related activities to meet a long-term need. It is anticipated that plant and equipment on the jetty topside would be decommissioned in parallel with the decommissioning of the related landside elements. On this basis, potential effects on marine transport and navigation from decommissioning have been scoped out.

12.9 Assessment of Residual Effects

12.9.1 The residual effects of all the hazard scenarios were assessed to be tolerable and ALARP, and insignificant in EIA terms, based on the mitigation measures already in place and/or that will be put in place as part of the Project, identified in **Table 12-6**.

12.10 Summary of Assessment

12.10.1 This chapter has analysed the marine transport and navigational impacts of the Project.

12.10.2 A summary of the hazards that have been assessed, is presented in **Table 12-8**.

12.10.3 The hazards were ranked in terms of frequency and consequences to people, property, the planet, and the port based on their most likely and worst credible outcomes. In all cases, the risks were assessed to be tolerable and ALARP, and **insignificant** in EIA terms, based on the mitigation adopted by the Project.

Table 12-8: Summary of Potential Hazards and Impact Significance

Risk No.	Hazard Title	Impact Significance
Construction		
C1	Allision of the Project Works Craft with Port Infrastructure	Insignificant
C2	Allision of Passing Vessel with the Project Marine Works	Insignificant
C3	Collision of Passing Vessel with the Project Works Craft at or near construction site	Insignificant
C4	Collision of the Project Vessel during Navigation within the wider Humber	Insignificant
C5	Collision during Towage Operations	Insignificant
C6	Increased Collision Risk between other vessels due to Displacement away from the Construction Site	Insignificant
C7a	Increased Grounding Risk for Other Vessels due to Displacement from the Project Construction Area	Insignificant
C7b	Grounding Risk for the Project Works Craft	Insignificant
C8	Payload related incidents	Insignificant
Operation		
O1	Collision risk due to Increased Traffic	Insignificant
O2	Collision risk due to Maintenance Dredging	Insignificant

Risk No.	Hazard Title	Impact Significance
O3a	Collision between Manoeuvring Vessel at the Project and Passing Vessel	Insignificant
O3b	Allision between Passing Vessel and Berthed Vessel at the Project	Insignificant
O4a	Allison of Manoeuvring Vessel with Port Infrastructure	Insignificant
O4b	Allision of Passing Vessel with the Project Infrastructure	Insignificant
O5	Mooring Breakout	Insignificant
O6	Increased Collision Risk between Other Vessels due to Displacement from the Project	Insignificant
O7	Increased Grounding Risk for Other Vessels due to Displacement from the Project	Insignificant

12.11 References

Ref 12-1 Department for Transport, Maritime & Coastguard Agency (2016). *Port Marine Safety Code.*

Ref 12-2 International Maritime Organization (2018). Revised guidelines for Formal Safety Assessment (FSA) for use in the IMO rule-making process.

Ref 12-3 UK Government (1987). Pilotage Act 1987. https://www.legislation.gov.uk/ukpga/1987/21/contents

Ref 12-4 Department for Transport, Maritime & Coastguard Agency (2018): A Guide to Good Practice on Port Marine Operations.

Ref 12-5 UK Hydrographic Office (2021). Admiralty Sailing Directions NP54 (12th edition).

Ref 12-6 Associated British Ports (2016). Pilotage Directions for ships to be navigated within the Humber pilotage area.

Ref 12-7 UK Legislation (2016). The Dangerous Goods in Harbour Areas Regulations 2016.

Ref 12-8 Maritime & Coastguard Agency (2022): Marine Guidance Note (MGN) 401 (M+F) Amendment 3 Navigation: Vessel Traffic Services (VTS) and Local Port Services (LPS) in the UK.

Ref 12-9 Merchant Shipping Notice (MSN) 1796 (Amendment 2) Vessel Traffic Services (VTS) - Designation of VTS Stations in the United Kingdom.