



LIGHTHOUSE GREEN FUELS PROJECT

Preliminary Environmental Information Report

Chapter 18: Marine Navigation

The Inspectorate Reference: No EN010150

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Volume 1



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18. MARINE NAVIGATION

18.1. INTRODUCTION

- 18.1.1. This Chapter reports the preliminary assessment of the likely significant effects of the Proposed Scheme on marine navigation during construction and operation. Where relevant, further assessment will be presented in the Environmental Statement (ES). The Proposed Scheme intends to make use of existing marine infrastructure for construction. Studies to determine the feasibility of different options are ongoing and involve liaison with third party operators and statutory and non-statutory consultees on the suitability of the alternatives. Currently, the assessment aims to evaluate two wharf options, Wilton Engineering Wharf (Option 1) or Clarence Wharf (Option 2) for construction and the use of two jetties at Navigator Wharf for operation of the Proposed Scheme as detailed in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.
- 18.1.2. During the operational phase, one of two existing jetties off Riverside Road (Navigator Wharf) will be utilised for transporting the operational products, Sustainable Aviation Fuel (SAF) and naphtha offsite via tankers or barges. These existing and operational wharfs are operated by a third party and no physical works to these facilities are anticipated.
- 18.1.3. Further information on the marine vessel movements is expected to inform the ES and this Chapter will be updated accordingly.
- 18.1.4. This Chapter describes:
- Relevant policy, legislation, and guidance;
 - Consultation undertaken to-date;
 - The methodology for assessment; and
 - Potential effects of the Construction and Operational Phase.
- 18.1.5. Throughout the construction of the Proposed Scheme, marine operations will involve unloading substantial abnormal indivisible loads (modules) from ocean-going vessels. These loads will then be transported from the wharf to the Application Site via either a private road or a combination of public highway and private road, contingent upon the selected option. This will involve mooring of large ocean-going vessels and/or barges for offloading as well as roll over operations to load barges with modules from ocean-going vessels.
- 18.1.6. To support the marine operations, a Navigation Risk Assessment (NRA) will also be prepared and included as an Appendix to the ES. The aim of the NRA is to identify and assess the hazards and risks affecting vessel navigation, before considering current controls to mitigate risks and further controls that could be adopted to minimise risk As Low As Reasonably Practicable (ALARP).

18.2. POLICY, LEGISLATION, AND GUIDANCE

18.2.1. The policy, legislation, and guidance relevant to the assessment of the Proposed Scheme is detailed in **Appendix 4A: Policy, Legislation and Guidance (Volume 3)**. The key policy, legislation, and guidance most relevant to this Chapter are as follows:

- Policy:
 - Department for Transport (DfT) Port Marine Safety Code 2016 (PMSA)¹.
- Legislation:
 - Tees and Hartlepool Port Authority Act 1982²; and
 - International Ship and Port Security (ISPS) Code 2004³.
- Guidance:
 - International Maritime Organisation (IMO) Revised Guidelines for Formal Safety Assessment 2018⁴;
 - Marine Guidance Note (MGN) 654 Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response 2021⁵; and
 - River Tees Passage Plan 2021, PD Ports⁶.

18.3. SCOPING OPINION AND CONSULTATION

18.3.1. An Environmental Impact Assessment (EIA) Scoping Opinion⁷ was received by the Applicant from the Planning Inspectorate ('the Inspectorate') on behalf of the Secretary of State dated 01 September 2023. The responses from the Inspectorate in relation to marine navigation and how these requirements should be addressed by the Applicant are set out in **Table 18-1**.

Table 18-1: Summary of the EIA Scoping Opinion in Relation to Marine Navigation

Section ID	Applicant's Proposed Matters to Scope Out	Scoping Opinion Comments	Response
Planning Inspectorate			
3.16.1	Operation Phase	<i>"The Scoping Report⁸ explains that further work is required to determine the likely number of export vessel movements for export of the final products. Paragraph 20.8.3 proposes further baseline data collation and discussions with the Statutory Harbour Authority to determine the scope. The discussions regarding the scope will be further assessed moving into the Environmental Statement Assessment"</i>	The marine operation is being developed by the Applicant for the Operational Phase, and this is intended to be assessed further during the ES stage if required. The Applicant is considering use of marine transport during the operational phase for the export of Sustainable Aviation Fuel (SAF) and naphtha. This Preliminary Environmental Information Report (PEIR) contains no additional

Section ID	Applicant's Proposed Matters to Scope Out	Scoping Opinion Comments	Response
		<i>stage On the basis of the information provided the Inspectorate does not agree to scope this matter out at this stage. However, as noted in Paragraph 1.0.4 of this Opinion this does not prevent the Applicant from subsequently scoping matters out should these be agreed by relevant statutory consultees, evidence of which should be provided as part of the application documents".</i>	information on the marine operation than the information included in the EIA Scoping Report ⁸ .
3.16.2	Decommissioning Phase	<i>"The Applicant proposes to scope out an assessment of the decommissioning phase on the basis that the length of operation lifespan means it is not "considered appropriate to accurately determine the unknown characteristics of the baseline marine environment". Furthermore, a Decommissioning Plan is also proposed to be prepared to confirm the use of marine infrastructure available at the time. The Inspectorate is content with this approach but would expect an outline Decommissioning Plan, which would reduce the impact of the Proposed Development on marine navigation, to be provided as part of the application documents".</i>	An Outline Decommissioning Plan will be submitted with the Development Consent Order (DCO) Application. Therefore, it is proposed to scope this aspect out of any further assessment.
3.16.3	Along-side berthing operations at Wilton Engineering Wharf - construction	<i>"It is stated that the Proposed Development is unlikely to impact on alongside-berthing operations at Wilton Engineering Wharf and Clarence Wharf provided the Proposed Development vessels are of similar</i>	The Mediterranean berthing option will be assessed at both locations. Along-side berthing has been scoped out as this currently takes place at both locations. Providing the project vessel and barges utilised is of similar

Section ID	Applicant's Proposed Matters to Scope Out	Scoping Opinion Comments	Response
		<i>specification and moor in a similar manner to current operation. The Inspectorate is content to scope this matter out provided the ES confirms the final vessel types and mooring style".</i>	specification and moors in a similar manner to current operations, alongside berthing is not a departure from normal baseline activity. The ES will confirm the final vessel types and mooring style.
Appendix 2 (Page 1 and 2 of Maritime & Coastguard Agency's (MCA) response)	The works associated with the marine environment, and the potential impact on the safety of navigation, access to ports, harbours and marinas and any impact on our search and rescue obligations.	<i>"The MCA is satisfied with the Scoping Report⁸ at this stage as the basis for an EIA and an ES from the shipping and navigation perspective and supports the shipping and navigation related impact pathways which are proposed to be scoped into the Environmental Statement during both the construction and operation of the development."</i>	No response required.

Table 18-2: Summary of consultations

Body/Organisation	Consultation Date	Consultation Outcomes
Statutory Harbour Authority	12th July 2023	<p>The below information will be used to define the marine operation further.</p> <p><u>Stakeholders and impacts on port services</u> Mediterranean mooring of a Big Lift vessel at Wilton Engineering Wharf and Clarence Wharf would block the channel. This can impact the port service activities, and other vessels that operate in a tidal window as well. Side-on mooring would not impede access through the channel and would have a smaller impact on the existing operations. A barge in Mediterranean mooring would partially obstruct the channel but still allow some vessel crossing. The biggest impact will be on Port Middlesbrough, directly opposite to Wilton Engineering Wharf, which also operate similar-sized vessels in a tidal window. Mediterranean mooring of a 150m long vessel has already occurred at Wilton Engineering, which left part of the channel free for port service boats. However, this was a one-off operation.</p>

Body/Organisation	Consultation Date	Consultation Outcomes
		<p><u>Transshipment</u> There is precedent for transshipment operations occurring between vessels and barges in Tees Dock.</p> <p><u>Suitability of berths</u> The Deputy Harbour Master observed that Clarence Wharf is not suitable for these marine operations – shallower depth at berth compared to Wilton and extremely narrow tidal window. Mediterranean mooring of a barge will obstruct a significant portion of the Tees channel.</p> <p><u>Navigation Risk Assessment</u> The Deputy Harbour Master stated that the proposed marine operations have significant potential navigation impacts and therefore a project Navigation Risk Assessment would be required.</p>

18.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

SIGNIFICANCE CRITERIA

- 18.4.1. The significance of potential effects will be evaluated using a systemic approach based on identification of frequency of impact (i.e. sensitivity of a receptor to change) and the consequence of the impact (i.e. magnitude of change). **See Chapter 3: Approach to EIA (Volume 1)** for more information on assessment methodology.
- 18.4.2. An assessment of risks to navigation arising from the Proposed Scheme will also be undertaken. The methodology for this assessment will include the two options subject of an ongoing feasibility study, and will address construction and operational phases. The NRA will incorporate analysis, consultation with stakeholders, expert judgement, and local knowledge to establish risk and identify appropriate controls. A matrix based on best practice NRA methodology will be used to score risks associated with identified hazards. Each identified hazard will be assessed in relation to 'hazard likelihood' and 'hazard consequence', to generate a risk score. **Figure 18-1** illustrates the risk scoring matrix.

Figure 18-1: Marine Navigation Risk Scoring Matrix

Risk Scoring Matrix					
Almost Certain	5	10	15	20	25
Likely	4	8	12	16	20
Possible	3	6	9	12	15
Unlikely	2	4	6	8	10
Rare	1	2	3	4	5
Likelihood	Minor	Moderate	Serious	Very Serious	Severe

18.4.3. Likelihood classifications range from Rare to Almost Certain and describe the probability of hazard occurring. Consequence classifications range from Minor to Severe, and describe the level of impact the hazard may cause in relation to:

- people;
- environment;
- property;
- reputation; and
- port operations.

SENSITIVE RECEPTORS

18.4.4. The following sensitive receptors have been identified, as they could be affected during the Construction and/or Operation of the Proposed Scheme:

- Proposed Scheme construction vessels:
 - Module Carrier (MC) Class vessels with a Length Overall (LOA) up to 173m, beam of 43m and summer draught of 6.5m to offload up to 300 modules during an 18-month period; and
 - An alternative North Sea Barge with 90m LOA, 31m beam and 5.0m draught for the same proposed operation.
- Existing port vessels:
 - Cargo vessels;
 - Port service vessels;
 - Tankers; and
 - Dredging vessels.

- Existing infrastructure within the Study Area. This will include wharf structures used by others outside of Wilton Engineering Wharf and Clarence Wharf.

BASELINE DATA COLLECTION

18.4.5. Baseline navigational environment data has been collected as reported in Section 3 of Appendix 20-A: Shipping and Navigation Scoping Report⁹ of the EIA Scoping Report⁸. This includes data regarding the following:

- Navigational features of the river Tees;
- Harbour authority;
- Vessel traffic management;
- Pilotage requirements;
- Vessel traffic analysis; and
- Maritime incidents.

PROPOSED ASSESSMENT METHODOLOGY

Data Sources

18.4.6. The following key data sources will be used to identify the baseline characteristics for the NRA and inform the ES:

- Accident and Incident data from:
 - the Statutory Harbour Authority;
 - the Marine Accident Investigation Branch (MAIB), and
 - the Royal National Lifeboat Institution (RNLI).
- Vessel Simulation Study and Swept Path Analysis;
- Weather and environmental-based data;
- Automatic Identification System (AIS) data from a range of sources among them:
 - the Marine Management Organisation (MMO) up to the year 2019; and
 - third-party data supplies for more recent years.
- Vessel movement statistics from Statutory Harbour Authority; and
- Navigational features and charted information from United Kingdom Hydrographic Office (UKHO) Admiralty Charts.

NAVIGATION RISK ASSESSMENT METHODOLOGY

18.4.7. The Navigation Risk Assessment (NRA) will be undertaken in accordance with the Legislation and Guidance identified in **Table 18-1**.

18.4.8. The NRA outputs will inform the Marine Navigation ES Chapter with a summary of the risk assessment provided as an Appendix.

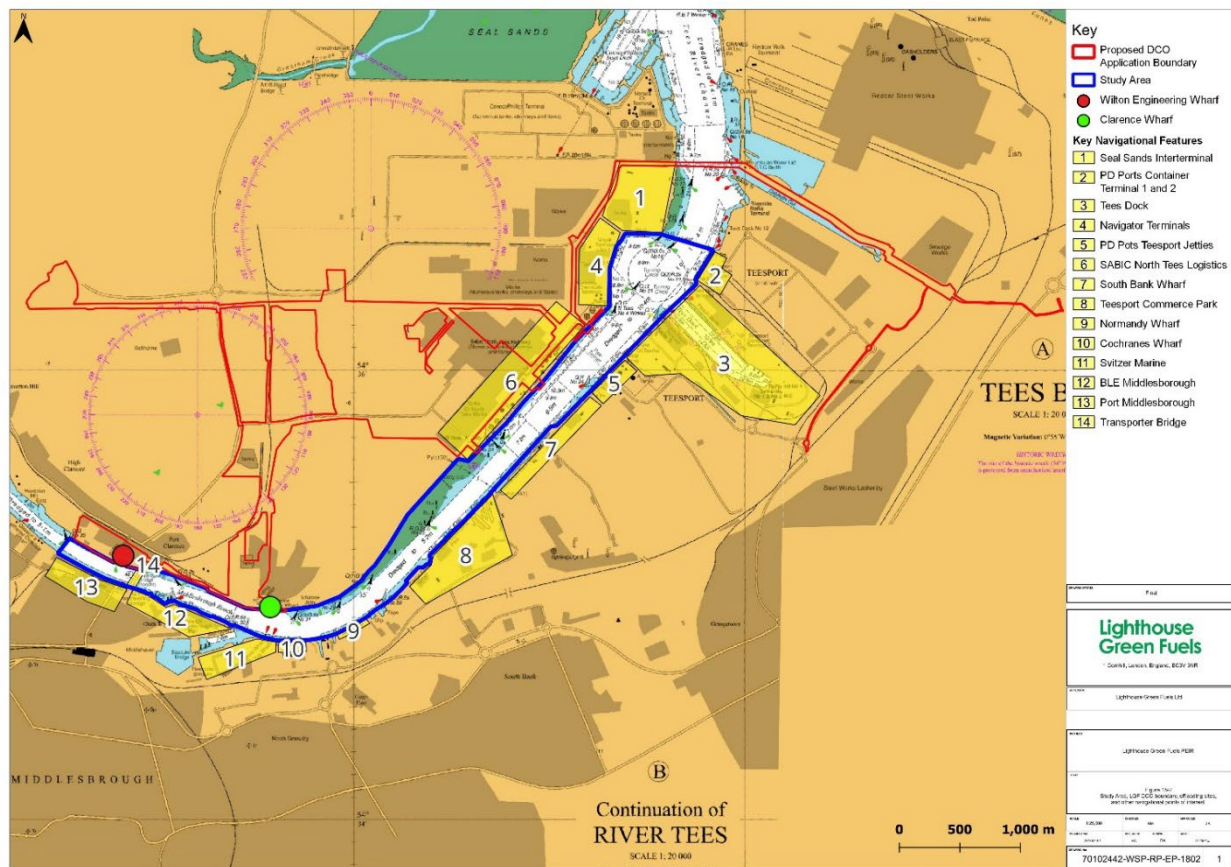
18.4.9. A hazard identification workshop will be held to ensure that relevant navigational stakeholders to review any identified the potential hazards to navigational safety associated with the Proposed Scheme.

- 18.4.10. Following the risk assessment process and full consideration of navigation hazards, the need to implement further controls will be determined. In the event the Applicant identifies a need to propose further controls, these measures will be agreed in consultation with the Statutory Harbour Authority. This will determine whether an ALARP state has been met for each risk.
- 18.4.11. The outputs of the NRA will be used to inform a judgement on the significance of effects arising from the Proposed Scheme, and these will be reported in the Marine Navigation ES Chapter.

18.5. STUDY AREA

- 18.5.1. This assessment considers the impacts of the proposed marine operation on shipping and navigation within the Navigational Study Area (referred to as the Study Area) as shown on **Figure 18-2**.
- 18.5.2. The Study Area extends upstream beyond the Transporter Bridge to include Wilton Engineering Wharf, and downstream beyond Tees Dock to PD Ports Container Terminal 1. The Study Area has been selected to include both Wilton Engineering Wharf and Clarence Wharf as the two key potential locations for unloading, as well as key navigation operations on the Tees that might be impacted by the Proposed Scheme.

Figure 18-2: Study Area, LGF DCO boundary, offloading sites, and other navigational points of interest



18.5.3. **Figure 18-2** shows the Boundary of the Application Site for the Proposed Scheme. It also shows the location of the two offloading sites under consideration (Wilton Engineering Wharf and Clarence Wharf) along with other navigational points of interest within the Study Area, which are described in **Section 18.6**.

18.6. BASELINE CONDITIONS AND FUTURE BASELINE

BASELINE

- 18.6.1. A preliminary baseline study has been undertaken. PD Ports operates as the designated Statutory Harbour Authority for the Port of Tees and Hartlepool, known collectively as Teesport. PD Ports oversees all vessel traffic management, ensuring safe navigation and maintaining channel depths for the vessels that visit Teesport.
- 18.6.2. Teesport is amongst the largest and busiest ports in the UK and has a diverse mix of vessel traffic activity. The port is primarily known for its bulk cargo operations and container handling. Commercial vessels range from small port service crafts to large commercial tankers and can be draught restricted.
- 18.6.3. Teesport harbour has extensive marine infrastructure including terminals, quays, jetties, and berths. As a consequence, careful passage planning is crucial for ensuring safe navigation.

- 18.6.4. The main navigational obstacle for ocean-going vessels transiting to Wilton Engineering Wharf is the Tees Transporter Bridge, which has an air draft of 48.2m at High Astronomical Tide (HAT). Clarence Wharf is downstream of the Transporter Bridge, therefore passage to the wharf is unaffected by any restrictions imposed by the Transporter bridge.
- 18.6.5. The dredged depth of the Tees Approach Channel starts at 15.4m Chart Datum (CD) and reduces to 14.2m CD at the mouth of the River Tees. The dredged channel continues up the River Tees decreasing to a depth of 5.1m CD in the vicinity of Wilton Engineering Wharf. The dredged channel depth at Clarence Wharf is 5.7m CD but, according to PD Ports during consultation, the minimum expected depth on a berth in Clarence Wharf is 3.1m CD.
- 18.6.6. Liaison with the Statutory Harbour Authority is currently ongoing and further baseline data will be collated to inform the ES.
- 18.6.7. **Figure 18-2** shows the location key navigational features in the Study Area, a brief description is included in **Table 18-3**.

Table 18-3: Summary of key navigational features within the Study Area

Figure Label	Key navigational feature	Description
1	Seal sands interterminal	2 jetties and 2 berths
2	PD Ports Container Terminal 1 & 2	4 berths, 10 Rubber Tyred Gantry (RTG) cranes, and 5 ship-to-shore cranes
3	Tees Dock	Cleveland Potash Bulk Terminal (3 general cargo berths), PD Ports Roll-on/Roll-off (RO/RO) Berth (2 RO/RO berths) and Teesport Bulk Terminal (500m quay)
4	Navigator Terminals	4 terminals and deep-water jetty
5	PD Ports Teesport Jetties	2 jetties
6	SABIC North Tees Logistics	2 terminals, 2 berths and 3 jetties
7	South Bank Wharf	1,000m quay
8	Teesport Commerce Park	4 dry docks, 2 berths, 5 cranes and a 240m quay
9	Normandy Wharf	100m quay
10	Cochranes Wharf	3 berths
11	Svitzer Marine	Fleet of 4 tugs
12	ABLE Middlesbrough	6 quays (1,000m in total), 6 cranes
13	Port Middlesbrough	1,000m of quayside, load-out heavy lift quays, can accommodate ships with Length Overall (LOA) 220m
14	Transporter Bridge	Air draft of 48.2m at Highest Astronomical Tide (HAT)

FUTURE BASELINE

- 18.6.8. The future baseline environment has not yet been determined and further consultation with the Statutory Harbour Authority will inform the basis of the future baseline environment for the NRA.
- 18.6.9. For the purpose of the assessment, it is assumed that Wilton Engineering Wharf will continue to operate servicing other users. It is also assumed Clarence Wharf will continue to be utilized for liquid transfer.

18.7. EMBEDDED DESIGN, MITIGATION AND ENHANCEMENT MEASURES

- 18.7.1. Within the PMSC, ALARP is an industry-wide concept applying to both health and safety and port marine safety. The core concept is that of 'reasonably practicable' which involves weighing up risk against the effort, time and money needed to control it. The PMSC specifically references ALARP with respect to NRAs:
- The NRA process will identify a set of mitigation measures or mitigation controls. These mitigation measures will inform either the design of the Proposed Scheme whilst the mitigation controls will require the adoption of management procedures and practices. The overall objective is to maintain risk levels within a limit that is deemed ALARP. Amendments to navigational controls are likely to include change to: Harbour Authority Safety Management System, which includes plans and processes to manage marine emergencies.
 - Vessel traffic management and the reactive response to marine emergencies.
 - Professional/ trained mariners' application of:
 - IMO conventions of Safety of Life at Sea (SOLAS);
 - Convention on the International Regulations of Preventing Collisions at Sea;
 - International Convention of Standards of Training, Certification and Watchkeeping for Seafarers; and
 - Ensuring compliance with the International Association of Marine Aids to Navigation and Lighthouse Authorities guidance on Aids to Navigation.

18.8. PRELIMINARY ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

CONSTRUCTION PHASE

- 18.8.1. The Applicant is currently evaluating two scenarios for marine operations during the Construction Phase of the Proposed Scheme:
- A direct transfer of the modules to the shore from the MC Class vessel; or
 - A transshipment of the modules (roll-over operation) onto barges, followed by subsequent offloading onto land.
- 18.8.2. The Mediterranean mooring of the MC-Class vessel at both offloading sites will obstruct the majority of the Tees navigation channel, particularly at Clarence Wharf (See Figure 18-4), where most of the channel is blocked due to the orientation of the berth. Mediterranean mooring of the vessel requires the deployment of anchors to stabilise the

vessel's bow, further contributing to the obstruction of the Tees navigation channel. Mediterranean mooring of the North Sea Barge partially blocks the channel and is less of an obstruction owing to its size.

Figure 18-3: Indicative MC class vessel and North Sea barge mooring configurations at Wilton Engineering

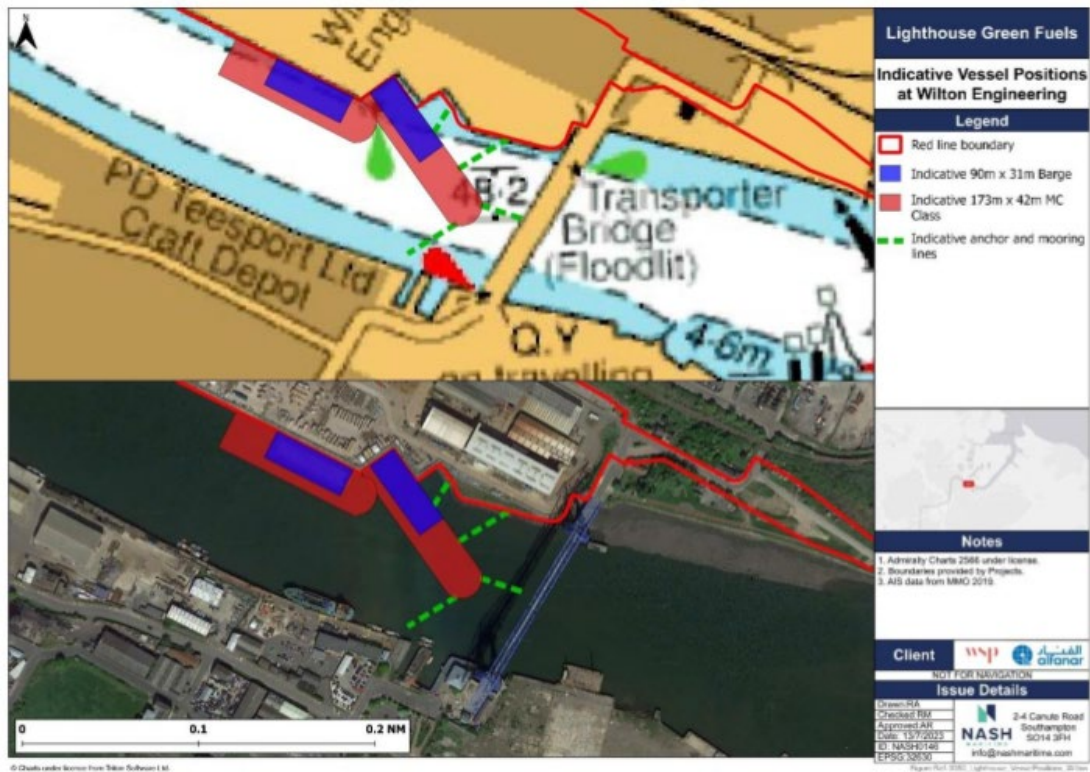
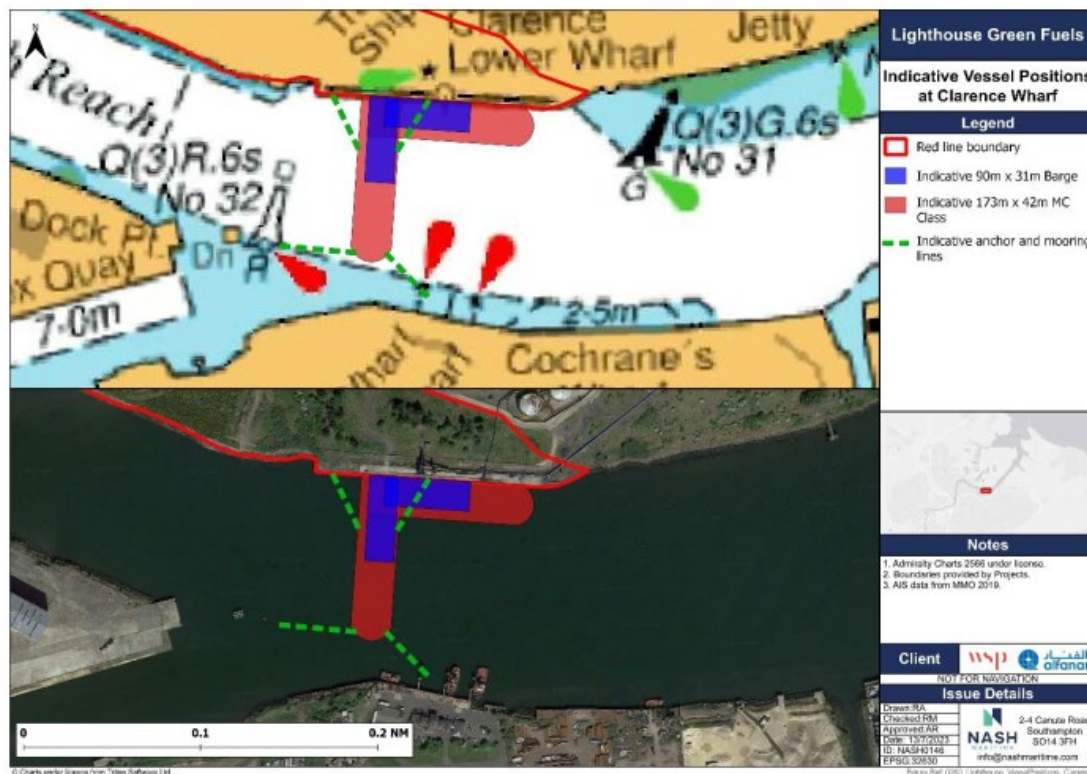


Figure 18-4: Indicative MC class vessel and North Sea barge mooring configurations at Clarence Wharf



- 18.8.3. Marine operations at both offloading sites face tidal restrictions due to the project vessel's summer draught of 6.5m. The minimum depths at Wilton Engineering Wharf and Clarence Wharf are 4.7m and 3.1m respectively, with tidal ranges of about 4.5m at spring tides and 2.3m at neap tides. The project vessel will have a narrow tidal window for offloading operations, especially at Clarence Wharf. Similar operations by a 150m long cargo vessel with a draught of 5.6m at Wilton Engineering Wharf were successful during a neap tide cycle.
- 18.8.4. Wilton Engineering Wharf specializes in loading large cargo structures and is the preferred offloading site for the modules. Clarence Wharf, privately owned and operated, is the secondary option and may require structural reinforcement of the main quay and marine infrastructure to support heavy loads. These considerations should be part of the NRA undertaken to support the ES.
- 18.8.5. Section 5 of Appendix 20A: Shipping and Navigation Scoping Report⁹ of the EIA Scoping Report⁸ describes in detail the potential likely navigational effects associated with the Construction Phase which could be significant. They are summarised below:
- Mediterranean mooring arrangements would obstruct most of the navigation channel at Wilton Engineering Wharf and completely block it at Clarence Wharf.
 - The deeper draught of Construction Phase vessels compared to minimum depths at the berth locations restricts offloading operations, especially at Clarence Wharf.
 - Potential contact between Construction Phase vessels and fixed structures during passage through the Tees navigation channel is a concern.

- Breakout of Construction Phase vessels in Mediterranean mooring poses a navigational risk.
- Collisions with third-party vessels due to high vessel activity, reduced manoeuvring space and deviations from the main channel are potential risks, with negligible differences in risk between the two wharf locations.

OPERATION PHASE

18.8.6. The Applicant is currently reviewing operational marine vessel movements, with plans for further discussion with the Statutory Harbour Authority regarding the baseline utilisation of the River Tees. Upon agreement on the viability of exporting products from the Application Site, an assessment based on assumed vessel movements will be conducted, informing both the NRA and ES.

18.9. ADDITIONAL DESIGN, MITIGATION AND ENHANCEMENT MEASURES

18.9.1. Additional design, mitigation and enhancement measures will be identified as part of the NRA and presented as part of the ES. At this point in the assessment, there is not enough information available to identify appropriate measures.

18.10. MONITORING

18.10.1. During the construction and operation phases monitoring may include the following methods and techniques:

- Vessel Traffic Services (VTS) Channels Marine-band Very High Frequency (VHF) radio frequencies are a source of live updates and information for users of the river. They provide a means for vessel crew to communicate with other vessels and shore station (e.g. ports, locks, bridges and marinas) on operational, navigation and safety matters. Listening to the appropriate radio channel will provide a picture of vessel traffic, which is important for operational safety.
- AIS systems can be used to monitor the location, heading and other details of vessels on the river.
- AIS tracks can be recorded and collated to produce a range of swept paths, which can be analysed to show longer term vessel movements in an area. This analysis can be used to show routes and transit frequencies for different vessel classes and, from an individual vessel though to all vessels over a certain time.
- Numbers of non-AIS equipped vessels such as recreational and leisure craft, used by more casual river users such as rowing clubs may be captured using CCTV positioned on or around the jetty. In addition, consultation with such groups can ascertain their weekly or monthly activities in the area.

18.11. RESIDUAL EFFECTS

18.11.1. Residual effects will be identified as part of the NRA and presented as part of the ES.

18.12. NEXT STEPS

18.12.1. Based on the likely environmental impacts set out in **Section 18.8** of this report, the assessment next steps will include:

- A qualitative assessment informed by an NRA which will inform the design development and reporting in a Marine Navigation ES Chapter, as required by the Statutory Harbour Authority⁹;
- A review of port operations; and
- Procurement of a Marine Concept Plan. The Marine Concept plan will include the areas around the site needed for navigation, turning and berthing.

18.13. LIMITATIONS AND ASSUMPTIONS

18.13.1. To ensure transparency within the preliminary EIA process, the following limitations and assumptions have been identified:

- Liaison with the Statutory Harbour Authority is ongoing and will inform the ES as appropriate. Therefore, the above scope is subject to amendment in response to agreements arising from this engagement.
- The publicly available AIS data sourced from the MMO relates to the year 2019. This was the most up-to-date data available at the time of the baseline study. It remains an accurate reflection of the current baseline and is an industry-standard approach at PEIR stage.
- When preparing the marine navigation baseline and undertaking the impact assessment the most recent information available at the time of preparation will be used.
- No baseline change assumed for Operational Phase subject to ongoing investigation on the likely types, number and routes of the barges to be used to transport the operation product, which will be assessed in the ES.

18.14. REFERENCES

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- ⁸ Lighthouse Green Fuels DCO. (2023). 'Environment Impact Assessment Scoping Report: Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010150/EN010150-000006-LGF%20EIA%20Scoping%20Volume%20I%20-%20Main%20Text%20and%20Figures.pdf>
- ⁹ Appendix 20-A - Shipping and Navigation Scoping Report. (2023). Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010150/EN010150-000007-LGF%20EIA%20Scoping%20Volume%20II%20-%20Appendices.pdf>



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