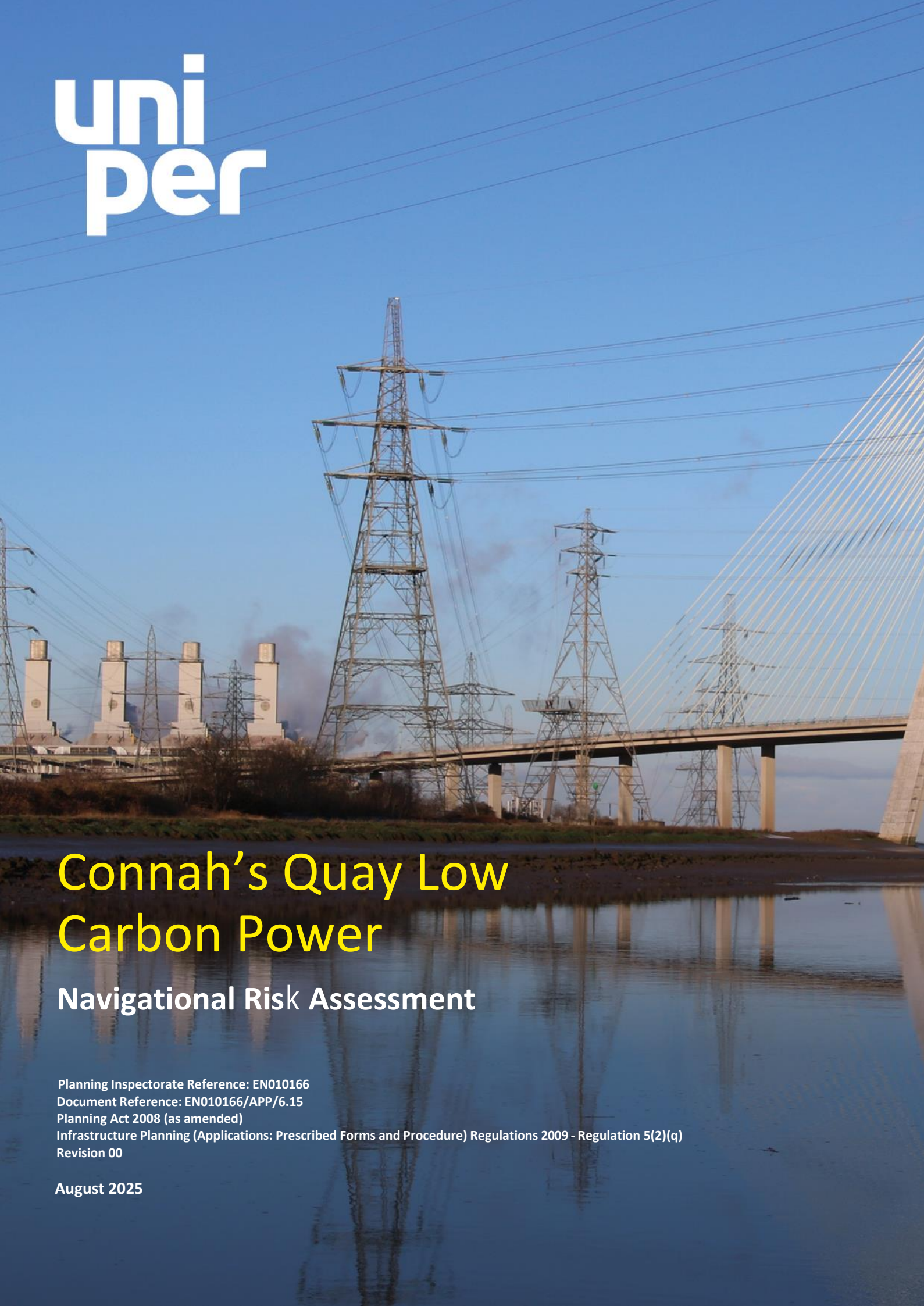

Connah's Quay Low Carbon Power

Navigational Risk Assessment

Planning Inspectorate Reference: EN010166
Document Reference: EN010166/APP/6.15
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Prepared for:
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Prepared by:
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1. Introduction

1.1 Background

1.1.1 This Navigational Risk Assessment (NRA) has been prepared on behalf of Uniper UK Limited (the Applicant). It forms part of the application (the Application) for a Development Consent Order (a DCO), that has been submitted to the Secretary of State (the SoS) for The Department for Energy Security and Net Zero (DESNZ), under Section 37 of The Planning Act 2008 (Ref 1).

1.1.2 The NRA has considered the available route options for Abnormal Indivisible Loads (AILs) to identify any cautions which may affect the viability of transporting these units by vessel from open water to the landside delivery points. The findings inform the risk associated with each route and where caution is required. A secondary part of this NRA considers the navigational risks associated with the maritime works proposed in the Water Connection Corridor.

1.1.3 It should be noted that all Statutory Harbour Authorities (SHAs) have a responsibility to comply with, *a*mong other things, the Port Marine Safety Code (PMSC). A core requirement of the PMSC is that the Duty Holder of the SHA must:

- assess, and keep under review, the marine risks within the waters for which the SHA is responsible;
- develop policies and procedures to manage those risks and to employ, resource, and empower suitably competent personnel to manage marine operations and reduce risk; and
- undertake the above by means of a structured Safety Management System (SMS), which has clear objectives, clear outcomes, and has the concept of continuous improvement embedded within it.

1.1.4 The Harbour Authorities of the proposed routes have very high standards of navigation and a proactive approach to management of risk, evidenced by their existing risk assessments and procedures. This document contains project information, hazards, NRA procedure and routing options for the delivery of the AILs; considering transportation from the open sea to the port.

1.1.5 The NRA methodology used in this report follows the Formal Risk Assessment (FRA) process preferred and used extensively by many operators and authorities and is based on guidance published by the International Maritime Organization IMO in; MS/Circ.1023 MEPC/Circ.392: 5-4 2002 (Ref 2), MSC/Circ.1180 MEPC/circ.474: 25-8-2005 (Ref 3), MSC-MEPC.2/Circ.:16-10-2006 (Ref 4).

1.1.6 As secured through Requirement 19 of the **Draft DCO** (**EN010166/APP/3.1**) a detailed AIL Risk Assessment and Method Statement will need to be prepared by the contractor in advance of the work commencing in accordance with the requirements of the selected landside delivery point(s).

In addition, an updated NRA would be prepared should it be determined that Connah's Quay North is selected as landside delivery point. These would consider further details on confirmed component size, weight, vessel size, AIL transfer, permitting and all other associated activities.

1.2 The Proposed Development

1.2.1 The (CQLCP) Abated Generating Station would comprise up to two Combined Cycle Gas Turbine (CCGT) with Carbon Capture Plant (CCP) units (and supporting infrastructure) achieving a net electrical output capacity of more than 350 megawatts (MW; referred to as MWe for electrical output) and up to a likely maximum of 1,380 MWe (with CCP operational) onto the national electricity transmission network.

1.2.2 Through a carbon dioxide (CO_2) pipeline, comprising existing and new elements the Proposed Development would make use of CO_2 transport and storage networks owned and operated by Liverpool Bay CCS Limited, currently under development as part of the HyNet Carbon Dioxide Pipeline project (referred to as the HyNet CO_2 Pipeline Project), that will transport CO_2 captured from existing and new industries in North Wales and North-West England, for offshore storage. The captured CO_2 would be permanently stored in depleted offshore gas reservoirs in Liverpool Bay.

1.2.3 For the purposes of the electrical connection, National Grid Electricity Transmission plc (NGET), which builds and maintains the electricity transmission network in England and Wales, is responsible for the operation and maintenance of the existing 400 kV NGET Substation.

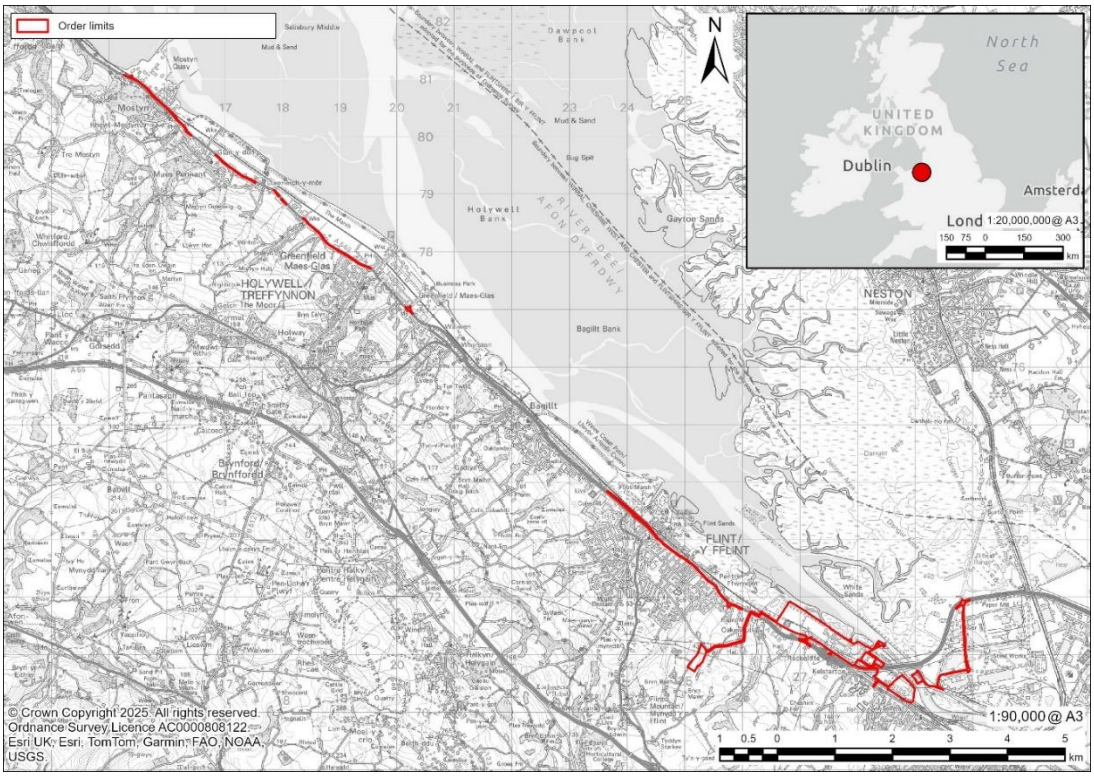
1.2.4 A description of the Proposed Development, including details of the maximum parameters assessed as part of the application, is set out in **Chapter 4: The Proposed Development** of the Environmental Statement (ES) (**EN010166/APP/6.2.4**) Volume II. At this stage in the development, the design of the Proposed Development incorporates a necessary degree of flexibility to allow for ongoing design development, which would adhere to the overall set parameters included within the DCO.

2. Navigation Overview

2.1.1 Connah's Quay Power Station is located in Flintshire, North Wales, south of the Dee Estuary.

2.1.2 **Figure 1** shows the Order limits for the Proposed Development. Additional works have been proposed to refurbish and replace existing eel screens on intake cannisters at the Water Connection Corridor. Further detail on the proposed work is given below in Section 2.5.

Figure 1: Order limits



2.1.3 Three options have been proposed to deliver the AILs to Connah's Quay. These routes all require the AIL units to be transported via vessel from the open water to a landside delivery location. From there, the AIL is to be transferred to a vehicle for road transportation to the delivery site. This study exclusively reviews the AIL delivery options from the open water to the landside delivery locations.

2.1.4 This NRA includes an assessment for each proposed route. The routes were determined by the location of the following Ports which were selected as viable landside delivery options:

- **Ellesmere Port.** Located within the Manchester Ship Canal at Eastham Locks, along the south bank of the River Mersey Estuary;
- **Port of Mostyn.** Located at the mouth of the River Dee Estuary on the North Coast of Wales in Flintshire; and
- **Connah's Quay North.** Located along the River Dee, adjacent to Flintshire Bridge and upstream of the Port of Mostyn.

2.1.5 A map illustrating the landside delivery locations can be found in **Figure 2** below.

Figure 2: Port Locations and Proposed Development

2.2 Ellesmere Port Navigational Route

2.2.1 The NRA for Ellesmere Port is based on a route that anticipates the AIL carrying vessel will travel from the open water into the River Mersey Estuary, where it will navigate upstream until reaching Eastham Locks on the south bank of the River Mersey. There, the vessel will pass through the locks into the Manchester Ship Canal and continue traveling in a south-eastern direction until it reaches Ellesmere Port. It has been assumed that the vessel will return following the same route it came once the AIL has been transferred over to the landside.

2.2.2 Depending on tidal conditions and vessel speed, navigating from the open sea to Eastham locks can take several hours. From there, the vessel must travel up the canal, approximately 2.9 miles to Ellesmere Port. The journey is bound by the tides where, outside of the canal, the channels must be deep enough for the vessel to travel through. Accounting for an appropriate tide for the vessel to travel on, strong tidal currents found in the Mersey and any potential traffic at the lock gate, it can be estimated that the approach and the unloading could take between one and two days. This is dependent on what the arrival time to the Port is, which is largely dictated by the high tide time (e.g. an earlier high tide time is more likely to result in the AIL being delivered earlier in the day allowing time for unloading).

2.2.3 **Figure 3** shows the geographically significant points along this route. While it is not the purpose of this report to review the transportation of the landside

delivery, it should be noted that Ellesmere Port is the only route that utilises a port along the River Mersey and therefore involves a more complex logistics arrangement to deliver the AIL to the power station once landside.

Figure 3: Ellesmere Port Navigation Route

2.3 Port of Mostyn Navigational Route

2.3.1 The NRA for the Port of Mostyn is based on a route that anticipates the AIL carrying vessel will travel from open water into the River Dee Estuary where it will navigate to the Port of Mostyn and transfer the AIL for landside transportation. It has been assumed that once the vessel has transferred the AIL to the land that it will return following the route it came.

2.3.2 As the Port of Mostyn is located close to the mouth of the river, and therefore the shortest journey of the three routes, it can be assumed that the turnaround time for the unloading of the AIL is the shortest. While the approach and departure is bound by the tides due to the sandbanks surrounding the Port of Mostyn, the approach and unloading is expected to take a day assuming the timing coincides with high tide. Departure time is contingent on how quickly the unloading of the AIL will take, which will be subject to the contractor's methods.

2.3.3 **Figure 4** shows the geographically significant points along this route. The Port of Mostyn is located near the mouth of the River Dee, resulting in a shorter upstream navigation distance compared to the other two options.

Figure 4: Port of Mostyn Navigational Route

2.3.4 While it is not the purpose of this report to assess the landside transportation arrangements (see the **Chapter 5: Construction Programme and Management** (**EN010166/APP/6.2.5**) and the **Framework Construction Traffic Management Plan** (**CTMP**) (**EN010166/APP/6.6**) which cover landside transportation arrangements), it should be noted that due to the port's proximity to the river's mouth, a portion of the delivery is completed by road following a straightforward and direct route running parallel to the river.

2.4 Connah's Quay North Navigational Route

2.4.1 The NRA for Connah's Quay North is based on a route that anticipates the AIL carrying vessel will travel from open water into the River Dee Estuary, navigating upstream through the River Dee. The vessel will continue upstream passing Connah's Quay Power Station, travelling in proximity to Water Connection Corridor and then under the Flintshire Bridge where it will reach Connah's Quay North berth situated on the north bank of the river. It has been assumed that once the vessel has transferred the AIL to the land that it will return following the route it came.

2.4.2 As for the Port of Mostyn's navigational route, the approach and departure are bound by a high tide requirement to allow for adequate under keel clearance. It is expected that, because of the distance to navigate to the port, a day will be required for the approach. The vessel will then lie alongside at the berth where the water depth remains adequate at low tide. Due to the berth at Connah's Quay North being deeper than the navigational channel surrounding it, a high tide is required to move off berth. A second day will be required to use the high tide to position bow on and unload the AIL. A third day will also be required to depart from the Quay and navigate back downstream.

2.4.3 **Figure 5** shows the geographically significant points along this route. While it is not the purpose of this report to review the transportation on the landside (see the **Chapter 5: Construction Programme and Management** (**EN010166/APP/6.2.5**) and the **Framework CTMP** (**EN010166/APP/6.6**) which cover landside transportation arrangements), it should be noted that Connah's Quay North is within close proximity to the Power Station, albeit on the opposite side of the river. Accordingly, the landside delivery route is considerably shorter than the other two options.

Figure 5: Connah's Quay North Navigational Route

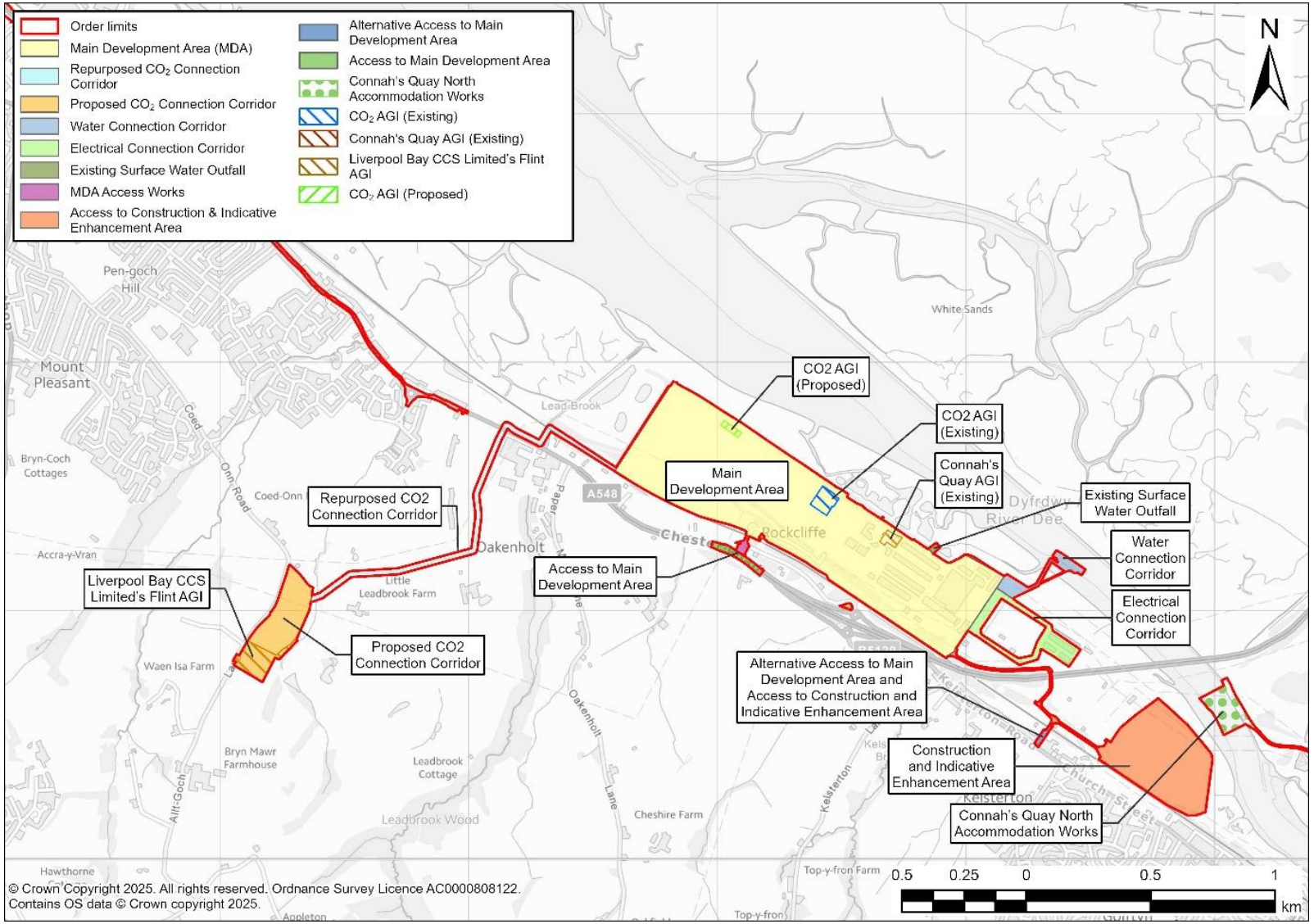
2.5 Water Connection Corridor

2.5.1 As referenced in the Navigation Overview Section above, part of the proposed works is the replacement of eel screens and minor refurbishment (to adhere with the Eels (England and Wales) Regulations 2009). The screens are located on the shore of the River Dee just outside the Power Station. **Figure 6** shows the current eel screens and water intakes protected by a fender structure.

Figure 6: Eel Screens at the Water Connection Corridor

2.5.2 The work on the intakes will involve lifting out the existing intake screen assemblies, detaching the existing screens and replacing them with finer mesh screens. The assemblies will then be lifted back into position. The estimated construction period is 3-5 months, and a crane barge is expected to be moored at site alongside the protective barrier for the duration of this period in order to lift the sections over the barrier. An additional vessel may also be required to deliver materials to site.

Figure 7: Key components of the Proposed Development including the Water Connection Corridor Location

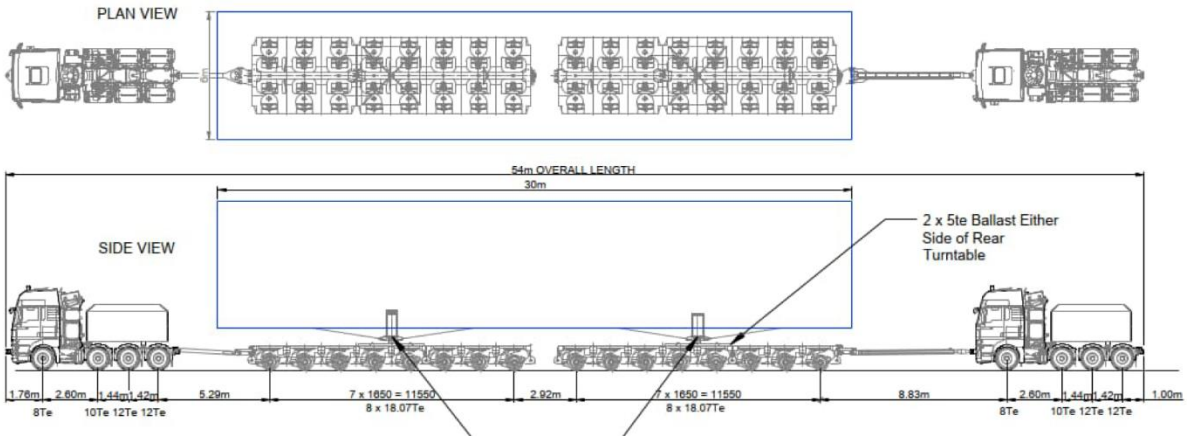


2.5.3 To navigate to Connah's Quay North, AILs must pass the Water Connection Corridor. Construction specific hazards have been identified that could arise if construction is ongoing while AILs are transported past the screens during the construction period. An Interim Water Connection Corridor NRA has been developed to address these hazards and mitigate associated risks should this situation arise. The Interim Water Connection Corridor NRA has been prepared independently of the Connah's Quay North NRA, as it is only applicable if construction coincides with the transportation of AILs. As secured by Requirement 19 of the **Draft DCO** (**EN010166/APP/3.1**) an updated NRA will need to be repeated by the contractor once the precise methodology has been confirmed in correspondence with the Dee Conservancy.

2.6 Vessel and Cargo Data

2.6.1 As this NRA is part of a preliminary investigation, vessel specific dimensions were not able to be provided. This NRA has therefore been completed on an assumed maximum vessel length of 60 m. This number was used on the basis that the AIL dimensions will be 30 m long by 6 m wide by 6 m high as shown in **Figure 8** and as such it would be unlikely that a vessel would exceed 60 m for these requirements.

Figure 8: AIL Dimensions for Delivery Vehicles



3. Data Collection

3.1 Guidelines

3.1.1 In addition to the IMO guidance used to produce the NRA (noted in Section 1), the following guidelines were also considered in the preparation of this assessment.

Table 1: Associated Guidelines

Item No.	Reference Title	Description
1	Port Marine Safety Code (Ref 5)	Issued by the UK Department for Transport and administered by the Maritime and Coastguard Agency (MCA), it sets out national standards for the safe management of marine operations in ports and harbours.
2	A Guide to Good Practice on Port Marine Operations (Ref 6)	Prepared in conjunction with the Port Marine Safety Code by the MCA, it provides detailed practical guidance to help harbour authorities and marine operators implement the standards set out in the Code.
3	Marine Safety in the Dee Conservancy (Ref 8)	Published by Natural Resources Wales, a guide to safe navigation outlines the implementation of the Port Marine Safety Code within the Dee Estuary.

3.2 Waterway Characteristics and Tidal Considerations – River Dee

3.2.1 The navigational channel to both the Port of Mostyn and Connah's Quay North requires sailing through the River Dee's Estuary. Responsibility for safety of navigation in the Dee Conservancy is presently split between Natural Resources Wales, as the conservancy, harbour and local lighthouse authority, and Mostyn Docks Ltd. As the pilotage authority and statutory harbour authority for the Port of Mostyn, which is the defined area immediately surrounding the Port, and the western approaches to the estuary. Due to the shifting nature of the sandbanks, strong tidal streams and changeable weather in the River Dee, there are some notable characteristics.

3.2.2 Frequent changes in the navigable channel mean that buoys marking the high-water channel are often moved. There are also various large commercial vessels associated with several offshore renewable energy operations running to and from the Port of Mostyn on a daily basis. To address this, the pilotage authority (Port of Mostyn) provides information on navigational safety and under present pilotage directions (Ref 7), pilotage is

compulsory for vessels that are 20 m or more in length. This would apply for routes to both the Port of Mostyn and Connah's Quay North.

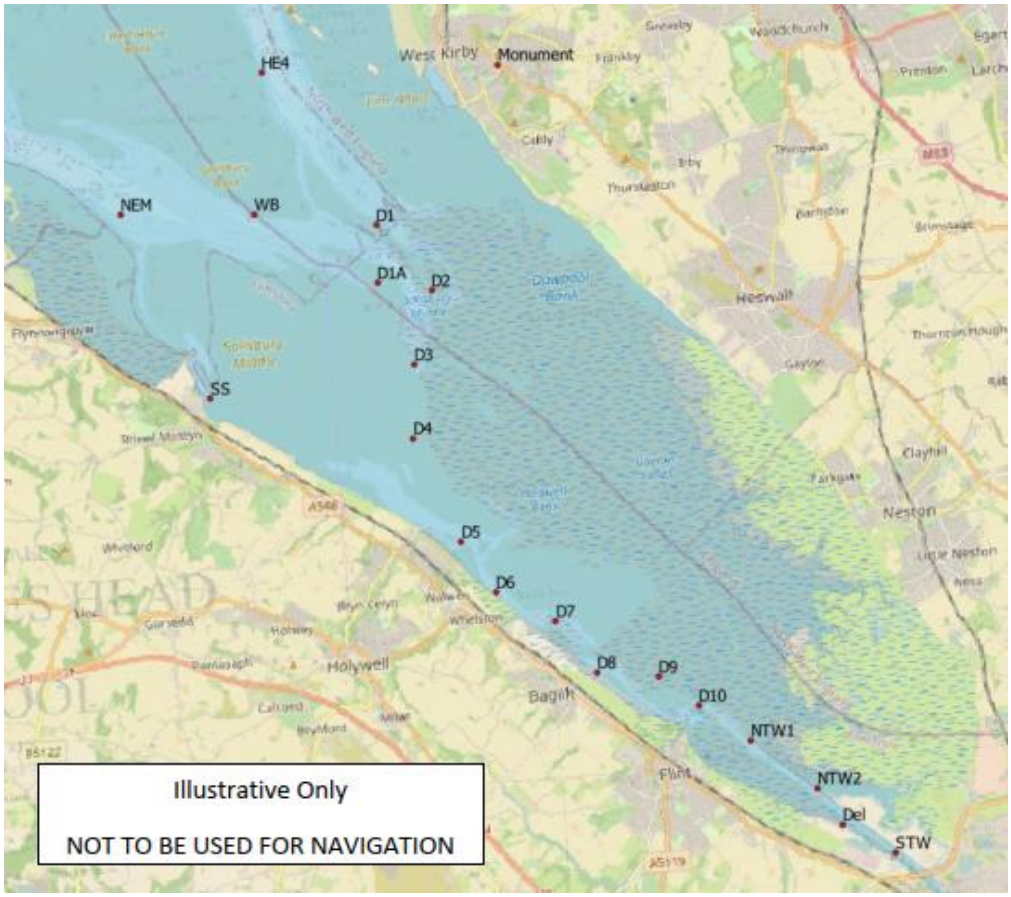
3.2.3 Incoming tides enter the shallow channels first when entering the estuary. This can often leave isolated areas of high sandbanks. The bed of the River Dee rises from the mouth of the estuary as it heads inland towards Chester. Accordingly, the rise of the tide found in the outer estuary is greater than that found further upstream. On a Spring tide, a rise of about 8.0 m can be found at the entrance of the estuary.

3.2.4 The tidal regime in the outer estuary has an incoming (flood) tidal stream that runs for about 5 and a half hours while the out-going (ebb) tidal stream runs for about 6 and a half hours. Upstream in the canalised section of the river, it typically takes 2 hours to flood and 10 hours on the ebb tide. During a Spring tide there is a chance of a bore occurring which can generate a wave of about 0.5 m, according to Natural Resources Wales (Ref 8).

1 – Approach to the Port of Mostyn

3.2.5 There are two main entrances into the Dee Estuary. The western entrance, leading to the inner dredged channel of the Port of Mostyn, is mainly used by commercial vessels. The northern entrance to the estuary is through Hilbre Swash and is normally only used by small craft. When the tide is appropriate, the AIL delivery vessel may navigate through the western entrance and into the high-water channel.

Figure 9: Navigational Aids Marking the High-Water Channel in the River Dee



3.2.6 This channel extends past the Port of Mostyn and carries on through the estuary (entering the canalised section of the river at Oakenholt which leads to Connah's Quay North (see **Figure 9**)). The proposed delivery route to the Port of Mostyn would terminate here.

2 – Approach to Connah's Quay North

3.2.7 To navigate to Connah's Quay North, the vessel would follow the same route as taken to the Port of Mostyn, navigating through the western entrance and into the High-Water channel. The route would continue past the Port of Mostyn, heading upstream and through the north and south training walls made of compacted rock. These walls are covered at high water and are marked by pole perches that remain visible. A sunken wreck is also marked by a buoy between Flintshire Road Bridge and Flint point. The bridge itself allows vertical clearance for a vessel for vessels of about 18 m. Just beyond the bridge lies the berth of Connah's Quay North. It has a locally deepened bed to allow vessels to remain safely moored at low tide when much of the surrounding channel becomes too shallow to navigate. Due to the shallow sand banks surrounding the berth, vessels can only arrive or depart during high tide when there is enough water to provide the necessary under-keel clearance over those banks.

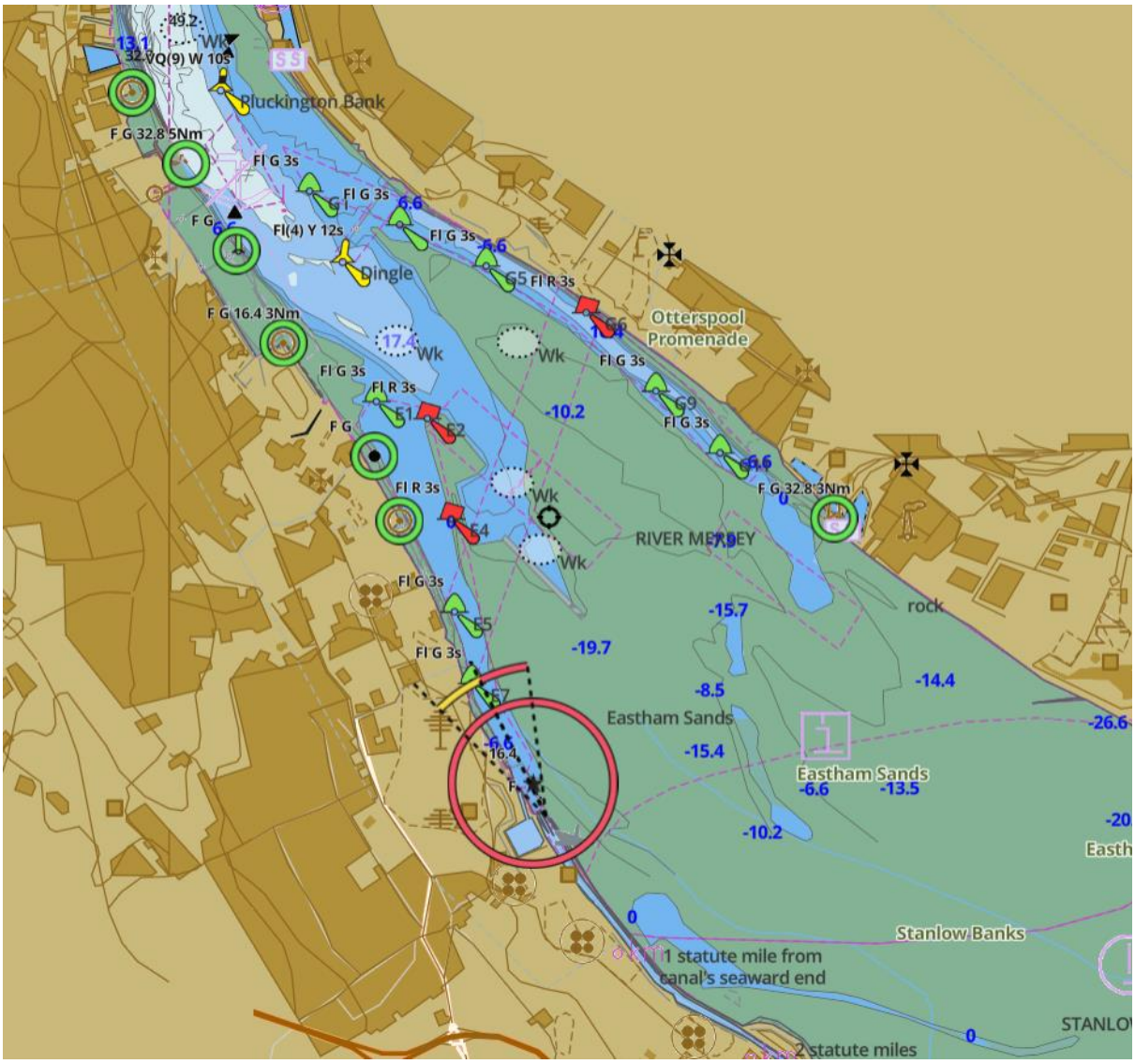
3.2.8 The Port of Mostyn is a Site of Special Scientific Interest (SSSI), a Ramsar Wetland of International Importance, a Special Protection Area (SPA) and a Special Area of Conservation (SAC). Connah's Quay North offloading area is categorised as an SSSI and an SAC with the adjacent navigable channel rated as a Ramsar Wetland of International Importance as well as an SPA.

3.3 Waterway Characteristics and Tidal Considerations – River Mersey

3.3.1 Navigating to Ellesmere Port requires passing through the River Mersey Estuary. Approaching the River Mesey involves traversing a well-marked buoyed channel. The Queens and Crosby channels found at the entrance of the estuary are well maintained to accommodate the large commercial shipping vessels that are travelling in and out of the Port of Liverpool. Both channels have deep beds helped by training walls located on either banks of the river.

3.3.2 Travelling upstream from Perch Rock to Bromborough Bay, the channel splits in two; one going to Garston Docks and the other heading to Eastham (Manchester Ship Canal). **Figure 10** shows the Eastham channel along the south bank of the Mersey Estuary whereby it enters the Manchester shipping canal which shelters Ellesmere Port upstream. The Manchester Ship Canal Company Ltd, a subsidiary of Peel Ports Group Ltd, is the designated harbour authority at this location.

Figure 10: Navigational Channel to Eastham Lock Entrance



3.3.3 The River Mersey has a large tidal range (over 10.2 m at Liverpool) and stream rates of up to 7 knots. Much like the River Dee, the flows are complex and sea conditions can be dangerous, particularly at the Eastham channel where the wind can be against the tide. The passage between Liverpool South Docks and Eastham Locks will likely require waiting until high tide to navigate here. Sandbanks should be expected in similar manor to those found in the River Dee.

3.3.4 After passing through the lock and entering the canal, the channel is maintained and cut off from the tide. This man-made embankment creates a channel that is relatively narrow compared to the open water channels. Compulsory pilotage is required for vessels exceeding 50 m in length, or for those that fall into any of the categories specified by Peel Ports Group (9). A maximum draught of 8 m is suggested for vessels that are travelling and offloading at Ellesmere Port (10).

3.3.5 The approach to Ellesmere Port through the River Mersey Estuary is a SSSI, a Ramsar Wetland of International Importance and an SPA.

4. Navigational Risk Assessment Procedure

4.1 What is a Risk Assessment

4.1.1 A risk assessment is a written document that records a three-step procedure:

- identifying the hazards relevant to the workplace/project;
- assessment of the risks presented by these hazards; and
- identifying controls and measures which can be put in place to reduce the risk of these hazards causing harm, to an acceptable level.

4.2 Terminology and Outline Procedure

4.2.1 Key definitions and terminology relevant to the NRA includes:

- A hazard is an unwanted and unplanned event or danger which has the potential to cause harm to persons, the environment, property, or the reputation of key stakeholders;
- Hazards must be considered for each aspect of the navigational operation;
- Each hazard shall be assessed and a consensus reached in relation to the likelihood, or probability (P) of that hazard occurring;
- Each hazard shall also be assessed and a consensus reached, in relation to the consequences if the hazard were to be realised. This includes consideration of outcomes for people, environment, property, and reputation (PEPR);
- The agreed consensual values of likelihood and consequence (C) are used to determine the risk;
- A risk (R) is therefore a weighted probability of the hazard occurring / being realised, where R= P*C;
- The above process will produce a base line numeric risk score for each hazard; and
- Risk control measures shall be considered and applied which will reduce the baseline risk score, outputting a mitigated risk score. This rating will show if the hazard is now tolerable when applying control measures. The score is categorized based on the Risk Assessment Matrix, detailed in Section 4.6.

4.2.2 To ensure the numeric values of C and P are assessed as accurately as they can be in the NRA, a workshop between stakeholders is held. The participants in the workshop are people with expert knowledge of the operations which are being assessed and who have been involved in such operations on a day to day basis for a number of years.

4.3 Workshop

4.3.1 In relation to the Proposed Development and this NRA, the workshop was convened by Microsoft Teams on 27th March 2025 with attendees from the Port of Mostyn, Peel Ports (representing Ellesmere Port), Natural Resources Wales, Dee Conservancy and AECOM (for the Applicant). The stakeholders that were invited to and attended the workshop were as follows:

- Port of Mostyn – Harbour Master;
- Connah's Quay North – Harbour Master;
- Ellesmere Port – Peel Ports;
- Natural Resources Wales - Senior Advisor Dee Conservancy;
- Natural Resources Wales - Senior Advisor - Development Planning;
- Uniper – Environmental Specialist;
- Uniper – Environmental Planning Specialist;
- AECOM – NRA Lead;
- AECOM – NRA Author; and
- AECOM – Environmental Impact Assessment Lead.

4.3.2 The process was carried out in an open discussion, using a list of queries and hazards raised in advance of the meeting which were recorded into the individual NRAs. During the workshop the participants used their knowledge and past experience to:

- Identify hazards;
- Agree the likelihood/probability of each hazard occurring; and
- Identify the control measures to reduce each risk.

4.3.3 Based on the information provided after the workshop, AECOM have, in detail, recorded the main hazards identified in relation to each of the options available and then produced the risk assessments contained in **Appendix A.2, A.3, A.4** and **A.5**.

4.4 Navigational Hazard Identification

4.4.1 The main hazards were identified in relation to the following topics:

- natural conditions such as storms, fog, currents;
- vessel system trouble such as mechanical failures (gear, engine or steering failure, wire breaking), vessels/barges breaking loose from moorings due to heavy storms, anchors dragging;
- navigational issues through the channels and sharing the water with other craft;
- human errors such as 'bad maneuvering', unskilled persons, unlicensed people operating the vessels or the bridge opening;

- obstructions on the waterway such as obstacles on the riverbed, floating materials, insufficient channel depth, lack or failure of navigational symbols, defect at traffic facilities; and
- risk to the public and personnel on board.

4.5 Navigational Risk Assessment Assumptions

4.5.1 The Navigational Risk Assessments are limited to the hazards and risks associated with the operation of the three main navigable routes to the Port of Mostyn, Connah's Quay North and Ellesmere Port considering the delivery of the AILs to these locations only – not the hazards and risks associated with the transit of ships from the open sea. It is assumed that these hazards have already been subject to a robust NRA.

4.5.2 Accordingly, the NRAs focus on scenarios where the commercial vessels are navigating upstream/downstream to each of the three locations provided respectively.

4.5.3 The Water Connection Corridor forms part of the proposed AIL route to Connah's Quay North. The Connah's Quay North NRA assesses hazards along this route under the assumption that no construction activity is taking place at the Water Connection Corridor. In contrast, the Water Connection Corridor NRA evaluates the additional risks that may arise specifically due to construction occurring within the Water Connection Corridor. The Interim Water Connection Corridor NRA should therefore be viewed as an extension of the Connah's Quay North NRA and should be implemented in addition to it if construction at the water intakes is taking place at the same time as AIL deliveries.

4.6 Risk Assessment Matrix

4.6.1 For the indicative risk analysis/review, an AECOM safety design tool was adopted. The risk evaluation is based on the severity and probability of the hazards identified. Points are given against the risk rating as presented in the table below in **Figure 11**.

4.6.2 The definitions regarding the levels of likelihood and consequence of a hazard occurrence are contained within the industry standard 5 x 5 matrix, which also shows the resultant risk categorisation ranging from:

- extreme risk;
- high risk;
- moderate risk;
- minor risk;
- slight risk.

4.6.3 Whilst all hazards should be kept under review, in some circumstances it is considered that a hazard categorised as Moderate, Minor, or slight is already As Low As Reasonably Practicable (ALARP). Risk Control Options (RCOs) were used to reduce the risk score until the residual risk was ALARP.

Figure 11: The Risk Assessment Matrix Key

RISK ASSESSMENT MATRIX: RISK CRITERIA		Likelihood				
		Level 1	Level 2	Level 3	Level 4	Level 5
		Rare	Unlikely	Possible	Likely	Almost certain
		One or more times greater per 200 years	One or more times per 100 years	One or more times per 10 years	One or more times per year	Ten or more times per year
Consequences	**5** - Loss of vessel or severe damage to vessel/equipment. Possibility of multiple fatalities. International news coverage. Serious long-term impact on environment and or permanent effects.	Moderate (5)	High (10)	Extreme (15)	Extreme (20)	Extreme (25)
	4 - Major damage to vessel/equipment. Possibility of a fatality. National news coverage. Significant impact on environment with short-term or long-term effects.	Minor (4)	Moderate (8)	High (12)	Extreme (16)	Extreme (20)
	3 - Moderate damage to vessel/equipment. Moderate/major injury. Regional news coverage. Limited impact on environment with short term or long term effects.	Minor (3)	Moderate (6)	Moderate (9)	High (12)	Extreme (15)
	2 - Minor or superficial damage to vessel/equipment. Minor injuries and local news coverage. Minor impact on environment with no lasting effects.	Slight (2)	Minor (4)	Moderate (6)	Moderate (8)	High (10)
	1 - Insignificant or no damage to vessel/equipment. No injuries. Insignificant impact on environment.	Slight (1)	Slight (2)	Minor (3)	Minor (4)	Moderate (5)
Action Key	Slight (< 2.5)	No action is required.				
	Minor (2.5 - 4.5)	No additional controls are required, monitoring is required to ensure no changes in circumstance.				
	Moderate (4.5 - 9.5)	Efforts should be made to reduce risk to "As low as reasonable practicable" (ALARP) but activity may be undertaken.				
	High (9.5 - 13.5)	Efforts should be made to reduce risk to "As low as reasonable practicable" (ALARP). Activity can only be undertaken with further additional controls.				
	Extreme (> 13.5)	Intolerable risk. Activity not authorised.				

4.7 Risk Control Measures

4.7.1 To reflect the use of RCOs in the NRAs, the stakeholders were consulted in the workshop to consider what RCOs are in place, or could be viably implemented, to reduce the baseline risk score. Reduction percentages were then entered for each RCO, individually reflecting the reduced effect it would have on the likelihood, the consequences or both the likelihood and consequence of the associated hazard.

4.7.2 These figures were inputted and used to compute the compound effect of such measures. This is done by embedded non linear algorithms which are based on probability functions. When dealing with frequent hazards, it is necessary to utilise high levels of risk reduction to significantly change the risk level.

4.7.3 Risk control measures must be considered to minimise or eliminate the risks. These mitigation measures typically include but are not limited to:

- mandatory procedures in place;
- contingency plans; and
- physical structures and solutions.

5. NRA Results - Discussion

5.1 NRA Route Results

5.1.1 The scope for the NRA routes considered the transportation of the AILs from the open water (the Irish Sea) to their respective offloading destinations. All three ports provide viable options for receipt of the AILs from delivery by sea. The NRAs summary set out below (and at the end of **Appendix A** in Section A.6), shows the scores of each NRA split into their baseline risks (pre-mitigation) and Mitigated Risk (the actual risk). Low scores suggest a lower risk compared to those with higher numbers.

5.1.2 All three routes recorded high scores in the following shared categories:

- restricted visibility due to severe weather (High - 12);
- strong winds / Poor weather (High - 12);
- medical emergency to key member on vessel (High - 12); and
- person overboard (High - 12).

5.1.3 These high-risk scenarios all show reductions once the RCOs are applied with their respective mitigated risk scores falling within the moderate – slight risk categories.

5.1.4 The Ellesmere NRA (**Appendix A.2**) averages a baseline risk of 7.5 (Moderate) and a Mitigated Risk of 3.6 (Minor) across the 35 hazards identified for this route. The highest Mitigated Risk was the "Restricted visibility due to severe weather" scoring 6.4 (Moderate). This can be attributed to the fact that should conditions rapidly change while sailing, which is very unlikely given the weather would be monitored, there could be a considerable distance to navigate to safety. Including this hazard, Ellesmere's NRA has 6 mitigated risk scores that are categorised as moderate with all other scores being classified as minor or slight.

5.1.5 Two unique site-specific hazards were identified; navigation through Eastham Locks (Moderate - 6) and collision at the lock gate (Moderate - 8). These hazards were further reduced to 2.7 (Minor) and 3.7 (Minor) respectively, reinforcing the Ports comprehensive safety plans. The overall findings suggest that the route to Ellesmere Port is a relatively low risk operation providing the RCOs are applied. The significant reduction in risk scores across all major hazards indicates it is an established route for commercial vessels. While certain baseline risks were deemed high, the mitigated risks reflect an effective risk management strategy.

5.1.6 The Port of Mostyn NRA (**Appendix A.3**) averages a baseline risk of 7.4 (Moderate) and a Mitigated Risk of 3.5 (Minor) across the 34 hazards identified for this location. Similar to Ellesmere's NRA, the highest Mitigated Risk was "Restricted visibility due to severe weather". However, the mitigated risk rating of 5.2 (Moderate) is lower than that of Ellesmere and Connah's Quay North. This is because the time it takes to navigate to the Port of Mostyn is comparably shorter than the other routes. Resultantly, the time to abort the approach and navigate to safety is smaller.

Figure 12: Summary Table of Navigational Risk Assessment Scores

NAVIGATIONAL RISK ASSESSMENTS - SUMMARY								
AGREED HAZARD	Ellesmere Port		Port of Mostyn		Connah's Quay North		WCC	
	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk
Commercial traffic	8.0	4.0	8.0	4.0	8.0	4.0	8.0	3.7
Leisure craft and fishing boat traffic	8.0	4.0	8.0	4.0	8.0	4.0	8.0	3.7
Commercial vessel losing control	8.0	4.3	8.0	4.0	8.0	4.0	8.0	4.0
Other vessels losing control	8.0	4.4	8.0	3.1	8.0	3.9	6.0	2.5
Failure of aids to navigation	8.0	4.0	8.0	4.0	8.0	4.0	8.0	4.0
Unknown dimensions of the vessel using the navigable channel (clearance through locks / mooring requirements)	4.0	1.5	6.0	2.0	6.0	2.0	-	-
Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse	4.0	3.7	4.0	3.7	4.0	3.7	4.0	3.7
Unknown obstructions in the riverbed/canal	6.0	2.4	6.0	2.4	6.0	2.4	-	-
Obstructions in the river - non vessel (i.e. person/recreational canoeing in the water that you have to divert around)	6.0	4.6	6.0	4.6	6.0	4.6	-	-
Harbour communications failure / loss of VHF	6.0	2.8	6.0	2.8	6.0	2.8	4.0	1.5
Tide height / running aground	6.0	2.4	6.0	2.9	6.0	2.9	-	-
Dropped line fouls bow thruster or vessel propellers	6.0	3.8	6.0	3.8	6.0	3.8	6.0	3.8
Tug failure	6.0	2.6	6.0	2.3	6.0	2.3	6.0	2.3
Contact with own berth or extended wharfage area while berthing, unberthing	9.0	4.2	9.0	4.2	12.0	5.3	-	-
Contact with adjacent berthed vessels	8.0	3.9	8.0	3.9	-	-	-	-
Contact with adjacent wharfage	8.0	3.9	8.0	3.6	-	-	-	-
Vessel breaking away from berth and striking other vessels/berths	8.0	3.9	8.0	3.9	8.0	3.9	-	-
Passing vessels striking the moored vessel	8.0	4.0	4.0	4.0	3.0	2.4	-	-
Leisure craft/fishing boats in vicinity of berths	6.0	4.5	6.0	4.5	6.0	3.4	6.0	4.1
Ship impact due to breakout of moored vessels, berth surge, dragging anchors	8.0	3.1	8.0	3.9	8.0	4.8	8.0	5.2
Restricted visibility due to severe weather	12.0	6.4	12.0	5.2	12.0	6.4	12.0	6.0
Strong winds / poor weather	12.0	4.3	12.0	4.7	12.0	5.8	-	-
Fire on board vessel - in river	8.0	2.5	8.0	2.2	8.0	2.2	-	-
Fire on board vessel - berthed/alongside	8.0	2.8	8.0	2.2	8.0	2.2	-	-
Fire on shore side	8.0	3.4	8.0	3.4	8.0	3.4	-	-
Medical emergency to key member on vessel	12.0	4.6	12.0	4.4	12.0	4.4	-	-
Person overboard	12.0	1.9	12.0	1.9	12.0	1.9	12.0	3.8
Sinking vessel	5.0	3.8	5.0	3.8	5.0	3.8	5.0	4.1
Terrorism in river/canal	5.0	4.6	5.0	4.6	5.0	4.6	5.0	4.6
Terrorism alongside	5.0	4.6	5.0	4.6	5.0	4.6	-	-
Gangway / Linkspan / Connection failure	6.0	2.2	6.0	2.2	6.0	2.2	-	-
Failure of transfer of AIL	8.0	3.4	8.0	3.4	8.0	3.4	-	-
Quay supporting transfer of AIL	8.0	3.0	8.0	3.0	8.0	3.5	-	-
Navigation through Eastham Locks	6.0	2.7	-	-	-	-	-	-
Collision at lock gate	8.0	3.7	-	-	-	-	-	-
Vessels grounding moving on/off berth	-	-	6.0	2.6	6.0	2.6	-	-
Vandalism	-	-	-	-	6.0	1.6	-	-
Associated risk with passing through the WCC	-	-	-	-	6.0	2.4	-	-
Collision with Flintshire Bridge	-	-	-	-	5.0	4.1	-	-
Restriction in channel width (due to construction)	-	-	-	-	-	-	6.0	3.0
Contact with screen structure	-	-	-	-	-	-	6.0	2.0
Contact with crane barge	-	-	-	-	-	-	8.0	3.7
Vessel grounding	-	-	-	-	-	-	6.0	2.3
Fire on board crane barge	-	-	-	-	-	-	10.0	3.5
Construction Risks	-	-	-	-	-	-	15.0	9.4

5.1.7 Including the restricted visibility hazard, the Port of Mostyn NRA has six mitigated risk scores that remain in the Moderate category, with 21 of the remaining hazards being Minor and seven being a Slight risk. One site-specific hazard in the Mostyn NRA was "Vessels grounding while moving on or off the berth". This was identified due to the River Dee having a large tidal range and resultantly vessels are only moved on and off the berth at appropriate tide times. It was scored a baseline risk of 6 (Moderate), which was reduced to 2.6 (Minor) following mitigation.

5.1.8 Overall, the findings show that the operation to navigate to the Port of Mostyn presents a relatively low risk when RCOs are implemented. The consistent reduction in risk scores supports the conclusion that Mostyn is a well-managed facility with appropriate procedures in place to support safe marine operations. Both the Port of Mostyn and Ellesmere Port regularly accommodate large vessels, resulting in similarities due to their existing infrastructure and operational procedures, which is reflected in the similarity of their risk assessment scores.

5.1.9 The Connah's Quay North NRA (Appendix A.4) averages a baseline risk of 7.3 (Moderate) and a Mitigated Risk of 3.5 (Minor) across 35 identified hazards. The highest Mitigated Risk was "Restricted visibility due to severe weather," scoring 6.4 (Moderate), followed by "Strong winds / poor weather" at 5.8 (Moderate). These risks highlight the environmental exposure of the route and the potential complications if visibility or wind conditions deteriorate unexpectedly. Including these, Connah's Quay has 7 hazards with a mitigated rating in the Moderate range, with the remainder falling into Minor or Slight categories.

5.1.10 In addition to the four baseline risks that are categorised as "High", noted as bullet points above, Connah's Quay North NRA has another baseline risk rated High. "Contact with own berth or extended wharfage area while berthing, unberthing" was scored 12 due to the southern end of the quay's condition not being in usable condition and as such the result of contact could result in serious structural consequences.

5.1.11 There are several unique, site-specific hazards such as "Vessel's grounding moving on/off berth", "Vandalism", "Associated risk with passing through the Water Connection Corridor " and "Collision with Flintshire Bridge". These hazards scored 2.6 (Minor), 1.6 (Slight), 2.4 (Slight) and 4.1 (Minor) respective to their mitigated risks. Connah's Quay North has a deepened bed locally at the berth allowing vessels to moor safely at low tide. This does mean that manoeuvring on and off the berth requires the tide to be at high water so there is adequate keel clearance through the navigable channels which are not deepened to the same depth. The other hazards, detailed in Appendix A.4, were discussed in the workshop. While vandalism has been experienced at the port, the likelihood of a collision at the Water Connection Corridor and Flintshire bridge were considered unlikely and rare.

5.1.12 The NRA findings confirm that, with adherence to recommended control measures, Connah's Quay North presents a well-managed and relatively low-risk operational route for commercial vessels. The Interim Water Connection Corridor NRA considered the additional risks associated with the

route to Connah's Quay North should construction be ongoing at the water intakes while AIL deliveries are being made.

5.1.13 Connah's Quay North is the closest port to the delivery site and has previously handled heavy load transfers. However, the allowable loading capacity of the quay is unconfirmed and will require verification through structural investigations and design checks. While the Port of Mostyn and Ellesmere Port have the infrastructure to support the AIL transfer and procedures to accommodate large vessels, they are further from the final destination, resulting in a longer road delivery route.

5.2 Interim Water Connection Corridor Results

5.2.1 The Interim Water Connection Corridor NRA (in **Appendix A.5**) determined that there were no hazards that were scored above a category of "Moderate" in the mitigated risks. However, there were some high scored baseline risks, notably "Construction risks" and "Fire on board crane barge". These were awarded respective baseline scores of 15 (High) and 10 (High) which have been reduced to 9.4 (Moderate) and 3.2 (Minor). While the fire hazard has been reduced to a low mitigated score, the construction risk score is still moderately high even though it is still categorised as moderate. This is due to the consequences being rated high and there being limited information on the construction method. This risk, and all others associated with the construction work, will require updating by the contractor following completion of their RAMS (Risk Assessment and Method Statement).

6. Conclusion

6.1.1 This NRA has been undertaken to help inform the decision-making process associated with establishing the optimum route for the transfer of the AILs to the Proposed Development. The assessment has determined that the Port of Mostyn and Connah's Quay North scored well, both averaging a mitigated risk score of 3.5. When taking into consideration the Interim Water Connection Corridor NRA in conjunction with the Connah's Quay North NRA, the Port of Mostyn can be considered a lower overall risk. Ellesmere Port is also a well-established facility with a maintained shipping route. It was awarded an average mitigated score risk of 3.6 which was marginally higher than the 3.5 scores of the other two assessed ports.

6.1.2 The lower overall risk for the Port of Mostyn is primarily down to the shorter navigational route, being an established port and the absence of tight passages affected by construction. However, other factors may offset that advantage as, for example, the landside journey is longer than Connah's Quay North with associated additional hazards. Overall, there is no clear and obvious reason why one port facility should be recommended for use for the Proposed Development ahead of the others. The NRA shows that when mitigations are considered, all routes can be safely used as part of the construction strategy for the Proposed Development.

6.1.3 As secured through Requirement 19 of the **Draft DCO** (**EN010166/APP/3.1**) a detailed AIL Risk Assessment and Method Statement will need to be prepared by the contractor in advance of the work commencing in accordance with the requirements of the selected landside delivery point(s). In addition, an updated NRA would be prepared should it be determined that Connah's Quay North is selected as landside delivery point. These would consider further details on confirmed component size, weight, vessel size, AIL transfer, permitting and all other associated activities.

6.1.4 The interim assessment of the navigational risks associated with the Water Connection Corridor has also been conducted to assist with identifying any significant risks. As secured by Requirement 19 of the **Draft DCO** (**EN010166/APP/3.1**) – an updated NRA will need to be prepared by the contractor once the precise methodology has been confirmed in correspondence with the Dee Conservancy.

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Ref 8. NRW (2022) Marine Safety in the Dee Conservancy guidance.

Ref 9. Peel Ports Group (2022), Harbour and Port of Manchester Pilotage Directions.

Ref 10. Peel Ports Group (2022), Harbour and Port of Manchester Pilotage Recommended Maximum Vessel Dimensions

Abbreviations

Abbreviation	Term
AILs	Abnormal Indivisible Loads
ALARP	As Low As Reasonably Practicable
CCGT	Combined Cycle Gas Turbine
CCP	Carbon Capture Plant
CO_2	Carbon Dioxide
CQLCP	Connah's Quay Low Carbon Power
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DESNZ	The Department for Energy Security and Net Zero
ES	Environmental Statement
FRA	Formal Risk Assessment
NGET	National Grid Electricity Transmission plc
NRA	Navigational Risk Assessment
PEPR	People, Environment, Property, and Reputation
PMSC	Port Marine Safety Code
RAMS	Risk Assessment and Method Statement
RCOs	Risk Control Options
SHAs	Statutory Harbour Authorities
SMS	Safety Management System
SoS	Secretary of State

Appendix A - Document Copies

A.1 Risk Assessment Matrix Key

RISK ASSESSMENT MATRIX: RISK CRITERIA		Likelihood				
		Level 1	Level 2	Level 3	Level 4	Level 5
		Rare	Unlikely	Possible	Likely	Almost certain
		One or more times greater per 200 years	One or more times per 100 years	One or more times per 10 years	One or more times per year	Ten or more times per year
Consequences	**5** - Loss of vessel or severe damage to vessel/equipment. Possibility of multiple fatalities. International news coverage. Serious long-term impact on environment and or permanent effects.	Moderate (5)	High (10)	Extreme (15)	Extreme (20)	Extreme (25)
	4 - Major damage to vessel/equipment. Possibility of a fatality. National news coverage. Significant impact on environment with short-term or long-term effects.	Minor (4)	Moderate (8)	High (12)	Extreme (16)	Extreme (20)
	3 - Moderate damage to vessel/equipment. Moderate/major injury. Regional news coverage. Limited impact on environment with short term or long term effects.	Minor (3)	Moderate (6)	Moderate (9)	High (12)	Extreme (15)
	2 - Minor or superficial damage to vessel/equipment. Minor injuries and local news coverage. Minor impact on environment with no lasting effects.	Slight (2)	Minor (4)	Moderate (6)	Moderate (8)	High (10)
	1 - Insignificant or no damage to vessel/equipment. No injuries. Insignificant impact on environment.	Slight (1)	Slight (2)	Minor (3)	Minor (4)	Moderate (5)

Action Key	
Slight (< 2.5)	No action is required.
Minor (2.5 - 4.5)	No additional controls are required, monitoring is required to ensure no changes in circumstance.
Moderate (4.5 - 9.5)	Efforts should be made to reduce risk to "As low as reasonable practicable" (ALARP) but activity may be undertaken.
High (9.5 - 13.5)	Efforts should be made to reduce risk to "As low as reasonable practicable" (ALARP). Activity can only be undertaken with further additional controls.
Extreme (> 13.5)	Intolerable risk. Activity not authorised.

A.2 Ellesmere Port NRA

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
1	**Commercial traffic**	The consequence has been awarded a 4 due to potential major damage to AIL vessel/other vessels. Traffic hazards can be mitigated through the services available at Ellesmere which include, VTS, radar monitoring and compulsory pilotage. Information on navigating the channel is also available. The approach is through the Mersey Estuary SSSI, SPA and RAMSAR site and hence resulting pollution would result in a significant impact.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						An increase of commercial vessels (e.g. AILs)	Damage to AIL vessel in the event of a collision	Radar monitoring devices are used	50	0		**6.8**	
							Damage to other commercial vessels in the event of a collision	VTS is available	75	0		**4.4**	
							Risk of pollution	Compulsory pilotage	80	0		**4.0**	
							Injury to persons	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
2	**Leisure craft and fishing boat traffic**	Controlled in a similar manner as to how commercial traffic is controlled.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						An increase of commercial vessels (e.g. AILs)	Damage to AIL vessel in the event of a collision	Radar monitoring devices are used	50	0		**6.8**	
							Damage to leisure vessels in the event of a collision	VTS	75	0		**4.4**	
							Risk of pollution	Compulsory pilotage	80	0		**4.0**	
							Injury to persons	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
3	**Commercial vessel losing control**	In the event that the commercial vessel carrying the AIL loses control there are emergency procedures in place. The vessel itself will have procedures to run through. The port informed the workshop that they also have procedures which would include a dead towage using the tugs they have at their disposal. Compulsorily pilotage ensures that experienced and qualified personnel are aboard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other commercial vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
						Human error	Risk of pollution	Possible use of tugs	10	0		**4.3**	
							Risk of damage to AIL		0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0	MITIGATED	**4.3**	**Minor**
4	**Other vessels losing control**	Other vessels will be controlled a similar manner to above.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
						Human error	Risk of pollution		0	0		**4.4**	
							Risk of damage to AIL		0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0	MITIGATED	**4.4**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
5	**Failure of aids to navigation**	A Local Notice to Mariners provides mariners with essential, up-to-date information and advice about navigational safety, including chart updates, changes in aids to navigation and warnings of potential hazards or activities that may affect navigation. Inspections of the navigational aids will ensure that everything is kept in order. If maintenance is required, it is undertaken promptly.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Aids to navigation damaged or out of order	Insufficient navigational aids on the leading channel	Notice to Mariners	75	0		**5.6**	
							Potential collision or running aground	Regular inspection of navigational aids	75	0		**4.0**	
							Risk of pollution	Channel is buoyed	75	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
6	**Unknown dimensions of the vessel using the navigable channel (clearance through locks / mooring requirements)**	Hazard describes navigating the channel and the risks associated with not yet knowing the dimensions of the vessel. Once the dimensions are given, any associated hazards should be reviewed. If the vessel is within the limitations set by the port and does not pose any risks, then this row can be deleted. River tugs and canal towage can help navigate the river and canal in a controlled manner. Limitations on vessel size to prevent running aground and issues navigating a large vessel. Limited to 170m L x 21.9m B x 8.0m draft. The maximum beam can be increased up to 23.07m, subject to over beam application and acceptance by the port on a case-by-case basis. The port indicated that, if approved, they would typically reduce the maximum permitted draft to around 7.80m as needed.	2.0	2.0	**4.0**						BASELINE	**4.0**	**Minor**
						Tide level outside of the canal	Navigating channel, risk of running aground	River tugs	15	0		**3.9**	
						Navigating the canal	Vessel size may be too big for navigating the canal	Canal towage	15	0		**3.7**	
								Limitations on vessel size and port procedure preventatives	80	80		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0	MITIGATED	**1.5**	**Slight**
7	**Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse**	These hazards were discussed and it was agreed that the impact due to these causes were very unlikely, as a result the likelihood was awarded a 1. Procedures put in place for personnel on the vessel should mitigate any unskilled person, unlicensed, sleeping/alcohol/drug abuse onboard. Compulsory pilotage ensures an experienced and qualified pilot is onboard reducing the likelihood of poor manoeuvring.	1.0	4.0	**4.0**						BASELINE	**4.0**	**Minor**
						Poor manoeuvring	Damage to Vessel	Procedures in place by ships	80	0		**4.0**	
						Human error	Damage to fendering system	Compulsory pilotage in areas to help navigate the channel	80	50		**3.7**	
							Injury to persons		0	0		**3.7**	
							Risk of Pollution		0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
8	**Unknown obstructions in the riverbed/canal**	Obstructions in the riverbed and changes in the bathometry are likely to be found, however they often don't pose a threat to navigation. Restrictions on the draft are in place to prevent major collisions and bathymetric surveys are taken weekly to monitor and identify any areas of concern. Compulsory pilotage helps mitigate risk through contributing experienced local knowledge of the river bed.	3.0	2.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Collision with obstruction	Limitations on draft and vessel size as part of the port procedure should prevent major collisions with any obstructions	50	30		**5.0**	
							Blocking main navigable channel	Bathymetric surveys (conducted weekly) monitors the bed	80	0		**3.7**	
							Floating or submerged debris	Compulsory pilotage	80	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
9	**Obstructions in the river - non vessel (i.e. person/recreational canoeing in the water that you have to divert around)**	This risk is unlikely following workshop discussions. There is not much recreational activity in the river and even less so in the lock. A Notice to Mariners can be issued to warn anyone in the navigable channel of large vessels in transit.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Collision with obstruction	Notice to mariners	50	0		**5.1**	
							Injury to persons/threat to life	Visual observations	30	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
10	**Harbour communications failure / loss of VHF**	This hazard is unlikely to happen following workshop discussions. In the event it does happen, most ships are outfitted with satellite phones and most personnel carry mobile devices which can be used in an emergency. VTS is available which reduces the risk and compulsory pilotage ensures a licenced and experienced pilot is available should there be a failure of VHF, who can act accordingly.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Equipment failure	VTS available	80	0		**3.9**	
								Satellite phone likely to be on ship	80	0		**3.0**	
								Mobile device likely to be on ship	80	0		**3.0**	
								Compulsory pilotage	80	30		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0	MITIGATED	**2.8**	**Minor**
11	**Tide height / running aground**	Running aground is not possible once in the lock. Risk is only found in the river. To avoid this the river is regularly dredged and ships are only bought in when there is adequate time and clearance to do so. Navigable channels are mapped and monitored through bathymetric surveys.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Engine failure (river)	Damage to vessel	Only move vessel at high water slack	75	50		**3.8**	
						Human error	Injury to persons	Tug control	50	25		**2.8**	
							Obstruction to navigation in channel	Compulsory pilotage	50	0		**2.6**	
								River is dredged regularly	75	0		**2.6**	
								Once in canal, water depth is regulated	50	25		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**
12	**Dropped line fouls bow thruster or vessel propellers**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Tug line failure	Damage to vessel	Procedures in place to mitigate lines fouling canal	75	0		**4.2**	
						Mooring failure	Damage to terminal facility	Diver access is available should it be needed	0	50		**3.8**	
							Injury to persons/threat to life		0	0		**3.8**	
							Risk of pollution		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	MITIGATED	**3.8**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
13	**Tug failure**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. In the unlikely event that this does occur, the risk is mitigated through the tugs available at the port and the fact that multiple tugs will likely be used at any one time.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Regular tug maintenance	50	0		**5.1**	
						Line failure	Damage to tug	Multiple tugs available, in the event that one fails another can be called out	50	15		**4.1**	
							Damage to terminal facility	Depending on the vessel, two or more tugs will be in use at any one time. Should one fail, it leaves one operational tug	75	50		**2.6**	
							Injury to persons/threat to life		0	0		**2.6**	
							Risk of pollution		0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0	MITIGATED	**2.6**	**Minor**
14	**Contact with own berth or extended wharfage area while berthing, unberthing**	The berth has fenders to reduce berthing loads and, by utilising tugs, the berthing process can be achieved with minimal impact. Impact is expected upon berthing, but due to the fendering the load is expected to have minimal impact on the quay wall. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	3.0	3.0	**9.0**						BASELINE	**9.0**	**Moderate**
						Human error	Damage to vessel and / or structure	Fendering	0	75		**7.2**	
						Mechanical malfunction	Risk of pollution	Tug control	80	50		**4.8**	
						Bad weather		Compulsory pilotage	50	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0	MITIGATED	**4.2**	**Minor**
15	**Contact with adjacent berthed vessels**	Mooring lines should prevent any vessels from straying from their berth and the use of tugs allows for vessels to be guided in in a controlled manner. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to vessel and/or structure	Secure mooring lines	50	0		**6.8**	
						Mechanical malfunction	Risk of pollution	Tug control	80	15		**3.9**	
						Bad weather		Compulsory pilotage	50	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**
16	**Contact with adjacent wharfage**	Within the canal there are several other docks and structures that are adjacent to Ellesmere Port. The workshop scored this hazard as unlikely. Mooring lines should prevent the vessel from straying once it has been berthed and the use of tugs allows for the vessels to be guided in in a controlled manner. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to vessel and/or structure	Secure mooring lines	50	0		**6.8**	
						Mechanical malfunction	Risk of pollution	Tug control	80	15		**3.9**	
						Bad weather		Compulsory pilotage	50	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
17	**Vessel breaking away from berth and striking other vessels/berths**	This hazard was identified as unlikely. Vessels typically have watchman to monitor things such as the lines. Having a minimum of 4 lines in use means that should one break, the other three can hold. Equipment (such as mooring lines) and port side mooring infrastructure should be regularly inspected to ensure the structural integrity.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Injury to persons/threat to life	Minimum of four lines used at any time	50	15		**6.7**	
						Mechanical malfunction	Damage to vessel	Lines are monitored - watchman on vessel	50	15		**5.4**	
						Bad weather	Risk of pollution	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**
18	**Passing vessels striking the moored vessel**	The workshop agreed this hazard was unlikely to happen, especially given the width of the canal. The river is wide enough for ships passing one another so there is no issue in the river. The hazard would be most likely to occur in the canal, however the width is such that vessels will be able to pass by the AIL with sufficient space. Canal towage is available to help vessels sail in and out in a controlled manner. Limitations on the size of the vessel in the canal ensure a sufficient width can be provided. Having a skilled and qualified person piloting other vessels also decreases the likelihood of this hazard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to vessels	Canal - wide enough for ship passing	80	0		**5.2**	
							Damage to AIL	Tug control	50	0		**4.0**	
							Risk of pollution	Limitations on vessel size	25	0		**4.0**	
							Damage to berth	Compulsory pilotage	50	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
19	**Leisure craft/fishing boats in vicinity of berths**	The workshop agreed this hazard was unlikely to happen, however should still be considered in the NRA. It was discussed that support vessels could be used to warn any craft out of the way of the vessel if necessary. A notice to mariners could be given if needed to make people aware of the vessels.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Potential collision	Damage to leisure/fishing boats	Tug/support vessel help navigate and ward off any leisure/fishing vessels	25	25		**5.4**	
							Injury to persons (leisure/fishing boats)	Notice to mariners	50	0		**4.5**	
							Risk of pollution (From leisure/fishing boats)		0	0		**4.5**	
							Risk to public reputation		0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0	MITIGATED	**4.5**	**Moderate**
20	**Ship impact due to breakout of moored vessels, berth surge, dragging anchors**	Breakout was agreed to be unlikely by the workshop due to the canal being sheltered. The river has some risk as this is the only place where you can drop an anchor (no anchors are dropped in the canal). Some surge can be expected in the canal but it was stated as being minimal at the workshop.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to other vessels	Anchor would not be utilised in canal	30	30		**7.1**	
							Potential injury	Little berth surge expected in canal	50	50		**5.5**	
							Risk of pollution	Multiple mooring lines used, positioned as close as possible to the ships horizontal line will reduce surge	30	0		**4.9**	
							Becoming an obstruction in the navigable channel	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		**3.5**	
								VTS helps monitor vessel positions	20	0		**3.2**	
								Watchman on vessel monitors position and lines	30	30		**3.1**	
									0	0		**3.1**	
									0	0		**3.1**	
									0	0		**3.1**	
									0	0	MITIGATED	**3.1**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
21	**Restricted visibility due to severe weather**	The workshop went through several control options for this hazard. It was discussed that the weather is regularly monitored to influence the decision of a go, no go for vessel movement. If conditions are forecast to be hazardous, the vessels can anchor out in the river or at the pilot station. Should conditions rapidly change while sailing, which is very unlikely, there could be a considerable distance to navigate to safety. The procedures put in place to reduce this include compulsory pilotage, canal towage and tug assistance to help navigate to the berth.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	70	0		**10.4**	
							Injury to persons/threat to life	Anchor out in the river should conditions be deemed hazardous	80	50		**7.5**	
							Damage to berth/structures	Compulsory pilotage	30	15		**6.9**	
								Tug assistance available	20	20		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0	MITIGATED	**6.4**	**Moderate**
22	**Strong winds / poor weather**	The workshop discussed that the weather is regularly monitored and if conditions are forecasted to be hazardous, the vessels can anchor out in the river or navigate to the pilot station and berth there to avoid entering the canal in these conditions. It was noted that the river is navigable in high winds. The approach can always be terminated and turned around.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	90	0		**9.0**	
							Injury to persons/threat to life	River is navigable in high winds	80	0		**6.9**	
							Damage to berth/structures	Anchor at pilot station in poor weather	80	50		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0		**4.3**	
									0	0	MITIGATED	**4.3**	**Minor**
23	**Fire on board vessel - in river**	The approach is designated a SSSI and SAC so environmental consequences could be high. It was discussed that ships will have their own procedures in place to deal with fires, which includes evacuation procedures should they be needed. Local RNLI station at mouth of the River Mersey. The port also has procedures in place and regularly has fire drills to prepare for such events. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error / negligence	Risk of loss of life/injury	Evacuation / RNLI	0	50		**6.8**	
							Risk of pollution	Procedures on board vessel	75	50		**4.3**	
							Damage to AIL	Procedures at port	75	50		**2.8**	
								Ship manifest/Hazardous Cargo	50	50		**2.5**	
									0	0		**2.5**	
									0	0		**2.5**	
									0	0		**2.5**	
									0	0		**2.5**	
									0	0	MITIGATED	**2.5**	**Slight**
24	**Fire on board vessel - berthed/alongside**	It was discussed that ships will have their own procedures in place to deal with fires. The port also has procedures in place and regularly has fire drills to prepare for such events. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken. There are warehouses on the quay but in the workshop it was stated that they are an adequate distance from the berth.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error/negligence	Injury to persons/threat to life	Procedures on board vessel	75	50		**4.8**	
							Risk of pollution	Procedures at port	75	50		**3.1**	
							Damage to AIL	Ship manifest / hazardous cargo	50	50		**2.8**	
							Damage to terminal	Risk of warehouse fire - distance between is adequate	50	0		**2.8**	
							Damage to shoreside infrastructure		0	0		**2.8**	
							Damage to other property/cargo		0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0	MITIGATED	**2.8**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT														
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25	Fire on shore side	The port has procedures in place and regularly has fire drills to prepare for such events. There are warehouses on the quay but in the workshop it was stated that they are an adequate distance from the vessel so as to be at negligible risk	2.0	4.0	8.0						BASELINE	8.0	Moderate
							Risk of damage to vessel	Procedures on board vessel	75	50		5.2	
							Injury to persons/threat to life	Procedures at port	75	50		3.4	
							Risk of pollution	Risk of warehouse fire spreading to vessel- distance between is adequate	50	0		3.4	
							Risk of damage to AIL		0	0		3.4	
							Damage to terminal		0	0		3.4	
							Damage to shoreside infrastructure		0	0		3.4	
							Damage to other property/cargo		0	0		3.4	
									0	0		3.4	
									0	0		3.4	
									0	0	MITIGATED	3.4	Minor
26	Medical emergency to key member on vessel	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board. Port has procedures in place. Local RNLI station at mouth of the River Mersey. Emergency services should have access to the port in such an event.	3.0	4.0	12.0						BASELINE	12.0	High
							Injury to persons/threat to life	Procedures on board vessel	15	75		10.0	
							Damage to vessel	Procedures at port	0	75		8.2	
								Emergency service has access at river and port	0	75		6.4	
								Trained personnel	15	75		4.6	
									0	0		4.6	
									0	0		4.6	
									0	0		4.6	
									0	0		4.6	
									0	0	MITIGATED	4.6	Moderate
27	Person overboard	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board and life jackets worn on deck. All crew should be briefed and trained in what to do in an event like this. Port has procedures in place. Local RNLI station at mouth of the River Mersey. Emergency services should have access to the port in such an event. Life saving equipment accessible both on vessel and land. If vessel has a watchman/someone on the gangway, they can assist and observe the safe boarding and disembarking of personnel.	3.0	4.0	12.0						BASELINE	12.0	High
						Drowning	Injury to persons/threat to life	Trained personnel/first aiders	15	75		10.0	
								Life saving equipment/life jackets	50	75		7.4	
								Procedures on board vessel	75	75		4.4	
								Procedures at port	75	75		2.3	
								Watchman on board vessel	25	25		1.9	
									0	0		1.9	
									0	0		1.9	
									0	0		1.9	
									0	0		1.9	
									0	0	MITIGATED	1.9	Slight
28	Sinking vessel	Very unlikely hazard, so rare that it was awarded a 1. Ships have evacuation procedures in place. Life jackets should be worn/accessible to all personnel on vessels. RNLI / emergency services have access at the river and land side.	1.0	5.0	5.0						BASELINE	5.0	Moderate
						Collision	Damage to vessel	Ship maintained / classification	75	50		4.7	
						Human error	Injury to persons/threat to life	Evacuation procedures in place	0	50		4.4	
							Risk of pollution	Life saving equipment/life jackets	0	50		4.1	
							Damage to/loss of AIL	RNLI / emergency services access	0	50		3.8	
							SSSI in River - greater environmental consequences		0	0		3.8	
									0	0		3.8	
									0	0		3.8	
									0	0		3.8	
									0	0		3.8	
									0	0	MITIGATED	3.8	Minor

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
29	**Terrorism in river/canal**	Very unlikely hazard, so rare that it was awarded a 1. It was discussed that the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel should be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	50	0		**5.0**	
							Injury to persons/threat to life	Emergency services	50	50		**4.7**	
							Risk of pollution	Safety procedures	0	25		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
									0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
30	**Terrorism alongside**	Very unlikely hazard, so rare that it was awarded a 1. It was discussed that the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel should be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	25	0		**5.0**	
							Damage to terminal facility	Emergency services	50	50		**4.7**	
							Injury to persons/threat to life	Safety procedures	0	25		**4.6**	
							Risk of pollution		0	0		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
31	**Gangway / Linkspan / Connection failure**	An unlikely event, biggest risk is someone falling in-between the vessel and quay wall due to failure of equipment. Other risks include damage to the vessel or land side structures and damage of the AIL should it be wheeled off the vessel (expected) as opposed to being lifted off. The workshop agreed that gangway failure was vey unlikely due to multiple control measures in place. Amongst those measures, safety nets are often used to mitigate personnel going overboard between the vessel and quay wall.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Typically, multiple gangways available	50	0		**5.1**	
							Injury to persons/threat to life	Safety net	0	80		**3.9**	
							Potential damage to AIL	Regular inspections / maintenance	75	0		**2.5**	
								Gangway watch	0	50		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**
32	**Failure of transfer of AIL**	It was suggested that the transfer of the AIL would likely not be the responsibility of the port or anyone present at the workshop but rather the contractor engaged to transfer the AIL. It was agreed that a suitable contractor would be used who would have prior experience of this. Accordingly, the contractor would develop Risk Assessment Method Statements (RAMS) which would detail personnel safety, the process (along with control measures/fail-safes) for the transfer from vessel to land side and what to do in the event of something going wrong.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical failure	Damage to AIL	Expert/experienced contractors to transfer AIL	75	0		**5.6**	
						Structural failure	Damage to vessel	RAMS	75	75		**3.4**	
						Human error	Damage quay side		0	0		**3.4**	
							Creates obstruction in the navigable channel		0	0		**3.4**	
							Injury to persons / threat to life		0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0	MITIGATED	**3.4**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - ELLESMERE PORT

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
33	**Quay supporting transfer of AIL**	Ellesmere Port No.3 (The Heavy Lift Berth) is limited at a maximum of 20 tonnes per square metre. The Roll on/Roll off HL berth can handle a load not exceeding 36 tonnes at 6-foot centres. Information on how the AIL would be transferred from vessel to the quay has not been provided at this stage of the project. Information on the weight of the AIL is unknown at this stage. Given that there is a reasonably large known and proven weight limit, the AIL transfer can be designed to be undertaken within this limit - this should minimise any likelihood or consequence.	2.0	4.0	**8.0**						**BASELINE**	**8.0**	**Moderate**
						Structural failure	Damage to AIL	Ro Ro and standard berth - rated at 20 tonnes per square metre limit	85	85		**3.7**	
							Severe damage quay side structure	Undertake engineering assessment of proposed transfer	95	30		**3.0**	
							Injury to persons/threat to life		0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0	**MITIGATED**	**3.0**	**Minor**
34	**Navigation through Eastham Locks**	Services available at Ellesmere which include VTS, radar monitoring, tug control and compulsory pilotage are in place to ensure that the vessel can navigate safely through the canal.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
							Potential collisions	Port procedures to be followed	30	0		**5.5**	
							Damage to structures	VTS	50	0		**4.6**	
							Damage to AIL	Compulsory pilotage	50	0		**3.7**	
							Injury to persons/threat to life	Tug control	50	50		**2.7**	
									0	0		**2.7**	
									0	0		**2.7**	
									0	0		**2.7**	
									0	0		**2.7**	
									0	0		**2.7**	
									0	0	**MITIGATED**	**2.7**	**Minor**
35	**Collision at lock gate**	A collision involving a vessel and the gate structure is unlikely, but in the event that this hazard occurs; could cause significant structural damage. This has been reflected in the awarded scores. Services available at Ellesmere which include VTS, radar monitoring, tug control and compulsory pilotage are in place to ensure that the vessel can navigate safely through the lock gates without incident.	2.0	4.0	**8.0**						**BASELINE**	**8.0**	**Moderate**
						Human error	Damage to structure	Port procedures to be followed	50	0		**6.8**	
						Mechanical	Injury to persons/threat to life	VTS	35	0		**6.0**	
								Compulsory pilotage	50	0		**4.8**	
								Tug control	50	50		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	**MITIGATED**	**3.7**	**Minor**

A.3 Port of Mostyn NRA

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
1	**Commercial traffic**	The likelihood was agreed to be unlikely by the workshop. The consequence has been awarded a 4 due to potential major damage to AIL vessel/other vessels. Traffic hazards can be mitigated through the services available at the Port of Mostyn which include VHF during working hours and compulsory pilotage. Information on navigating the channel is also available.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						An increase of commercial vessels (e.g. AILs)	Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to other commercial vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Risk of pollution	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Injury to persons		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
2	**Leisure craft and fishing boat traffic**	Controlled in a similar manner as to how commercial traffic is controlled. Due to the area being environmentally protected by National Resource Wales (NRW), there are limited fishing licences available in this area which reduces the amount of fishing vessels and as such the likelihood of this risk.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to leisure vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Risk of pollution	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Injury to persons	NRW fishing licence - limited	50	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
3	**Commercial vessel losing control**	In the event that the commercial vessel carrying the AIL loses control there are emergency procedures in place. The vessel itself will have procedures to run through. The port informed the workshop that they also have procedures which would include a dead towage using the tugs they have at their disposal. Compulsory pilotage ensures that experienced and qualified personnel are aboard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other commercial vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
						Human error	Risk of pollution	Tugs available from Mostyn for larger	25	0		**4.0**	
							Risk of damage to AIL		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
4	**Other vessels losing control**	Other vessels will be controlled in a similar manner to above. It was noted that there are two in/out channels so the other channel can be used if one channel is blocked.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
							Risk of pollution	Alternative channel available	50	50		**3.1**	
							Risk of damage to AIL		0	0		**3.1**	
									0	0		**3.1**	
									0	0		**3.1**	
									0	0		**3.1**	
									0	0		**3.1**	
									0	0	MITIGATED	**3.1**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
5	**Failure of aids to navigation**	The consequence was rated 4 due to the route being an environmentally protected area and significant damage to the environment as a result of this hazard could pose both short and long term effects. A Local Notice to Mariners provides mariners with essential, up-to-date information and advice about navigational safety, including chart updates, changes in aids to navigation, and warnings of potential hazards or activities that may affect navigation. Inspections of the navigational aids will ensure that everything is kept in order. If maintenance is required, it is undertaken promptly. The Port of Mostyn stakeholders stated that the channel was buoyed to help guide vessels.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Aids to navigation damaged or out of order	Insufficient navigational aids on the leading channel	Local Notice to Mariners	75	0		**5.6**	
							Potential collision or running aground	Regular inspection of navigational aids	75	0		**4.0**	
							Risk of pollution - SSSI	Channel is buoyed	75	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
6	**Unknown dimensions of the vessel using the navigable channel (clearance through port / mooring requirements)**	Hazard describes navigating the channel and the risks associated with not yet knowing the dimensions of the vessel. Once the dimensions are given, any associated hazards should be reviewed. If the vessel is within the limitations set by the port and does not pose any risks, then this row can be deleted. Limitations on vessel size to prevent running aground and issues navigating a large vessel. River tugs and canal towage help navigate the river and canal in a controlled manner.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Tide levels	Navigating channel, risk of running aground	River tugs	15	0		**5.8**	
						Navigating the channel		Limitations on vessel size and port procedure preventatives	90	90		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0	MITIGATED	**2.0**	**Slight**
7	**Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse**	These hazards were discussed and it was agreed that the impact due to these causes were very unlikely, as a result the likelihood was awarded a score of 1. Procedures put in place for personnel on the vessel should mitigate any unskilled person, unlicensed, sleeping/alcohol/drug abuse onboard. Compulsory pilotage ensures an experienced and qualified pilot is onboard reducing the likelihood of poor manoeuvring.	1.0	4.0	**4.0**						BASELINE	**4.0**	**Minor**
						Poor manoeuvring	Damage to Vessel	Procedures in place by ships	80	0		**4.0**	
						Human error	Damage to fendering system	Compulsory pilotage in areas to help navigate the channel	80	50		**3.7**	
							Injury to persons		0	0		**3.7**	
							Risk of Pollution		0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
8	**Unknown obstructions in the riverbed**	Restrictions on the draft are in place to prevent major collisions on the sea bed. Compulsory pilotage helps mitigate risk through contributing experienced local knowledge of the river bed. Regular bathymetric surveys undertaken to verify the declared depths and identify obstructions.	3.0	2.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Collision with obstruction	Limitations on draft and vessel size as part of the port procedure should prevent major collisions with any obstructions	50	30		**5.0**	
							Blocking main navigable channel	Compulsory pilotage	80	0		**3.7**	
								Bathymetric surveys	80	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
9	**Obstructions in the river - non vessel (i.e. person/recreational canoeing in the water that you have to divert around)**	This risk is unlikely following workshop discussions. There is not much recreational activity in the channel. A Local Notice to Mariners could be issued to warn anyone in the navigable channel of large vessels in transit.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Collision with obstruction	Local Notice to Mariners	50	0		**5.1**	
							Injury to persons / threat to life	Visual observation	30	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
10	**Harbour communications failure / loss of VHF**	This hazard is unlikely to happen following workshop discussions. In the event it does happen, most ships are outfitted with satellite phones and most personnel carry mobile devices which can be used in an emergency. Compulsory pilotage ensures a licenced and experienced pilot is available should there be a failure of VHF, who can act accordingly.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Equipment failure	Satellite phone likely to be on ship	80	0		**3.9**	
								Mobile device likely to be on ship	80	0		**3.0**	
								Compulsory pilotage	80	30		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0	MITIGATED	**2.8**	**Minor**
11	**Tide height / running aground**	Although this hazard is unlikely to happen, it was scored a 3 due to it posing a moderate consequence to the environment. This area is a SSSI, SAC and SPA sites and therefore needs to be protected accordingly. To mitigate the hazard, ships are only bought in / out on a suitable tide when there is adequate time and clearance to complete the manoeuvre. Navigable channels are mapped and piloted by experienced personnel.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Engine failure (river)	Damage to vessel	Compulsory pilotage	75	0		**4.2**	
						Human error	Injury to persons	Timed navigation, only manoeuvring ships on suitable tide	75	0		**3.0**	
							Obstruction to navigation in channel	Tug control	50	25		**2.9**	
							SSSI - greater environmental consequences		0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0	MITIGATED	**2.9**	**Minor**
12	**Dropped line fouls bow thruster or vessel propellers**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Tug line failure	Damage to vessel	Procedures in place to mitigate lines fouling canal	75	0		**4.2**	
						Mooring failure	Damage to terminal facility	Diver access is available should it be needed	0	50		**3.8**	
							Injury to persons/threat to life		0	0		**3.8**	
							Risk of pollution		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	MITIGATED	**3.8**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
13	**Tug failure**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Regular tug maintenance	50	0		**5.1**	
						Line failure	Damage to tug	Depending on the vessel, two or more tugs will be in use at any one time. Should one fail, it leaves one operational tug	75	50		**3.0**	
							Damage to terminal facility	Work boat available in emergency	0	75		**2.3**	
							Injury to persons/threat to life		0	0		**2.3**	
							Risk of pollution		0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0	MITIGATED	**2.3**	**Slight**
14	**Contact with own berth or extended wharfage area while berthing, unberthing**	The berths have fenders to reduce berthing loads and utilising tugs the berthing process can be achieved with minimal impact. Impact is expected upon berthing, but due to the fendering the load is expected to have minimal impact on the structure. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	3.0	3.0	**9.0**						BASELINE	**9.0**	**Moderate**
						Human error	Damage to vessel and / or structure	Fendering	0	75		**7.2**	
						Mechanical malfunction	Risk of pollution	Tug control	80	50		**4.8**	
						Bad weather		Compulsory pilotage	50	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0		**4.2**	
									0	0	MITIGATED	**4.2**	**Minor**
15	**Contact with adjacent berthed vessels**	Due to the distance between berths, its is unlikely that the vessel would come into contact with the adjacent berthed vessels. Mooring lines should prevent any vessels from straying from their berth and the use of tugs allows for vessels to be guided in in a controlled manner. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to vessel and/or structure	Berth space	50	0		**6.8**	
						Mechanical malfunction	Risk of pollution	Secure mooring lines	50	0		**5.6**	
						Bad weather		Tug control	80	15		**3.9**	
								Compulsory pilotage	50	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**
16	**Contact with adjacent wharfage**	Due to the distance between berths, its is unlikely that the vessel would come into contact with the adjacent wharfage. Mooring lines should prevent the vessel from straying once it has been berthed and the use of tugs allows for the vessels to be guided in in a controlled manner. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to vessel and/or structure	Berth space	50	50		**6.3**	
						Mechanical malfunction	Risk of pollution	Secure mooring lines	50	0		**5.2**	
						Bad weather		Tug control	80	15		**3.6**	
								Compulsory pilotage	50	0		**3.6**	
									0	0		**3.6**	
									0	0		**3.6**	
									0	0		**3.6**	
									0	0		**3.6**	
									0	0		**3.6**	
									0	0	MITIGATED	**3.6**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
											BASELINE	6.0	Moderate
17	**Vessels grounding moving on/off berth**	The workshop rated this hazard unlikely for this to happen. The consequences being rated a 3 due to the site being in a designated environmental area. The likelihood of this hazard is mitigated by vessels only being allowed to move on/off berth at appropriate tide. This reduces both the likelihood and consequence significantly only leaving room for human error/mistakes.	2.0	3.0	**6.0**	Human error	Injury to public	Only move vessel at high water slack	75	50		**3.8**	
							Damage to vessel	Tug control	50	25		**2.8**	
							Risk of pollution	Compulsory pilotage	50	0		**2.6**	
								River is surveyed regularly	75	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0		**2.6**	
									0	0	MITIGATED	**2.6**	**Minor**
											BASELINE	**8.0**	**Moderate**
18	**Vessel breaking away from berth and striking other vessels/berths**	This hazard was identified as unlikely. Vessels typically have watchman to monitor things such as the lines. Having multiple lines in use means that should one break, the others can hold. Equipment (such as mooring lines) and port side mooring infrastructure should be regularly inspected to ensure the structural integrity.	2.0	4.0	**8.0**	Master error	Injury to persons/threat to life	Multiple lines in use	50	15		**6.7**	
						Mechanical malfunction	Damage to vessel	Lines are monitored - watchman on vessel	50	15		**5.4**	
						Bad weather	Risk of pollution	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**
											BASELINE	**4.0**	**Minor**
19	**Passing vessels striking the moored vessel**	The workshop agreed that this chances of this happening were extremely rare given the width of the river. Passing vessels are unlikely to be in close proximity to the port. Tug control is available to help vessels sail in and out in a controlled manner. Having a skilled and qualified person piloting other vessels also decreases the likelihood of this hazard.	1.0	4.0	**4.0**		Damage to vessels	Channel - wide enough for ship passing	80	0		**4.0**	
							Damage to AIL	Tug control	50	0		**4.0**	
							Risk of pollution	Compulsory pilotage	50	0		**4.0**	
							Damage to berth		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
											BASELINE	**6.0**	**Moderate**
20	**Leisure craft / fishing boats in vicinity of berths**	The workshop agreed this hazard was unlikely to happen, however should still be considered in the NRA. It was discussed that support vessels could be used to warn any craft out of the way of the vessel if necessary. A Notice to Mariners could be given if needed to make people aware of the vessels.	2.0	3.0	**6.0**	Potential collision	Damage to leisure/fishing boats	Tug/support vessel help navigate and ward off any leisure/fishing vessels	25	25		**5.4**	
							Injury to persons (leisure/fishing boats)	Notice to Mariners	50	0		**4.5**	
							Risk of pollution (From leisure/fishing boats)		0	0		**4.5**	
							Risk to public reputation		0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0		**4.5**	
									0	0	MITIGATED	**4.5**	**Moderate**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
21	**Ship impact due to breakout of moored vessels, berth surge, dragging anchors**	Breakout was agreed to be an unlikely event by the workshop. Breakout from infrastructure was stated to be incredibly rare. Some surge is to be expected but the port has some coverage in the form of a small breakwater. Vessels are not expected to come within close proximity while passing the port. Utilising multiple mooring lines significantly reduces berth surge.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to other vessels	Reduced surge from breakwater	50	50		**6.3**	
							Potential injury	Multiple mooring lines used, positioned as close as possible to the ships horizontal line will reduce surge	30	0		**5.7**	
							Risk of pollution	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		**4.2**	
							Becoming an obstruction in the navigable channel	Watchman on vessel monitors position and lines	20	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**
22	**Restricted visibility due to severe weather**	The workshop went through several control options for this hazard. It was discussed that the weather is regularly monitored to influence the decision of a go, no go for vessel movement. If conditions are forecast to be hazardous, the vessels can anchor out in the river or at the pilot station. Should conditions rapidly change while sailing, which is very unlikely, the time it takes to navigate to the port is comparably shorter than the other routes. Resultantly, the time to abort the approach and navigate to safety is smaller. The procedures put in place to reduce this include compulsory pilotage, canal towage and tug assistance to help navigate to the berth.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	90	0		**9.0**	
							Injury to persons/threat to life	Anchor out in the river or at pilot station should conditions be deemed hazardous	80	50		**6.2**	
							Damage to berth/structures	Compulsory pilotage	30	15		**5.6**	
								Tug assistance available	20	20		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0	MITIGATED	**5.2**	**Moderate**
23	**Strong winds / poor weather**	The workshop discussed that the weather is regularly monitored and if conditions are forecasted to be hazardous, the vessels can anchor out in the river to avoid entering the berth in these conditions. The approach can always be terminated and turned around.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	90	0		**9.0**	
							Injury to persons/threat to life	Anchor in river	80	50		**6.2**	
							Damage to berth/structures	Terminating approach	30	25		**5.5**	
								Tug assistance available	40	30		**4.7**	
									0	0		**4.7**	
									0	0		**4.7**	
									0	0		**4.7**	
									0	0		**4.7**	
									0	0		**4.7**	
									0	0	MITIGATED	**4.7**	**Moderate**
24	**Fire on board vessel - in river**	Although unlikely, the consequences a pose a significant threat to personnel safety and the local environment. It was discussed that ships will have their own procedures in place to deal with fires, which includes evacuation procedures should they be needed. Multiple local RNLI stations i.e. Flint, West Kirby and Hoylake. The port also has procedures in place and regularly has fire drills to prepare for such events. Support/tug vessels should have fire fighting equipment. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error/negligence	Risk of loss of life/injury	Evacuation / RNLI	0	50		**6.8**	
							Risk of pollution	Procedures on board vessel	75	50		**4.3**	
							Damage to AIL	Procedures at port	75	50		**2.8**	
							Environmental risk SSSI	Ship manifest / hazardous Cargo	50	50		**2.5**	
								Small vessels / tugs with fire fighting equipment	0	50		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
25	**Fire on board vessel - berthed / alongside**	The river is designated a SSSI and SAC so environmental consequences could be high. It was discussed that ships will have their own procedures in place to deal with fires. The port also has procedures in place and regularly has fire drills to prepare for such events. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken. Emergency services can gain access to the site should it be needed.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error/negligence	Injury to persons/threat to life	Procedures on board vessel	75	50		**4.8**	
							Risk of pollution	Procedures at port	75	50		**3.1**	
							Damage to AIL	Ship manifest/Hazardous Cargo	50	50		**2.8**	
							Damage to terminal	Small vessels/tugs with fire fighting equipment	0	50		**2.5**	
							Damage to shoreside infrastructure	Emergency service access	0	50		**2.2**	
							Damage to other property/cargo		0	0		**2.2**	
							Environmental risk SSSI		0	0		**2.2**	
									0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**
26	**Fire on shore side**	The river is designated a SSSI and SAC so environmental consequences could be high. The port has procedures in place and regularly has fire drills to prepare for such events. There is a laydown area and some small structures on the land side. These is an adequate distance from the berths so in the event of a fire the vessel should have time to react.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Risk of damage to vessel	Procedures on board vessel	75	50		**5.2**	
							Injury to persons/threat to life	Procedures at port	75	50		**3.4**	
							Risk of pollution		0	0		**3.4**	
							Risk of damage to AIL		0	0		**3.4**	
							Damage to terminal		0	0		**3.4**	
							Damage to shoreside infrastructure		0	0		**3.4**	
							Damage to other property/cargo		0	0		**3.4**	
							Environmental risk SSSI		0	0		**3.4**	
									0	0		**3.4**	
									0	0	MITIGATED	**3.4**	**Minor**
27	**Medical emergency to key member on vessel**	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board. Port has procedures in place. Multiple local RNLI stations. Emergency services should have access to the port in such an event. Work boats are available in the event of an emergency to assist the AIL vessel.	3.0	4.0	**12.0**						BASELINE	**12.0**	**High**
							Injury to persons/threat to life	Procedures on board vessel	15	75		**10.0**	
							Damage to vessel	Procedures at port	0	75		**8.2**	
								Emergency service has access at river and port	0	75		**6.4**	
								Trained personnel	15	75		**4.6**	
								Work boats available	0	10		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0	MITIGATED	**4.4**	**Minor**
28	**Person overboard**	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board and life jackets worn on deck. All crew should be briefed and trained in what to do in an event like this. Port has procedures in place. Multiple local RNLI stations e.g. Flint. Emergency services should have access to the port in such an event. Life saving equipment accessible both on vessel and land. If vessel has a watchman/someone on the gangway, they can assist and observe the safe boarding and disembarking of personnel.	3.0	4.0	**12.0**						BASELINE	**12.0**	**High**
						Drowning	Injury to persons/threat to life	Trained personnel/first aiders	15	75		**10.0**	
								Life saving equipment/life jackets	50	75		**7.4**	
								Procedures on board vessel	75	75		**4.4**	
								Procedures at port	75	75		**2.3**	
								Watchman on board vessel	25	25		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0	MITIGATED	**1.9**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
29	**Sinking vessel**	Very unlikely hazard, so rare that it was awarded a 1. The river is designated a SSSI and SAC which could pose a significant threat to the environment should the vessel sink. Additionally, the threat of injury and loss of life ranks the consequence a 5. Ships have evacuation procedures in place. Life jackets should be worn/accessible to all personnel on vessels. RNLI/emergency services have access at the river and land side.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
						Collision	Damage to vessel	Ships maintained / classification	75	50		**4.7**	
						Human error	Injury to persons/threat to life	Evacuation procedures in place	0	50		**4.4**	
							Risk of pollution	Life saving equipment / life jackets	0	50		**4.1**	
							Damage to/loss of AIL	RNLI / Emergency services access	0	50		**3.8**	
							SSSI - greater environmental consequences		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	MITIGATED	**3.8**	**Minor**
30	**Terrorism in river/canal**	Very unlikely hazard, so rare that it was agreed that it should be awarded a score of 1. It was discussed that the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel can be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	50	0		**5.0**	
							Injury to persons/threat to life	Emergency services	50	50		**4.7**	
							Risk of pollution	Safety procedures	0	25		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
									0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
31	**Terrorism alongside**	Very unlikely hazard, so rare that it was agreed that it should be awarded a score of 1. It was discussed that the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel can be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	50	0		**5.0**	
							Damage to terminal facility	Emergency services	50	50		**4.7**	
							Injury to persons/threat to life	Safety procedures	0	25		**4.6**	
							Risk of pollution		0	0		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**
32	**Gangway / Linkspan / Connection failure**	An unlikely event, biggest risk is someone falling in-between the vessel and quay wall due to failure of equipment. Other risks include damage to the vessel or land side structures and damage of the AIL should it be wheeled off the vessel (expected) as opposed to being lifted off. The workshop agreed that gangway failure was vey unlikely due to multiple control measures in place. Amongst those measures, safety nets are often used to mitigate personnel going overboard between the vessel and quay wall.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Typically, multiple gangways available	50	0		**5.1**	
							Injury to persons/threat to life	Safety net	0	80		**3.9**	
							Potential damage to AIL	Regular inspections / maintenance	75	0		**2.5**	
								Gangway watch	0	50		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - PORT OF MOSTYN													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
33	**Failure of transfer of AIL**	It was suggested that the transfer of the AIL would likely not be the responsibility of the port or anyone present at the workshop but rather the contractor engaged to transfer the AIL. It was agreed that a suitable contractor would be used who would have prior experience of this. Accordingly, the contractor would develop Risk Assessment Method Statements (RAMS) which would detail personnel safety, the process (along with control measures/fail-safes) for the transfer from vessel to land side and what to do in the event of something going wrong.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical failure	Damage to AIL	Expert/experienced contractors to transfer AIL	75	0		**5.6**	
						Structural failure	Damage to vessel	RAMS	75	75		**3.4**	
						Human error	Damage quay side		0	0		**3.4**	
							Creates obstruction in the navigable channel		0	0		**3.4**	
							Injury to persons/threat to life		0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0	MITIGATED	**3.4**	**Minor**
34	**Quay supporting transfer of AIL**	On the quayside, the area has an allowable loading capacity of 4t/sqm (40 kN per square metre). There are also two strong points that are used for heavy crane lifts. Any weight above this would pose a risk to damage on the structure. Information on how the AIL would be transferred from vessel to the quayside has not been provided at this stage of the project. Information on the weight of the AIL is unknown at this stage. Given that there is a large known and proven weight limit, the AIL transfer can be designed to be undertaken within this limit - this should minimise any likelihood or consequence.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Structural failure	Damage to AIL	Berth rated at 40kN per square metre limit	85	85		**3.7**	
							Severe damage quay side structure	Undertake engineering assessment of proposed transfer	95	30		**3.0**	
							Injury to persons/threat to life		0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0	MITIGATED	**3.0**	**Minor**

A.4 Connah's Quay North NRA

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
1	**Commercial traffic**	The likelihood was agreed to be unlikely by the workshop. There is negligible commercial traffic expected upstream in the river. The consequence has been awarded a 4 due to potential major damage to AIL vessel/other vessels. Traffic hazards can be mitigated through the services available at Connah's Quay North which include VHF during working hours and compulsory pilotage. Information on navigating the channel is also available.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						An increase of commercial vessels	Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to other commercial vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Risk of pollution	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Injury to persons		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
2	**Leisure craft and fishing boat traffic**	Controlled in a similar manner as to how commercial traffic is controlled. Due to the area being environmentally protected by National Resource Wales (NRW), there are limited fishing licences available in this area which reduces the amount of fishing vessels and as such the likelihood of this risk.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to leisure vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Risk of pollution	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Injury to persons	NRW fishing licence - limited	50	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
3	**Commercial vessel losing control**	In the event that the commercial vessel carrying the AIL loses control there are emergency procedures in place. The vessel itself will have procedures to run through. The port informed the workshop that they also have procedures which would include a dead towage using the tugs they have at their disposal (via the tugs at the Port of Mostyn). Compulsory pilotage ensures that experienced and qualified personnel are aboard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other commercial vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
						Human error	Risk of pollution	Tugs available from Mostyn for larger	25	0		**4.0**	
							Risk of damage to AIL		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
4	**Other vessels losing control**	Other vessels will be controlled in a similar way to above. It was noted that there are two in/out channels to the P{ort of Mostyn so the other channel can be used if one channel is blocked. There will be negligible traffic from Mostyn to Connah's Quay North.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
							Risk of pollution	Alternative channel available in downstream section	25	25		**3.9**	
							Risk of damage to AIL		0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0		**3.9**	
									0	0	MITIGATED	**3.9**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
5	**Failure of aids to navigation**	The consequence was rated 4 due to the route being an environmentally protected area and significant damage to the environment as a result of this hazard could pose both short and long term effects. A Local Notice to Mariners provides mariners with essential, up-to-date information and advice about navigational safety, including chart updates, changes in aids to navigation, and warnings of potential hazards or activities that may affect navigation. Inspections of the navigational aids will ensure that everything is kept in order. If maintenance is required, it is undertaken promptly. The channel is buoyed to Mostyn to help guide vessels and temporary buoys can be provided to Connah's Quay.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Aids to navigation damaged or out of order	Insufficient navigational marks on the leading channel	Local Notice to Mariners	75	0		**5.6**	
							Potential collision or running aground	Regular inspection of navigational aids	75	0		**4.0**	
							Risk of pollution - SSSI	Channel is buoyed (PoM)	75	0		**4.0**	
								Temporary buoys (CQN)	75	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
6	**Unknown dimensions of the vessel using the navigable channel (clearance through port / mooring requirements)**	This hazard considers navigating the channel and the risks associated, whilst not yet knowing the dimensions of the vessel. Once the dimensions are given, any associated hazards should be reviewed. Limitations on vessel size apply due to limited depth of water and navigable channel. The tentative vessel size of 60m length and associated beam and draft should be acceptable. It is understood that the depth of the bed is deepened at the berth to allow vessels to moor safely without grounding during the tidal cycle. Manoeuvring to and from the berth requires the tide to be at high water so that there is adequate under keel clearance. River tugs and canal towage help navigate the river and canal in a controlled manner.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Tide levels	Navigating channel, risk of running aground	River tugs	15	0		**5.8**	
						Navigating the channel	Dimensions may be too big for navigating the channel	Limitations on vessel size and port procedure preventatives	90	90		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0	MITIGATED	**2.0**	**Slight**
7	**Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse**	These hazards were discussed and it was agreed that the impact due to these causes were very unlikely, as a result the likelihood was deemed to have a score of 1. Procedures put in place for personnel on the vessel should mitigate any unskilled person, unlicensed, sleeping/alcohol/drug abuse onboard. Compulsory pilotage ensures an experienced and qualified pilot is onboard reducing the likelihood of poor manoeuvring.	1.0	4.0	**4.0**						BASELINE	**4.0**	**Minor**
						Poor manoeuvring	Damage to Vessel	Procedures in place by ships	80	0		**4.0**	
						Human error	Damage to fendering system	Compulsory pilotage in areas to help navigate the channel	80	50		**3.7**	
							Injury to persons		0	0		**3.7**	
							Risk of Pollution		0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
8	**Unknown obstructions in the riverbed**	Restrictions on the draft are in place to prevent major collisions on the sea bed. Compulsory pilotage helps mitigate risk through contributing experienced local knowledge of the river bed. The port commented that regular weekly bathymetric surveys are not typical, buy can be implemented to monitor the bed should the quay be put into use.	3.0	2.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Collision with obstruction	Limitations on draft and vessel size as part of the port procedure should prevent major collisions with any obstructions	50	30		**5.0**	
							Blocking main navigable channel	Compulsory pilotage	80	0		**3.7**	
								Bathymetric surveys to monitor the bed	80	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
9	**Obstructions in the river - non vessel (i.e. person/recreational canoeing in the water that you have to divert around)**	This risk is unlikely following workshop discussions. There is limited recreational activity in the channel. A Local Notice to Mariners can be issued to warn anyone in the navigable channel of large vessels in transit.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
							Collision with obstruction	Local Notice to Mariners	50	0		**5.1**	
							Injury to persons/threat to life	Visual observations	30	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0		**4.6**	
									0	0	**MITIGATED**	**4.6**	**Moderate**
10	**Harbour communications failure / loss of VHF**	This hazard is unlikely to happen following workshop discussions. In the event it does happen, most ships are outfitted with satellite phones and most personnel carry mobile devices which can be used in an emergency. Compulsory pilotage ensures a licenced and experienced pilot is available should there be a failure of VHF, who can act accordingly.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
							Inexperienced pilots don't have assistance	Satellite phone likely to be on ship	80	0		**3.9**	
								Mobile device likely to be on ship	80	0		**3.0**	
								Compulsory pilotage	80	30		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0		**2.8**	
									0	0	**MITIGATED**	**2.8**	**Minor**
11	**Tide height / running aground**	Although this hazard is unlikely to happen, it was scored a 3 due to it posing a moderate consequence to the environment (Site of Special Scientific Interest (SSSI)). To mitigate the hazard, ships are only bought in / out on a suitable tide with adequate time and clearance to do so. It is understood that the berth alongside the quay is deepened to provide a pocket to accommodate vessels over the full tidal cycle. Navigable channels are mapped and piloted by experienced personnel with regular bathymetric surveys to ensure a safe route to the quay.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Engine failure (river)	Damage to vessel	Compulsory pilotage	50	0		**5.1**	
						Human error	Injury to persons	Timed navigation, only manoeuvring ships on suitable tide	50	0		**4.2**	
							Obstruction to navigation in channel	Tug control	50	25		**3.2**	
							SSSI - greater environmental consequences	River is surveyed regularly	50	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0		**2.9**	
									0	0	**MITIGATED**	**2.9**	**Minor**
12	**Dropped line fouls bow thruster or vessel propellers**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Tug line failure	Damage to vessel	Procedures in place to mitigate lines fouling canal	75	0		**4.2**	
						Mooring failure	Damage to terminal facility	Diver access is available should it be needed	0	50		**3.8**	
							Injury to persons/threat to life		0	0		**3.8**	
							Risk of pollution		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	**MITIGATED**	**3.8**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
											BASELINE	6.0	Moderate
13	Tug failure	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	6.0	Mechanical failure	Damage to vessel	Regular tug maintenance	50	0		5.1	
						Line failure	Damage to tug	Work boat available in emergency	0	75		4.1	
							Damage to terminal facility	Depending on the vessel, two or more tugs will be in use at any one time. Should one fail, it leaves one operational tug	75	50		2.3	
							Injury to persons/threat to life		0	0		2.3	
							Risk of pollution		0	0		2.3	
									0	0		2.3	
									0	0		2.3	
									0	0		2.3	
									0	0		2.3	
									0	0	MITIGATED	2.3	Slight
											BASELINE	12.0	High
14	Contact with own berth or extended wharfage area while berthing, unberthing	The berth has piles to the northern end of the quay that were introduced more recently for vessels to berth alongside, ensuring that berthing loads were not applied to the quay structure. The southern end of the quay's condition is not as upkept and as such the result of contact could result in serious structural consequences. Utilising tugs, the berthing process can be achieved with minimal impact. Impact is expected upon berthing, but the load is expected to have minimal impact on the structure. Having a skilled and qualified person piloting the vessel also decreases the likelihood of this hazard.	3.0	4.0	12.0	Human error	Damage to vessel and / or structure	Piles	50	75		9.2	
						Mechanical malfunction	Risk of pollution	Tug control	80	50		6.2	
						Bad weather		Compulsory pilotage	50	0		5.3	
									0	0		5.3	
									0	0		5.3	
									0	0		5.3	
									0	0		5.3	
									0	0		5.3	
									0	0	MITIGATED	5.3	Moderate
											BASELINE	6.0	Moderate
15	Vessels grounding moving on/off berth	The workshop rated this hazard unlikely for this to happen. The consequences being rated a 3 due to the area being a SSSI. The likelihood of this hazard is mitigated by vessels only being allowed to move on/off berth at high water. This reduces both the likelihood and consequence significantly only leaving room for human error/mistakes. It is understood that the depth of the bed is deepened at the berth to allow vessels to moor safely without grounding during the tidal cycle. Manoeuvring to and from the berth requires the tide to be at high water so that there is adequate under keel clearance.	2.0	3.0	6.0	Human error	Injury to public	Only move vessel at high water slack	75	50		3.8	
							Damage to vessel	Tug control	50	25		2.8	
							Risk of pollution	Compulsory pilotage	50	0		2.6	
								River is surveyed regularly	75	0		2.6	
									0	0		2.6	
									0	0		2.6	
									0	0		2.6	
									0	0		2.6	
									0	0		2.6	
									0	0	MITIGATED	2.6	Minor
											BASELINE	8.0	Moderate
16	Vessel breaking away from berth and striking other vessels/berths	This hazard was identified as unlikely. Vessels typically have watchman to monitor things such as the lines. Having multiple lines in use means that should one break, the others can hold. Equipment (such as mooring lines) and port side mooring infrastructure should be regularly inspected to ensure the structural integrity.	2.0	4.0	8.0	Master error	Injury to persons/threat to life	Multiple lines in use	50	15		6.7	
						Mechanical malfunction	Damage to vessel	Lines are monitored - watchman on vessel	50	15		5.4	
						Bad weather	Risk of pollution	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		3.9	
									0	0		3.9	
									0	0		3.9	
									0	0		3.9	
									0	0		3.9	
									0	0		3.9	
									0	0		3.9	
									0	0	MITIGATED	3.9	Minor

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
17	**Passing vessels striking the moored vessel**	The workshop agreed that this chances of this happening were extremely rare given the width of the river. Passing vessels are unlikely to be in close proximity with the port or even this far upstream of the river. It is expected that only small craft are to be seen this far upstream and so the consequences of collisions are reduced.	1.0	3.0	**3.0**						BASELINE	**3.0**	**Minor**
							Damage to vessels	Channel - wide enough for ship passing	80	0		**3.0**	
							Damage to AIL	Only small craft in upstream river	0	75		**2.4**	
							Risk of pollution	Tug control	50	0		**2.4**	
							Damage to berth	Compulsory pilotage	50	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**
18	**Leisure craft / fishing boats in vicinity of berths**	The workshop agreed this hazard was unlikely to happen due to the sparse traffic on the river, however should still be considered in the NRA. A Notice to Mariners will be issued if needed to make people aware of the vessels. No large vessels are expected this far upstream so any potential interactions would likely be with small craft only which decreases the consequences.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Potential collision	Damage to leisure/fishing boats	Notice to Mariners	50	0		**5.1**	
							Injury to persons (leisure/fishing boats)	Only small craft in upstream river	0	50		**4.6**	
							Risk of pollution (From leisure/fishing boats)	Pilot and tugs adopted in the river	50	50		**3.4**	
							Risk to public reputation		0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0	MITIGATED	**3.4**	**Minor**
19	**Ship impact due to breakout of moored vessels, berth surge, dragging anchors**	Breakout was agreed to be an unlikely event by he workshop. However it was stated that significant surge can be expected while berthed here. Breakout from infrastructure was stated to be incredibly rare. Surge is to be expected so additional mooring lines are recommended. Vessels are not expected to pass whilst the quay is used. Utilising multiple mooring lines within the ships horizontal position significantly reduces berth surge.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to other vessels	Multiple mooring lines used, positioned as close as possible to the ships horizontal line will reduce surge	30	0		**7.4**	
							Potential injury	Extra lines to be used to secure the vessel further	30	0		**6.8**	
							Risk of pollution	Bollards, piles and port mooring infrastructure is inspected on a regular basis	50	50		**5.1**	
							Becoming an obstruction in the navigable channel	Watchman on vessel monitors position and lines	20	0		**4.8**	
							Large surge		0	0		**4.8**	
									0	0		**4.8**	
									0	0		**4.8**	
									0	0		**4.8**	
									0	0		**4.8**	
									0	0	MITIGATED	**4.8**	**Moderate**
20	**Restricted visibility due to severe weather**	The workshop went through several control options for this hazard. It was discussed that the weather is regularly monitored to influence the decision of a go / no go for vessel movement. It was stated that vessels are not bought in in poor weather conditions. The passage takes 3 hours and so vessels are bought in in windows that are weather appropriate. If conditions are forecasted to be hazardous, the vessels can anchor out in the river or at the pilot station. Should conditions rapidly change while sailing, which is very unlikely, there could be a considerable distance to navigate to safety. The procedures put in place to reduce this include compulsory pilotage, canal towage and tug assistance to help navigate to the berth.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	70	0		**10.4**	
							Injury to persons/threat to life	Anchor out in the river at the PoM pilot station should conditions be deemed hazardous	80	50		**7.5**	
							Damage to berth/structures	Compulsory pilotage	30	15		**6.9**	
								Tug assistance available	20	20		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0		**6.4**	
									0	0	MITIGATED	**6.4**	**Moderate**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
21	**Strong winds / poor weather**	The workshop discussed that the weather is regularly monitored and if conditions are forecasted to be hazardous, the vessels can anchor out in the river to avoid entering the berth in these conditions. The approach can always be terminated and turned around. Should conditions rapidly change while sailing, which is very unlikely, there could be a considerable distance to navigate to safety.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	70	0		**10.4**	
							Injury to persons/threat to life	Anchor in river	80	50		**7.5**	
							Damage to berth/structures	Terminating approach	30	25		**6.8**	
								Tug assistance	40	30		**5.8**	
									0	0		**5.8**	
									0	0		**5.8**	
									0	0		**5.8**	
									0	0		**5.8**	
									0	0		**5.8**	
									0	0	MITIGATED	**5.8**	**Moderate**
22	**Fire on board vessel - in river**	Although unlikely, the consequences a pose a significant threat to personnel safety and the local environment. The channel passes Connah's Quay Power station, in the event of a fire on board this could be a threat to the station and should be considered. The station is set back from the channel a considerable distance by a grass bank. It was discussed that ships will have their own procedures in place to deal with fires, which includes evacuation procedures should they be needed. Local RNLI station at Flint. The port will have procedures in place. Support/tug vessels will have fire fighting equipment. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error/negligence	Risk of loss of life/injury	Evacuation/RNLI	0	50		**6.8**	
							Risk of pollution	Procedures on board vessel	75	50		**4.3**	
							Damage to AIL	Procedures at port	75	50		**2.8**	
							Environmental risk SSSI	Ship manifest/Hazardous Cargo	50	50		**2.5**	
							Connah's 's Quay Power Station	Small vessels/tugs with fire fighting equipment	0	50		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**
23	**Fire on board vessel - berthed / alongside**	The river is a SSSI and SAC so environmental consequences could be high. The port is within close proximity to an industrial park which houses multiple companies including Tata steel. Should a fire spread from the port it could potentially reach the park. It was discussed that ships will have their own procedures in place to deal with fires. The port will have procedures in place and plan for emergency service access. Cargo and the associated hazards should be recorded before sailing and the correct procedures undertaken. Emergency services can gain access to the site should it be needed.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**7.4**	
						Human error/negligence	Injury to persons/threat to life	Procedures on board vessel	75	50		**4.8**	
							Risk of pollution	Procedures at port	75	50		**3.1**	
							Damage to AIL	Ship manifest/Hazardous Cargo	50	50		**2.8**	
							Damage to terminal	Small vessels/tugs with fire fighting equipment	0	50		**2.5**	
							Damage to shoreside infrastructure	Emergency service access	0	50		**2.2**	
							Damage to other property/cargo		0	0		**2.2**	
							Environmental risk SSSI		0	0		**2.2**	
							Proximity to industrial park		0	0		**2.2**	
									0	0	MITIGATED	**2.2**	**Slight**
24	**Fire on shore side**	The river is a SSSI and SAC so environmental consequences could be high. The port is within close proximity to an industrial park which houses multiple companies including Tata steel. Should a fire spread from the port it could potentially reach the park. The port has procedures in place and regularly has fire drills to prepare for such events. There is a laydown area and some small structures on the land side. These are an adequate distance from the berths so in the event of a fire the vessel should have time to react.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Risk of damage to vessel	Procedures on board vessel	75	50		**5.2**	
							Injury to persons/threat to life	Procedures at port	75	50		**3.4**	
							Risk of pollution		0	0		**3.4**	
							Risk of damage to AIL		0	0		**3.4**	
							Damage to terminal		0	0		**3.4**	
							Damage to shoreside infrastructure		0	0		**3.4**	
							Damage to other property/cargo		0	0		**3.4**	
							Environmental risk SSSI		0	0		**3.4**	
							Proximity to industrial park		0	0		**3.4**	
									0	0	MITIGATED	**3.4**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
25	**Medical emergency to key member on vessel**	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board. Port has procedures in place. Local RNLI station at Flint. Emergency services have access to the port in such an event. Work boats are available in the event of an emergency to assist the AIL vessel.	3.0	4.0	**12.0**						BASELINE	**12.0**	**High**
							Injury to persons/threat to life	Procedures on board vessel	15	75		**10.0**	
							Damage to vessel	Procedures at port	0	75		**8.2**	
								Emergency service has access at river and port	0	75		**6.4**	
								Trained personnel	15	75		**4.6**	
								Work boats available	0	10		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0		**4.4**	
									0	0	MITIGATED	**4.4**	**Minor**
26	**Person overboard**	Ships will have their own individual plans and procedures in place. Emergency first aiders should be on board and life jackets worn on deck. All crew should be briefed and trained in what to do in an event like this. Port has procedures in place. Local RNLI station at Flint. Emergency services should have access to the port in such an event. Life saving equipment accessible both on vessel and land. If vessel has a watchman/someone on the gangway, they can assist and observe the safe boarding and disembarking of personnel.	3.0	4.0	**12.0**						BASELINE	**12.0**	**High**
						Drowning	Injury to persons/threat to life	Trained personnel/first aiders	15	75		**10.0**	
								Life saving equipment/life jackets	50	75		**7.4**	
								Procedures on board vessel	75	75		**4.4**	
								Procedures at port	75	75		**2.3**	
								Watchman on board vessel	25	25		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0		**1.9**	
									0	0	MITIGATED	**1.9**	**Slight**
27	**Sinking vessel**	Very unlikely hazard, so rare that it was awarded a 1. The river is a SSSI which poses a major threat to the environment should the vessel sink. Additionally, the threat of injury and loss of life ranks the consequence a 5. Ships have evacuation procedures in place. Life jackets should be worn/accessible to all personnel on vessels. RNLI/emergency services have access at the river and land side.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
						Collision	Damage to vessel	Ships maintained / classification	75	50		**4.7**	
						Human error	Injury to persons/threat to life	Evacuation procedures in place	0	50		**4.4**	
							Risk of pollution	Life saving equipment / life jackets	0	50		**4.1**	
							Damage to/loss of AIL	RNLI / Emergency services access	0	50		**3.8**	
							SSSI - greater environmental consequences		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	MITIGATED	**3.8**	**Minor**
28	**Terrorism in river/canal**	Very unlikely hazard, so rare that it was awarded a 1. With Connah's Quay Power Plant along the river, this could be considered a target. It was discussed that the industrial park which leads to the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel can be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	50	0		**5.0**	
							Injury to persons/threat to life	Emergency services	50	50		**4.7**	
							Risk of pollution	Safety procedures	0	25		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
							Connah's 's Quay Power Station		0	0		**4.6**	
									0	0	MITIGATED	**4.6**	**Moderate**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
29	**Terrorism alongside**	Very unlikely hazard, so rare that it was awarded a 1. It was discussed that the industrial park which leads to the port has security fencing as well as gated entrance/exits. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is often policed. Personnel can be briefed on protocols should it be necessary. Safety procedures are in place in the event of sinking or injury.	1.0	5.0	**5.0**						**BASELINE**	**5.0**	**Moderate**
							Damage to vessel	Port security infrastructure	50	0		**5.0**	
							Damage to terminal facility	Emergency services	50	50		**4.7**	
							Injury to persons/threat to life	Safety procedures	0	25		**4.6**	
							Risk of pollution		0	0		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to port		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
									0	0	**MITIGATED**	**4.6**	**Moderate**
30	**Gangway / Linkspan / Connection failure**	An unlikely event, biggest risk is someone falling in-between the vessel and quay wall due to failure of equipment. Other risks include damage to the vessel or land side structures and damage of the AIL should it be wheeled off the vessel (expected) as opposed to being lifted off. The workshop agreed that gangway failure was vey unlikely due to multiple control measures in place. Amongst those measures, safety nets are often used to mitigate personnel going overboard between the vessel and quay wall.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Typically, multiple gangways available	50	0		**5.1**	
							Injury to persons/threat to life	Safety net	0	80		**3.9**	
							Potential damage to AIL	Regular inspections / maintenance	75	0		**2.5**	
								Gangway watch	0	50		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0		**2.2**	
									0	0	**MITIGATED**	**2.2**	**Slight**
31	**Failure of transfer of AIL**	It was suggested that the transfer of the AIL would likely not be the responsibility of the port or anyone present at the workshop but rather the contractor engaged to transfer the AIL. It was agreed that a suitable contractor would be used who would have prior experience of this. Accordingly, the contractor would develop Risk Assessment Method Statements (RAMS) which would detail personnel safety, the process (along with control measures/fail-safes) for the transfer from vessel to land side and what to do in the event of something going wrong.	2.0	4.0	**8.0**						**BASELINE**	**8.0**	**Moderate**
						Mechanical failure	Damage to AIL	Expert/experienced contractors to transfer AIL	75	0		**5.6**	
						Structural failure	Damage to vessel	RAMS	75	75		**3.4**	
						Human error	Damage quay side		0	0		**3.4**	
							Creates obstruction in the navigable channel		0	0		**3.4**	
							Injury to persons/threat to life		0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0		**3.4**	
									0	0	**MITIGATED**	**3.4**	**Minor**
32	**Quay supporting transfer of AIL**	On the quayside, the area has been used for heavy load transfers previously but it is understood that there is no confirmed allowable loading capacity for the quay. Therefore it will be necessary to undertake verification probably comprising structural investigations and design checks. Information on how the AIL would be transferred from vessel to the quayside has not been provided at this stage of the project. Information on the weight of the AIL is also unknown at this stage.	2.0	4.0	**8.0**						**BASELINE**	**8.0**	**Moderate**
						Structural failure	Damage to AIL	Structural investigations and design assessment required. Additional possible strengthening works	50	50		**6.3**	
							Severe damage quay side structure	Undertake engineering assessment of proposed transfer	95	30		**3.5**	
							Injury to persons/threat to life		0	0		**3.5**	
									0	0		**3.5**	
									0	0		**3.5**	
									0	0		**3.5**	
									0	0		**3.5**	
									0	0		**3.5**	
									0	0		**3.5**	
									0	0	**MITIGATED**	**3.5**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - CONNAH'S QUAY NORTH													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
33	**Vandalism**	The workshop identified that this port is prone to some vandalism. Vandalism to the property could cause damage to infrastructure and require vessels, machinery and cargo to not be left unattended. Improved security and lighting should deter potential whilst site is in use, particularly during the night.	3.0	2.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Damage to property	Vessels, machinery and cargo to not be left unattended	80	80		**3.0**	
								Contractor to provide necessary security e.g. night watchman	80	80		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0		**1.6**	
									0	0	MITIGATED	**1.6**	**Slight**
34	**Associated risk with passing through the WCC**	The modifications made at the eel screen will require construction on the river. There is a separate NRA which captures the risk at the screen. The likelihood of a collision with the structure is considered unlikely due to the width of the river and ample width to pass. The eel screen itself has a piled structure to mitigate any damage from vessels. For this hazard, the consequences were awarded a 3 and the likelihood a 2. The consequence of hazards associated with the construction at the eel screen are considered to be major. For more detail please see the Water Corridor Connection (WCC) NRA.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Damage to structure	Safety boat present	50	0		**5.1**	
							Injury to persons/threat to life	Notice to Mariners	25	0		**4.7**	
							Damage to vessel	Adequate distance for vessels to pass	75	75		**2.4**	
							Risk of pollution		0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0		**2.4**	
									0	0	MITIGATED	**2.4**	**Slight**
35	**Collision with Flintshire Bridge**	Identified as rare and very unlikely due to the supports foundations spanning from the banks of the channel. If a vessel ran aground and onto the banks it could potentially reach the supports, however this is incredibly improbable. There is also a small risk of hitting the underside of the bridge but with a clearance beneath it in the region of 27m, the vessel would have to be extremely tall to be able to make contact. Compulsory pilotage and VHF should help avoid this from happening. Utilising tugs should increase control and reduce any potential impact or running aground.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
						Human error	Damage to structure	Monitor VHF during working hours	25	0		**5.0**	
						Mechanical error	Injury to persons/threat to life	Compulsory pilotage	75	0		**5.0**	
							Damage to vessel	Tug control	75	50		**4.7**	
							Risk of pollution	Distance from navigable channel	75	75		**4.1**	
							Considerable threat to public		0	0		**4.1**	
							Closing the bridge / lack of access across the river		0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0	MITIGATED	**4.1**	**Minor**

A.5 Water Connection Corridor NRA

NAVIGATIONAL RISK ASSESSEMENT - WATER CONNECTION CORRIDOR

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
1	**Commercial traffic**	Low volume of commercial traffic expected. Adequate space in the river to pass the structure / barge without congesting the river. Local Notice to Mariners to increase awareness of construction.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						An increase of commercial vessels	Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to commercial vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Damage to the structure/barge in the event of a collision	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Risk of pollution	Low commercial traffic expected, pass on other side of river	75	50		**3.7**	
							Injury to persons		0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
2	**Leisure craft and fishing boat traffic**	Associated hazards with leisure/fishing vessels building up traffic at this point. Low amount of traffic expected. Adequate space in the river to pass the structure / barge without congesting the river. Guidelines and Local Notice to Mariners should ensure knowledge of construction and how to operate around it. NRW limits fishing licences.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
							Damage to AIL vessel in the event of a collision	Monitor VHF during working hours	75	0		**5.6**	
							Damage to leisure vessels in the event of a collision	Compulsory pilotage	80	0		**4.0**	
							Damage to the structure/barge in the event of a collision	Operation guidelines and Local Notice to Mariners	50	0		**4.0**	
							Risk of pollution	NRW fishing licence - limited	50	0		**4.0**	
							Injury to persons	Low traffic expected, pass on other side of river	75	50		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
3	**Restriction in channel width (due to construction)**	Hazard made with the assumption there is a crane barge moored to the piled structure. As previously stated, the width of the river is such that vessels should be able to navigate with sufficient space left for construction work and the construction barge. Therefore having a lifting barge here should not significantly restrict the channel and cause any hazards.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
							Damage to AIL vessel in the event of a collision	Pass on other side of river	75	50		**3.8**	
							Damage to leisure vessels in the event of a collision	Operation guidelines and Local Notice to Mariners	50	0		**3.0**	
							Damage to the structure/barge in the event of a collision		0	0		**3.0**	
							Risk of pollution		0	0		**3.0**	
							Injury to persons		0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0		**3.0**	
									0	0	MITIGATED	**3.0**	**Minor**
4	**Commercial vessel losing control**	Hazard made with the assumption there is a crane barge moored to the piled structure. In the event that the commercial vessel carrying the AIL loses control there are emergency procedures in place. The vessel itself will have procedures to run through. Dead towage could be used (via the tugs at the Port of Mostyn). Compulsory pilotage ensures that experienced and qualified personnel are aboard. There is a threat that the vessel would collide with the construction barge. The eel screen itself is protected by a piled structure.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**6.7**	
						Mechanical failure	Damage to other commercial vessels in the event of a collision	Emergency procedures - dead towage	0	80		**5.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**4.4**	
						Human error	Risk of pollution	Tugs available from Mostyn for larger	25	0		**4.0**	
							Damage to the structure/barge in the event of a collision		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - WATER CONNECTION CORRIDOR														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
5	**Other vessels losing control**	Hazard made with the assumption there is a crane barge moored to the piled structure. Other vessels will be controlled in a similar manner to the above. There is a threat that if a boat looses control, it could cause the vessel carrying the AIL to come into contact with the construction barge/eel screens. The workshop informed us that not many commercial vessels are expected in the upstream part of the river. Dead towage can be used if there are any commercial vessels that have lost control. With fewer commercial vessels expected in this part of the river, the likelihood of a commercial vessel losing control is lower. Smaller vessels are unlikely to have the same impact but should still be considered as a hazard.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Master error	Damage to AIL vessel in the event of a collision	Emergency procedures onboard vessel	50	15		**5.0**	
						Mechanical failure	Damage to other vessels in the event of a collision	Emergency procedures - dead towage	0	50		**4.5**	
						Bad weather	Injury to persons	Compulsory pilotage	50	15		**3.6**	
							Risk of pollution	Only small craft in upstream river	25	75		**2.5**	
							Risk of damage to AIL		0	0		**2.5**	
							Damage to the structure/barge in the event of a collision		0	0		**2.5**	
									0	0		**2.5**	
									0	0		**2.5**	
									0	0		**2.5**	
									0	0	MITIGATED	**2.5**	**Slight**
6	**Failure of aids to navigation**	The consequence was rated 4 due to the route being an environmentally protected area and significant damage to the environment as a result of this hazard could pose both short and long term effects. A Local Notice to Mariners provides mariners with essential, up-to-date information and advice about navigational safety, including chart updates, changes in aids to navigation, and warnings of potential hazards or activities that may affect navigation. Inspections of the navigational aids will ensure that everything is kept in order. If maintenance is required, it is undertaken promptly. The channel is buoyed to Mostyn to help guide vessels and temporary buoys can be provided to Connah's Quay. Any floating construction plant will need to be lit at night.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Aids to navigation damaged or out of order	Insufficient navigational marks on the leading channel	Local Notice to Mariners	75	0		**5.6**	
							Potential collision	Inspection of navigational aids	75	0		**4.0**	
							Risk of pollution - SSSI	Temporary buoys	75	0		**4.0**	
							Damage to the structure/barge in the event of a collision		0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0		**4.0**	
									0	0	MITIGATED	**4.0**	**Minor**
7	**Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse**	These hazards were discussed and it was agreed that the impact due to these causes were very unlikely, as a result the likelihood was deemed to have a score of 1. Procedures put in place for personnel on the vessel should mitigate any unskilled person, unlicensed, sleeping/alcohol/drug abuse onboard. Compulsory pilotage ensures an experienced and qualified pilot is onboard reducing the likelihood of poor manoeuvring.	1.0	4.0	**4.0**						BASELINE	**4.0**	**Minor**
						Poor manoeuvring	Damage to Vessel	Procedures in place by ships	80	0		**4.0**	
						Human error	Damage to the structure/barge in the event of a collision	Compulsory pilotage	80	50		**3.7**	
							Injury to persons		0	0		**3.7**	
							Risk of Pollution		0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	MITIGATED	**3.7**	**Minor**
8	**Harbour communications failure / loss of VHF**	This hazard is unlikely to happen following workshop discussions. A loss of communication for vessels when passing the construction site poses a small risk in the event something goes wrong and it cannot be communicated. In the event it does happen, most ships are outfitted with satellite phones and most personnel carry mobile devices which can be used in an emergency. Compulsory pilotage ensures a licenced and experienced pilot is available should there be a failure of VHF, who can act accordingly. At the PoM the pilot boat will have access to VHF, if the vessel carrying the AIL looses it the pilot boat can relay information or help guide the vessel.	2.0	2.0	**4.0**						BASELINE	**4.0**	**Minor**
							Inexperienced pilots don't have assistance	Satellite phone likely to be on ship	80	0		**2.6**	
								Mobile device likely to be on ship	80	0		**2.0**	
								Compulsory pilotage	80	30		**1.8**	
								Pilot boat with VHF (PoM)	0	50		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0		**1.5**	
									0	0	MITIGATED	**1.5**	**Slight**

NAVIGATIONAL RISK ASSESSEMENT - WATER CONNECTION CORRIDOR

Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
9	**Dropped line fouls bow thruster or vessel propellers**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Tug line failure	Damage to vessel	Procedures in place to mitigate lines fouling canal	75	0		**4.2**	
						Mooring failure	Damage to the structure/barge in the event of a collision	Diver access is available should it be needed	0	50		**3.8**	
							Injury to persons/threat to life		0	0		**3.8**	
							Risk of pollution		0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	**MITIGATED**	**3.8**	**Minor**
10	**Tug failure**	Workshop agreed this was unlikely to happen and awarded it a 2 in likelihood as a result. There are ship and port procedures in place to prevent this from happening and the port has access to divers to remove any lines/objects if necessary. Tugs are available as well to help with any dead towage.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Mechanical failure	Damage to vessel	Regular tug maintenance	50	0		**5.1**	
						Line failure	Damage to tug	Work boat available in emergency	0	75		**4.1**	
							Damage to the structure/barge in the event of a collision	Depending on the vessel, two or more tugs will be in use at any one time. Should one fail, it leaves one operational tug	75	50		**2.3**	
							Injury to persons/threat to life		0	0		**2.3**	
							Risk of pollution		0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0	**MITIGATED**	**2.3**	**Slight**
11	**Contact with screen structure**	The eel screens are protected from vessel contact by a piled structure that will deflect / absorb the impact load in the event of a collision. It is therefore unlikely that the vessels could impose structural damage to the screens. In the event of a collision, the piled structure may superficial damage but any significant damage would not be anticipated. There is a risk of damage to the vessel if the impact is significant.	2.0	3.0	**6.0**						**BASELINE**	**6.0**	**Moderate**
						Human error	Damage to the structures in the event of a collision	Piled structure	0	80		**4.6**	
						Mechanical malfunction	Risk of pollution	Tug control	80	50		**2.6**	
						Bad weather		Compulsory pilotage	50	0		**2.0**	
						Human error			0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0		**2.0**	
									0	0	**MITIGATED**	**2.0**	**Slight**
12	**Contact with crane barge**	This hazard was made on the assumption that a crane barge will be used to lift the screens over the piled structure to make the modifications. The barge will be moored on the river side of the structure and therefore, the hazard of contact is to be considered. It is an unlikely hazard; with tug control, compulsory pilotage and navigational aids contact should be mitigated from happening.	2.0	4.0	**8.0**						**BASELINE**	**8.0**	**Moderate**
						Master error	Damage to the structure/barge in the event of a collision	Tug control	80	50		**4.8**	
						Mechanical malfunction	Risk of pollution	Compulsory pilotage	50	0		**3.7**	
						Bad weather		Navigational aids	50	0		**3.7**	
						Human error			0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0		**3.7**	
									0	0	**MITIGATED**	**3.7**	**Minor**

NAVIGATIONAL RISK ASSESSEMENT - WATER CONNECTION CORRIDOR														
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
13	**Vessel grounding**	Hazard made with the assumption that a crane barge will be moored to the piled structure and as such the channel width is restricted. The workshop rated this hazard unlikely for this to happen. The likelihood of this hazard is mitigated by vessels only being allowed to navigate through the channels at high tide. Utilising tug boats and having compulsory pilotage should reduce the likelihood of this happening during manoeuvring. When alongside the screen piles, there is believed to be adequate depth of water but this will need to be confirmed when the proposed barge dimensions are confirmed.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Human error	Injury to public	Only move vessel at high water slack	75	50		**3.8**	
							Damage to vessel	Tug control	50	25		**2.8**	
							Risk of pollution	Compulsory pilotage	50	0		**2.6**	
							Damage to structure	River is surveyed regularly	75	0		**2.6**	
							Damage to screens	Adequate width in river for passing	50	50		**2.3**	
							SSSI		0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0		**2.3**	
									0	0	MITIGATED	**2.3**	**Slight**
14	**Leisure craft / fishing boats in vicinity of structure**	The workshop agreed this hazard was unlikely to happen. It was discussed that support vessels could be used to warn any craft in the vicinity, if necessary. A Local Notice to Mariners will be issued to ensure people aware of the vessel and activity taking place. No large vessels are expected this far upstream so any potential interactions would likely be with small craft only which reduces the consequences.	2.0	3.0	**6.0**						BASELINE	**6.0**	**Moderate**
						Potential collision	Damage to leisure/fishing boats	Support vessel/line boat help navigate and ward off any leisure/fishing vessels	25	25		**5.4**	
							Injury to persons (leisure/fishing boats)	Local Notice to Mariners	50	0		**4.5**	
							Risk of pollution (From leisure/fishing boats)	Only small craft in upstream river	0	50		**4.1**	
							Risk to public reputation		0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0	MITIGATED	**4.1**	**Minor**
15	**Barge breaking away from mooring and striking vessel**	Hazard made on the assumption that there will be a crane barge moored to the piled structure. Breakout was agreed to be an unlikely event by the workshop. However it was stated that some surge can be expected while berthed here. It should be noted this structure is not designed for mooring. Mooring lines and equipment should regularly be inspected regularly to ensure it is up to standard.	2.0	4.0	**8.0**						BASELINE	**8.0**	**Moderate**
						Bad weather	Damage to other vessels	Multiple lines in use	30	0		**7.4**	
						Human error	Potential injury	Mooring equipment inspections	50	50		**5.7**	
						Equipment failure	Risk of pollution	Safety boat present	0	50		**5.2**	
						Large surge	Becoming an obstruction in the navigable channel		0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0		**5.2**	
									0	0	MITIGATED	**5.2**	**Moderate**
16	**Restricted visibility due to severe weather**	Hazard made on the assumption that there will be a crane barge moored to the piled structure. The workshop went through several control options for this hazard whilst manoeuvring. It was discussed that the weather is regularly monitored to influence the decision of a go, no go. It was stated that vessels are not bought in in poor weather conditions. The passage takes several hours and so vessels are bought in when suitable weather windows exist. If conditions are forecasted to be unfavourable, the vessel can anchor. Should conditions rapidly change while sailing, which is very unlikely, the procedures put in place such as compulsory pilotage and tug assistance will help navigate to the screen. The likelihood of poor visibility occurring is high. The threat of a collision because of this is low due to the procedures in place. the piled structure shields the screens however the barge would be more vulnerable having less protection. Whilst in location, the barge will be lit and a Local Notice to Mariners will be issued warning of the barge's location.	4.0	3.0	**12.0**						BASELINE	**12.0**	**High**
							Damage to vessel	Weather monitored	70	0		**10.4**	
							Injury to persons/threat to life	Anchor out in the river at the PoM pilot station should conditions be deemed hazardous	80	50		**7.5**	
							Damage to the structure/barge in the event of a collision	Compulsory pilotage	30	15		**6.9**	
								Tug assistance available	20	20		**6.4**	
								Vessel lit and Local Notice to Mariners	30	0		**6.0**	
									0	0		**6.0**	
									0	0		**6.0**	
									0	0		**6.0**	
									0	0		**6.0**	
									0	0	MITIGATED	**6.0**	**Moderate**

NAVIGATIONAL RISK ASSESSEMENT - WATER CONNECTION CORRIDOR													
Hzd Nr.	AGREED HAZARD	Notes from the Workshop	Workshop Survey Averaged Likelihood	Workshop Survey Averaged CON	BASE LINE	HAZARD Likelihood/Cause	HAZARD CONSequence	RISK Control measures	% reduce Likelihood USER ASSESSED	%reduce Con USER ASSESSED		CUMULATIVE RISK SCORE MITIGATED	Result
17	**Fire on board crane barge**	Hazard made on the assumption that there will be a crane barge moored to the piled structure. Although unlikely, the consequences a pose a significant threat to personnel safety and the local environment. Although located in the vicinity of Connah's Quay Power Station; a fire on board the barge is unlikely to be a threat to the station. The station is set back from the channel a considerable distance by a grass bank. However, the eel screens, construction taking place and the construction barge would be at risk. The fire would also be a threat to vessels on the river. The barge should have their own procedures in place to deal with fires, which includes evacuation procedures should they be needed. RNLI station nearby. The contractor will have RAMS in place and all vessels should have fire fighting equipment on board.	2.0	5.0	**10.0**						BASELINE	**10.0**	**High**
						Mechanical Failure	Damage to vessel	Fire drills	0	50		**9.4**	
						Human error/negligence	Injury to persons/threat to life	Evacuation/RNLI	0	50		**8.8**	
							Risk of pollution	Procedures on board barge	75	50		**5.7**	
							Damage to AIL	RAMS	75	50		**3.8**	
							Damage to the structure/barge in the event of a collision	Fire fighting equipment	0	50		**3.5**	
							Damage to other property/cargo		0	0		**3.5**	
							Environmental risk SSSI		0	0		**3.5**	
							Proximity to industrial park		0	0		**3.5**	
									0	0		**3.5**	
									0	0	MITIGATED	**3.5**	**Minor**
18	**Construction worker overboard**	Contractors will have their own individual plans and procedures in place. Emergency first aiders should be on board the barge/on site and life jackets should be worn when working near/on the water. All personnel should be briefed and trained in what to do in an event like this. Local RNLI's. Emergency services should have access to the site in such an event. Life saving equipment accessible both on barge and on site.	3.0	4.0	**12.0**						BASELINE	**12.0**	**High**
						Drowning	Injury to persons/threat to life	Trained personnel/first aiders	15	75		**10.0**	
								Life saving equipment/life jackets	50	75		**7.4**	
								Site procedures/RAMS	75	75		**4.4**	
								Emergency service access	0	50		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0		**3.8**	
									0	0	MITIGATED	**3.8**	**Minor**
19	**Sinking barge**	A very unlikely hazard, awarded a 1. The river is a SSSI which poses a major threat to the environment should the vessel sink. Additionally, the threat of injury and loss of life ranks the consequence a 5. Barge and contractor should have an evacuation procedure in place. Life jackets should be worn/accessible to all personnel working on the vessel. RNLI/emergency services have access at the river and on site.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
						Collision	Damage to vessel	Evacuation procedures in place	0	50		**4.7**	
						Human error	Injury to persons/threat to life	Life saving equipment/life jackets	0	50		**4.4**	
							Risk of pollution	RNLI/Emergency services access	0	50		**4.1**	
							Damage to/loss of AIL		0	0		**4.1**	
							SSSI - greater environmental consequences		0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0		**4.1**	
									0	0	MITIGATED	**4.1**	**Minor**
20	**Terrorism in river, on construction barge or on site**	Very unlikely hazard, so rare that it was awarded a likelihood score of 1. The contractor will need to consider and implement security accordingly. Emergency services can be alerted to the transport of the AIL's should it be necessary. The river is reported to be policed. Personnel should be briefed on security.	1.0	5.0	**5.0**						BASELINE	**5.0**	**Moderate**
							Damage to the structure/barge in the event of a collision	Security	50	0		**5.0**	
							Damage to vessel	Emergency services	50	50		**4.7**	
							Injury to persons/threat to life	Safety procedures	0	25		**4.6**	
							Risk of pollution		0	0		**4.6**	
							Risk of kidnapping		0	0		**4.6**	
							Risk of sinking vessel		0	0		**4.6**	
							Risk of public reputation		0	0		**4.6**	
							Risk of closure to site		0	0		**4.6**	
							Damage to/Loss of AIL		0	0		**4.6**	
							Connah's 's Quay Power Station		0	0	MITIGATED	**4.6**	**Moderate**
21	**Construction Risks**	There are numerous hazards that are associated with the construction work on the river. These will be dealt with by the contractor when RAMS (Risk Assessment and Method Statements) are produced for each work activity.	3.0	5.0	**15.0**						BASELINE	**15.0**	**Extreme**
							Damage to the structure	Contractor to produce RAMS	90	50		**9.4**	
							Damage to vessel		0	0		**9.4**	
							Injury to persons		0	0		**9.4**	
							Risk of pollution		0	0		**9.4**	
							Risk of public reputation		0	0		**9.4**	
							Risk of sinking vessel		0	0		**9.4**	
							Others to be added		0	0		**9.4**	
									0	0		**9.4**	
									0	0		**9.4**	
									0	0	MITIGATED	**9.4**	**Moderate**

A.6 NRA Summary Table

NAVIGATIONAL RISK ASSESSMENTS - SUMMARY								
AGREED HAZARD	Ellesmere Port		Port of Mostyn		Connah's Quay North		WCC	
	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk	Baseline Risk	Mitigated Risk
Commercial traffic	8.0	4.0	8.0	4.0	8.0	4.0	8.0	3.7
Leisure craft and fishing boat traffic	8.0	4.0	8.0	4.0	8.0	4.0	8.0	3.7
Commercial vessel losing control	8.0	4.3	8.0	4.0	8.0	4.0	8.0	4.0
Other vessels losing control	8.0	4.4	8.0	3.1	8.0	3.9	6.0	2.5
Failure of aids to navigation	8.0	4.0	8.0	4.0	8.0	4.0	8.0	4.0
Unknown dimensions of the vessel using the navigable channel (clearance through locks / mooring requirements)	4.0	1.5	6.0	2.0	6.0	2.0	-	-
Ship impact due to human error, 'bad manoeuvring', unskilled person, unlicensed, sleeping/alcohol/drug abuse	4.0	3.7	4.0	3.7	4.0	3.7	4.0	3.7
Unknown obstructions in the riverbed/canal	6.0	2.4	6.0	2.4	6.0	2.4	-	-
Obstructions in the river - non vessel (i.e. person/recreational canoeing in the water that you have to divert around)	6.0	4.6	6.0	4.6	6.0	4.6	-	-
Harbour communications failure / loss of VHF	6.0	2.8	6.0	2.8	6.0	2.8	4.0	1.5
Tide height / running aground	6.0	2.4	6.0	2.9	6.0	2.9	-	-
Dropped line fouls bow thruster or vessel propellers	6.0	3.8	6.0	3.8	6.0	3.8	6.0	3.8
Tug failure	6.0	2.6	6.0	2.3	6.0	2.3	6.0	2.3
Contact with own berth or extended wharfage area while berthing, unberthing	9.0	4.2	9.0	4.2	12.0	5.3	-	-
Contact with adjacent berthed vessels	8.0	3.9	8.0	3.9	-	-	-	-
Contact with adjacent wharfage	8.0	3.9	8.0	3.6	-	-	-	-
Vessel breaking away from berth and striking other vessels/berths	8.0	3.9	8.0	3.9	8.0	3.9	-	-
Passing vessels striking the moored vessel	8.0	4.0	4.0	4.0	3.0	2.4	-	-
Leisure craft/fishing boats in vicinity of berths	6.0	4.5	6.0	4.5	6.0	3.4	6.0	4.1
Ship impact due to breakout of moored vessels, berth surge, dragging anchors	8.0	3.1	8.0	3.9	8.0	4.8	8.0	5.2
Restricted visibility due to severe weather	12.0	6.4	12.0	5.2	12.0	6.4	12.0	6.0
Strong winds / poor weather	12.0	4.3	12.0	4.7	12.0	5.8	-	-
Fire on board vessel - in river	8.0	2.5	8.0	2.2	8.0	2.2	-	-
Fire on board vessel - berthed/alongside	8.0	2.8	8.0	2.2	8.0	2.2	-	-
Fire on shore side	8.0	3.4	8.0	3.4	8.0	3.4	-	-
Medical emergency to key member on vessel	12.0	4.6	12.0	4.4	12.0	4.4	-	-
Person overboard	12.0	1.9	12.0	1.9	12.0	1.9	12.0	3.8
Sinking vessel	5.0	3.8	5.0	3.8	5.0	3.8	5.0	4.1
Terrorism in river/canal	5.0	4.6	5.0	4.6	5.0	4.6	5.0	4.6
Terrorism alongside	5.0	4.6	5.0	4.6	5.0	4.6	-	-
Gangway / Linkspan / Connection failure	6.0	2.2	6.0	2.2	6.0	2.2	-	-
Failure of transfer of AIL	8.0	3.4	8.0	3.4	8.0	3.4	-	-
Quay supporting transfer of AIL	8.0	3.0	8.0	3.0	8.0	3.5	-	-
Navigation through Eastham Locks	6.0	2.7	-	-	-	-	-	-
Collision at lock gate	8.0	3.7	-	-	-	-	-	-
Vessels grounding moving on/off berth	-	-	6.0	2.6	6.0	2.6	-	-
Vandalism	-	-	-	-	6.0	1.6	-	-
Associated risk with passing through the WCC	-	-	-	-	6.0	2.4	-	-
Collision with Flintshire Bridge	-	-	-	-	5.0	4.1	-	-
Restriction in channel width (due to construction)	-	-	-	-	-	-	6.0	3.0
Contact with screen structure	-	-	-	-	-	-	6.0	2.0
Contact with crane barge	-	-	-	-	-	-	8.0	3.7
Vessel grounding	-	-	-	-	-	-	6.0	2.3
Fire on board crane barge	-	-	-	-	-	-	10.0	3.5
Construction Risks	-	-	-	-	-	-	15.0	9.4