ABP Lowestoft

Lake Lothing Third Crossing

pNRA Peer Review

April 2019





Innovative Thinking - Sustainable Solutions

ABP mer

Page intentionally left blank

Lake Lothing Third Crossing

pNRA Peer Review

April 2019

Document Information

Document History and Authorisation		
Title	Lake Lothing Third Crossing	
	pNRA Peer Review	
Commissioned by	ABP Lowestoft	
Issue date	April 2019	
Document ref	R.3190	
Project no	R/4566/01	
Date	**Version**	**Revision Details**
26/04/2019	1	Issued for client use

Prepared	Approved (QM)	Authorised (PD)
Adam Fitzpatrick (Author)	Monty Smedley	Nick Kitson
[redacted]	[redacted]	[redacted]

Suggested Citation

ABPmer, (2019). Lake Lothing Third Crossing, pNRA Peer Review, ABPmer Report No. R.3190. A report produced by ABPmer for ABP Lowestoft, April 2019.

Notice

ABPmer
Quayside Suite, Medina Chambers, Town Quay, Southampton, Hampshire SO14 2AQ
T: +44 (0) 2380 711844 W: http://www.abpmer.co.uk/

About ABPmer

ABPmer has 65 years port related research and consultancy experience, and appreciates that the successful design and operation of ports, harbours and wharfs is dependent on understanding both the marine environment and port operational requirements. ABPmer provides an independent port consultancy service, using the combined expertise of its diverse team to deliver services across a range of disciplines including: marine engineering, port design, safety, management, compliance audits, marine scientific services (biology, oceanography, geomorphology, hydrography) and data management. By integrating our capabilities, we deliver a tailor-made service to our clients. ABPmer employs 50 staff, located in offices in Southampton. All our work is undertaken in accordance with our Quality Management System certified to ISO 9001:2015 for the delivery of Environmental Consultancy and Research Services.

Authors

Adam Fitzpatrick (BSc, MNI) is a Senior Maritime Consultant providing a range of technical maritime work including support for nationally significant infrastructure projects, Development Consent Order (DCO) submissions, Harbour Authority powers advice and managing navigational risk. As part of this, Adam has provided expert witness services at Planning Inspectorate Hearings. He is an experienced mariner with operational knowledge of a range of ship and boat handling aspects. Adam was previously the Chief Officer for a towage company with responsibility for safety of operations, passage planning, maintaining a navigational watch and ensuring compliance with state and international regulations. Adam was also previously a deck officer for Carnival UK.

Monty Smedley (BSc) is a Principal Maritime Consultant with over 20 years' experience working as a consultant on port and navigation studies. He leads on ABPmer's navigation and marine risk studies, and is a Lead Auditor for Port Marine Safety Code compliance projects. Monty has managed a wide range of marine risk management studies including implementation of an ABP Group wide risk assessment and accident/incident reporting system, Stena Line Ports compliance audits, developing navigational guidelines, pilotage manuals and developing a reporting system for marine accident/incident. Monty is a graduate of Southampton Institute who studied at Warsash Maritime Academy, with a degree in Maritime Studies. In addition, Monty is also an experienced Sea Kayak Coach and a recreational yachtsman with a practical understanding of the water sports industry. Monty has co-authored this report.

Nick Kitson (IEng, MIET) is Head of Operations at ABPmer and has over thirty years' experience in modelling port, coastal and riverine processes and hydraulic structures and the collection and analysis of field data. Having managed projects on wave overtopping, sea defence stability, the hydraulic efficiency of marine structures and forces on floating bodies Nick has also managed and participated in ABPmer's contributions to a number of European research projects considering port environmental issues. Nick is responsible for the development and maintenance of the Company's Quality Management programme, which is certified to ISO 9001:2015 and which includes the development of quality and risk management control techniques for use in ABPmer's project delivery. Nick is qualified in mechanical engineering, is currently a member of the Institution of Engineering Technology and has served as a member of the BSI technical committee for standards in marine renewable energy. Nick is the Project Director and final signatory for this report.

Contents

Appendices

Figure

1 Introduction

Suffolk County Council (SCC) proposes to build a Bascule Bridge, spanning Lake Lothing in Lowestoft. The proposed scheme will provide new road infrastructure to relieve traffic congestion around Lowestoft town and will cross the estate of Associated British Ports (ABP) Port of Lowestoft. SCC expects to consent this project through the Development Consent Order (DCO) process. The location of the proposed new bridge is illustrated in Figure 1.

Taken from document reference: 1069948-WSP-MAR-LL-RP-MA-0010 (WSP, 2018)

Figure 1. Location of LLTC

SCC has produced a preliminary Navigational Risk Assessment (pNRA) (SCC, 2018,) which has been submitted into the DCO process with the objective of identifying:

- The hazards to navigation created by the presence of the scheme bascule bridge.
- The existing control and mitigation measures in place within the Port of Lowestoft.
- The risk levels associated with the identified hazards.
- Any additional control or mitigation measures that are required to ensure the risks are "as low as reasonably practicable" (ALARP).

ABP is the Statutory Harbour Authority (SHA) for the Port of Lowestoft and has requested that ABP Marine Environmental Research Ltd (ABPmer) carries out a peer review of the pNRA to verify that the methodology used to identify navigational hazards and corresponding mitigation measures is correct, appropriate and sufficient. ABP is the competent authority for navigational safety in the Port and so has a duty to ensure that any risks introduced through the construction, operation and decommissioning of the scheme are accurately identified and sufficiently mitigated.

2 Reference Document

ABPmer has reviewed APP-208 Document 6.7 'Preliminary Navigation Risk Assessment' (SCC, 2018). The pNRA document is set out in the following sections:

Section 1: Introduction;

Section 2: Project Description;

Section 3: Methodology;

Section 4: Hazard Identification;

Section 5: Existing Operational Measures;

Section 6: Risk Assessment; and

Section 7: Additional Mitigation Measures.

Notably, within the structure of the document there is no section that presents the current marine navigational environment as a baseline for the assessment. It is expected that any assessment would first seek to establish the baseline for navigation, which should include the analysis of marine traffic, marine incidents, emergency response and management procedures. The compilation of a baseline provides a level of understanding for the area of interest, to provide a basis for the assessment of hazards due to a new development in the area. It has to be questioned whether the conclusions reached by even a pNRA can be relied upon without an assessment of the existing marine baseline.

The following sections of this report comment on the adequacy of the analysis carried out within the pNRA.

2.1 Preliminary status of the NRA

In response to questions by the Examining Authority as part of the DCO process, SCC has stated:

> *"Submission of a Preliminary NRA as part of an application has precedent in both the Silvertown and Thames Tideway DCO projects."*

On review of the Preliminary NRA for Silvertown (TfL, 2016) and an example preliminary NRA for Thames Tideway (Thames Water, 2013), there are significant differences between the NRAs.

Putting aside the fact that neither of those projects contemplated the construction of a low bridge through the middle of an operational Port, they can, therefore, hardly be viewed as genuine precedents. The Silvertown and Thames Tideway NRAs have used methodology proposed by the Port of London Authority (PLA) in the capacity of Harbour Authority. It is evident that the PLA has been consulted throughout the process. This is shown by the following extracts.

Silvertown Tunnel Section S.1.7 states:

> *"The NIPRA is a live document and follows the preferred PLA methodology for NIPRA's, which is appropriate to the level of design completed to gain planning approval. This report shall be revisited and updated on commission of the detailed design by the design team and likewise throughout the construction phase by the Contractor in consultation with the PLA."*

Thames Tideway Blackfriars Bridge Foreshore Section 1.1.2 States:

> *"It was developed through liaison and consultation with Port of London Authority (PLA) and the other key stakeholders. It is intended to support the application for development consent and identify the navigational issues at the site and how these are to be managed. The process was used to inform the design of the permanent and temporary works and a number of measures to address navigational hazards have been embedded into the design."*

The methodology prescribed by the PLA to assess the navigational risk resulted in detailed and thorough assessments with substantial baseline information to substantiate the conclusions made. By comparison, the LLTC pNRA is lacking in detail and information to back up assumptions made.

Summary: Through comparison with the Silvertown Preliminary NRA and an example Thames Tideway Preliminary NRA it is considered that SCC have used the term 'preliminary' to justify a minimalistic approach. Compared to the example preliminary NRAs there is a lack of data, consultation and detail.

3 Methodology

This section details a critique of the methodology used within the pNRA.

3.1 Assessment process

Section 3.1.1 of the pNRA states:

> *"The preliminary NRA has been prepared to assess the additional risks to vessel navigation that will arise during and following construction of the proposed bridge. It does not look to assess existing risks present during navigation or risks outside the areas of influence of the bridge and its operation."*

A NRA must consider the hazards associated with marine construction and dredging craft operating at the scheme including transits of dredge vessels to/from disposal site, the passage of vessels engaged in towing and the physical presence of craft during the construction. The use of any marine craft during the project construction will present new hazards and potentially affect current hazards at the port. Without consideration of the activities and craft associated with the construction, the potential change in navigational risk cannot be appropriately assessed and mitigation measures will not be identified.

A Guide to Good Practice on Port Marine Operations (GtGP) (DfT/MCA, 2018) has been cited as the methodology used for the assessment. The GtGP process is intended to inform the port's Marine Safety Management System (MSMS) and for assessing port marine operations rather than a port related development project. The method proposed within the Maritime and Coastguard Agency (MCA) 'Methodology for Assessing the Marine Navigational Safety and Emergency Response Risks of Offshore Renewable Energy Installations' (OREI) (DfT/MCA, 2013) is appropriate for developments in the marine environment. Alternatively, the International Maritime Organisation (IMO) Formal Safety Assessment Approach (IMO, 2015) can be implemented. The OREI methodology was designed for use with the offshore wind industry but provides a detailed process for data gathering and the scope of assessment for a development. This is applicable to all developments in the marine environment.

Summary: Consideration of all direct and indirect impacts associated with the proposed LLTC development has not taken place. There is no assessment of the ancillary activities associated with the construction and maintenance of the development. This is a significant omission by the Applicant and a serious defect.

3.2 Consultation

The pNRA identifies that consultation meetings have taken place as part of the pNRA process and that a working group has been established. These steps are detailed in Section 3.2 of the pNRA as;

- *"November 2017 – project update and operational method workshop.*
- *May 2018 – project update and risk assessment methodology workshop."*

Notably, there have been no consultation meetings held to discuss specific hazards that may be associated with the scheme. Section 4.2.6 of the GtGP states:

> *"Harbour authorities are required to identify hazards and to develop or refine procedures and defences to mitigate those risks. It is good practice to establish channels of consultation which can be used for this purpose."*

It is important to use the local experience of port stakeholders to compile the hazard log, discuss the causes for the hazards and the potential consequences. This is emphasized in the GtGP Section 4.3.13 which states:

> *"Structured meetings need to be held during this process involving relevant marine practitioners at all levels. Port users, including groups such as PEC holders, commercial operators, leisure users, boatmen, tug operators, crew and possibly other regulators and agencies, is required. Where harbour authority areas abut, liaison with that authority is essential. There will also be benefit in consulting with other bodies including those who represent the users or workforce and neighbouring local authorities."*

The pNRA was not issued to stakeholders for comment and so has had no local input into the process. As the competent authority for navigational safety at the Port of Lowestoft, ABP should have been consulted at all stages of the process. The Silvertown Tunnel Navigational Issues and Preliminary Risk Assessment (TfL, 2016) Section S.1.7 states:

> *"The NIPRA is a live document and follows the preferred PLA methodology for NIPRA's, which is appropriate to the level of design completed to gain planning approval."*

This demonstrates an approach of consulting with the Harbour Authority at all stages of the assessment to gain approval before submission into the planning process.

Summary: There has been insufficient consultation regarding the identification of hazards as promoted by the referenced guidance on carrying out an NRA.

3.3 Guidance and references

A previous version of the GtGP was referenced within the pNRA, dated February 2017. When the pNRA was published, the current version of the GtGP was dated February 2018. Whilst this is not a significant issue in itself, it is indicative of a lack of attention to detail in preparing the pNRA for the proposed LLTC.

3.4 Data gathering

The data used for the pNRA are not listed in sufficient detail to assess their adequacy and they do not include any information that could be used to analyse the current vessel traffic in the area. This section should include detailed information on the data used, to show that an appropriate analysis of the current navigational environment has been carried out.

4 Hazard Identification

This section of the pNRA sets out the types of hazards that have been considered for the scheme. The pNRA considers three types of marine hazards, namely; collision, contact and grounding. This list of potential hazards is not considered to be appropriate for the construction and operation of the scheme and is considered to have arisen due to a lack of assessment regarding the activities associated with the construction, including use of marine craft and lifting operations. There should be consideration of the effect of all elements of the scheme and how port marine operations may affect the scheme. A list of hazards suggested by the OREI guidance is provided in Appendix A.

The hazards identified in the pNRA are not considered to be sufficient for the development. The lack of consideration of the impact of ancillary construction activities and associated craft is a serious omission. The Silvertown NRA has identified a range of hazards associated with construction craft which have then been considered in terms of controls. For reference, the Silvertown NRA Hazard log has been included in Appendix B.

4.1 General

Section 4.1.1 of the pNRA states:

> *"The following section outlines the hazards resulting specifically from navigation in the vicinity of an opening bridge and the primary causational effect which lead to such hazards."*

This statement implies that these hazards only apply to the scheme in the operational phase and not during construction.

Summary: This is not considered a sufficient level of assessment for a development.

4.2 Major cause of hazards

Causes are described for the three assessed hazards which can lead to a marine incident associated with the scheme. The causes do not include any interactions with either craft engaged in the construction, the effects of road traffic or pedestrians. It is considered that the list of identified causes is incomplete and doesn't fully represent the area and risks associated with the development.

The identified causes provide a basis for considering appropriate mitigation. It is important that all causes that may influence a hazard are identified to provide for a robust assessment.

Summary: The causes considered for the assessment within the pNRA are not considered to be sufficient for the development.

4.3 Incident frequencies

This section of the pNRA contains analysis of data obtained from the Marine Accident Investigation Branch (MAIB) and the results of a traffic survey. The data set has been reviewed throughout for incidents involving bridges. There has been no analysis of incident rates in the Harbour Area or any review of other relevant incident data, including that from the Royal National Lifeboat Institute (RNLI) or ABP that include incidents which would not be classed as MAIB reportable.

It is important to quantify and assess the marine incidents that occur in the local area to effectively consider the implications of a new development. The incident trends should be used to inform the frequency in which a marine incident may occur and the resulting consequences if it were to occur.

The assessment of traffic frequency does not consider the types of commercial vessels navigating in the Harbour Area. Different types of vessels have differing levels of manoeuvrability and ability to react to emergencies.

For example; tankers and bulk carriers usually have a single propeller and may not have a bow thruster, whereas crew transfer vessels (CTVs) are highly manoeuvrable and are able to stop in a short distance. The types of vessels manoeuvring near the development should be quantified to inform the pNRA.

Summary: Incident data for the local area has not been considered for the pNRA assessment. Knowledge of the local navigational environment informing the assessment is therefore limited.

5 Existing Operational Measures

This section of the pNRA describes the current practices in the Harbour Area that affect the safety of navigation. This section does not provide any information on the emergency response available, operational procedures or national and international standards.

The availability of emergency response options available in an area and the level of response available affects the potential consequences and impacts of a marine incident. Examples of available response options include oil spill response plans and equipment, local ambulance service and lifeboats. These should be considered when assessing the hazards associated with a development.

There are procedures used by the port to regulate operations in the Harbour Area. These procedures include a permit and permission to work systems, non-routine towage assessments and the requirement for contractors to complete risk assessment method statements. The main objective of these procedures is to implement controls for specific operations and decrease the likelihood of an incident occurring.

National and international regulations prescribe minimum standards of training and competence for crew and equipment for vessels. These regulations are mainly aimed at commercially operated vessels but the Royal Yachting Association (RYA) provides training levels for recreational users.

Summary: The list of existing mitigation measures considered for the assessment in the pNRA does not consider all relevant measures.

5.1 Navigation control

This section describes the level of control available for navigation in the Harbour Area. This section references that general directions can be used to control vessels. This power is not available to the Port of Lowestoft and is only obtained through inclusion in the port's Local Acts.

There are a range of different navigation marks available which provide information to vessels navigating in an area. These marks may be used to mark a channel, identify hazards to navigation or provide reference points to aid the positioning of vessels. The range of uses for these marks is large and so it is important to adequately identify the navigational marks in a Harbour Area and their purpose. There is no detail on the specific marks available or their purpose, in the pNRA.

The definition of a commercial vessel is vague and does not comment on the commercial vessels using the Harbour area or the characteristics of different types of vessels. There is no analysis in the pNRA of the types of commercial vessels navigating in the port.

There is no quantification of the size of the recreational community at the Port of Lowestoft or the different recreational activities that take place. It is common for recreational activities to be most frequent during summer months when weather conditions are more favourable and, conversely, there is a reduction in activity during the winter period. There should be a quantification of activity during these periods so that the seasonal differences can be considered in conjunction with the intended construction programme for the development. This requirement is detailed in the OREI guidance Section B.1.3 as:

"A key issue following collection and collation of data is the accurate representation of "Design Traffic Densities and Types" in the risk assessment. This raises the issue over whether average, peak or some intermediate values should be used as the base case and of the traffic limits appropriate to the assessment.

In some cases it might be appropriate to identify an average of the daily traffic densities and types for these routes or operations and for the survey area as a whole.

Routes and operational areas associated with and used by leisure craft, fishing vessels, aggregate dredging and other marine activities, should be identified. The seasonal variation of such traffic, if appropriate, should be closely examined and the data used to assess the specific risks relevant to these vessel types together with their interaction with larger vessels which might be navigating on through routes."

Summary: There is minimal detail given in the pNRA on 'navigation control' as a measure and how it may affect the level of risk associated with the development.

5.2 Vessel control

Section 5.2.1 of the pNRA states:

"Individual vessel movements for commercial traffic are controlled by the SHA through a Local Port Service (LPS); all vessels must notify a controller of any intended movements and are only permitted to proceed on receipt of confirmation."

This statement is incorrect, a LPS does not have any powers to regulate the movements within a Harbour Area unless;

- A Special Direction is issued by the Harbour Master or an appointed deputy; or
- There are requirements in the port Byelaws, General Directions or Harbour Directions for permission to be sought before proceeding.

A Special Direction is issued for a specific vessel to carry out a specific action for a limited set of reasons. Special Directions would not be used to regularly control traffic in a port. The Port of Lowestoft does not have powers to issue General Direction, does not currently have any issued Harbour Directions and there are no provisions in the Port of Lowestoft Byelaws for vessels to seek permission before proceeding so there is no mechanism for the LPS to control vessel traffic as stated by the pNRA.

The LPS will provide information to vessels navigating in the area including safety related information, vessel movements in the harbour and weather conditions at the port.

Summary: There is a lack of understanding by the Applicant of how a LPS operates and the powers available to a Harbour Master.

5.3 Depth control

Section 5.4.2 of the pNRA states:

> *"The SHA publishes depths for vessel passages and produces navigation charts detailing the actual bed levels for vessel Masters to plan movements."*

This statement is misleading, the SHA carries out hydrographic surveys used to produce soundings charts and passes this data to the United Kingdom Hydrographic Office (UKHO). The UKHO uses the survey data to compile navigational charts which are made available to those who wish to navigate in the area.

Summary: This section is misleading and demonstrates a lack of understanding of the related process.

6 Risk Assessment

This section of the pNRA describes the criteria used when assessing hazards and how risk scores have been calculated.

The severity descriptors consider the effects on people, property and environment. It is recommended that the consequences to reputation and loss of business are also considered as part of the process. This is recommended in Section 4.3.18 of the GtGP, which states:

> *"Risks and the impact of identified outcomes should normally be assessed against four criteria; the consequence to:*
>
> - *life (public safety);*
> - *the environment;*
> - *port and port user operations (business, reputation etc); and*
> - *port and shipping infrastructure (damage)."*

This section also lists the types of vessel considered in the Applicant's assessment, these are:

- Commercial (Large);
- Commercial (Small);
- Recreational (Motor); and
- Recreational (Sail).

There is no definition of what is considered to be a large and small commercial vessel. Whilst the size of a vessel is an important factor for commercial vessels, the type of vessel is of equal relevance as this provides information on its manoeuvrability, as previously noted.

Summary: The assessment in the pNRA does not cover damage to reputation or business as suggested by the available guidance.

7 Additional Mitigation Measures

This section of the pNRA describes the additional mitigation that has been identified as relevant for the scheme. The mitigation has been split into the stages of the scheme that it would be applied to.

7.1 Planning and design phase

There is a lack of information on how the identified items have been incorporated into the design of the scheme. Features such as the fendering and marking of the bridge should have been identified and determined through the mitigation measures described in this section. Listing the features that have been incorporated or amended due to the pNRA process would show that navigational safety has been considered throughout the planning process. This is not currently evident.

The outputs of a NRA process should be a detailed set of mitigation measures for inclusion into the various stages of construction and operation. The additional mitigation measures listed in the pNRA do not provide enough detail to evaluate the effects of the measures on the identified hazards.

Summary: There is no detail on what aspects of the design, if any, have changed due to the NRA process.

7.2 Construction phase

Section 7.2.1 of the pNRA states:

> *"Monitoring of potential changes in the level of risk to navigation caused by the construction of the new bridge should be undertaken, and early interventions to prevent risk to navigation becoming higher than As Low as Reasonably Practicable should be carried out should any potentially hazardous conditions be seen to be developing."*

This section of text does not provide any information on how the monitoring of risk to navigation would be carried out. This is not a commonly identified mitigation measure as there is not practical way to monitor levels of risk. There needs to be further detail on how the applicant intends to monitor levels of risk and evaluate it to identify if a hazardous situation is developing.

The notifications identified in this section place the responsibility for distribution of information on the SHA. To provide Notices to Mariners at the appropriate level to inform port users, there needs to be coordination of construction activities with the SHA. In practice, this means that schedules should be provided to the SHA and a designated point of contact provided once a construction contractor is appointed.

Proposals regarding lighting and marking of the construction works need to be the subject of consultation with Trinity House Lighthouse Service (THLS) in addition to the SHA. As the General Lighthouse Authority, THLS will provide guidance on markings and consent the design. If consultation has not been carried out, this should be completed before the scheme design progresses further.

Summary: The suggestion of monitoring navigational risk as a control is impractical and shows a lack of understanding of the range of hazards associated with port marine operations.

7.3 Operation phase

Section 7.3.5 states:

> *"All navigational risk assessments are live documents and must be reviewed and revised in light of any changes in conditions to remain effective, as such the final bridge NRA should be incorporated into the wider SHA's Port Navigation Risk Assessment and revised and updated in line with the Ports Marine Safety Management System."*

This paragraph places the responsibility for the additional risk on the SHA. The SHA has not been consulted on the pNRA and the hazard identification process, it is unrealistic to assume that any additional responsibility should, or would, be accepted. If this is the intended outcome, the SHA will need to be satisfied that the eventual NRA correctly identifies all the hazards and the corresponding mitigation measures.

8 Principal Weaknesses

This section highlights the main areas of weakness identified through review of the Applicant's pNRA, specifically:

- There has been a failure to identify and establish the current marine navigational environment as a baseline for the assessment;
- There has been a failure to identify and consider all direct and indirect impacts associated with the LLTC proposal;
- There has been no consideration of vessel movements and construction activities associated with the development meaning the assessment is incomplete.
- During the hazard identification process, ABP as Harbour Authority and local port users have not been consulted on the hazard log (hazard identification) process.
- There is minimal description of data sources used for the assessment. There is no analysis of the local navigational environment and not all relevant data sources are used.
- There are several sections of the pNRA which show a lack of understanding of port operations, legislation and powers.
- Compared with the Preliminary NRAs cited as a precedent, the Applicant's pNRA does not evidence:
  - a sufficient level of detail;
  - comprehensive hazard identification;
  - genuine consultation; and
  - the use of NRA guidance methodology.

The pNRA has significant omissions, insufficient detail and insufficient consideration of the hazards, their causes and control measures. The weaknesses in the pNRA result in a document that is not fit for purpose. The purpose of a NRA is to assess the level of risk and determine appropriate mitigation. The pNRA in its current form cannot be used by the Harbour Authority for this purpose. The PMSC requires that the risk associated with port operations is 'as low as reasonably practicable'. This cannot be determined through application of the current pNRA.

The LLTC pNRA has been compared with the 'preliminary' NRA produced for the Silvertown Tunnel and the Thames Tideway projects. These NSIP projects were cited as providing a precedent for a preliminary version of the NRA. The Silvertown Tunnel and Thames Tideway 'preliminary' NRA documents, whilst being preliminary, provided a detailed level of assessment following the PLA's methodology. The Applicant's pNRA in contrast, does not include the expected level of assessment or detail and does not provide an output that can be used to identify suitable mitigation to address the navigational risk of the scheme.

9 References

DfT/MCA 2013. Methodology for Assessing the Marine Navigational Safety and Emergency Response Risks of Offshore Renewable Energy Installations (OREI). Department for Transport (DfT) and Maritime Coastguard Agency (MCA), published 2013.

DfT/MCA, 2018. Port Marine Safety Code – A Guide to Good Practice on Port Marine Operation. Department for Transport (DfT) and Maritime Coastguard Agency (MCA), published February 2018.

IMO, 2015. Revised Guidelines for Formal Safety Assessment (FSA) for use in the IMO rule making process. International Maritime Organization. 18 June 2015.

ISO 9001:2015: Quality Management Systems. International Organization for Standardisation.

SCC, 2018. Lake Lothing Third Crossing - Preliminary Navigation Risk Assessment. Suffolk County Council, Document 6.7 (PINS Reference TR010023), June 2018.

TfL, 2016. Silvertown Tunnel Environmental Statement Appendix 7.A (6.3.7.1) Navigational Issues and Preliminary Risk Assessment. Transport for London (TfL), published April 2016.

Thames Water, 2013. Navigational Issues and Preliminary Risk Assessment: Blackfriars Bridge Foreshore. Thames Water, published January 2013.

WSP, 2018. Lake Lothing Third Crossing Commentary on ABP Document LLTC Emergency/Contingency Berth (document reference 1069948-WSP-MAR-LL-RP-MA-0010-P02). Draft Confidential. October 2018

10 Abbreviations/Acronyms

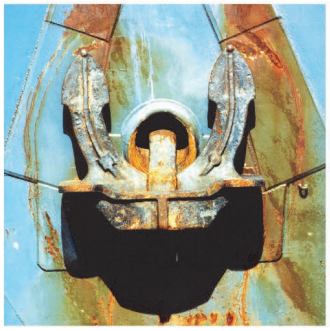
ABP	Associated British Ports
ALARP	As Low As Reasonably Practicable
CTV	Crew Transfer Vessel
DCO	Development Consent Order
DfT	Department for Transport
FSA	Formal Safety Assessment
GtGP	A Guide to Good practice on Port Marine Operations
IMO	International Maritime Organisation
LLTC	Lake Lothing Third Crossing
LOHI	Loss of Hull Integrity
LPS	Local Port Service
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MSMS	Marine Safety Management System
NAABSA	Not Always Afloat but Safely Aground
NIPRA	Navigational Issues and Preliminary Risk Assessment
NRA	Navigational Risk Assessment
NSIP	Nationally Significant Infrastructure Projects
OREI	Offshore Renewable Energy Installation
PEC	Pilot Exemption Certificate
PLA	Port of London Authority
PMSC	Port Marine Safety Code
pNRA	preliminary Navigation Risk Assessment
RNLI	Royal National Lifeboat Institute
RYA	Royal Yachting Association
SCC	Suffolk County Council
SHA	Statutory Harbour Authority
TfL	Transport for London
THLS	Trinity House Lighthouse Service
TML	Transportable Moisture Level
UKHO	United Kingdom Hydrographic Office

Cardinal points/directions are used unless otherwise stated.

SI units are used unless otherwise stated.

Appendices




Innovative Thinking - Sustainable Solutions

ABP mer

A Hazard Definitions

Category	Description
Accidents to personnel	Accidents to personnel are defined as those accidents which cause harm to any person on board the vessel e.g. crew, passengers, stevedores; which do not arise as a result of one of the other accident categories. Essentially, it refers to accidents to individuals, though this does not preclude multiple human casualties as a result of the same hazard, and typically includes harm caused by the movement of the vessel when underway, slips, trips, falls, electrocution and confined space accidents, food poisoning incidents, etc.
Accidents to the general public	Accidents to the general public are defined as those accidents which lead to injury, death or loss of property amongst the population ashore resulting from one of the other ship accident categories.
Allision	Defined as a violent contact between a vessel and a fixed structure.
Capsizing	The overturning of a vessel after attaining negative stability.
Collision	Collision is defined as a vessel striking, or being struck by, another vessel, regardless of whether either vessel is under way, anchored or moored; but excludes hitting underwater wrecks.
Contact	Contact is defined as a vessel striking, or being struck by, an external object that is not another vessel or the sea bottom. Sometimes referred to as impact.
Explosion	An explosion is defined as an uncontrolled release of energy which causes a pressure discontinuity or blast wave.
Fire	Fire is defined as the uncontrolled process of combustion characterised by heat or smoke or flame or any combination of these.
Flooding	Flooding is defined as sea water, or water ballast, entering a space, from which it should be excluded, in such a quantity that there is a possibility of loss of stability leading to capsizing or sinking of the vessel.
Foundering	To sink below the surface of the water.
Grounding	Grounding is defined as the ship coming to rest on, or riding across underwater features or objects, but where the vessel can be freed from the obstruction by lightening and/or assistance from another vessel (e.g. tug) or by floating off on the next tide.
Hazardous substance accidents	Hazardous substance accidents are defined as any substance which - if generated as a result of a fire, accidental release, human error, failure of process equipment, loss of containment, or overheating of electrical equipment - can cause impairment of the health and/or functioning of people or damage to the vessel. These materials may be toxic or flammable gases, vapours, liquids, dusts or solid substances.

Category	Description
Loss of hull integrity	Loss of Hull Integrity (LOHI) is defined as the consequence of certain initiating events that result in damage to the external hull, or to internal structure and sub-division, such that any compartment or space within the hull is opened to the sea or to any other compartment or space.
Machinery related accidents	Machinery related accidents are defined as any failure of equipment, plant and associated systems which prevents, or could prevent if circumstances dictate, the ship from manoeuvring or being propelled or controlling its stability.
Payload related accidents	Payload related accidents include loss of stability due to cargo shifting and damage to the vessel's structure resulting from the method employed for loading or discharging the cargo. This category does not include incidents which can be categorised as Hazardous Substance, Fires, Explosions, Loss of Hull Integrity, Flooding accidents etc.
Stranding	Stranding is defined as being a greater hazard than grounding and is defined as the ship becoming fixed on an underwater feature or object such that the vessel cannot readily be moved by lightening, floating off, or with assistance from other vessels (e.g. tugs).

B Silvertown Tunnel Hazard Log

Hazard ID	Category	Phase	Hazard Title	Hazard Causes
1	Contact	C of temporary structures	Contact of construction vessels/ plant with existing structures (during construction).	Lack of visibility from coning positions Lack of manoeuvrability Lack of power Interaction with river topography (bank effect, squat, etc.) High winds Buoy or moorings out of position Inadequate Master/lack of local knowledge/human error Failure of passage Plan Traffic congestion Restricted visibility Result of avoiding 3rd party vessel Mechanical defect/failure Fatigue
2	Contact	O and D of temporary structures	Contact of commercial and freight with temporary structures.	Commercial freight traffic not aware of changes to river morphology Inadequate master/lack of local knowledge Restricted visibility Fatigue Mechanical defect/failure
3	Contact	O and D of temporary structures	Contact of recreational and service vessels with temporary structures	River users and service vessels not aware of changes to river morphology Recreational/service vessel operators not aware of works Restricted visibility
4	Contact	O and D of temporary structures	Contact of Class V passenger vessels with temporary structures.	Class V passenger vessel operators not aware of changes to river morphology Class V passenger vessel operators not aware of works Restricted visibility
5	Collision	C/O/D	Collision of construction vessels/ plant with Class V passenger vessel	Lack of visibility from coning positions Lack of manoeuvrability High winds Buoy or moorings out of position Failure to passage Plan Traffic congestion Restricted visibility Fatigue Result of avoiding 3rd party vessel Mechanical defect/failure Class V vessels unaware of works Class V vessel not aware of changes to river topography.

Hazard ID	Category	Phase	Hazard Title	Hazard Causes
				Interaction with river topography (bank effect, squat, etc.) Inadequate Master/lack of local knowledge/human error
6	Collision	C/O/D	Collision of construction vessels /plant with recreational and service vessel	Lack of visibility from coning positions Lack of manoeuvrability Recreational users not aware of works Interaction with river topography (bank effect, squat, etc) Buoy or moorings out of position Inadequate Master/lack of local knowledge/human error Failure to passage Plan Traffic congestion Restricted visibility Result of avoiding 3rd party vessel Mechanical defect/failure Fatigue
7	Collision	C/O/D	Collision of construction vessels/ plant with commercial and freight	Lack of visibility from coning positions Lack of manoeuvrability Lack of power Interaction with river topography (bank effect, squat, etc) High winds Buoy or moorings out of position Inadequate Master/lack of local knowledge/human error Failure to passage Plan Traffic congestion Restricted visibility Result of avoiding 3rd party vessel Mechanical defect/failure Fatigue
8	Collision	C/O/D	Collision of construction vessels/ plant with construction vessels/plant.	Lack of visibility from coning positions Lack of manoeuvrability Lack of power High winds Buoy or moorings out of position Inadequate Master/lack of local knowledge/human error Failure to passage Plan Traffic congestion Restricted visibility Result of avoiding 3rd party vessel Mechanical defect/failure Fatigue
9	Grounding	C/O/D	Grounding of construction vessels within project vicinity	Lack of visibility from coning positions Lack of manoeuvrability Lack of power

Hazard ID	Category	Phase	Hazard Title	Hazard Causes
				Interaction with river topography (bank effect, squat, etc) High winds Restricted visibility Inadequate Master/lack of local knowledge/human error Tidal Cuts Vessel taking avoidance action due to pending action. Incorrect chartered depth/unknown hazard to navigation Failure to passage plan Inability to abort passage
10	Grounding	C/O/D	Grounding of construction barges on NAABSA Berth	Lack of visibility from coning positions Lack of manoeuvrability Lack of power Interaction with river topography (bank effect, squat, etc) High winds Unsuitable design of NAABSA for planned barge size Inadequate Master/lack of local knowledge Tidal Cuts Vessel taking avoidance action due to pending action. Incorrect chartered depth/unknown hazard to navigation Failure to passage plan Inability to abort passage
11	Other	C/O/D	Blackout, loss of propulsion	Flotsam Mechanical defect/ Failure Lack of maintenance/maintenance plan
12	Other	C/O/D	Vessel swinging.	Vessel incorrectly secured/Inadequate mooring ropes and/or securing arrangements Excessive wash Insufficient space for swing High moisture content limits of spoil
13	Other	C/O/D	Personal injury: Dropped objects Freight and commercial.	Vessel straying into exclusion area Failure of lifting equipment Object dropped by a worker Freight/ commercial unaware works
14	Other	C/O/D	Personal injury: Dropped objects Class V Passenger vessels	Vessel straying into exclusion area Failure of lifting equipment Object dropped by a worker Class V vessel not aware of works

Hazard ID	Category	Phase	Hazard Title	Hazard Causes
15	Other	C/O/D	Personal injury: Dropped objects, recreation/service vessels.	Vessel straying into exclusion area Failure of lifting equipment Object dropped by a worker
16	Break Out	C/O/D	Breakout of mooring during construction, operation and dismantlement jetty/NAABSA berth.	Vessel incorrectly secured/inadequate mooring ropes/and/or securing arrangements Moorings part Excessive wash Loss of control during manoeuvring
17	Other	C/O/D	Construction plant/ dry bulk cargo vessels /Barges congestion during Thames Barrier Closure	Lack of traffic forecast Traffic threshold volumes undefined Lack of local knowledge Lack of safe berthing options Lack of safe anchoring zones Inadequate Master/Lack of local knowledge
18	Other	C/O/D	Failure of marine construction equipment	Scour leading to undermining of temporary works Failure of jack up or spud barge Failure of lifting equipment
19	Other	C/O/D	Terrorist Threat	Malicious Action on temporary structures or vessels
20	Other	C/O	Damage to river wall following dredging/berth levelling activities.	Lack of information of existing condition of river wall Inadequate design and/or construction of NAABSA berth levelling depths
21	Other	C/O/D	Failure of existing Thames River wall during construction operations.	Lack of information of existing condition of river wall Landside construction plant working too close to river wall edge Imposed loads too high for river wall capacity
22	Other	C/O/D	Excessive Wash	Inadequate Master/lack of local knowledge Lack of manoeuvrability Failure to Passage Plan Lack of traffic forecast Lack of safe berthing options Lack of safe anchoring zones Inadequate vessels for work requirements
23	Other	Operation	Excessive of unworkable transport moisture limit	Undefined Cargo TML Insufficient spoil stockpiling capacity

C Construction phase
O Operation phase
D Decommission phase

Contact Us

ABPmer

Quayside Suite,
Medina Chambers
Town Quay, Southampton
SO14 2AQ

T +44 (0) 23 8071 1840
F +44 (0) 23 8071 1841
E enquiries@abpmer.co.uk

www.abpmer.co.uk