| | |
|---|---|
| **From:** | CARPENTER Matthew |
| **To:** | "Thanet Extension"; Thanet Extension |
| **Cc:** | OWEN Robbie |
| **Subject:** | Port of Tilbury London Limited and London Gateway Port Limited Deadline 4C submission [PM-AC.FID3789724] |
| **Date:** | 10 April 2019 20:44:32 |
| **Attachments:** | PoTLL and LGPL - Deadline 4C submission.PDF<br>Appendix 1 HRW Report.PDF |

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Manveer, Kate,

Please see attached the Deadline 4C submissions of PoTLL and LGPL.

In accordance with the Rule 8(3) letter dated 4 April 2019 we shall also forward the contents on to the listed IPs who we have been able to obtain contact details for.

Kind regards,

**Matthew Carpenter**
Solicitor
for Pinsent Masons LLP

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**APPLICATION BY VATTENFALL WIND POWER LIMITED**

**FOR A DCO FOR THE THANET EXTENSION OFFSHORE WIND FARM**

# UPDATED POSITION OF PORT OF TILBURY LONDON LIMITED AND LONDON GATEWAY PORT LIMITED

**INCLUDING COMMENTS ON THE ADDENDUM NAVIGATION RISK ASSESSMENT**

**SUBMITTED AT DEADLINE 4C (10 APRIL 2019)**

## SUMMARY

1) London Gateway Port Limited (LGPL) and Port of Tilbury London Limited (POTLL) wish to participate in ISH8 and will be represented by the following: Robbie Owen and Matthew Carpenter (Pinsent Masons LLP); Vincent Crockett (HR Wallingford); and Trevor Hutchinson (TH Planning and Transportation) (should additional attendees from the two ports be required to participate then this will be confirmed in due course).

2) This statement provides an update on the position of LGPL and POTLL in advance of ISH8. At Appendix 1 is a draft report written by HR Wallingford for the two ports: "*Support to London Gateway and Port of Tilbury on Navigation Aspects"* (the HRW Report). Since the HRW Report was commissioned, the Applicant has submitted the Navigation Risk Assessment Addendum (NRAA) (received by the two Ports at Deadline 4B on 5 April 2019). Due to timescales, the HRW Wallingford Report does not yet consider the contents of the NRAA. Had the NRAA been submitted at Deadline 4 (as was anticipated) then the two ports would be in a stronger position to comment on it by this point in the examination. Nevertheless, in order to assist the ExA as far as possible, LGPL and POTLL have set out some initial comments on the NRAA in this document below.

3) The NRAA has been developed in order to assess the acceptability of the Structures Exclusion Zone (SEZ) proposed by the Applicant at Deadline 4 (REP4-018). The ports acknowledge that the SEZ provides a concession and an improvement on the previous position taken by the Applicant, however until such time as the assessment provided to support the SEZ is sufficiently robust to determine the impacts on shipping and navigation, the two ports are unable to comment fully on whether the SEZ is acceptable or not. As set out below, the two ports are not yet satisfied by the contents of the NRAA.

4) In addition, POTLL and LGPL note that the Applicant has not proposed a reduction in the Order Limits and has sought to deal with this through the use of an exclusion zone as an alternative. The two ports are yet to be convinced as to why using an SEZ is an appropriate means to seek to reduce the impact of the extension to the offshore wind farm and therefore wish to understand why the Order Limits should not, instead, be reduced.

## COMMENTS ON THE NAVIGATION RISK ASSESSMENT ADDENDUM (NRAA)

5) LGPL and POTLL have carried out an initial review of the document titled *"Annex 1 to Deadline 4B Submission: Addendum to Navigation Risk Assessment"* submitted at Deadline 4B by the Applicant.

### Inter Party Workshops and Discussions

6) LGPL and POTLL have also been party to discussions regarding the SEZ and NRAA, including presence at the 'Post Hearing Workshop' on 27 February 2019, the 'Hazard Workshop' on 29 March 2019 and the 'call – review of hazard workshop scores' on 2 April 2019. The following paragraphs reflect, and are consistent with, the feedback given by LGPL and POTLL to the Applicant during such discussions.

**General Approach**

7) LGPL and POTLL's preferred approach is to see a more detailed assessment of risk scores based upon combinations of vessel types and categorisation of vessels which takes into accounts factors beyond only vessel length (such as draft and handling characteristics). It is understood, however, that the Applicant has used a significantly narrower categorisation of vessel types and combinations. LGPL and POTLL are prepared to accept the approach taken, with the caveat that scoring of the risks (i.e. the consequence and likelihood) must take a robust approach in considering the worst-case of the potential combinations/categories.

**Future Traffic Growth**

8) Paragraphs 119 to 125 of the NRAA discuss future traffic growth with reference to statistical data for the period 1994 to 2017 (represented by Figure 26). Therein it is suggested that the growth in the number of cargo ship calls to the Port of London has been relatively flat over this period. Paragraph 120 acknowledges the additional committed facilities at DPWLG and POTL, however it suggests that "*these ports individually make up a minority of vessel movements in the Thames Estuary"*.

9) The two ports refer to the HRW Report, Table 4.1 which provides a summary of container ship calls at selected UK ports for the period 2009 to 2017. This demonstrates that the number of container ship calls to the ports of London has increased from a level of approximately 1,000 calls per annum, in 2009 through to 2013, to over 1900 calls per annum in 2017, an increase of approximately 90%. It is to be noted that the start of this period of rapid growth corresponded with the opening of the first berth at DPWLG and that the third berth did not become operational until Q2 2017. With consent for up to seven berths (and a current intention to develop six) at DPWLG, it is clear that the potential for a further significant increase in the number of container ship calls to the Port of London exists within the 'reasonable planning horizon'. POTLL and LGPL have provided additional information in respect of future traffic growth generally (e.g. with construction of 'Tilbury2', consented in February 2019, already well underway) during the course of the examination and in particular in their Deadline 2 submission (REP2-050).

10) Table 1 of REP2-050 provided information on the total number of ship calls to DPWLG and LGPL in the period 2015 to 2018. It is to be noted that the number of ship calls presented therein for the 2017 calendar year (3872) represents approximately 50% of the total number of ship calls to "London Ports" demonstrated by Figure 26 of the NRAA in the corresponding year. Thus, we contend that the statement at Paragraph 120 of the NRAA is misleading and that, in fact, ship calls to DPWLG and POTLL, which are the subject of rapid growth as discussed in paragraph 9 above, comprise a very significant proportion of all ship calls to London Ports.

11) Minded by the above the two ports remain of the view that the 10% allowance for future growth applied to the NRA and NRAA is completely insufficient to account for potential future traffic growth to the ports of London (and critically transiting the inshore route and

utilising the NE Spit pilot boarding station) in the 'reasonable planning horizon', which the Examining Authority defined in ISH2 Action Points (EV-003) as "+35 years from 2019". In respect of future traffic growth the NRAA is therefore seriously deficient.

**Shipping Traffic Mix**

12) LGPL and POTLL do not agree with paragraph 22 of the NRAA, which concludes that the data presented in the NRA was representative of the breakdown of vessels using the study area. The assessment in the NRAA now considers vessels of up to 333m LOA which gives some greater comfort with regard to vessel transits via the inshore channel however the analysis of the breakdown of vessels remains deficient. With regard to pilotage operations, it was DPWLG and POTLL's understanding that consideration of vessels of up to 400m LOA and 11.5m draft was agreed at the Post Hearing Workshop on the 2nd February 2019, however it is not evident that this has been borne out in the NRAA hazard scoring.

13) With reference to survey data, the NRAA highlights that less than 1% of vessels transiting the inshore route are in excess of 240m. It should be noted however that this 1% represented 78 vessels. Should there be a requirement for vessels over 240m to be re-routed to the east of the TEOWF, LGPL and POTLL therefore contend that this would represent a material economic impact which should be considered, particularly in light of the potential growth in ship calls in the 'reasonable planning horizon' discussed in paragraphs 8 to 11 above. The economic cost diversion of ships from the inshore route to the east of the TEOWF is discussed in more detail in the HRW Report.

14) LGPL and POTLL will consider the final response of the shipping and pilotage organisations who are Interested Parties in the examination process in respect of the appropriateness of the hazard scores (consequence and likelihood). It is noted, however, that throughout the discussions with the Applicant and IPs regarding the NRAA scoring, LGPL and POTLL have contended that the scoring applied to the consequence for stakeholders in the most likely scenario (the concept of which is set out in Table 17 and paragraph 81 of the NRAA) is significantly understated. For example, a collision between two vessels (which could be two Class 1 vessels or a Class 1 vessel with, for example, a fishing vessel) is scored as "Category 1" (defined by Table 17 of the NRAA as "negligible" with an associated cost of under £10k). It is the contention of LGPL and POTLL that the cost to business of such an incident could be significantly in excess of this (particularly when taking account of matters such as reputational damage, vessel damage assessment, accident investigation and associated loss of sailing time). The same applies to the grounding of a class 1 vessel which LGPL and POTLL contend has the potential to significantly exceed the stated "Category 2" (Minor – costs £10k to 100k).

15) Paragraph 153 of the NRAA acknowledges these concerns, but does not assess in sufficient detail to allow the reader to develop an understanding of the effect on risk scores. For example, increasing the consequence score to "Minor level" only increases the score for collision. It does not increase the score for grounding, which LGPL and POTLL contend should be 'Moderate'.

**Pilotage Simulation Study**

16) Whilst the NRAA gives more comfort than the NRA with regard to the transit of ships via the inshore route, LGPL and POTLL remain unconvinced by the NRAA with regard to pilot boarding operations. In this regard a full bridge simulation study is considered necessary. It is noted that the NRAA (paragraph 163) has also endorsed such a study, but considers it

acceptable to defer its completion until the (post DCO) detailed design stage. We do not agree with this suggestion and believe that the study is required to inform the ExA's consideration of the application for development consent.

**Conclusions**

17) Without the necessary adjustments to the NRAA including a pilotage simulation study being carried out, it is not possible for the IPs, the ExA and the Secretary of State to make a reasoned assessment of the navigation risks and economic impacts of the project.

18) For the reasons outlined, the two Ports are unable to comment fully on the acceptability of the SEZ proposed by the Applicant.

19) As such, at this stage the impacts of the project cannot be examined fully and therefore the ExA is not yet in a position to assess the effects of the application in accordance with what the National Policy Statement EN-3 requires.

20) Further information in respect of policy considerations is set out in LGPL and POTLL's Deadline 3 submission (REP3-070) in the Planning Policy Position Paper. The two ports note that the Applicant produced "*Appendix 5 to the Deadline 4 Submission - Responses to comments on Shipping Policy Considerations"* (REP-007) at Deadline 4 in which it commented on the policy position. The two ports do not agree in particular with the Applicant's characterisation of the applicability of NPS EN-3 paragraphs 2.6.161 – 2.6.163. Further submissions will be made on this point if necessary however it is understood that this will be discussed in more detail at ISH8.

**Appendix 1**

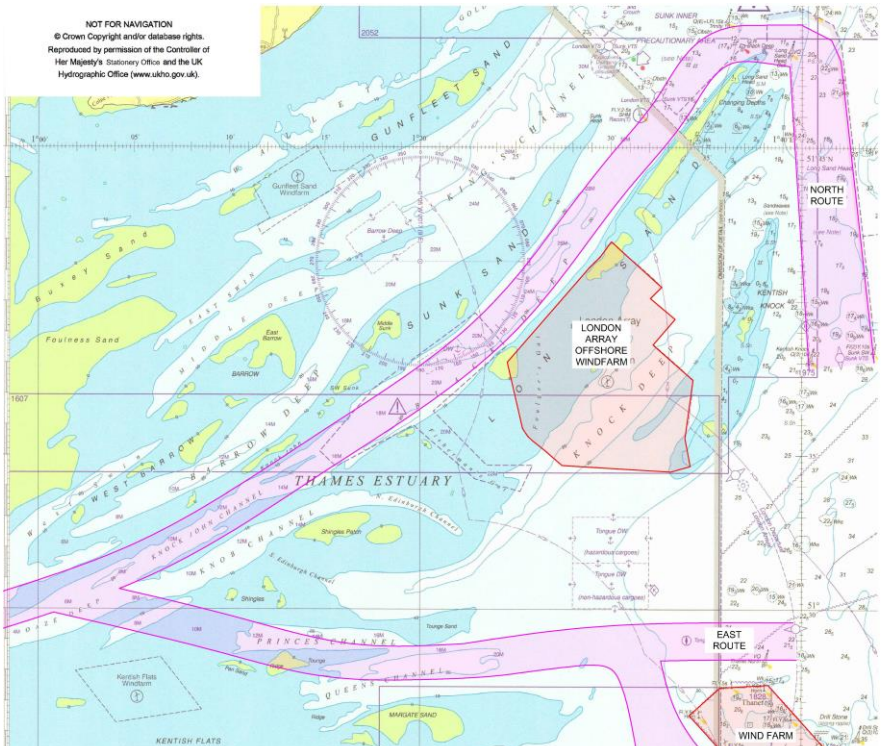
**Draft report: Support to London Gateway and Port of Tilbury on Navigation Aspects, HR Wallingford**

HR Wallingford
Working with water



# Thanet Extension Offshore Wind Farm

## Support to London Gateway and Port of Tilbury on Navigation Aspects




DLR4527-RT017-R03-00

April 2019

# Document information

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| Document permissions | Confidential - client |
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| Project name | Thanet Extension Offshore Wind Farm |
| Report title | Support to London Gateway and Port of Tilbury on Navigation Aspects |
| Report number | RT017 |
| Release number | R03-00 |
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| Client | DP World London Gateway Limited and Port of Tilbury London Limited |
| Client representative | Trevor Hutchinson |
| Project manager | David Middlemiss |
| Project director | Dr Mark Lee |

# Document history

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| 10 Apr 2019 | 03-00 | VPC | MPD | MPD | Text expanded to take account of clent comments. |
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This unsigned document has not been formally checked and authorised for release. Until it has been reviewed and signed off by qualified technical staff within HR Wallingford, this document must not be considered complete or final.

# Summary

Vattenfall Wind Power Limited is seeking development consent to extend its existing Thanet Offshore Wind Farm (TOWF) by installing additional wind turbines within a new development area adjacent to the existing wind farm creating Thanet Extension Offshore Wind Farm (TEOWF). The proposed extension is currently being examined by a panel on behalf of the Secretary of State. It is likely that the extension of the offshore wind farm will extend into one or more of the shipping routes passing the existing wind farm and/or reduce the space available along shipping routes that currently pass the wind farm, with consequent impacts on the NE Spit pilot station. Accordingly, any navigational impacts arising from the reduced space need to be examined.

Marico Marine, on behalf of Vattenfall, have undertaken a Navigation Risk Assessment (NRA) for the application for development consent for the proposed expansion of TOWF. The NRA is a comprehensive document, however, it has several shortcomings and the reader is led astray regarding the impacts of the TEOWF on the ports located in the Thames Estuary in the assessment. The NRA does not mention or assess the potential impacts of the TEOWF on London Gateway Port or the Port of Tilbury, the two most significant ports on the Thames.

As part of the process of engaging with the examination of the application for development consent, London Gateway Port Limited (London Gateway) and the Port of Tilbury London Limited (Port of Tilbury) appointed HR Wallingford to provide support on particular navigation aspects.

This report, prepared by HR Wallingford, provides a context for considering future growth in ship numbers at London Gateway and the Port of Tilbury for the relevant business sectors, and summarises the relevant traffic levels . The number of vessels using the inshore route between the TOWF and the Kent coast is presented for these two ports, along with the locations at which pilots are embarked or disembarked. The analysis shows that the largest vessels using the inshore route are up to 333m in length, with a 10,000 TEU geometric capacity. The largest vessels using the NE Spit Pilot Station are 333m in length, with over 11,000 TEU geometric capacity.

From a navigation standpoint, extension of the offshore wind farm may require changes to current marine operations including the following:

- For one or more routes, inbound and outbound sailing distances may increase, resulting in additional sailing time, with consequent impacts on time, money, fuel and delays
- For one or more routes, there may be less space available for pilot transfer operations, with consequent impacts on risk
- For one or more routes, the reduced space may deter masters from using a particular route in favour of a longer, but safer route, with consequent pressures on congestion on this longer route.

The review of the Vattenfall NRA undertaken by HR Wallingford finds that the NRA does not appreciate the strategic importance of London Gateway Port and the Port of Tilbury, with significant additional committed growth, and it completely fails to consider the potential economic impacts of the TEOWF on the Thames Estuary. No consideration was given to the likelihood of ships of over 11,000 TEU geometric capacity using the inshore route, and this was a shortcoming of the Pilot Transfer Bridge Simulation that has been used to

inform the NRA. The review concludes that the NRA undertaken to support the application for the TEOWF should be repeated taking into account larger vessels and increased traffic volumes.

Following receipt of comments from several interested parties, Vattenfall has sought to reduce the potential impact on the two ports' marine operations by introducing a structures exclusion zone (SEZ), principally at the north west corner of the expanded wind farm. This SEZ was submitted to the examination at Deadline 4 under reference REP4-018 and an NRA Addendum has been produced by Vattenfall, but did not accompany the submission of the SEZ. In the time available for submission of this report HR Wallingford have not been able to consider whether the additional space provided by the SEZ addresses the primary concerns of the two ports, from a navigation standpoint. Such analysis of the NRA Addendum will be carried out as soon as possible. Nevertheless, it is understood that the NRA Addendum is not based upon real time navigation simulation studies and it is considered that without such studies it will be incomplete.

# Contents

## Figures



## Tables

# 1. Introduction

Vattenfall Wind Power Limited (the Applicant) is seeking development consent to extend its existing Thanet Offshore Wind Farm (TOWF) by installing additional wind turbines within a new development area adjacent to the existing wind farm creating Thanet Extension Offshore Wind Farm (TEOWF). The proposed extension is currently being examined by a panel on behalf of the Secretary of State. It is likely that the extension of the offshore wind farm will extend into one or more of the shipping routes passing the existing wind farm and/or reduce the space available along shipping routes that currently pass the wind farm, with consequent impacts on the NE Spit pilot station. Accordingly, any navigational impacts arising from the reduced space need to be examined.

As part of the process of engaging with the examination of the application for development consent, London Gateway Port Limited (London Gateway) and the Port of Tilbury London Limited (Port of Tilbury) have appointed HR Wallingford to provide support on particular navigation aspects.

# 2. HR Wallingford

## 2.1. Overview

HR Wallingford is an independent company, established for over 70 years, offering specialist consultancy and applied research services in civil engineering and environmental hydraulics to clients worldwide. The company has gained an international reputation for a scientific and engineering excellence, and has no vested interest in any particular methods of solving problems, only in finding suitable solutions.

With a staff of over 2350 including engineers, scientists, mathematicians, technicians and support staff, a wide range of skills and expertise is available. HR Wallingford is the UK national centre for civil engineering hydraulics. Our fields of activity cover:

- Navigation and vessel movement
- Dredging and disposal
- Ports and harbours
- Marine and coastal and structures including locks
- Estuary processes and management
- Coastal processes and management
- Environmental modelling and assessment
- Irrigation and water resources
- Pipelines and outfall engineering
- River basin management.

HR Wallingford has a specific team of engineers dedicated to providing practical engineering services to support the specialist technical capabilities for which HR Wallingford is renowned. The team's background in consulting engineering and construction means that it has extensive experience in ports, coastal and tidal

engineering projects. This team works closely with both end client and consulting engineers and architects to develop optimum project solutions. Through our continuing research projects and close contact with government and expert organisations, our work represents best current practice and is consistent with current and imminent national and international legislation. This coupling of practical knowledge with the range of technical skills available at HR Wallingford means that we can provide a dependable, independent and rounded service to meet our client's needs.

To enable us to offer these supporting services we give advice at all stages of project development, drawing upon the existing specialist technical capabilities and combining these with the `hands-on' experience of actual engineering projects.

## 2.2. Navigation services

HR Wallingford provide a wide range of navigation services including the following:

- Desk based navigation assessments
- Rassessments
- Rand fast time navigation simulation from centres in the United Kingdom and Australia
- Port operational simulation studies.

# 3. Project appreciation

From a navigation standpoint, extension of the offshore wind farm may require changes to current marine operations including the following:

- For one or more routes, inbound and outbound sailing distances may increase, resulting in additional sailing time
- For one or more routes, there may be less space available for pilot transfer operations
- For one or more routes, the reduced space may deter masters from using a particular route in favour of a longer, but safer route.

The consequences of the changes may include the following:

- Extended pilotage times for certain ship/route combinations
- Additional ship charter/operational costs
- Reduced tidal windows, particularly for Port of Tilbury impounded dock berths
- Increased vessel traffic density on one or more routes, with associated increased risk of collision or grounding
- Relocation of pilot boarding areas resulting in increased operating costs
- Potential delays to pilot boarding or landing (especially in bad weather)
- Potential increase in pilot over-carriage occurrences
- Acquisition of new, higher specification, pilot boats as a result of relocation of pilot transfer areas
- Recruitment of additional pilots if required
- Possible increased berth occupancy as a result of increased sailing time with the consequent loss of berth or terminal capacity.

# 4. Selected SE United Kingdom ship call statistics

## 4.1. Overview

This section provides a context for considering future growth in ship numbers at London Gateway and the Port of Tilbury for the relevant business sectors.

The ports of Felixstowe, Southampton and Medway (Thamesport) are included for reference because, prior to the development of London Gateway in 2013, they were the only ports in the United Kingdom with deep sea berths capable of accommodating the larger container ships deployed on Asia to Europe arterial routes. Carriers effectively had a choice between these 3 ports or not calling at a United Kingdom port. Deep sea container services were discontinued at Thamesport in 2013.

## 4.2. Container ship calls

### 4.2.1. Statistics review

Table 4.1 and Figure 4.1 summarise calls by fully cellular container ships at the ports of London, Medway, Felixstowe and Southampton between 2009 and 2017. Coincidentally, the data covers a 4 year period from 2009 to 2012, before the opening of London Gateway in 2013, and a further 4 year period from 2014 to 2017, after the opening of London Gateway. The calls may be put in context by noting that the Thanet wind farm was officially opened in September 2010.

Prior to the opening of London Gateway in 2013, the Port of Tilbury provided the principal container terminal capacity within the Port of London. Table 4.1 shows that the Port of Tilbury generated an average of 1,040 ship calls, or 2,080 movements per annum in the period 2009 to 2012. This is equivalent to almost 6 movements per day.

In 2013, the year in which the first ship called at London Gateway, the number of container ship calls reduced to 928, the lowest number of calls per annum in the time series. The table shows that in the 2 years following the opening of London Gateway, there was no significant increase in the number of container ship calls within the Port of London and not until 2016 that is there a significant increase in the number of calls per annum. The 1,931 calls per annum, or almost 11 movements a day, recorded in 2017 represents an 82% increase over the 1,061 calls recorded in 2009. As the Department for Transport statistics report at a port rather than terminal level, it is not possible to subdivide the 1,931 calls between the Port of Tilbury and London Gateway.

This significant increase in calls within the Port of London should be seen in the context that the number of calls per annum for the ports of London, Medway, Felixstowe and Southampton combined has remained effectively static in the period between 2009 and 2017, primarily because of the introduction of larger ships. Separately, several services have transferred from the Port of Felixstowe to London Gateway, resulting in a significant increase in the number of calls within the Port of London. Significantly, in 2017, the Port of London received almost 20% more container ship calls than Felixstowe.

The most significant decline in container ship calls within the Thames Estuary was recorded for Medway and, in particular, Thamesport. The Thamesport terminal is reported to now handle only short sea ships.

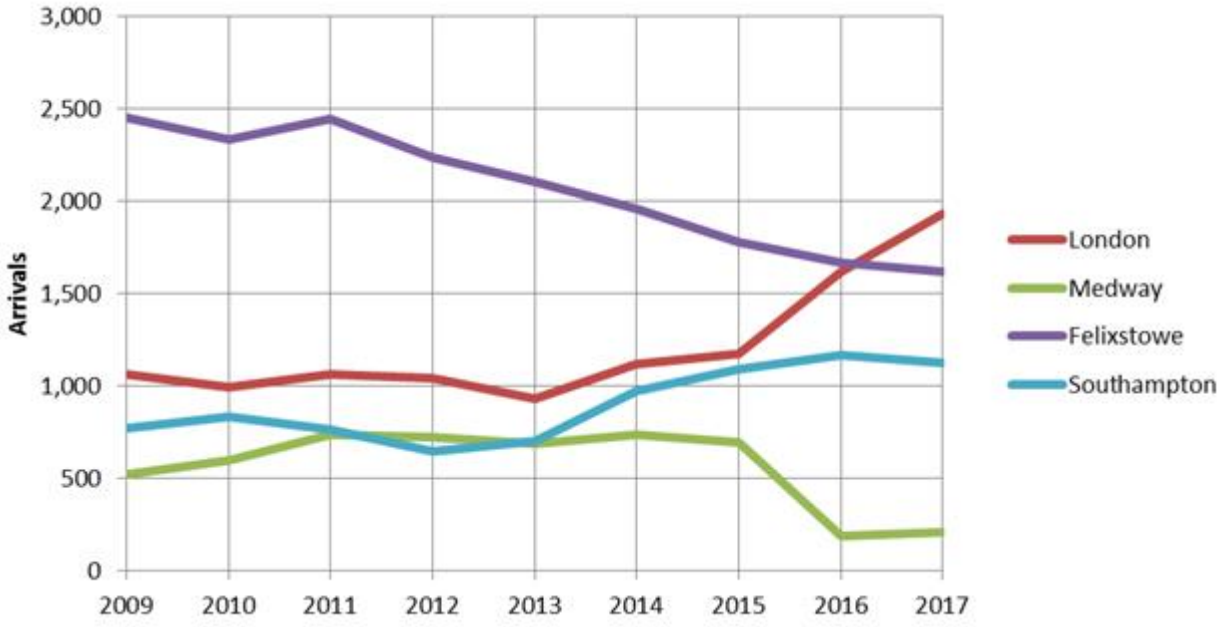


Figure 4.1: Summary of container ship calls at selected SE UK Ports 2009 to 2017

*Source: United Kingdom Department for Transport*

### 4.2.2. Growth prospects

**London Gateway**

London Gateway has seen a rapid growth in throughput over its existing 3 berths in the last 2 years or so, primarily as a result of securing calls by large ships deployed on the Asia to Europe arterial routes and further strong growth is expected. In this respect, the stated capacity of London Gateway is about 3.5 million TEU per annum for the full, consented development of 6 berths, with theoretically the 3 existing berths providing 1.75 million TEU capacity.. Throughput in 2018 was reported as 1.3 million TEU.

This growth is expected to be generated by a range of factors including:

- Growth in the United Kingdom economy, noting uncertainties cause by Brexit
- further transfer of calls from other ports in the United Kingdom
- Transfer of calls from continental Europe
- Increased transhipment.

**Port of Tilbury**

For the Port of Tilbury, it is expected that growth would be generated by:

- Again, growth in the United Kingdom economy
- Increased intra-European volumes
- Deployment of larger ships on the deep sea services calling at Tilbury within the constraints of the ship size that can be handled at Tilbury (which is relatively large at about 10,000 to 11,000 TEU geometric capacity).

## 4.3. RoRo ship calls

Table 4.2 and Figure 4.2 summarise calls by RoRo ships at the ports of London and Medway between 2009 and 2017.

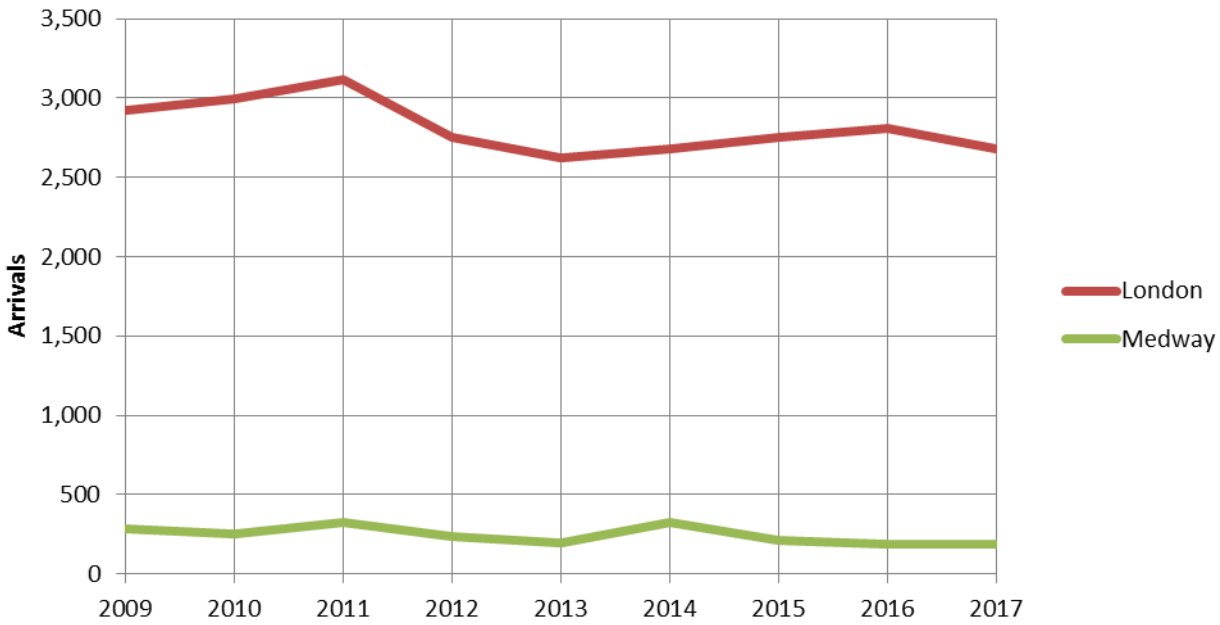


Figure 4.2: Summary of Ro Ro ship call statistics for the Ports of London and Medway

*Source: United Kingdom Department for Transport*

A key driver of the Tilbury2 development is to provide additional RoRo capacity outside the impounded dock. The volume of RoRo units handled at Tilbury 2 is expected to be approximately 250% higher than the existing volumes handled at impounded dock RoRo berths.

Table 4.1: Summary of container ship calls at selected SE UK Ports 2009 to 2017

| Port | 2009 | 2010[1] | 2011 | 2012 | 2013[2] | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| London | 1,061 | 996 | 1,061 | 1,042 | 928 | 1,121 | 1,175 | 1,620 | 1,931 |
| Medway | 523 | 599 | 734 | 720 | 686 | 734 | 696 | 188 | 207 |
| **Subtotals** | **1,584** | **1,595** | **1,795** | **1,762** | **1,614** | **1,855** | **1,871** | **1,808** | **2,138** |
| Felixstowe | 2,450 | 2,332 | 2,442 | 2,234 | 2,102 | 1,960 | 1,776 | 1,663 | 1,614 |
| Southampton | 774 | 833 | 767 | 648 | 701 | 972 | 1,091 | 1,164 | 1,126 |
| **Totals** | **4,808** | **4,760** | **5,004** | **4,644** | **4,417** | **4,787** | **4,738** | **4,635** | **4,878** |

*Source: United Kingdom Department for Transport*

*Notes: 1 Thanet wind farm opened in 2010*

*2 London Gateway opened in 2013*

Table 4.2: Summary of Ro Ro ship call statistics for the Ports of London and Medway

| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|
| London | 2,922 | 2,992 | 3,114 | 2,753 | 2,621 | 2,682 | 2,756 | 2,806 | 2,676 |
| Medway | 281 | 248 | 322 | 238 | 197 | 322 | 215 | 188 | 186 |
| **Totals** | **3,203** | **3,240** | **3,436** | **2,991** | **2,818** | **3,004** | **2,971** | **2,994** | **2,862** |

*Source: United Kingdom Department for Transport*

## 4.4. London and Medway

Figure 4.3 shows vessel arrivals per year according to the Department of Transport Port Freight Statistics for London only and for London plus Medway combined. It also shows container ship arrivals per year.

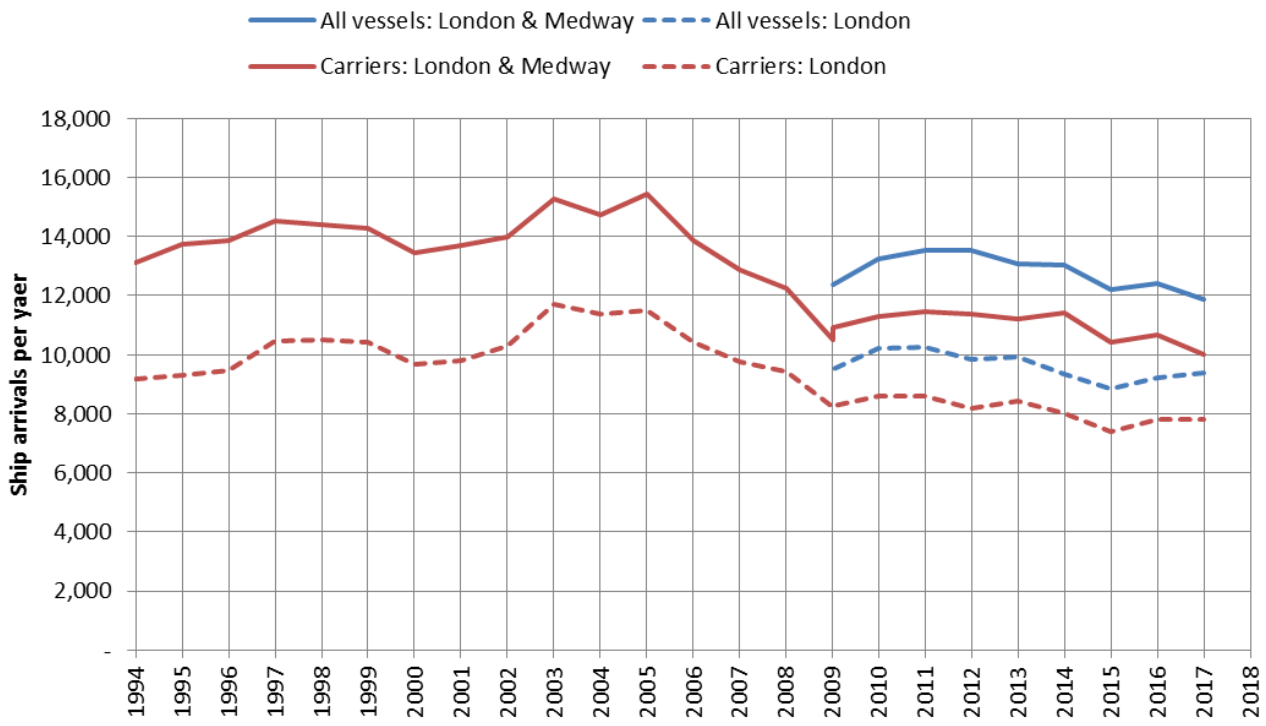


Figure 4.3: Port Freight Statistics for all vessels and container ships (carriers) London and Medway

*Source: Department for Transport: Port Freight Statistics 2017*[5]

# 5. Maritime access routes to the Port of London

## 5.1. Overview

An overview of the principal maritime access routes to DP World London Gateway (London Gateway) and Port of Tilbury is presented on United Kingdom Hydrographic Office Chart 8157 "Port Approach Guide Thames Estuary". This shows the following alternative routes, working in a clockwise direction from the north (Figure 5.1):

- Approach from the north east, from the Sunk area to the Black Deep, passing along the north western side of the existing London Array Wind Farm, and inward to the Thames Estuary and London Gateway
- Approach from the east, passing to the north of the Thanet North cardinal and to the south of the Tongue anchorage, and inward to the Princes Channel to London Gateway and Port of Tilbury (i.e. passing to the east and north of the TOWF)

- Approach from the south east, passing to the east of the NE Goodwin and Elbow cardinals, and hence, inshore to the south and west of the TOWF.

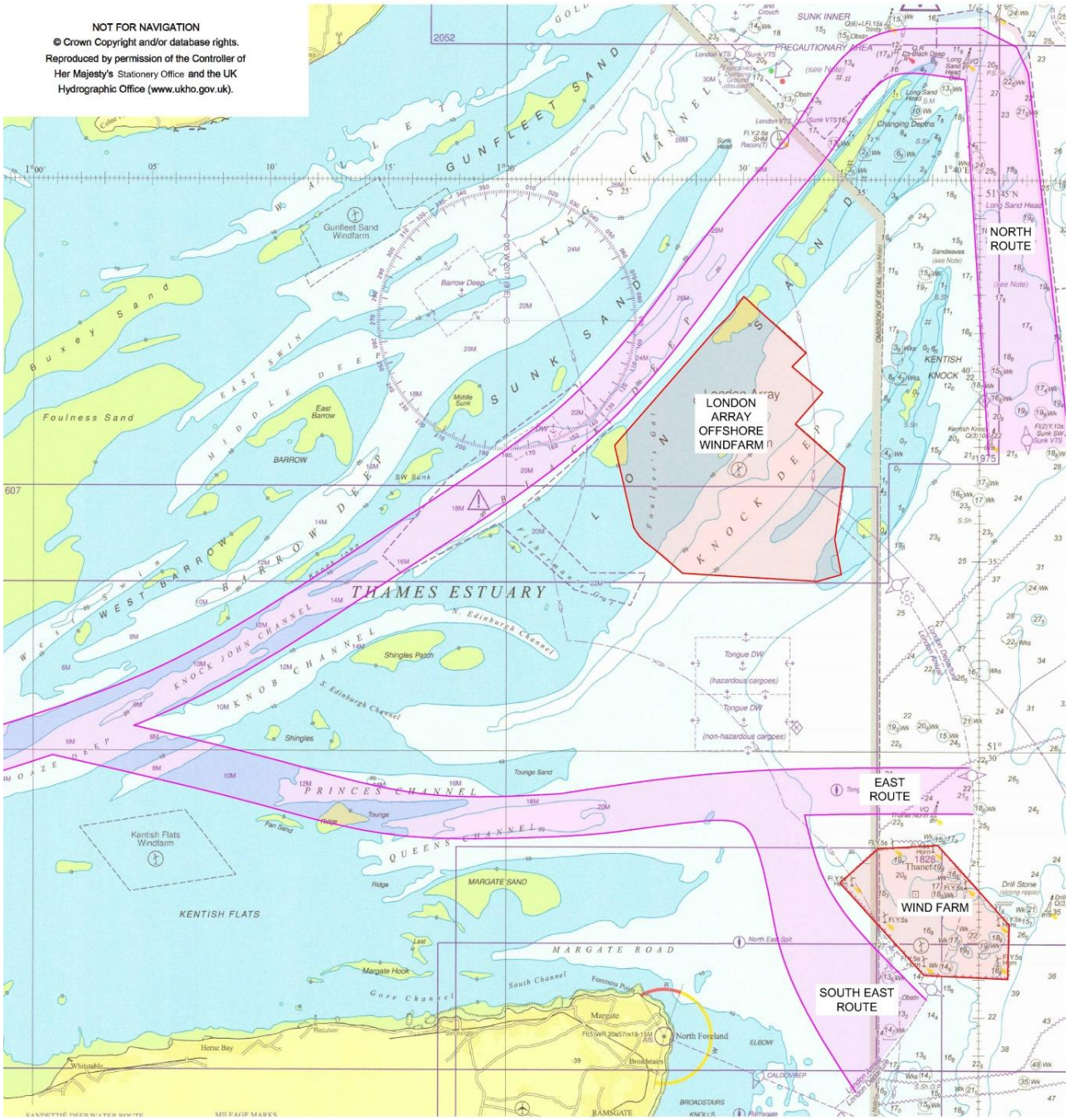


Figure 5.1: Principal maritime access routes to Port of London

*Source: Admiralty Chart 1610 "Approaches to the Thames Estuary"*

## 5.2. Northern approach via the Sunk

This is the deep water approach to the Port of London and is effectively unaffected by expansion of the TOWF. Current ruling depths on the route based on Reference 1 are summarised in Table 5.1

Table 5.1: Ruling depths on northern approach via the Sunk

| Location | Ruling depth (m CD) | Comments |
|---|---|---|
| Sunk Pilots SHM | 15.4 | |
| Black Deep Middle | 16.0 | |
| Knock John Shoal | 14.4 | Inner and outer limits |
| Oaze Buoy | 16.2 | |
| West Oaze Buoy | 14.5 | |
| Sea Reach | 13.8 | Minimum value |
| London Gateway | 14.2 | |
| Lower Hope Point Shoal | 9.3 | |
| Coal House Shoal | 9.2 | |
| Diver Shoal | 9.7 | |
| Tilburyness shoal | 9.1 | |

*Source: Reference 1*

The table shows that on the basis of a 15% gross under keel clearance, there is currently full tidal access to London Gateway with ships with a static draught of up to 12m. Tidal benefit is required for a ship with a draught of 12m to proceed to the Port of Tilbury.

## 5.3. Eastern approach

This approach passes to the north of the TOWF and uses the Princes Channel. Current ruling depths on the route based on Reference 1 are summarised in Table 5.2

Table 5.2: Ruling depths on eastern approach

| Location | Ruling depth (m CD) | Comments |
|---|---|---|
| NE Spit Pilots | 9.6 | |
| Princes Channel Bar | 8.1 | Deep water route |
| Shivering sands Shoal | 8.2 | |

*Source: Reference 1*

The table shows that on the basis of a 15% gross under keel clearance, there is currently full tidal access to London Gateway and the Port of Tilbury for ships with a static draught of up to 7m.

## 5.4. South east approach

This route passes to the west of the TOWF and provides the shortest route to and from the Princes Channel. The ruling depths are the same as those summarised in Section 5.3.

# 6. AIS and POLARIS data analyses

## 6.1. Overview

The two main stations for picking up pilots for the larger vessels inbound for the Port of London are the Sunk Pilot Station, to the north, and the NE Spit Pilot Station, inshore of the TOWF. A further station, the Tongue, lies to the north and west of the TOWF, but this site is hardly used, with the NE Spit being the preferred inshore pilot station owing to its shorter pilot boat transit from shore and its less exposed location.

The Port of London Authority (PLA) supplied HR Wallingford with a year of AIS (Automatic Identification System) and POLARIS (Port of London River Information System) data for the period 1/12/17 to 30/11/18.

## 6.2. POLARIS data

The POLARIS data provided the full record of pilotage inbound to and outbound from the Port of London. The POLARIS data identified ship details, the location at which the pilot came aboard and the destination of the ship. So, for inbound trips it can be determined whether pilots were picked up at the Sunk or NE Spit, for example. For outbound trips the records did not always identify where pilots are landed.

## 6.3. AIS data

The AIS data supplied by the PLA included two “gates”, one inshore of the Thanet Offshore Wind Farm (TOWF) and the other extending eastward to seaward of the TOWF. The AIS data thus covered a subset of the inbound and outbound traffic from the Port of London. It (Gate 1) covered all vessels recorded by AIS inbound or outbound using the inshore route between the TOWF and the Kent coast (comparable to Gate A of the Marico Marine analysis). It (Gate 2) covered vessels inbound from the south using the Princes Channel, Fisherman’s Gat or heading up to the Sunk to use the deepest water approach. The gate did not capture vessels coming across the North Sea to the north of Gate 2. The approximate gate layout is shown in Figure 6.1.

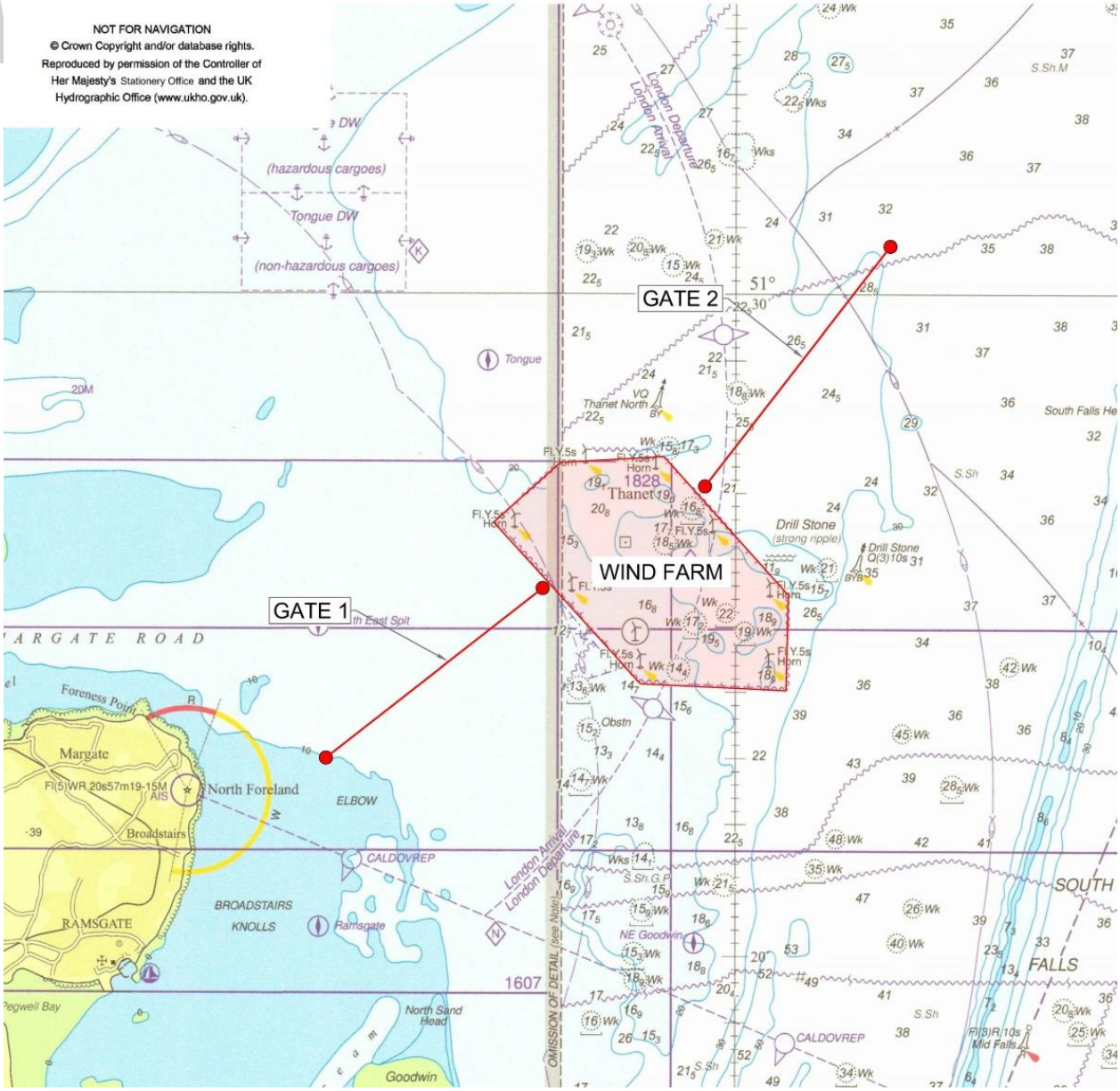


Figure 6.1: Gate layout

*Source: Admiralty Chart 1610 "Approaches to the Thames Estuary"*

## 6.4. Analysis

The AIS and POLARIS data sets have been processed to provide subsets of vessels inbound/outbound for the Port of Tilbury and for London Gateway. From the POLARIS data, the locations for the pick-up of pilots were readily identified. From the AIS data the number of vessels making passage inshore of the TOWF can be determined. By comparison of the POLARIS data and the AIS data, the number of vessels using the inshore channel that are piloted can also be established.

Summary findings are provided in the following sections.

## 6.5. Port of Tilbury

In the year ending 30 November 2018, 534 ships inbound for the Port of Tilbury used the inshore route.

For Port of Tilbury ships (inbound and outbound) there were a total of 3,127 recorded piloted movements. Of the inbound movements 754 included picking up a pilot at the NE Spit. Approximately 50% of the inbound piloted ships to the Port of Tilbury pick up a pilot at the NE Spit.

## 6.6. London Gateway

In the year ending 30 November 2018, 79 inbound ships used the inshore route.

There were a total of 2,134 recorded piloted movements, inbound and outbound and of the inbound movements, 160 included picking up a pilot at the NE Spit. Approximately 15% of the inbound piloted vessels to London Gateway pick up a pilot at the NE Spit.

# 7. London Gateway marine operations

## 7.1. North European context

### 7.1.1. Ship size

Ships with a container capacity of 14,000 TEU or more account for more than 25% of the container throughput handled in North European ports (Reference 2). The same reference reports that the ports of Southampton and Felixstowe are ranked second and third in the world, after the port of Yangshan in China, in terms of the largest average size of container ship handled. The average ship capacities for Southampton and Felixstowe are noted as 9,919 TEU and 9,105 TEU, respectively. This large average size may be readily appreciated by noting the location of these ports on the arterial Asia to Europe route, as is London Gateway, as discussed in Section 4.

### 7.1.2. Average container exchange per call

The IHS-Markit research (Reference 2) also indicates that the average container ship call size or exchange, expressed in terms of crane moves, for container terminals in Northern Europe, increased from 970 moves in the first half of 2016 to 1,165 moves in the first half of 2017, an increase of about 20%. Correspondingly, the total number of container ship calls declined significantly, from 13,156 in the first half of 2016 to 10,711 in the first half of 2017. The same reference suggests that a key factor underlying these changes is the growth in the geometric capacity of container ships handled in Northern European container terminals.

## 7.2. Terminal capacity and throughput

### 7.2.1. Present terminal capacity

Public domain information indicates that the terminal has a stated capacity of 3.5 million TEU per annum when fully developed. In the 2018 calendar year, throughput equalled approximately 1.3 million TEU.

### 7.2.2. Future demand

At present there are three berths operational at London Gateway and a further three berths are yet to be developed. It is difficult to predict with precision the number of vessel movements that will be generated when terminal throughput reaches a level of 3.5 million TEU per annum. This is because, as discussed in outline in Section 4, expected vessel movements are likely to depend on several factors, including the mix of services calling at the terminal.

## 7.3. Ship calls and movements

Analysis of the PLA's POLARIS database for pilotage acts for the period 1 December 2017 to 30 November 2018, indicates that London Gateway received 1,069 arrivals and 1,065 departures during this period. This represents an average of approximately 178 movements per month, or just under 6 movements per day. Separately, Table 4.1 indicates that there were 1,931 container ship calls into the Port of London in 2017, so it is possible that the Port of Tilbury continued to account for around 900 container ship calls per annum in 2017 and 2018.

It is important to note that large ship movements are often tidally constrained and, therefore, average movement data needs to be considered with caution. For example, Estuary Services Limited (ESL) report they have carried out pilot transfers for 6 ships at the North East Spit pilot station in a relatively short time period.

Table 7.1 shows the distribution of ship calls and movements throughout the period for which POLARIS records are available. The table shows a generally even distribution of calls throughout the period, although there is evidence of slightly increased shipments leading up to Christmas 2018 and slightly reduced activity after Christmas 2017.

Table 7.1: Ship call distribution December 2017 to November 2018

| Period | Number of calls | Number of movements |
|---|---|---|
| December 2017 to February 2018 | 258 | 514 |
| March 2018 to May 2018 | 278 | 560 |
| June 2018 to August 2018 | 264 | 523 |
| September 2018 to November 2018 | 269 | 537 |
| **Totals** | **1,069** | **2,134** |

*Source: PLA POLARIS data*

## 7.4. Ship size

Table 7.2 shows that ship size distribution was reasonably constant during the period from December 2017 to November 2018. More importantly, it underlines the importance of ensuring that the Thames Estuary and London Gateway are able to continue to receive calls from the largest container ships currently in operation and likely to be in operation in the future. In this respect, ships with a geometric capacity of 23,000 TEU will start to enter service in 2019 and/or 2020.

Table 7.2: Ship size distribution from December 2017 to November 2018

| Period | Ship geometric capacity (TEU) | | |
|---|---|---|---|
| | Average | Minimum | Maximum |
| December 2017 to February 2018 | 6,314 | 660 | 20,568 |
| March 2018 to May 2018 | 6,603 | 660 | 19,600 |
| June 2018 to August 2018 | 6,570 | 632 | 19,600 |
| September 2018 to November 2018 | 6,416 | 819 | 20,150 |

*Source: PLA POLARIS database and HR Wallingford research*

Figure 7.1 illustrates the distribution of ship size by length for London Gateway transits recorded on the PLA POLARIS database. A significant number of transits recorded (31%) were by vessels falling within the range of 290 to 300m LOA, and 26% of all transits were by vessels above 300m LOA.

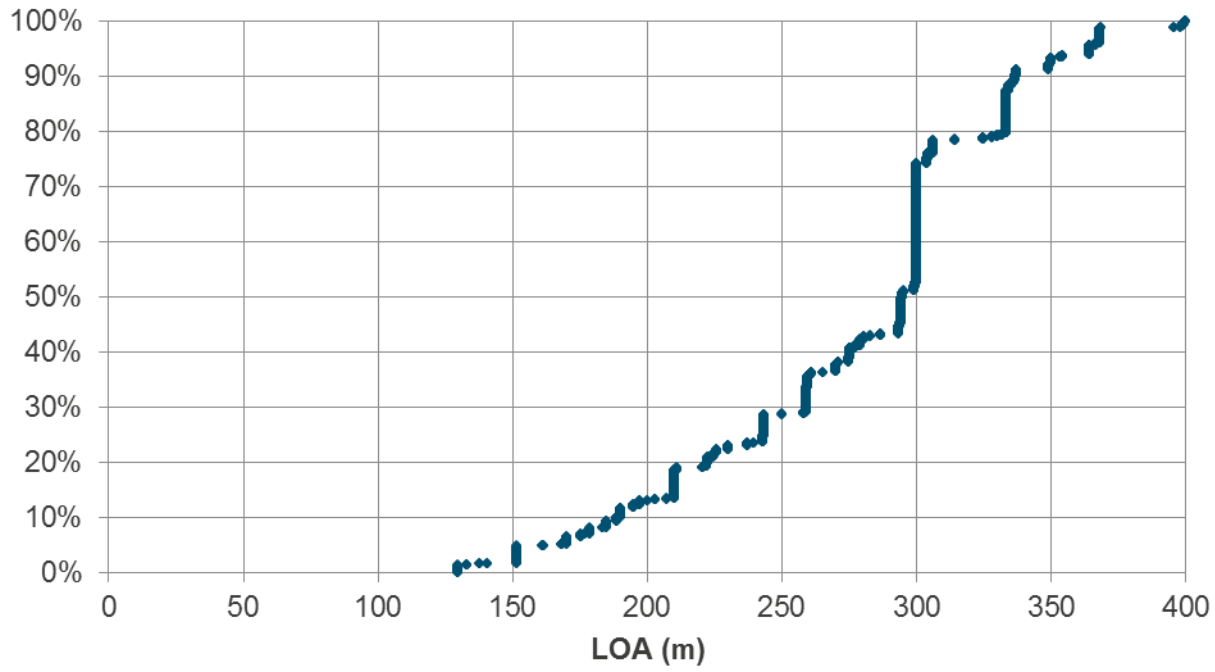


Figure 7.1: Distribution of ship size for all transits by length

*Source: PLA POLARIS database*

## 7.5. Deep sea transits west of TOWF

Table 7.3 shows the 5 largest and the 5 most frequently transiting deep sea transits inbound through AIS Gate 1.The data as a whole suggests that London Gateway generated at least 51 deep sea transits inbound through Gate 1 (i.e. to the west of TOWF), providing a total geometric capacity of at least 139,000 TEU. TEU data was assumed from readily available data for the considered ships.

A full table of transits is supplied in Appendix A.

Table 7.3: Deep sea container ship transits inbound through AIS Gate 1

| Ship | Length (m) | TEU | Number of transits |
|---|---|---|---|
| **Largest (by TEU):** | | | |
| Cap San Raphael | 333 | 9,814 | 1 |
| MSC Chloe | 300 | 9,400 | 1 |
| CCNI Andes | 300 | 9,000 | 1 |
| Al Bahia | 306 | 4,898 | 1 |
| Rotterdam Express | 294 | 4,890 | 1 |
| **Most frequent:** | | | |
| Marfret Guyane | 170 | 1,713 | 8 |
| CMA CGM St. Laurent | 190 | 2140 | 7 |
| Marfret Marajro | 170 | 1691 | 6 |
| CMA CGM Marseille | 190 | 2140 | 5 |
| CMA CGM Brazil | 189 | 2339 | 3 |

*Source: Port of London Authority Gate 1 AIS recordsPilotage operations*

## 7.6. Short sea transits west of TOWF

Table 7.4 shows all short sea carrier transits inbound through AIS Gate 1.

The data as a whole suggests that London Gateway generated at least 28 short sea transits inbound through Gate 1 (i.e. to the west of TOWF), providing a total geometric capacity of at least 25,000 TEU. TEU data was assumed from readily available data for the considered ships.

A full table of vessel transits is supplied in Appendix B.

Table 7.4: Short sea container ship transits inbound through AIS Gate 1

| Ship | Length (m) | TEU | Number of transits |
|---|---|---|---|
| Helena Schepers | 152 | 1036 | 10 |
| Wes Carina | 153 | 1036 | 7 |
| Helena Schepers | 129 | 698 | 6 |
| Ice Crystal | 129 | 700 | 5 |

*Source: Port of London Authority Gate 1 AIS recordsPilotage operations*

## 7.7. Pilot transfer locations

Table 7.5 summarises the pilot transfers which took place by transfer area in the period 1 December 2017 to November 2018.

Table 7.5: Pilot boarding transfers by boarding area for London Gateway

| Pilot boarding area | No. of transfers | No. of individual ships | Transfers per ship |
|---|---|---|---|
| Sunk | 877 | 276 | 3.2 |
| North East Spit | 160 | 63 | 2.5 |
| Dover | 14 | 13 | 1.1 |
| NE Goodwin | 12 | 12 | 1 |
| "Europe" | 4 | 4 | 1 |
| Other | 2 | 2 | 1 |
| **Total** | **1,069** | | |

*Source: PLA POLARIS database*

The table shows that the most important transfer area for London Gateway is the Sunk, with 877 transfers taking place, or about 82% of the total transfers. The North East Spit is the second most used transfer area, with 160 transfers, or about 15% of the total transfers.

It was noted that the "Europe" transfers all took place in March 2018, suggesting that these pilots joined inbound ships in continental European ports because of the particularly adverse weather conditions that prevailed in early and mid-March 2018.

### 7.7.1. Largest ships using Sunk pilot transfer area

The largest container ships using the Sunk boarding area have a geometric capacity in excess of 20,000 TEU.

### 7.7.2. Largest ships using North East Spit pilot transfer area

Table 7.6 summarises the details of the 8 largest, by length, container ships to have used the North East Spit boarding area in the period December 2017 to November 2018. The largest ships recorded were the 333m long "Valparaiso Express" and "Guayaquil Express", with geometric capacities of 11,519 TEU.

Table 7.6: Largest ships using NE Spit boarding area, December 2017 to November 2018

| Ship | Length (m) | Capacity (TEU) |
|---|---|---|
| Valparaiso Express | 333 | 11,519 |
| Guayaquil Express | 333 | 11,519 |
| MSC Yashi B | 330 | 11,000 |
| Al Bahia | 306 | 7,323 |
| MSC Barbara | 304 | 6,402 |
| CCNI Andes | 300 | 9,000 |
| MSC Chloe | 300 | 9,400 |
| MSC Giselle | 300 | 9,400 |

*Source: PLA POLARIS database December 2017 to November 2018*

# 8. Port of Tilbury marine operations

## 8.1. Overview

### 8.1.1. Core port complex

An overview of the existing, core Tilbury port complex is shown in Figure 8.1. The image shows that the complex is dominated by the original impounded docks, which are accessed from the river through a single lock. The image also shows the more recent container and dry bulk river berths, which have been developed upstream of the lock. In the bottom right hand corner of the image is the original Tilbury landing stage, now the London Cruise Terminal, and a relatively recent RoRo berth.

In broad terms, ships calling at the core complex may be considered in terms of 2 groups, as ships with dimensions that enable them to transit the lock and those that are too large to transit the lock and therefore call at the river berths. Table 5.1 summarises the limiting dimensions of ships able to transit the lock.

Table 5.1: Tilbury lock limiting dimensions

| Parameter | Value | Notes |
|---|---|---|
| Length (m) | 262.1 | Depends on tug configuration |
| Beam (m) | 32.3 | Original Panamax beam |
| Draught (m) | 11.4 | Typical maximum draught is about 10.5m |

*Source: Port of Tilbury, Port of London Authority*

Excluding draught constraints, for example Diver Shoal as discussed in Section 5, the key constraint for the river berths is ship length. The largest container ship to have called at the river berths is reported to have been the partially laden, Sovereign Maersk (Reference 3). This ship has a length of 347m and a geometric capacity of 10,457 TEU, significantly higher than the capacity noted in Reference 3. More recently, the NeoPanamax container ships 333m long “Cap San Lorenzo” and the 300m long “MSC Sofia Celeste” have called at the river berths. These ships have geometric capacities of 9,814 TEU and 8,800 TEU, respectively.

Downstream of the lock, the largest cruise ship to have called at the London Cruise Terminal is reported to be the “Mein Schiff 3” (Reference 4). This ship has a length of 295m. In principle, there is no reason why significantly larger (longer) cruise ships cannot be handled at the terminal, for example up to “Oasis of the Seas” class ships, with a length of 360m.


Figure 8.1: Overview of Port of Tilbury core complex

*Source: Bing Maps*

### 8.1.2. Tilbury2

The Tilbury2 development was granted development consent on 20 February 2019. Tilbury2 will result in a significant increase in the total tonnage handled through the combined operation, with the Tilbury2 facility being a dedicated RoRo terminal and CMAT (Construction Materials and Aggregates Terminal). Tilbury2 started construction immediately when the DCO came into force, on 13 March 2019. The location of Tilbury2 is shown in Figure 8.2 and the development plan is shown in Figure 8.3. The port development is based on redevelopment of a former coal fired power station site and its associated coal handling jetty.

When fully operational, Tilbury 2 will have a capacity of approximately 1.6 million tonnes (CMAT) and 500,000 TEU (RoRo) (equivalent to approximately 8.75 million tonnes).

Figure 8.2: Overview of Tilbury 2 site location

*Source: Bing Maps*


Figure 8.3: Tilbury2 Site development plan

*Source: Port of Tilbury Limited*

## 8.2. Ship size

Figure 8.4 illustrates the distribution of ship size by length for Port of Tilbury transits recorded on the PLA POLARIS database. It shows 18.1% of transits were by vessels under 90m in length, which represents a threshold where pilotage requirements are reduced. Few transits recorded were by vessels above 240m.

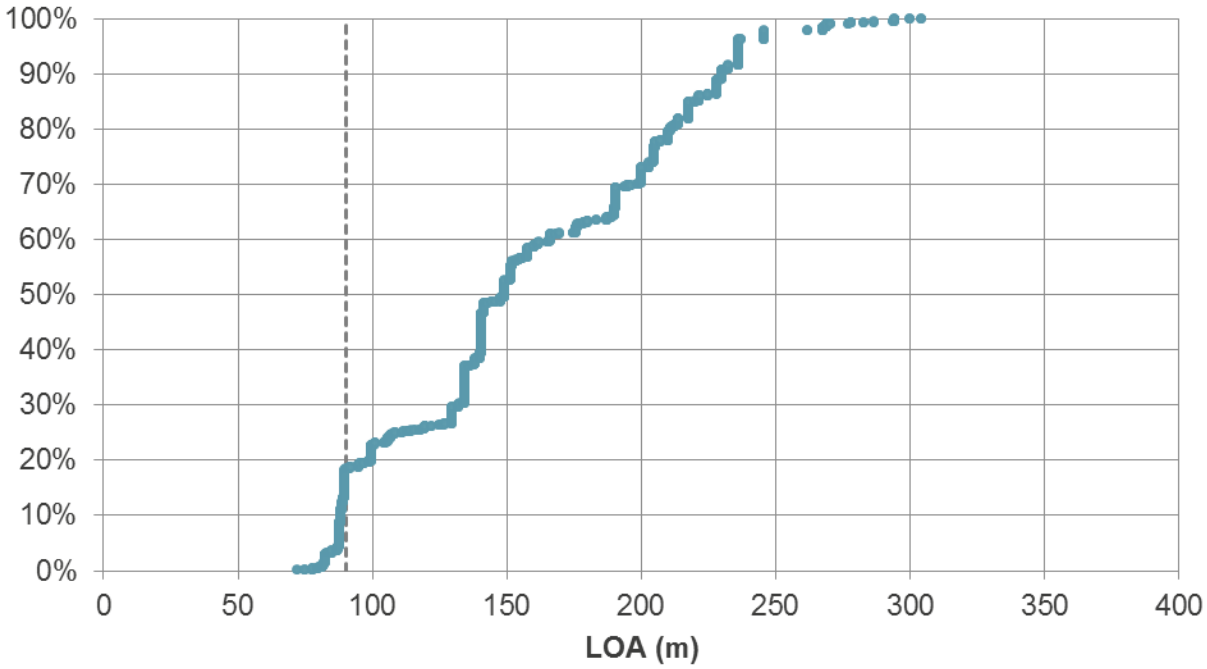


Figure 8.4: Distribution of ship size for all transits by length

*Source: PLA POLARIS database*

## 8.3. Container ship operations

### 8.3.1. London Container Terminal capacity

The London Container Terminal provides short sea and deep sea berths, with the short sea berths being provided within the impounded dock complex, although short sea ships also use the river berths. The terminal is stated as having a capacity of about 1 million TEU per annum.

### 8.3.2. Deep sea container services

Considering the AIS recorded transits by deep sea container ships operating to London Container Terminal through Gate 1, Table 8.2 shows the largest 5 vessels and the 5 vessels of highest inbound transit frequency.

The data as a whole suggests that London Container Terminal alone generated at least 52 deep sea transits inbound through AIS Gate 1 (i.e. to the west of TOWF), providing a total geometric capacity of at least 170,000 TEU. TEU data was assumed from readily available data for the considered ships.

A full table of vessel transits is supplied in Appendix C.

Table 8.2: Selected deep sea container ship transits inbound through AIS Gate 1

| Ship | Length (m) | TEU | Number of transits |
|---|---|---|---|
| **Largest (by TEU):** | | | |
| CMA CGM Sambhar | 269 | 4,045 | 4 |
| CMA CGM America | 269 | 4,043 | 6 |
| Polar Peru | 230 | 3,884 | 1 |
| CMA CGM Africa Three | 228 | 3,718 | 7 |
| CMA CGM Africa Four | 227 | 3,718 | 3 |
| **Most frequent:** | | | |
| CMA CGM Africa One | 228 | 3,650 | 7 |
| CMA CGM Africa Three | 228 | 3,718 | 7 |
| CMA CGM America | 269 | 4,043 | 6 |
| CMA CGM Africa Two | 228 | 3,718 | 6 |
| Maersk Neston | 210 | 2,556 | 4 |

*Source: Port of London Authority Gate 1 AIS records*

### 8.3.3. Short sea container services

Considering the AIS recorded transits by short sea container ships operating to London Container Terminal through Gate 1, Table 8.3 shows the largest 5 vessels and the 5 most frequently transiting vessels.

The data as a whole suggests that London Container Terminal alone generated at least 291 short sea transits inbound through Gate 1 (i.e. to the west of TOWF), providing a total geometric capacity of at least 246,000 TEU. TEU data was assumed from readily available data for the considered ships. A full table of vessel transits is supplied in Appendix D.

Table 8.3: Ten largest container ship transits inbound through AIS Gate 1

| Ship | Length (m) | TEU | Number of transits |
|---|---|---|---|
| **Largest (by TEU):** | | | |
| Hansa Rendsburg | 175 | 1,718 | 1 |
| Paul Russ | 161 | 1,338 | 1 |
| Varamo | 167 | 1,296 | 2 |
| Sunrise X | 130 | 1,050 | 3 |
| Bernhard Schepers | 151 | 1,036 | 3 |
| **Most frequent:** | | | |
| Elan | 150 | 1,008 | 23 |
| CMA CGM Goya | 142 | 809 | 23 |
| Elite | 150 | 1,008 | 22 |
| Ensemble | 135 | 750 | 22 |
| Enforcer | 135 | 750 | 21 |

*Source: Port of London Authority Gate 1 AIS records*

## 8.4. RoRo ship operations

Table 8.4 summarises AIS transit records for inbound RoRo ship transits through Gate 1. There were 49 inbound RoRo transits through Gate 1. Many of the short sea RoRo ferries do not pick up pilots.

Table 8.4: RoRo ship inbound transits through AIS Gate 1

| Ship | Length (m) | Number of transits |
|---|---|---|
| CSCC Asia | 200 | 1 |
| CSCC Europe | 200 | 1 |
| Estraden | 163 | 1 |
| Finnsun | 218 | 12 |
| Glovis Solomon | 232 | 1 |
| Glovis Stella | 199 | 1 |
| Glovis Superior | 199 | 3 |
| Grand Aurora | 199 | 1 |
| Grand Dolphin | 199 | 1 |
| Grand Duke | 199 | 1 |
| Grand Uranus | 232 | 2 |
| Grande Abidjan | 236 | 1 |
| Grande Cotonou | 236 | 2 |
| Grande Dakar | 236 | 1 |
| Grande Lagos | 236 | 2 |
| Grande Luanda | 236 | 3 |
| Grande Tema | 236 | 1 |
| Morning Champion | 200 | 1 |
| Morning Compass | 200 | 1 |
| Morning Composer | 200 | 2 |
| Morning Conductor | 200 | 1 |
| Morning Post | 200 | 1 |
| Schelde Highway | 100 | 1 |
| Taipan | 199 | 1 |
| Thruxton | 199 | 1 |
| Tosca | 200 | 1 |
| Tundraland | 190 | 3 |
| Viking Adventure | 199 | 1 |

*Source: Port of London Authority Gate 1 AIS records*

## 8.5. General cargo ships

Table 8.5 summarises AIS recorded inbound transits through Gate 1 by general cargo ships by the nine largest vessels. Table 8.6 shows the most frequenting ships for the same route. In total there were 87 recorded inbound transits through Gate 1.

Table 8.5: Nine largest general cargo ship transits through AIS Gate 1

| Ship | Length (m) | Destination | Number of transits |
|---|---|---|---|
| Beatrix | 157 | Tilbury | 1 |
| Fraserborg | 156 | Tilbury | 1 |
| Alaskaborg | 143 | Tilbury | 1 |
| Americaborg | 142 | Tilbury | 1 |
| BBC New York | 132 | Tilbury | 1 |
| Arklow Beacon | 120 | Tilbury | 2 |
| Arklow Beach | 119 | Tilbury | 1 |
| Damina | 116 | Tilbury | 1 |
| Johann | 115 | Tilbury | 1 |

*Source: Port of London Authority Gate 1 AIS records*

Table 8.6: Nine most frequenting cargo ship transits through AIS Gate 1

| Ship | Length (m) | Destination | Number of transits |
|---|---|---|---|
| Pinnau | 88 | Tilbury | 3 |
| Aristote | 86 | Tilbury | 3 |
| Right Step | 101 | Tilbury | 3 |
| Musketier | 85 | Tilbury | 2 |
| Arlau | 88 | Tilbury | 2 |
| Ohlau | 88 | Tilbury | 2 |
| Bekau | 88 | Tilbury | 2 |
| Linnau | 88 | Tilbury | 2 |
| Bockoe | 107 | Tilbury | 2 |

*Source: Port of London Authority Gate 1 AIS records*

## 8.6. Bulk carrier operations

Table 8.7 summarises AIS recorded inbound transits by bulk carriers through Gate 1. There were 14 transits through Gate 1.

Table 8.7: Bulk carrier transits through AIS Gate 1

| Ship | Length (m) | Destination | Number of transits |
|---|---|---|---|
| An Chang | 190 | Tilbury | 1 |
| Arklow Bay | 119 | Tilbury | 2 |
| Athos | 178 | Tilbury | 1 |
| Atlantic Elm | 190 | Tilbury | 1 |
| Bulk Bahamas | 190 | Tilbury | 1 |
| Cembay | 98 | Tilbury | 2 |
| Hong Jing | 221 | Tilbury | 1 |
| Navin Vulture | 112 | Tilbury | 1 |
| Sea Ruby | 78 | Tilbury | 1 |
| Sfl Dee | 176 | Tilbury | 1 |
| Sikinos | 90 | Tilbury | 1 |
| Suse | 190 | Tilbury | 1 |

*Source: Port of London Authority Gate 1 AIS records*

## 8.7. Cruise ship operations

Table 8.8 summarises the AIS recorded inbound cruise ships transits through Gate 1. The table suggests that the terminal accounted for at least 20 transits through Gate 1.

Table 8.8: Cruise ships inbound transits through AIS Gate 1

| Ship | Length (m) | Destination | Number of transits |
|---|---|---|---|
| Columbus | 245 | Tilbury | 6 |
| Magellan | 221 | Tilbury | 6 |
| Astoria | 160 | Tilbury | 3 |
| Marco Polo | 176 | Tilbury | 2 |
| Astor | 176 | Tilbury | 1 |
| Aegean Odyssey | 140 | Tilbury | 1 |
| Artania | 230 | Tilbury | 1 |

## 8.8. Other vessels

"Other" vessels not in the above categories, including tugs and reefers, account for 21 inbound transits through Gate 1. The largest of these are shown in Table 8.9.

Table 8.9: Other vessels inbound transits through AIS Gate 1

| Ship | Length (m) | Destination | Number of transits |
|---|---|---|---|
| St Paul | 190 | Tilbury | 1 |
| Pacific Reefer | 175 | Tilbury | 2 |
| Swedish Reefer | 159 | Tilbury | 1 |
| Italia Reefer | 159 | Tilbury | 1 |
| Hellas Reefer | 158 | Tilbury | 1 |
| Schweiz Reefer | 158 | Tilbury | 2 |
| Nederland Reefer | 158 | Tilbury | 1 |

## 8.9. Pilotage operations

Table 8.10 confirms the importance of the North East Spit pilot boarding area for the Port of Tilbury.

Table 8.10: Port of Tilbury pilotage transfers for inbound vessels

| Pilot boarding area | No. of transfers (River Berths) | No. of transfers (Tilbury Dock) | No. of transfers (Total) |
|---|---|---|---|
| North East Spit | 604 | 150 | 754 |
| Gravesend | 7 | 292 | 299 |
| Warps | 0 | 254 | 254 |
| Sunk | 130 | 8 | 138 |
| Dover | 8 | 0 | 8 |
| North East Goodwin | 1 | 0 | 1 |
| Other | 3 | 12 | 15 |
| **Totals** | **753** | **716** | **1,469** |

*Source: PLA POLARIS database and HR Wallingford*

# 9. Potential impacts on Port of Tilbury

## 9.1. Operations potentially least likely to be affected

### 9.1.1. Non piloted short sea dry cargo ships (< 90m)

Dry cargo ships with a length of less than 90m are not required to carry a pilot east of Sea Reach No 1 Buoy and therefore, there is no requirement for a pilot transfer in the vicinity of the TEOWF. Generally, for these ships a pilot is boarded or landed at the Warps pilot station.

Available POLARIS data indicates that there were about 500 movements by ships with a length of less than 90m to and from the Port of Tilbury. This represents a significant percentage, just over 18%, of the Tilbury ship movements recorded in the POLARIS data.

### 9.1.2. Deeper draught container ships

The maximum advertised draught for the river berths is 12.5m. Subject to prevailing environmental conditions, deeper draught, inbound ships calling at the river container berths, with a draught of up to 12.5m, and that do not board a pilot at the NE Spit or Tongue, are more likely to board a pilot(s) at Dover or NE Goodwin or the Sunk and to use the Black Deep, deep water route, thus passing well clear of the existing TOWF.

This statement recognises that if the Dover or NE Goodwin or the Sunk pilot boarding areas or the Tongue cannot be used because of the prevailing environmental conditions then pilot boarding would need to take place at the NE Spit, assuming that this pilot boarding area is still operational.

It is difficult to identify the threshold at which a ship would use the Black Deep route instead of the Princes Channel with precision, but for the purposes of this report a draught of 11m has been selected. A tidal benefit of about 4.6m would be required to transit the Princes Channel with a static draught of 11m and an under keel clearance of 15% of the ship's static draught. This tidal benefit may be put in context by noting that mean high water neaps (MHWN) for Shivering Sands is 4.4m above Chart Datum.

It is recognised that a draught of 11.5m was mentioned as being the maximum for the inshore route at the first technical workshop on 27th February 2019, but such a draught would require a minimum depth of 13.2m below Chart Datum for an under keel clearance of 15% of the ship's static draught and therefore, a tidal benefit of about 5.2m. As mean high water springs (MHWS) for Shivering Sands is 5.4m above Chart Datum, it is considered that a ship's accessibility with an 11.5m static draught would be unreasonably restricted and that 11m is a reasonable maximum draught for the Princes Channel.

### 9.1.3. Deeper draught bulk carriers

Available POLARIS data indicates that inbound bulk carriers with draughts of between 10.6m and 11.4m have boarded a pilot at the Sunk and have therefore also passed well clear of the existing wind farm.

Again, this suggests that a static draught of about 11m represents the threshold at which Black Deep, deep water route may be used in preference to the Princes Channel.

### 9.1.4. Self-discharging bulk carriers

Self-discharging bulk carriers operating to and from Norway are assumed to generally use the Sunk deep water route and would therefore operate well clear of the TOWF.

### 9.1.5. Scrap export bulk carriers

Scrap export bulk carriers, sailing at a static draught of about 10.5m, use the Sunk route and again operate well clear of the TOWF.

### 9.1.6. Cruises to Norwegian fjords and other northern destinations

Subject to the comments previously made regarding the availability of pilot boarding and landing areas, cruise ships operating to the Norwegian fjords and other northern destinations will generally use the Sunk pilot station and will therefore not usually be affected by the TOWF.

## 9.2. Operations that may potentially be affected

As may be expected, larger ships operating on routes passing to the north and west of the TOWF are most likely to be affected by the wind farm extension. This is not because there will be insufficient space for the ships to make a safe passage through the area, but because encounters between ships on passage and ships engaging in pilotage transfer operations may take place within a more confined area.

Typically, the ships that may be affected can be summarised as:

- Deep sea combination RoRo container ships
- Feeder and intra-European container ships
- Larger, multipurpose dry cargo ships
- Bulk carriers able to use the inshore route
- Deep sea car carriers
- Southbound cruise ships.

# 10. Potential impacts on London Gateway

The preceding sections have clearly demonstrated that the Sunk pilot station is of key importance for London Gateway marine operations, with larger ships using the NE Goodwin and Dover pilot stations if the Sunk Pilot station is not available for any reason.

For the balance of ships that do not use the Sunk, Dover or NE Goodwin pilot stations, then the impacts on ships using the NE Spit pilot boarding areas must be considered. Typically the following issues require consideration:

- The continued ability of container ships, particularly larger container ships to transit west of the TEOWF
- Any disruption to feeder and/or intra-European ships that deters masters from passing to the west of the TEOWF and results in the ships deviating to pass to the east of the TEOWF
- Any disruption to feeder and/or intra-European ships passing either to north or west of the TEOWF that may deter masters from using these routes at all.

# 11. Vessel deviation considerations

## 11.1. Overview

The primary focus of this section is a consideration of the implications of ships deviating from the west side of the TOWF to the east side of the TOWF.

If a vessel would normally use the inshore route to pick up a pilot at the NE Spit and then continue on to the Port of Tilbury or London Gateway, that vessel will need to deviate around the extended windfarm and pick up a pilot at either the NE Spit or the Tongue. The deviation to pick up a pilot at the NE Spit would be about 14 nautical miles and the deviation to pick up a pilot at the Tongue would be about 11 nautical miles.

There are presently only a few pilot transfers at the Tongue, reflecting the fact that the Tongue is significantly further out to sea than the NE Spit, requiring longer pilot boat transfers. The Tongue pilot station is also more exposed to sea conditions than the NE Spit. These factors combined make the NE Spit the preferred pilot station for many of the vessels entering the Thames Estuary from the south and east.

## 11.2. Port of Tilbury

### 11.2.1. Passage planning options for impounded dock berths

Table 11.1 summarises the passage planning options available for inbound and outbound ships for south and south east origins and destinations, based on the assumption that the maximum static draught for ships calling at berths within the impounded dock currently is typically about 10.5m. Such ships are assumed to be able to use the Princes Channel, with tidal benefit as required, and will be able to use the Princes Channel for the foreseeable future. This is considered a reasonable assumption given the constraints imposed by the existing lock dimensions.

Other routes such as the Fisherman's Ghat could be used but the Prince's Channel usually provides the shortest route.

Table 11.1: Route options for Tilbury dock berths for south and south east origins and destinations

| Option | Description | West or east of wind farm | Pilot boarding area | Pilot landing area | West or east of NES cardinal |
|---|---|---|---|---|---|
| A1 | Inbound to Princes Channel | East | Tongue | Not applicable | Not applicable |
| A2 | Inbound to Princes Channel | East | NE Spit | Not applicable | East |
| A3 | Inbound to Princes Channel | East | NE Spit | Not applicable | West (subject to draught) |
| A4 | Inbound to Princes Channel | West | Tongue | Not applicable | Not applicable |
| A5 | Inbound to Princes Channel | West | NE Spit | Not applicable | East |
| A6 | Inbound to Princes Channel | West | NE Spit | Not applicable | West (subject to draught) |
| A7 | Inbound to Princes Channel | East | NE Goodwin/Dover | Not applicable | Not applicable |
| A8 | Inbound to Princes Channel | West | NE Goodwin/Dover | Not applicable | East |
| A9 | Inbound to Princes Channel | West | NE Goodwin/Dover | Not applicable | West (subject to draught) |
| D1 | Outbound from Princes Channel | East | Not applicable | Tongue | Not applicable |
| D2 | Outbound from Princes Channel | East | Not applicable | NE Spit | East |
| D3 | Outbound from Princes Channel | East | Not applicable | NE Spit | West (subject to draught) |
| D4 | Outbound from Princes Channel | West | Not applicable | Tongue | Not applicable |
| D5 | Outbound from Princes Channel | West | Not applicable | NE Spit | East |
| D6 | Outbound from Princes Channel | West | Not applicable | NE Spit | West (subject to draught) |
| D7 | Outbound from Princes Channel | East | Not applicable | NE Goodwin/Dover | Not applicable |
| D8 | Outbound from Princes Channel | West | Not applicable | NE Goodwin/Dover | East |
| D9 | Outbound from Princes Channel | West | Not applicable | NE Goodwin/Dover | West (subject to draught) |

Table 11.2: Principal implications of route selection decisions

| Option | Time saving benefit | Pilot time on board ship |
|---|---|---|
| A1 | Discounted | Largely minimised |
| A2 | Discounted | Largely minimised |
| A3 | Discounted | Largely minimised |
| A4 | Partially discounted | Largely minimised |
| A5 | Largely utilised | Largely minimised |
| A6 | **Maximised** | **Minimised** |
| A7 | Discounted | Largely maximised or maximised (Dover) |
| A8 | Largely utilised | Largely maximised or maximised (Dover) |
| A9 | **Maximised** | Largely maximised or maximised (Dover) |
| D1 | Discounted | Largely minimised |
| D2 | Discounted | Largely minimised |
| D3 | Discounted | Largely minimised |
| D4 | Partially discounted | Largely minimised |
| D5 | Largely utilised | Largely minimised |
| D6 | **Maximised** | **Minimised** |
| D7 | Discounted | Largely maximised or maximised (Dover) |
| D8 | Largely utilised | Largely maximised or maximised (Dover) |
| D9 | **Maximised** | Largely maximised or maximised (Dover) |

### 11.2.2. Ship speeds

Table 11.3 identifies the wide range of speeds for ships operating to and from the Port of Tilbury. Because of the complex vessel traffic patterns in the area, the ships may not be operating at their service speeds, but nonetheless, the table gives an indication of the value of time that is implicit in the design of a particular ship.

Table 11.3: Selected ship speeds for Port of Tilbury

| Reference ship | Type | Service/typical speed (knots) |
|---|---|---|
| **Usually, more time sensitive ships operating to published schedules:** | | |
| CMA CGM Sambhar | 4,045 TEU container ship | 24 |
| CMA CGM Africa One | 3,650 TEU container ship | 22 |
| Astor | 176m long cruise ship | 21 |
| Finnsun | 218m long RoRo ship | 21 |
| Glovis Solomon | 232m long car carrier | 20 |
| CMA CGM Goya | 809 TEU container ship | 19 |
| Grande Lagos | 236m long RoRo container ship | 19 |
| Columbus | 245m long cruise ship | 19 |
| Elan | 1,008 TEU container ship | 18 |
| **Slower ships that may have schedule constraints for certain trades:** | | |
| Alaskaborg | 143m long general cargo ship | 15 |
| Schelde Highway | 100m long car carrier | 14 |
| **Typically, less time sensitive ships:** | | |
| Hong Jing | 221m long Panamax bulk carrier | 14 |
| Cembay | 98m long cement carrier | 13 |
| Arklow Beach | 119m long general cargo ship | 13 |

*Source: Ship data*

With the exception of the 100m long car carrier, the table confirms that most ships operating to a sailing schedule have relatively high speeds and, subject to safe navigation, a route that saves time may be important for such ships, particularly if they are attempting to recover delays.

Conversely, bulk carrier operations are not usually time sensitive and therefore the importance of a time saving route may be reduced.

### 11.2.3. Ship costs

Table 11.4 summarises recent charter rates for the range of container ships that currently call at Tilbury.

Table 11.4: Selected container ship charter rates for Port of Tilbury

| Ship size | Charter rate (US Dollars) |
|---|---|
| 9,000 to 11,000 TEU container ships | 30,000 per day |
| 5,300 to 7,500 TEU container ships | 20,000 per day |
| 5,600 TEU container ships | 15,000 per day |
| 4,000 TEU container ships | 10,000 per day |
| 2,500 TEU container ships | 8,000 per day |
| 1,700 TEU container ships | 8,000 per day |
| 1,000 TEU container ships | 7,000 per day |

## 11.3. London Gateway

Because of the importance of the Sunk deep water route for London Gateway operations, the decision to pass to the west or east of the TOWF is of less importance. Notwithstanding this, Table 7.3 demonstrates that time saving benefits were important for several ships.

## 11.4. Assessment

The decision as to whether to pass to the west or east of the wind farm may depend on several factors on a particular day and more detailed real time navigation simulation studies are required to be completed to enable the threshold for a particular operation to be identified.

# 12. Review of key Applicant submissions

## 12.1. Navigation risk assessment

### 12.1.1. General comments

Marico Marine, on behalf of Vattenfall, have undertaken a Navigation Risk Assessment (NRA) for the application for development consent for the proposed expansion of TOWF. In this section, a commentary on key elements of the NRA is provided. All references to section numbers and figures relate to the NRA.

The NRA is a comprehensive document, however, it has a number of shortcomings and the reader is led astray regarding the impacts of the TEOWF on the ports located in the Thames Estuary in the assessment. The NRA does not mention or assess the potential impacts of the TEOWF on London Gateway Port or the Port of Tilbury, but it does mention the Port of Ramsgate.

Generally, the NRA does not appreciate the strategic importance of London Gateway Port and the Port of Tilbury, with significant additional committed growth and it completely fails to consider the potential economic impacts of the TEOWF on the Thames Estuary. No consideration was given to the likelihood of ships of over 11,000 TEU geometric capacity using the inshore route, and this was a shortcoming of the Pilot Transfer Bridge Simulation that has been used to inform the NRA.

### 12.1.2. Policy

The Port of Tilbury and London Gateway Port have provided a Policy Position Paper as part of Deadline 3 submissions to the DCO (Reference 4) and policy is not addressed further in this report..

### 12.1.3. Surveys and AIS analysis to inform the NRA

**Overview**

Section 5.5 of the NRA presents an analysis of the vessels passing through selected sampling sections or “gates.” The principal gates of interest are Gates A and E, as these are located on the western and north western sides of the existing wind farm.

Both gates would be expected to capture vessels in transit along the inshore route, while Gate E would also be expected to capture vessels “dipping down” to the North East Spit pilot boarding/landing area.

### Gate A

The lateral distribution of vessel movements along the Gate A baseline is considered to reflect the proximity of the wind farm to the east, the North Foreland promontory and its associated shallow bathymetry to the west, along with several charted hazards. In more detail, Figure 33 of the NRA shows that most vessel movements were confined to a baseline track of about 3,800m, reflecting, most clearly, the presence of the "Elbow" cardinal mark to the west and, less clearly, charted hazards to the east and the wind farm boundary. The most frequent movements were confined to a significantly narrower corridor with a width of about 2,700m.

### Gate E

Figure 33 of the NRA shows that, compared with Gate A, there are significantly more vessel movements through Gate E and a greater lateral distribution of these movements along the baseline.

The lateral distribution of vessel movements along the Gate E baseline reflects the proximity of the wind farm to the east and the shallow bathymetry to the west, as marked by the Margate East port lateral mark. In contrast to Gate A, vessels pass close to the wind farm boundary, although most movements take place at least 1,400m from the red line boundary.

## 12.1.4. Future marine traffic growth

Future marine traffic growth is dealt with only briefly in Section 6 of the NRA. Section 6 comprises 3 pages with the first page, primarily Section 6.1, providing statistics for United Kingdom major ports between 2000 and 2016. This was used to suggest a continuing trend of declining volumes, expressed as tonnages, without providing any information on unitised cargo, containers and RoRo cargoes, or the several major container terminals in the south-east of the United Kingdom. No mention is made of the Tilbury2 development and there is no mention at all of the Port of Tilbury. In this respect, Tilbury's London Container Terminal is one of the largest reefer container facilities in Europe. The importance of unimpeded maritime access to and from this terminal for high value cargoes may be recognised by noting that Tilbury's London Container Terminal alone generated over 343 short sea and deep sea transits through the inshore route, providing a total geometric capacity of almost 0.5 million TEU through the PLA's AIS Gate 1.

Section 6.1 makes the valid point that, as ship size increases, there will be fewer port calls, but does not recognise that the London Gateway Port has only been in operation since 2013 and is still in the growth phase, with Terminals 4, 5 and 6 still to be developed, and that Tilbury2 is consented and now in the very early stages of construction. The Port of Tilbury and London Gateway had a combined growth of 22.5% between 2016 (the end of the study period, which informed the growth assumptions in the NRA) and 2018, with further growth to be expected. This is greater than the overall 10% growth factor allowed for in the NRA and a continuing trend of growth above that predicted in the NRA is anticipated for the reasons set out above..

Section 6.2 mentions the Port of Ramsgate before the Medway Ports and, in particular, does not mention that there is an LNG import terminal on the Isle of Grain handling the largest LNG carriers currently in operation, some of which use the inshore route. In providing context to the complex vessel traffic patterns in and around the Thames Estuary, no mention is made of the ports within the navigation authority of the Harwich Haven Authority, including Felixstowe, Harwich and Ipswich in Section 6.

Section 6.3 of the NRA concedes that, despite a predicted national decline in maritime trade, an increase in maritime traffic may be expected at the Port of London.

### 12.1.5. Risk assessment

The methodological basis for findings that marine risks have been reduced to as low as reasonably practical (ALARP) levels is well established and understood. However, since future demand is considered at a relatively high level only in Section 6 of the NRA, it is not clear that the collision modelling reported to have been carried out takes sufficient account of the space required for operations with significantly larger ships or greater numbers of ships.

### 12.1.6. Summary

The NRA does not appear to recognise the complexity of navigation associated with the routes leading around the existing windfarm, the likely growth in shipping using these routes and the prospect that larger ships are likely to use the inshore route in the future.

It is considered that the NRA needs to be repeated, taking into account larger vessels and increased traffic volumes. Parameters for the required sea room should consider the largest vessels (of 400, 366, 333 and 299m in length), vessel handling characteristics, and a worse case beam of 60m and draught of 11.5m.Appropriate consultation should be carried out on the NRA and engagement with key shipping interested parties will be required.

Points of reference for considering sea room distances are Elbow Buoy, North East Spit Pilot Diamond, North East Spit Buoy and Tongue Deep Water Diamond. MGN543, as referred to in the NRA, is considered to be a starting point for considering sea room. The World Ocean Council, Nautical Institute and IALA special paper titled “The Shipping Industry and Marine Spatial Planning – A Professional Approach – November 2013” is also relevant when considering the tolerability of risks.

## 12.2.NE Spit Pilot Transfer Simulation Study

In respect of the Pilot Transfer Bridge Simulation report, the key point which this study was required to consider was whether or not there will be sufficient space for a ship to manoeuvre safely to transfer a pilot(s). As a starting point, the study only considered ships of up to 240m in length, which is not long enough, given that ships of over 330m transit through the inshore route and it is clear that such larger ships will require more space to accommodate their greater swept paths. Accordingly, the study cannot be relied upon and a larger range of ships is required to be examined.

The largest vessel reported to use the NE Spit Pilot Station is the “Valparaiso Express” (Table 7.6), at 333m in length and 11.3m draught. This is 93m, or almost 40%, longer than the longest ship simulated in the Pilot Transfer Simulation Study. It is likely that significantly larger ships would be able to use the inshore route at an appropriate draught in the future.

There are also presentational issues associated with the study’s use of a tug, instead of a pilot boat, in the simulation runs.

It is considered that the Pilot Transfer Simulation Study should be repeated using mutually agreed ships.

The objectives of the repeat study should be to:

- Demonstrate likely transit tracks through the inshore route and around the NE Spit cardinal mark for a range of agreed ships and agreed environmental conditions, with and without the wind farm extension in place

- Undertake a pilot transfer study using agreed ships with and without the windfarm extension in place, in agreed environmental conditions. At least 2 pilot transfers should be carried out simultaneously.

# 13. Summary and principal conclusions

## 13.1. Summary

This study has summarised the present levels of traffic to London Gateway and the Port of Tilbury. It demonstrates the importance of these ports within the Port of London, and has quantified the vessel traffic that utilises the inshore route to the west of TOWF that may be impacted by TEOWF.

The study has also quantified the use of the NE Spit Pilot Station by ships calling at London Gateway and the Port of Tilbury.

## 13.2. Conclusions

### 13.2.1. Navigation risk assessment

This study concludes that the Navigation Risk Assessment undertaken to support the application for the TEOWF should be repeated taking into account larger vessels and increased traffic volumes.

### 13.2.2. Structure exclusion zone

Following receipt of comments from several interested parties, the Applicant has sought to reduce the potential impact on the two ports' marine operations by introducing a structures exclusion zone (SEZ), principally at the north west corner of the expanded wind farm. This SEZ was submitted to the examination at Deadline 4 under reference REP4-018.

The shape and extent of the SEZ requires justification, preferably by carrying out additional real time navigation simulation studies. As mentioned previously, as the Deadline 4 submission of the SEZ was not accompanied by the NRA Addendum, this report has not considered whether or not the additional space provided addresses the primary concerns of the two ports, from a navigation standpoint. Such analysis of the NRA Addendum will be carried out by the two ports as soon as possible.

Nevertheless, it is understood that the NRA Addendum is not based upon real time navigation simulation studies and it is considered that without such studies it will be incomplete.

# 14. Recommendations

### 14.1.1. Navigation risk assessment

The Navigation Risk Assessment should be repeated and as part of that assessment, the Pilot Transfer Simulation Study should be repeated using mutually agreed ships. The NRA should identify factors that will be affected by the TEOWF and focus on these. London Gateway Port and the Port of Tilbury will need to be involved so that matters that are of importance to them are satisfactorily addressed during this reassessment.

### 14.1.2. Structures exclusion zone

Additional real time navigation simulation studies should be carried out to demonstrate that the proposed SEZ provides sufficient space for continued safe navigation within the NRA study area.

# 15. References

1. Port of London Authority, "River Thames Critical Depths List," 25th March 2019, 10:36am.
2. https://ihsmarkit.com/research-analysis/2017-review-port-call-sizes-continue-to-rise.html
3. https://server1.pla.co.uk/Sovereign-Maersk-breaks-Port-of-London-Record
4. https://www.forthports.co.uk/wp-content/uploads/2018/03/3965.pdf
5. https://www.gov.uk/government/statistics/port-freight-statistics-2017-final-figures
6. Vattenfall Wind Power Ltd, Thanet Extension Offshore Wind Farm, Appendix 1 to Deadline 4B Submission: Addendum to Navigation Risk Assessment, April 2019 Revision A.

# Appendices

## A. London Gateway deep sea Gate 1 transits

Table A.1: London Gateway deep sea Gate 1 transits

| Name | Length (m) | TEU | Transits |
|---|---|---|---|
| Al Bahia | 306 | 4,898 | 1 |
| Bomar Resilient | 210 | 2,602 | 1 |
| Cap San Raphael | 333 | 9,814 | 1 |
| CCNI Andes | 300 | 9,000 | 1 |
| CMA CGM Brazil | 189 | 2,339 | 3 |
| CMA CGM Cayenne | 190 | 2,140 | 2 |
| CMA CGM Marseille | 190 | 2,140 | 5 |
| CMA CGM St. Laurent | 190 | 2,140 | 7 |
| Evridiki G | 210 | 2,530 | 1 |
| Marfret Guyane | 170 | 1,713 | 8 |
| Marfret Marajo | 170 | 1,691 | 6 |
| Moen Island | 222 | 2,824 | 2 |
| MSC Carmen | 275 | 4,860 | 1 |
| MSC Chloe | 300 | 9,400 | 1 |
| MSC Iris | 203 | 1,254 | 1 |
| MSC Regina | 259 | 4,056 | 1 |
| Rio Thelon | 210 | 2,556 | 1 |
| Rotterdam Express | 294 | 4,890 | 1 |
| Santa Bettina | 222 | 2,030 | 1 |
| Seatrade Orange | 185 | 1,580 | 1 |
| Seatrade White | 185 | 1,580 | 1 |
| St Louis Express | 243 | 3,237 | 3 |
| Winchester Strait | 175 | 1,740 | 1 |

*Source: Port of London Authority Gate 1 AIS records Pilotage operations*

# B. London Gateway short sea Gate 1 transits

Table B.1: London Gateway short sea Gate 1 transits

| Name | Length | TEU | Transits |
|---|---|---|---|
| DS Blue Ocean | 129 | 698 | 6 |
| Helena Schepers | 152 | 1,036 | 10 |
| Ice Crystal | 129 | 700 | 5 |
| Wes Carina | 153 | 1,036 | 7 |

*Source: Port of London Authority Gate 1 AIS records Pilotage operations*

# C. Tilbury deep sea container ship Gate 1 transits

Table C.1: Tilbury deep sea container ship Gate 1 transits

| Name | Length (m) | TEU | Transits |
|---|---|---|---|
| AS Fabiana | 166 | 1,296 | 1 |
| AS Floretta | 165 | 1,269 | 2 |
| BSL Cape Town | 210 | 2,556 | 1 |
| CMA CGM Africa Four | 227 | 3,718 | 3 |
| CMA CGM Africa One | 228 | 3,650 | 7 |
| CMA CGM Africa Three | 228 | 3,718 | 7 |
| CMA CGM Africa Two | 228 | 3,718 | 6 |
| CMA CGM America | 269 | 4,043 | 6 |
| CMA CGM Sambhar | 269 | 4,045 | 4 |
| Georgia Trader | 204 | 2,122 | 3 |
| HSL Porto | 208 | 2,478 | 1 |
| HSL Sheffield | 209 | 2,556 | 1 |
| Maersk Nairobi | 210 | 2,556 | 1 |
| Maersk Neston | 210 | 2,556 | 4 |
| Maersk Newcastle | 210 | 2,556 | 2 |
| Nordisabella | 195 | 2,500 | 2 |
| Polar Peru | 230 | 3,884 | 1 |

*Source: Port of London Authority Gate 1 AIS records Pilotage operations*

# D. Tilbury short sea container ship Gate 1 transits

Table D.1: Tilbury short sea container ship Gate 1 transits

| Name | Length (m) | TEU | Transits |
|---|---|---|---|
| Alinda | 129 | 690 | 6 |
| AS Laguna | 139 | 916 | 2 |
| Aurora | 134 | 868 | 1 |
| BBC Georgia | 138 | 685 | 1 |
| Bernhard Schepers | 151 | 1,036 | 3 |
| CMA CGM Goya | 142 | 809 | 23 |
| Comoros Stream | 155 | 492 | 1 |
| Conmar Avenue | 151 | 1,036 | 2 |
| Conmar Elbe | 133 | 707 | 5 |
| Corina | 122 | 676 | 1 |
| Dance | 125 | 801 | 1 |
| Dina Trader | 134 | 868 | 1 |
| Elan | 150 | 1,008 | 23 |
| Elite | 150 | 1,008 | 22 |
| Encounter | 136 | 750 | 11 |
| Enforcer | 135 | 750 | 21 |
| Ensemble | 135 | 750 | 22 |
| Expansa | 141 | 877 | 7 |
| Externo | 141 | 877 | 9 |
| Grete Sibum | 151 | 1,036 | 3 |
| Hansa Rendsburg | 175 | 1,718 | 1 |
| Heinrich Schepers | 150 | 1,036 | 2 |
| Henneke Rambow | 135 | 868 | 13 |
| Iduna | 125 | 801 | 1 |
| India | 136 | 864 | 1 |
| JRS Capella | 130 | 698 | 9 |
| JSP Mistral | 140 | 900 | 9 |
| JSP Slidur | 134 | 868 | 2 |
| Kristin Schepers | 141 | 803 | 13 |
| Luca | 101 | 509 | 1 |
| Maris | 101 | 509 | 1 |
| Marja | 100 | 509 | 1 |
| Max Mars | 133 | 704 | 2 |

| Name | Length (m) | TEU | Transits |
|---|---|---|---|
| Meandi | 141 | 803 | 13 |
| Moveon | 134 | 868 | 1 |
| Neuburg | 142 | 812 | 18 |
| Nordic Luebeck | 152 | 1,036 | 4 |
| Paul Russ | 161 | 1,338 | 1 |
| Paula Anna | 107 | 389 | 2 |
| Philemon | 158 | 880 | 5 |
| Ranger | 141 | 803 | 12 |
| Reestborg | 170 | 558 | 1 |
| Stefan Sibum | 152 | 1,036 | 5 |
| Sunrise X | 130 | 1,050 | 3 |
| Varamo | 167 | 1,296 | 2 |
| Vega Philipp | 155 | 917 | 1 |
| Wilhelm | 135 | 868 | 1 |
| Wilson Garston | 82 | 137 | 1 |

*Source: Port of London Authority Gate 1 AIS records Pilotage operations*

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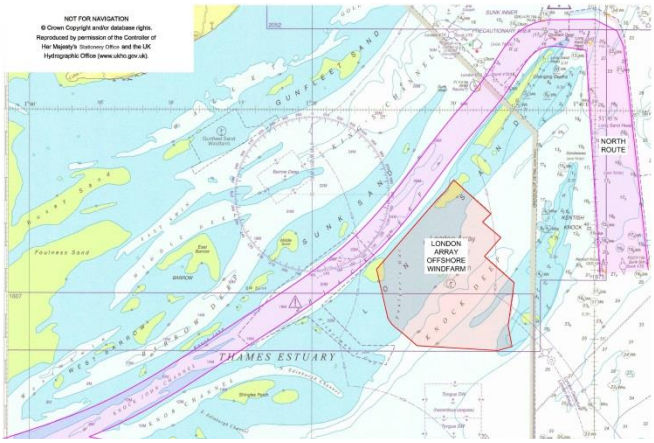


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