The London Resort Development Consent Order

BC080001

Environmental Statement
Volume 1: Main Statement

Chapter 10 – River transport

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Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(a)
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Regulation 12(1)

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Chapter Ten ◆ River transport

INTRODUCTION

10.1 This chapter sets out the methodologies adopted in the assessment of any significant effects resulting from river transport associated with the London Resort, in particular effects on navigation, and relates them to the relevant policies and guidance. Following the review of policies and guidance, the existing and future baseline conditions are outlined and assessed and an assessment of the effects of the proposed London Resort follows. Consideration is then given to mitigation strategies (where deemed necessary) and any residual and in-combination effects. The chapter concludes with a summary of the results of the assessment.

10.2 The London Resort, as proposed, has the potential to affect existing river traffic and its users to varying degrees depending on the season, visitor demand, and extent of implementation of waterborne services provided. This chapter provides an assessment of the potential effects arising from the waterborne transport associated with the London Resort during both construction and operational phases, the potential use of river transport for the decommissioning phase has not been assessed, the Resort has a design life in excess of 60 years and therefore no reliable prediction of baseline conditions is considered possible. Land transport is considered separately in chapter 9: Land transport of this ES (document reference 6.1.9).

10.3 The assessment method set out in this chapter for the preliminary Navigation Risk Assessment (pNRA) (ES Appendix 10.1 – document reference 6.2.10.1) is expected to form the basis of the future development of the pNRA in respect of producing updates in accordance with the requirements of the Department for Transport and Maritime & Coastguard Agency's Port Marine Safety Code (PMSC) and its subsequent adoption as a full Navigation Risk Assessment (NRA).

10.4 The proposed London Resort's access strategy is explained in the Transport Assessment (ES Appendix 9.1, document reference 6.2.9.1). As ES chapter 4: Project development and assessment of reasonable alternatives (document reference 6.1.4) explains, the potential to use the River Thames for the transport of building materials and construction workers at the construction stage and for goods and materials and passenger and staff services once the London Resort is in operation was one of the factors that influenced LRCH's decision to select the Swanscombe Peninsula as its preferred site for the London Resort.

10.5 Indeed feedback from LRCH's statutory consultation in 2015 where a number of concerns were raised about the volume of car borne traffic on the strategic road network in Kent as a result of the resort has resulted in LRCH resolving to introduce car parking at the Port of Tilbury. The proposed carparking will accommodate 25% of the Resort's car and

coach borne visitors. Further detail is set out within chapter 9 of this ES.

- The London Resort will include a number of marine transport facilities which are works included in Schedule 1 of the draft DCO (document reference 3.1) and will be subject to the Deemed Marine Licence (DML) included in Schedule 11 of the draft DCO (document reference 3.1) and potentially require licencing from the Port of London Authority (PLA) as follows , and
- potential temporary mooring at Bell Wharf and White's Jetty for construction material discharge (forms part of Work No. 14a see Work Plan Sheet 3, document reference LR-DG-APT-DCP-2.5.3).

10.6 For the navigation assessments 3 options for the provision of the required marine transport facilities have been considered as follows;

- Option A includes the new passenger ferry terminal at Bell Wharf, the extension to the floating jetty at Port of Tilbury, renovation of Bell Wharf and construction of a new floating Ro-Ro platform and access bridge at White's Jetty, see Figures 2.1 and 2.4 of the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1),
- Option B includes the new passenger ferry terminal at Bell Wharf, the extension to the floating jetty at Port of Tilbury, renovation of Bell Wharf and renovation of White's Jetty, see Figures 2.2 and 2.4 of the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1), and
- Option C includes the new passenger ferry terminal at Bell Wharf, the extension to the floating jetty at Port of Tilbury, renovation of Bell Wharf and dredging to provide deeper vessel access at Bell Wharf, see Figures 2.3 and 2.4 of the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1).

10.7 The London Resort will thererfore introduce a number of new vessel operations, including;

- river passenger services between central London and the new jetty at the Resort;
- river passenger service between Tilbury and the London Resort, with the potential to make further connections should it be required;
- construction materials to be transferred between Tilbury and the Resort using a reconditioned Bell Wharf or new pontoon at White's Jetty on the western side of the Swanscombe Peninsula for Ro-Ro and crane-unloaded deliveries at the existing Seacon freight terminal at Northfleet on the eastern side of the Swanscombe Peninsula for deliveries of palletised construction materials;
- construction personnel transfer services between Tilbury and the Resort;

- the majority of deliveries of goods and materials to service the Resort during its operation; and
- inspection and maintenance of marine infrastructure.

10.8 There is the potential that dredging will be required in order to bring Bell Wharf back into a usable condition, although at present the extent of dredging required has not been finalised. In order to produce a robust assessment, the impacts of the construction plant required to undertake any dredging that might be required has been included in the pNRA (document reference 6.2.10.1) and at paragraph 10.75 of this chapter.

METHODOLOGY AND DATA SOURCES

EIA Scoping

10.9 As part of the scoping exercise for the London Resort, an EIA Scoping Report was submitted to the Planning Inspectorate in mid-June 2020 (document reference 6.2.1.3). The Scoping Report proposed the methods for assessing the environmental impacts of the London Resort, which included, inter alia, the assessment of impacts associated with river transport.

10.10 The EIA Scoping Report attracted responses from numerous authorities and interest groups. Consideration has been given to all received comments and to relevant advice of the Secretary of State's EIA Scoping Opinion (document reference 6.2.1.4). The relevant extracts from the Scoping Opinion and our responses are set out in Table 10.1 below.

Table 10.1: Table of relevant advice from EIA scoping opinion

Respondent	Scoping Comment	Response
Secretary of State – scoping advice	It is noted that the ES will contain a separate chapter on river transport. The Scoping Report only considers the potential impacts during the construction period but makes no reference to any impacts resulting from the operational period. There is no explanation as to why the operational period has not been considered. The ES must either present an assessment of the impacts during operation or evidence demonstrating agreement with the relevant consultation bodies and the absence of an LSE.	The effects and potential impacts of the London Resort's river transport during both the construction and operational periods have been considered in this chapter of the ES.

Respondent	Scoping Comment	Response
Gravesham Borough Council	Ferry service improvements (para 9.17/18) including link to Tilbury, combined with a service from central London are mentioned, along with the car parking proposal in Tilbury. All this is to be welcomed in principle. Thames Clippers have run a trial service from Gravesend and a holistic approach to service provision is required. However, allied with this is the future of the Tilbury Ferry as part of enhancing cross river public transport opportunities. This is the only current public transport link across the river downstream of the Dartford Crossing and it is very important that it is retained and not lost.	The navigational interaction of the proposed ferry services and the existing Tilbury-Gravesend Ferry is considered in this ES Chapter (see paragraph 10.93) and the pNRA (Appendix 10.1 of this ES - document reference 6.2.10.1). Additionally, LRCH has met with POTLL and Jetstream and have confirmed Jetstreams operation will not be compromised. As the new ferry operations have been developed to cater primarily for London Resort visitors it is considered that they will not have a material commercial impact on the existing Tilbury/Gravesend ferry, which caters for a different customer base
Kent County Council	The Scoping Report states that 95% of construction materials are proposed to be supplied to the site by river. This is welcomed as it will take a large number of trips off the highway network. A Construction Management Plan will be required and with regards to river transport, and this must demonstrate that 95% is achievable. Whilst the Scoping Report assumes that the construction traffic will be significantly lower than development traffic, the two types of traffic are likely to have different peak periods which could coincide with the network peak hours. Construction traffic should, therefore, be considered.	River-based construction traffic has been considered as part of the Construction Traffic Management Plan (document reference 6.2.9.1) and in this chapter of the ES. Following further assessment of the likely construction method the proposals were revised to80% of construction materials can be supplied to the site via river. This ES Chapter considers the impacts of this level of movements (See paragraph 10.73).
Port of London Authority	The Applicant recognises that a Navigational Risk Assessment (NRA) is required to support the project and discussions on the scope of the NRA, consultation requirements and potential impacts and mitigations should be held with the PLA.	Consultation meetings have been held with Port of London Authority, first in November 2017 and subsequently in August 2020, to agree the extent and scope of the pNRA (document reference 6.2.10.1).

Respondent	Scoping Comment	Response
		Port of London were participants in the pNRA preparation workshop held on 6 October 2020.
Port of London Authority	It is proposed to use the river for the transport of passengers to the site through the addition of a new floating pontoon jetty which is proposed between Bell's Wharf and Ingress park. An extension is proposed to an existing jetty at the Port of Tilbury and there will be a mooring area for vessels in the immediate vicinity of the jetty extension. Services are proposed between the application site and central London as well as from Tilbury and potentially from Grays, although no further details are given on the Grays river transport options.	LRCH's transport strategy does not rely on jetty at Grays and it therefore has not been included within the DCO application or assessed as part of the ES. However, Thurrock Council and Grays Town Board are undertaken a feasibility assessment with the aim to fund and develop a pier at Grays. LRCH has signed an MOU with Thurrock Council and has agreed to support the council with its proposals which would form a separate planning application should it be progressed.
Port of London Authority	Initial estimates are 25% of car borne visitors will travel to the Resort via Tilbury and approximately 2,500 spaces would be provided at Tilbury. As such, the anticipated percentage of visitors that will arrive at the resort by water from North of the River should be clarified.	The level of visitors arriving at the London Resort by car is set out in detail in sections 6 and 8 of the Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1)
Port of London Authority	Consideration should also be given to the potential to use the river for the transport of construction workers to the site and for staff to be transported to the site during the operation of the resort. The measures that will be taken to encourage visitors to arrive by water should be clearly set out.	An assessment of the level of construction workers using ferry services to transfer between Tilbury and the London Resort has been undertaken and is included in the Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1) and in the Construction Traffic Management Plan (document reference 6.2.9.1). The potential vessel movements associated with these operations is considered in this chapter of the ES. Furthermore, the Transport

Respondent	Scoping Comment	Response
		Assessment (Appendix 9.1 of this ES- document reference 6.2.9.1) sets out a demand management plan which looks to encourage visitors and staff by sustainable modes of travel, including river vessels.
Port of London Authority	It is noted that the applicant proposes to scope out sea-related (as opposed to river-related) water traffic from the assessment but that more cruise visitors are expected. The scoping out of sea related water traffic should therefore be justified.	Chapter 9: Land transport of the ES (document reference 6.1.9) discusses this in further detail. However, the introduction of the London Resort is not expected to see any increases in cruise ships into Tilbury and the London Resort are not looking to increase facilities for Cruise ships at Tilbury. For those cruise ships that already berth at Tilbury, there will be the opportunity for passengers to visit London Resort.
Port of London Authority	Robust modelling should support the proposed river transport figures and if achieved then almost one million visitors could be arriving at the application site by water for gate 1 or nearly two million across both gates one and two.	The trip generation, distribution and mode choice is assessed in detail in the Transport Assessment (Appendix 9.1 of this ES - (document reference 6.2.9.1).
Port of Tilbury London	PoTLL support the approach of having a separate chapter in the ES to consider the effects of river transport. Detailed consideration will need to be given to the impact on navigation from marine infrastructure both during the construction and operation of the Resort and the river services both from London and from Tilbury itself. The transfer of construction materials between Tilbury and the Resort will need to be assessed carefully to ensure that there is no adverse effect on Port operations albeit PoTLL, in supporting the initiatives of LRCH to use the Port of Tilbury as a construction hub, will work with LRCH and PLA to ensure no adverse effects arise.	A number of consultation meetings have been held with Port of Tilbury London Limited (POTLL) and they participated in the pNRA preparation workshop held on 6 October 2020. LRCH has continued to engage with POTLL.

Respondent	Scoping Comment	Response
Thurrock Council	It is noted that the Scoping Assessment makes reference to the current Tilbury Ferry and that it is unlikely that the new proposals will impact on the existing ferry service. However further clarification will be required in this respect. It is also well known that on certain occasions the Tilbury Ferry is unable to run due to fog, exceptionally low tides, adverse weather conditions etcetera. Thus the applicant will need to consider what contingencies will be necessary in this respect and in addition what contingencies will be in place for breakdowns or servicing of vehicles etcetera.	The navigational interaction of the proposed ferry services and the existing Tilbury-Gravesend Ferry is considered in this ES River Chapter (para 10.93) and the pNRA (Appendix 10.1 of this ES - document reference 6.2.10.1). Additionally, LRCH has met with POTLL and Jetstream and have confirmed Jetstreams operation will not be compromised. Contingencies in the event of an inability for vessels to sail is considered in Section 11 of the Transport Assessment (Appendix 9.1 of this ES, document reference 6.2.9.1).
Thurrock Council	Concerns remain as to the impact on the viability of the existing Gravesend to Tilbury ferry once this development is operation, and would there be an impact on its long-term future. The ferry provides the only non-motorised link across the river outside of London and coupled with the heritage and tradition of the ferry, the authority believe it essential that the service is not lost.	The navigational interaction of the proposed ferry services and the existing Tilbury-Gravesend Ferry is considered in the ES River Chapter (para 10.93) and the pNRA (Appendix 10.1 of this ES - (document reference 6.2.10.1). As the new ferry operations have been developed to cater primarily for London Resort visitors it is considered that they will not have a material commercial impact on the existing Tilbury/Gravesend ferry which caters for a different customer base. Additionally, LRCH has met with POTLL and Jetstream and have confirmed Jetstreams operation will not be compromised.
Thurrock Council	It is noted in the chapter that analysis has not been undertaken on the impact of ferry movements on the wider network, as well as impact of passenger movements by sea and air. In terms of river and sea	The impacts of the proposed ferry operations have been assessed in this chapter of the ES, this includes an assessment of the interaction between new

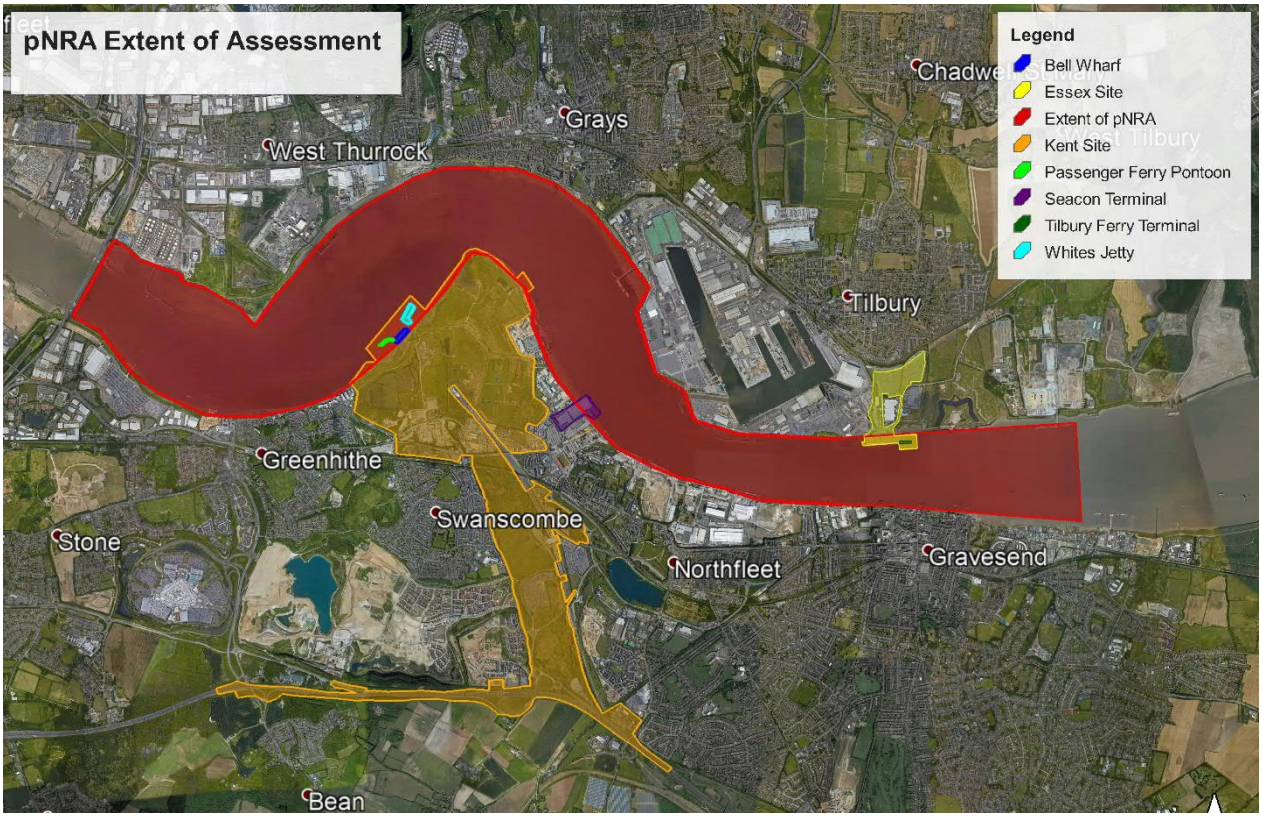
Respondent	Scoping Comment	Response
	passengers, the Thames is a busy operational river, and increased vessels will have an impact on a wide variety of environmental factors, including busier shipping lanes. Any potential increase in large sea vessels/cruise ships will impact Thurrock, as it would be expected these to dock at the Port of Tilbury, and there is an impact on air quality on the local community.	and existing vessel movements. LRCH are not proposing any additional large sea vessels or cruise ship services as part of the access strategy.
Transport for London	If, as set out in paragraph 4.53, 15% of all visitors travelling by river from central London, the potential impact of this on crowding at and onward travel from central London river piers would need to be assessed. However, notwithstanding any attraction the river trip itself will have, given the extended journey times from central London (or indeed even the closer piers such as Woolwich, itself one hour distant by riverbus from there), it is not clear how attractive this will be to the majority of visitors to the proposed development.	The inclusion of the river service is seen as part of the day trip to the resort, this is considered in more detail in Sections 5, 8 and 11 of the Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1).
Transport for London	The proposal to deliver 95% of all construction materials by river (paragraph 4.53) and suggestion that this will also be used for operational waste (paragraph 5.72) are fully supported. However, the ultimate proposals must include details of how these objectives will be achieved.	River-based construction traffic has been considered in Section 16 of the Transport Assessment (Appendix 9.1 of this ES – document reference 6.2.91). Following further assessment of the likely construction method the proposals were revised to 80% of construction materials to be delivered by river.
Highways England	Does not specifically mention the existing conditions associated with the ferry trips which would be needed to understand future movement needs and demand.	New local ferry services will be provided. The new services will not affect the conditions of the existing Gravesend to Tilbury Ferry, so the Proposals are not considered to have an impact on existing services. Details of the principle of the proposed ferry operations are set out in Section 11 of the

Respondent	Scoping Comment	Response
		Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1).
Highways England	As indicated by the LTC team, no reference has been made to the PoT2 and likely impacts of construction or linkages. Any further consideration of river methodology and documents has not been undertaken.	This has been assessed and reviewed in more detail in Sections 13 and 16 of the Transport Assessment (Appendix 9.1 of this ES – document reference 6.2.91).
LTC Via Highways England	There may also be increased maritime traffic which could impact LTC if the jetty were to be used.	Increases in marine traffic and their potential impacts are considered in this chapter of the the ES and the pNRA (Appendix 10.1 of this ES- document reference 6.2.10.1)).
LTC Via Highways England	Para 9.30. does not take account of the known (LTC has to include it) fog/visibility issues and how this may affect the cross-river ferry for passengers and logistics, i.e. it can be reasonably be assumed the service will be suspended and visitors will be obliged to cross the river at Dartford if they continue their journey to the resort. For logistics, materials would either be delayed or travel via Dartford.	This has been reviewed and assessed in Section 11 of the Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1)).
LTC via Highways England	15% of arrivals by river from Central London appear high given the likely long journey time.	The inclusion of the river service is seen as part of the day trip to the resort, this is considered in more detail in Section 8 of the Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1).

Consultation feedback

10.11 LRCH held a consultation meeting with the PLA to discuss potential navigational impacts of the London Resort in May 2017. It was agreed that the assessment area for the London Resort NRA (details of the NRA process are outlined in paragraphs 10.24 to 10.31 below) should cover a 10 km stretch of the River Thames between the Tilbury Landing Stage and the Queen Elizabeth Bridge. This extent was subsequently extended, through discussion with PLA, to include a further stretch of river to the east, extending the boundary to the Tilbury2 Terminal as shown in figure 10.1 below.

Figure 10.1: NRA – Extent of assessment



10.12 It was also agreed with the PLA that the NRA should be seen as an iterative process. The NRA submitted with the DCO application (document reference 6.2.10.1) is a pNRA. Requirement 14 in Schedule 2 Part 1 of the draft DCO (document reference 3.1) provides that the NRA will be updated as new and more detailed information becomes available on considerations including vessel sizes and frequencies, temporary works for outfall construction, etc.

10.13 The aspects of the London Resort development that have the potential to affect the safety of navigation are identified in table 10.2:

Table 10.2: Table of development that could affect the safety of navigation

Aspect of Development with potential impact	Example	Construction Phase	Operational Phase
Passenger Ferry Operations	River passenger service arrivals/departures	X	X
Delivery/waste transportation	Delivery of construction materials	X	X
Maritime construction activities	Construction of new jetty	X	

Landside development with potential to impact sight lines and navigation systems	Buildings (including temporary works), land raising	X	X

10.14 The introduction of additional vessel operations would result in an increase in vessel movements in the River in general and around the London Resort and Port of Tilbury in particular. This increase will bring with it an increase in vessel emissions and noise along with an increase in navigational risk.

10.15 Statutory consultations on the London Resort were undertaken in 2014, with further informal consultation undertaken in 2017. At this time, there were no proposals to provide access parking north of the river, however some initial comments were received which included;

- Balance of views and concerns, for example, transport workshops seek to exploit the potential of River Thames access whilst ecology seek to minimise disruption to estuary; How is it addressed: Inclusion of a river connection to Tilbury, providing access north of the river for visitors, staff, construction materials and operational supplies.

- Exploit public transport (including river);
  How is it addressed: Consultation has been undertaken with key operators in the area looking to enhance bus services, provide new river connections into London and north into Essex, and identify connections to the rail network in the vicinity of the site.

- Construction traffic (including by water) and the environmental impact of construction and decommissioning;
  How is this addressed: Construction traffic has been considered and included in the CTMP (document reference 9.1, Appendix TA-AD). Chapter 10: River transport considers the impacts of river-borne movements to the site during construction.

10.16 In respect of the statutory consultation for the Proposed Development undertaken in July to September 2020, responses relevant to river transport are presented in Table 10.3 below.

Table 10.3: Table of relevant responses to the 2020 statutory consultation

Consultee	Relevant Response	Consideration in ES
Gravesham Borough Council	It is important that the Tilbury Ferry (Tilbury to Gravesend Town Pier) be retained and enhanced as a basis for making much better use of the river for local transport and strengthen north – south connections. The statement at para 10.61 is welcomed, however the	The navigational interaction of the proposed ferry services and the existing Tilbury-Gravesend Ferry is considered in this ES River Chapter (para 10.93 and the pNRA (Appendix 10.1 of the

	development boundary covers the entire Tilbury landing stage. Gravesham owns the Town Pier and Pontoon and is keen to see greater use of these to support the economic regeneration of Gravesend Town Centre.	ES - document reference 6.2.10.1). Additionally, LRCH has met with POTLL and Jetstream and have agreed to safeguard Jetstream's existing operation.
Gravesham Borough Council	There are, in effect, two river transport markets. A long distance (Thames Clipper) service for Resort visitors and also commuters into London. There is also what might be termed a local market for resort, employment, school, etc. traffic between Swanscombe Peninsula, Grays (as a potential ferry destination not mentioned in PEIR), Tilbury and Gravesend, and possibly other destinations.	The navigational interaction of the proposed ferry services and the existing Tilbury-Gravesend Ferry is considered in the ES River Chapter (para 10.93) and the pNRA (Appendix 10.1 of the ES – document reference 6.2.10.1). Ferry services from Grays are not proposed in the current DCO application.
Gravesham Borough Council	The river is proposed to be used for bringing in materials as well as supplies / waste during operation. The Borough Council welcomes this as a general principal but will need to see more detail as to the actual implications and practicality . For example during construction it would be illogical for goods / lorry movements coming from south of the river to travel north of the river only to come back again by water Options for the use of rail can also be explored given the availability of existing rail freight sidings at Northfleet.	River-based construction traffic has been considered as part of the Construction Management Plan and Construction Traffic Management Plan (document reference 6.2.9.2) and the ES. It is agreed that goods movements from the south east of London would be better served accessing the Resort from the Kent side.
DPWorld London Gateway	We are of the view that the proposed ferry terminal on the north banks of the River Thames in Tilbury does not promote the use of sustainable transport by visitors to the London Resort or a material reduction in visitor related road vehicle mileage.	The Transport Assessment (Appendix 9.1 of this ES - document reference 6.2.9.1) considers the sustainability of the site in greater detail. The inclusion of the car park and ferry terminal at Tilbury is considered beneficial by removing the requirement for car and coach borne visitors to use the Thames crossing at Dartford and travelling on the A2(T).

Assessment methodology

10.17 This chapter of the ES considers the navigational impacts of the river transport operations associated with the London Resort.

10.18 The assessment of the environmental effects from marine operations are considered in the relevant chapters in this ES, specifically, chapter 13: Marine ecology and biodiversity, chapter 15: Noise and vibration and chapter 16: Air quality (document references 6.1.13, 6.1.15 and 6.1.16 respectively).

10.19 Construction activities connected to the marine infrastructure have the potential to create disturbance to marine habitats through sediment disruption and underwater noise (especially piling activities). These effects are considered in chapters 13: Marine ecology and biodiversity (document reference 6.1.13) and 15: Noise and vibration (6.1.15) of this ES.

10.20 All UK Statutory Harbour Authorities (SHAs) have a responsibility to comply with, inter alia, the letter and spirit of the Port Marine Safety Code (PMSC). For the Thames the SHA is the Port of London Authority (PLA). A core requirement of the PMSC is that the Duty Holder of the SHA must:

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

10.21 As part of this responsibility it is required that a Navigation Risk Assessment (NRA) is prepared to assess the risks associated with marine operations.

10.22 An NRA is therefore required to be submitted to the SHA in whose water the candidate shipping will navigate, in this case the PLA, for approval.

10.23 The approach adopted for the preparation of the London Resorts pNRA follows the PLA's preferred methodology for a NRA taken from Navigational Risk Assessment – Guidance to Operators and Owners, PLA, http://www.pla.co.uk/Safety/Navigational-Risk-Assessment-Guidance-to-Operators-and-Owners. This methodology and the extent of the area to be assessed have been agreed with the PLA.

10.24 The risk analysis method adopted in the pNRA process comprises a likelihood and severity matrix to rate each identified hazard. The method assigns a value ranging from 1 (lowest) to 5 (highest) for each aspect.

10.25 The product of the likelihood and severity rating for each hazard is then assigned an overall risk outcome based on its value, as follows;

- 1-3 Minor,
- 4-8 Moderate,
- 9-14 Serious,
- 15-19 Very Serious, and
- 20-25 Severe.

10.26 At the low end of this scale, where the overall risk outcome is minor or moderate, the risk would be considered negligible and acceptable. At the high end of the scale, severe, the risk would be considered very high and intolerable.

10.27 The pNRA also takes account of the recommendation of the following documents:

- Port Marine Safety Code, DfT/MCA Nov 2016;
- A Guide to Good Practice on Port Marine Operations, DfT/MCA Feb 2018;
- The National Contingency Plan - A Strategic Overview for Responses to Marine Pollution from Shipping and Offshore Installations, DfT/MCA Sept 2014; and
- Local byelaws including;
  - General Directions for Navigation in the Port of London, 2016 (PLA Directions);
  - Pilotage Directions, 2017;
  - Port of London Thames Byelaws, 2012 (Thames Byelaws);
  - Marine Safety Management Systems Manual, 2017 (PLA SMS);
  - Code of Practice for the Management and Operation of Commercial Vessels on the Thames, 2013;
  - Code of Practice for Passenger Vessel Operations on the Thames, 2016;
  - Code of Practice for Craft Towage Operations on the Thames, 2017; and
  - Code of Practice for the Safe Mooring of Vessels on the Thames, 2010

10.28 For the pNRA the following information sources have been reviewed:

- existing operational arrangements;
- previous studies and assessments;

- scheme studies and assessments;
- vessel traffic density;
- Marine Accident Investigation Branch (MAIB) incident reports;
- RNLI incident reports; and
- SHA recorded Accident-Incident records.

10.29 Potential impacts on navigation could occur during the construction and operational periods. Without prejudice to the outcome of the final NRA, the following are the types of hazard which have been identified and assessed in sections 6 and 7 of the pNRA. The list is not intended to be exhaustive, and future hazard identification might well identify other hazards.

- collision (between two vessels);
- contact (a vessel hitting an object other than another vessel or riverbed);
- grounding (vessel hitting riverbed); and
- wash / draw (movement of a moored vessel from a passing vessel's wake).

10.30 The pNRA was informed by a hazard identification workshop, held on 6th October 2020 and attended by representatives of the PLA, POTLL and Thames Clipper.

10.31 The impacts of the construction plant required to undertake any dredging that might be required has been included in the pNRA (document reference 6.2.10.1) and at paragraph 10.75 of this chapter. Any further assessments of dredge materials required during the detailed design of the London Resort will be conducted to satisfy the requirements of both the PLA and the Marine Maritime Organisation's (MMO) dredging and disposal licencing regimes.

RELEVANT LAW, POLICY AND GUIDANCE

Introduction

10.32 Chapter 5: Relevant law and policy of this ES (document reference 6.1.5) provides an overview of law, policy and best practice of general relevance to the London Resort.

10.33 This section identifies the specific policy and guidance related to river transport relevant to the London Resort at a national and local level. These policies and plans were considered to help define the scope of the assessment in this chapter.

National policy

National Policy Statement for Ports (PNPS), 2012

10.34 The PNPS was published in January 2012 and sets out the government's policies for new

nationally significant port development projects. The London Resort does not provide for a nationally significant port development in the terms of the relevant qualifying criteria for nationally significant infrastructure projects in the Planning Act 2008. However, where aspects of the PNPS are pertinent to elements of the London Resort that might affect existing port facilities, assessments in this ES have appropriately referenced the PNPS.

10.35 The PNPS (section 5.7) requires applicants to consider the effects of a project during both the construction and operational phases upon air quality taking into account the existing air quality levels. This aspect of potential river transport impacts is assessed in chapter 16: Air quality of this ES (document reference 6.1.16).

10.36 The PNPS (section 5.10) requires an applicant to assess the noise generating aspects of a development on the marine and terrestrial environment including noise sensitive areas and noise sensitive species which has been informed by the existing marine and terrestrial noise environment. These assessments should then identify any measures that are included to mitigate the effects of noise. This aspect of potential river transport impacts is assessed in chapter 15: Noise and vibration of this ES (document reference 6.1.15).

10.37 The PNPS (section 5.3) identifies policies specific to coastal environments in which ports are located, particularly with the need to consult the MMO on projects that cause or affect coastal change.

10.38 The PNPS (paragraph 5.1.22) identifies that any dredging required as part of a development must be assessed in accordance with the Water Frameworks Directive (2000/60/EC).

South East Inshore Marine Plan (SEIMP) Draft, 2020.

10.39 The draft South East Inshore Marine Plan was prepared in accordance with Section 51 of the Marine and Coastal Access Act 2009 and published by the MMO on 10 January 2020.

10.40 Whilst not yet adopted and agreed by the Secretary of State for Environment, Food and Rural Affairs the policies contained have been considered in the preparation of this ES.

10.41 Ports and harbours are essential to realise economic and social benefits for the south east inshore marine plan area and the UK. Policy SE-PS-1 of the SEIMP makes sure proposals do not restrict current port and harbour activity or future growth, enabling long-term strategic decisions, and supporting competitive and efficient port and shipping operations.

10.42 The SEIMP states 'space in the small and busy south-east inshore marine plan area is limited. To realise sustainable social, environmental and economic benefits it is therefore important to plan for and make efficient use of the space'. Policy SE-CO-1 in the SEIMP encourages proposals to be spatially planned, take account of existing activities, and

promote co-existence. The policy ensures new activities seek to avoid creating conflicts and to minimise their footprint.

10.43 Many marine activities in the south-east and adjacent marine plan areas are reliant on land-based infrastructure in the south-east inshore marine plan area. Supporting infrastructure development will provide economic and social benefits and facilitate marine business, including those that are land-based. Policy SE-INF-1 of the SEIMP supports integration between marine and terrestrial systems by encouraging proposals and other measures that maintain existing or provide new infrastructure in the intertidal area that facilitates marine activity.

Port Marine Safety Code (PMSC)

10.44 As set out in paragraph 10.21, all UK Statutory Harbour Authorities (SHAs) have a responsibility to comply with the PMSC.

10.45 Table 10.4, below, summarises the policies and guidance identified related to river transport.

Table 10.4: River transport – policy and guidance

Assessment Area and Policy	Policy Summary	Scheme Summary
Navigation Safety PMSC	Assess, and keep under review, the marine risks in the waters for which the SHA is responsible.	These assessments have been undertaken in the preliminary Navigation Risk Assessment (pNRA) (Appendix 10.1 of the ES - document reference 6.2.10.1). and will be further developed and reviewed as part of the detailed Navigation Risk Assessment (NRA).
Navigation Safety PMSC	Develop policies and procedures to manage those risks and to employ, resource, and empower suitably competent personnel to manage marine operations and reduce risk.	These assessments have been undertaken in the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1).and will be further developed and reviewed as part of the detailed Navigation Risk Assessment (NRA).
Existing Operations South East Inshore Marine Plan (Draft Only) (SEIMP).	Policy SE-CO-1: Proposals that optimise the use of space and incorporate opportunities for co-existence and co-operation with existing activities will be supported.	Proposals include re-establishment of existing infrastructure and co-operation with existing port facilities and operators, e.g. PoTL and Thames Clippers.
Existing Operations	Policy SE-PS-1: Only proposals	These assessments have been

South East Inshore Marine Plan (Draft Only) (SEIMP).	demonstrating compatibility with current activity and future opportunity for sustainable expansion of port and harbour activities will be supported.	undertaken in the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1).and will be further developed and reviewed as part of the detailed Navigation Risk Assessment (NRA).
Existing Operations South East Inshore Marine Plan (Draft Only) (SEIMP).	Policy SE-INF-1: Appropriate land-based infrastructure which facilitates marine activity (and vice versa) should be supported.	The scheme has been developed to include appropriate land based infrastructure to facilitate marine transportation for visitors and deliveries, discussions with service operators is ongoing.

BASELINE CONDITIONS

Existing baseline conditions

River conditions

10.46 The river adjacent to the Resort is located within the tidally influenced reach of the River Thames, therefore water levels within the river fluctuate during the course of the day. Data taken from PLA hydrographic survey charts indicates that the tidal range during spring tides, the difference between mean high water and mean low water over spring tidal conditions, is 5.99m at the Kent site and 5.86m at the Essex site.

10.47 The highest predicted tide level, referred to as Highest Astronomical Tide (HAT), at the Essex site is 3.85m above Ordnance Datum (Newlyn) (OD).

10.48 When high tides coincide with storm conditions the water levels in the river can exceed the predicted tide levels, the highest recorded water level at the Kent site is 4.95m above OD and at the Essex site is 4.86m above OD.

10.49 Tidal currents within the pNRA study area can be high, exceeding 2m/s (3.9 knots), on ebb tides, flood tidal flows are slightly lower at 1.6m/s (3.5 knots).

Passenger vessels

10.50 Existing passenger vessel services on the River Thames include river buses and river tours. These provide passenger services from Putney and Chelsea Harbour Piers in west London (with tours between Hampton Court and Westminster Piers operating in summer only) to Woolwich Royal Arsenal Pier and North Greenwich Pier in east London respectively. The closest pier to the London Resort (Woolwich Royal Arsenal Pier) is located to the west of the Project Site approximately 20 km up river.

10.51 There are six river bus services operated by Thames Clippers. River bus routes RB1 and

RB5 both serve Woolwich Royal Arsenal Pier. On weekdays there are 15 eastbound sailings to and 15 westbound sailings from Woolwich Royal Arsenal Pier, resulting in 30 vessel movements per day. On weekends there are a total of 22 eastbound sailings to and 21 westbound sailings from Woolwich Royal Arsenal Pier, equating to 43 vessel movements per day.

10.52 The frequency of the services throughout the day is up to three boats per hour. It should be highlighted that the services have been disrupted by the COVID-19 pandemic, including a complete suspension of operations between 5th November 2020 and 3rd December 2020.

10.53 A regular ferry service with up to two sailings per hour operates from Monday to Saturday between Tilbury Landing Stage and Town Pier in Gravesend. The ferry service, aboard Thames Swift, is operated by Jetstream Tours on behalf of Kent County Council and Thurrock Council and provides 26 vessel movements in each direction per day, and 25 on Saturdays. The service has a capacity of 50 passengers (albeit capacity is currently reduced because of COVID-19.)

Freight vessels

10.54 The numerous freight terminals on the River Thames make the Thames Estuary the second busiest port area, by total tonnage, in the UK, typically handling over 50 million tonnes of cargo per year. The area considered in the pNRA includes 20 active freight terminals, the locations of these are shown on Figure 4.1 of the pNRA (Appendix 10.1 of the ES - document reference 6.2.10.1).

10.55 From publicly available information on vessel traffic density it can be ascertained that the annual number of commercial vessel movements (excluding domestic ferry vessels) currently occurring in the vicinity of the London Resort is between 20,000 and 30,000. This would equate to an average daily number of movements of up to 86 vessels. These figures were discussed with the PLA during the preparation of the pNRA and no contradictory comments were received.

10.56 The various terminals serve a wide range of commodities and vessel types. An analysis of shipping traffic data [1] published by DfT (Port and domestic waterborne freight statistics 2019) indicates around 14% of vessels arriving in the Thames were tankers, 28% were Ro-Ro vessels, 24% container ships, 17% dry bulk carriers, 1% passenger vessels with the remainder classified as 'other'.

10.57 In terms of vessel sizes the DfT Port statistic indicates, just under 18% of vessels were less than 5,000 gross tonnage (GT), almost 60% were between 5,000 and 20,000 GT, 22% were 20,000 to 100,000 GT, and less than 0.5% were greater than 100,000 GT.

[1]https://www.gov.uk/government/statistics/port-freight-annual-statistics-2019#:~:text=our%20interactive%20dashboard.-,Annual%20statistics%20on%20the%20UK%20port%20freight%20traffic%20for%202019,to%20127.4%20million%20tonnes%20exported

Recreational vessels

10.58 The area considered in the pNRA is also used for recreational sailing, with the Thurrock Yacht Club based at Kilverts Wharf in Grays on the north bank of the river north east of the Kent Project Site and the Broadness Cruising Club based at Broadness Creek on the Swanscombe Peninsula which benefits from a functioning slipway.

10.59 There is limited information available on the number of recreational vessel movements that occur within the area considered by the pNRA, however it is considered that such movements would be small in number in comparison to the commercial vessel numbers.

Aids to navigation

10.60 Navigation in the river around the project sites is assisted by a number of aids to navigation (AtoN). These comprise;

- Broadness lighthouse, of the northern tip of the Swanscombe Peninsula;
- Stoneness lighthouse, to the west of the Swanscombe Peninsula;
- Broadness, White Hart and Black Shelf navigation lights marking the authorised channel in the vicinity of the Swanscombe peninsula;
- Stoneness and Saint Clement's navigation lights marking the authorised channel in the vicinity of the Stoneness peninsula; and
- navigation lights fixed to the outer edge of jetties and piers.

10.61 The locations of all AtoN within the pNRA study area are shown on Figure 4.2 in the pNRA (Appendix 10.1 of this ES, document reference 6.2.10.1).

10.62 In addition to the formal AtoN, line of sight observations across Swanscombe Peninsula play an important part in safe navigation allowing vessels visual observation of other vessels navigating around the peninsula.

Kent Project Site

10.63 The Kent Project Site currently includes the following marine infrastructure:

- Bell Wharf lies midway down the western side of the Swanscombe Peninsula. It was previously used by Blue Circle as part of its cement works operations, however it is in poor condition;
- White's Jetty is located just north of Bell Wharf. It is in poor condition;
- on the most northern tip of Swanscombe Peninsula is a gangway leading out to Broadness Point Light; and
- located on the most northern tip of peninsula at Broadness Point Light between the navigation channel and Bell Wharf is St Clement's anchorage. This includes two fixed mooring buoys within the order limits. The area of the anchorage extends

approximately 400m into the river from the land and runs from the end of Whites Jetty upstream for approximately 750m.

10.64 On the east of the Swanscombe Peninsula but outside the Kent Project Site is the Seacon Terminal, which might be used by LRCH for palletised material deliveries by river during construction and waste removal during the operational phase. This facility has deep water berths and is principally utilised for forest products (timber and paper) imports, handles cargo for the adjacent Britannia Metals and recently handled prefabricated concrete tunnel sections for the Thames Tideway Tunnel Project which were being temporarily stored at Seacon and also on the Swanscombe Peninsula.

Essex Project Site

10.65 The Essex Project Site includes the following.

- Tilbury Landing Stage which is currently used as a berthing area for the London Cruise Terminal;
- The Tilbury to Gravesend ferry landing berth that is operated by Jetstream;
- Tilbury Ro-Ro which includes a series of dolphins that run upstream from the end of the Tilbury Landing Stage; and
- Down river of Tilbury Docks is a buried cable that runs across the River Thames.

ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

10.66 By definition the introduction of additional vessel operations to support the construction and operation of the London Resort will result in an increase in total vessel movements on the River Thames in general and around the London Resort and Port of Tilbury in particular. This increase will bring with it an increase in vessel emissions and noise along with an increase in navigational risk.

10.67 Due to the London Resort's location beside the River Thames, there is the opportunity to adopt river-based transport. Indicatively, the use of river taxis/shuttle services can provide a further travel option, reducing the impact on the local and strategic road networks.

10.68 Discussions with Uber Boats by Thames Clippers indicates that a potential journey time of 75 minutes from Westminster Pier to the London Resort, 35 minutes from Greenwich Pier to the London Resort, and 25 minutes from Woolwich Royal Arsenal Pier to the London Resort would be a viable and attractive alternative to other transport modes. Ultimately, the journey time will be dependent on the service pattern adopted and economic viability. However, this provided an outline indication of how a passenger ferry could be adopted to serve the London Resort and provide another public transport

alternative from central London. Thames Clipper have been examining the potential for a ferry service from central London to Tilbury and Gravesend with a potential commencement of service from 2022.

10.69 As part of the overall aim of encouraging river transport to the Resort, supporting river infrastructure at the Kent and Essex Project Sites, as described in paragraph 10.6, is to be developed that will enable the movement of visitors, staff and service vessels to and from the London Resort.

10.70 PoTLL has agreed in principle to accommodate a new car park (plus ancillary visitor services) at the Essex Project Site and to allow access to the river for a new ferry service connecting the London Resort to the PoTL. Furthermore, PoTL will also be the hub for the majority of construction material and operational servicing for the London Resort.

10.71 In addition to the above, LRCH has entered into a memorandum of understanding with Uber Boat by Thames Clippers for the provision of new river-based passenger services to the London Resort from PoTL and central London.

Effects of construction phase vessel movements

10.72 For the purpose of this assessment it is assumed that 80% of construction materials for the Resort will be transferred to the Kent site from POTL, equating to 3.3 million tonnes over the two-year construction period. Materials would be transferred via a number of 1,000T barges propelled by either tugs or workboats, to either the Resort marine facilities when constructed or the Seacon Terminal. Based on the anticipated material volumes and vessel capacities this would require an average of five barge loads per day (ten movements) over the planned construction period. For the purposes of assessment, the upper limit for daily barge movements is likely to be the capacity of the berths at the Kent Project Site, this has been assessed at eight barge discharges per day (16 vessel movements).

10.73 It is expected that waste removal from the Kent Project Site would utilise the same barges on their return journey, so their movements are included within the construction barge movements detailed in paragraph 10.73 above.

10.74 For the purpose of vessel movements, the disposal of materials arising from any dredging required adjacent to Bell Wharf during construction has been considered to be undertaken using 1,000T hopper barges which would be towed from the Kent Project Site to a suitable licenced offshore disposal site, these being the smallest barges considered viable for such an operation. While the total volume of material that may require removal has not yet been confirmed, it is not considered likely to exceed 100,000 m^3 which would equate to around 60 barge movements. The dredging operations themselves would be undertaken using specialist dredging plant, either grab dredgers or trailer suction dredgers depending on the nature of material to be removed, these vessels would be located within the dredging area for the duration of their operation.

10.75 There is the opportunity of utilising either the Resorts facilities when constructed or

other existing facilities at Tilbury to transfer construction staff to the London Resort. This is investigated in more detail in the Transport Assessment (Appendix 9.1 of this ES – document reference 6.2.9.1). The assessment indicates that up to 1,825 staff could utilise a crossing service from Tilbury during the proposed two-year construction phase. The nature and extent of such a service would be dependent on the infrastructure available at the particular stage of the construction. However, for the purpose of navigational assessment it has been assumed that a small number of larger capacity ferries would be utilised for such transfers. Based on the use of 500 PAX capacity vessels this would require four return journeys (i.e. eight ferry movements) in the hours before the beginning and after the end of each workday. (anticipated to be 7 to 9am and 6 to 8pm).

10.76 Therefore, it can be anticipated that the average number of daily vessel movements from all activities during the construction phase would be 26, with potential peaks of up to 38. The specific navigational risks associated with all the aforementioned construction vessels have been considered separately in the pNRA (Appendix 10.1 of this ES - document reference 6.2.10.1).

10.77 In relation to the existing number of vessel movements through the area, the construction phase movements would equate to an average 30% increase in daily vessel movements.

10.78 The pNRA process has identified 25 hazards associated with the construction phase vessel operations, these can be categorised as;

- 4 hazards for collision between 2 construction vessels,
- 9 hazards for collision between a construction vessel and another vessel,
- 9 hazards for contact or grounding of a vessel as a result of construction vessels, and
- 3 hazards associated with wash created by construction vessel movements.

10.79 Of these identified hazards 6 where considered to be serious risks, 10 to be moderate risk and 8 to be minor. The 6 serious risks are;

- A waste removal Tug and Tow collision with a material delivery Tug and Tow at or close to Bell Wharf,
- contact or grounding of a material delivery Tug and Tow as a result of a waste removal Tug and Tow,
- material delivery Tug and Tow collision with a recreational vessel while crossing the authorised navigation channel,
- A material delivery Tug and Tow collision with a waste removal Tug and Tow at or close to Bell Wharf,
- contact or grounding of a waste removal Tug and Tow as a result of a material delivery Tug and Tow, and
- dredge material removal Tug and Tow collision with a recreational vessel while crossing the authorised navigation channel.

10.80 None of these risks were rated as serious from an environmental perspective.

Effects of operational phase vessel movements

10.81 Proposals for River Transport associated with the London Resort visitors includes a new passenger ferry service between Tilbury and the Resort operating up to 84 movements per day This service would have capacity to accommodate up to 16,800 visitors per day.

10.82 Along with the Tilbury service, additional passenger services between central London and the London Resort comprising 54 movements per day are proposed, these services would be capable of accommodating 10,000 visitors per day, based upon the peak mode share of 15% this would equate to 1.8 million per year by 2038. The service proposals, as set out within Appendix TA-W of the Transport Assessment (Appendix 9.1 of the ES) is based upon a high mode share of 15% arriving via ferry from the London terminals and is considered a worst-case assessment with regards to the ES.

10.83 In addition to the proposed passenger services, operational deliveries will create additional vessel movements to and from the London Resort. At present the frequency of these movements has not been confirmed, however, they will likely be limited by the capacity of the associated terminal facilities at six per day so will be significantly less than the anticipated passenger service numbers.

10.84 The specifications for the vessels to be used for the operations of the Resort, both in terms of passengers and service deliveries have not been confirmed. Currently available information suggests that passenger services may utilise either 220PAX capacity single deck or 400PAX double deck catamarans, these would typically be of around 40m length and 10m beam, with draughts between one and two metres. Operational servicing would likely be undertaken by HGV Ro-Ro capable ferries or Lift-on / Lift-off (Lo-Lo) self-propelled barges. It is assumed these would be around 1,000T, similar in size to the construction phase vessels as they would make use of the same berthing facilities.

10.85 It is estimated that the number of new vessel movements created during operations would be up to 144 per day, 50,000 per year. This figure is expected to comprise approximately 95% (around 48,000 per year) passenger vessel movements and 5% (2,000 per year) service vessel movements.

10.86 When compared to the existing baseline vessel movements the operational phase movements would equate to a 167% increase in movements through the area.

10.87 The pNRA identified 28 hazards associated with the operational phase vessel movements, these can be categorised as;

- 8 hazards for collision between 2 London Resort operational vessels,
- 7 hazards for collision between a London Resort operational vessel and another vessel,
- 10 hazards for contact or grounding of a vessel as a result of operational vessels, and
- 3 hazards associated with wash created by operational vessel movements.

10.88 Of these identified hazards 3 where considered to be serious risks, 7 to be moderate risk and 18 to be minor. The 3 serious risks are;

- a material delivery vessel collision with a recreational vessel while crossing the authorised navigation channel,
- two material delivery vessels collide at or close to Bell Wharf, and
- contact or grounding of a material delivery vessel as a result of another material delivery vessel.

10.89 None of these risks were rated as serious from an environmental perspective.

10.90 There were no serious risks identified associated with the London Resorts passenger vessel services.

10.91 Details of the proposed river transport operations and the management of vessel movements and terminal operations, at both ends of the routes, are under discussion with potential operators.

10.92 The operational arrangements at the Tilbury Terminal are being developed so as not to adversely affect the operations of the existing Tilbury to Gravesend Ferry. The overall layout of the terminal is being developed in consultation with PoTLL, Jetstream (as operator of the Tilbury Gravesend Ferry) and Thurrock Council and Gravesham Borough Council, and LRCH have agreed to safeguard Jetstream's existing operation. .

Effects of landside construction and operation

10.93 The pNRA process identified two navigational risks associated with the design and operation of the landside infrastructure at the London Resort.

10.94 The site and in particular the elevation levels of buildings and their impact on sight lines over the peninsula have the potential to increase navigational risks. This will be given due consideration during the design development. Additionally, the potential for site lighting to interfere with navigational lighting and thus navigational safety will need to be considered during detailed design of the London Resort's layout.

10.95 A further risk was identified relating to the design and operation of the berthing structures to be used for the river transport operations. The mitigations required to reduce this risk will be incorporated into the design of the marine infrastructure when developed during the detailed design.

10.96 The full outputs of the pNRA are described in Appendix 10.1 of this ES (document reference 6.2.10.1).

10.97 Table 10.5, below, sets out the assessed impacts, duration of effect and their significance for the various phases and operations proposed within the London Resort which could have an effect on navigation safety. Activities which have hazards rated as serious before

mitigation have been classified as Minor (due to the principal risks being none environmental) while Activities with no hazards rated as serious have been considered Negligible as further mitigation is not considered necessary.

Table 10.5: River transport – Summary of Effects

Activity	Assessed Impact	Duration of Effect	Significance of Effect
Construction phase vessel movements	Increase in navigation risk resulting from an increase in vessel numbers in the river.	Temporary	Minor
Operational phase passenger vessel movements	Increase in navigation risk resulting from an increase in vessel numbers in the river.	Permanent	Negligible
Operational phase service vessel movements	Increase in navigation risk resulting from an increase in vessel numbers in the river.	Permanent	Minor
Infrastructure constructed on the Kent Project Site	Obstruction of sightlines across Swanscombe Peninsula for vessels navigating in the area	Permanent	Negligible to Minor
Lighting implemented on the Kent Project Site	Interference with navigation lights	Permanent	Negligible to Minor

AVOIDANCE AND MITIGATION MEASURES

10.98 A pNRA has been prepared which identifies the navigation hazards associated with the London Resorts construction and operation and the mitigation that will be required to maintain navigational safety.

10.99 The pNRA identifies 41 hazards that were rated as either moderate or minor, these hazards are considered to be sufficiently mitigated by the existing vessel control processes in place within the area, these include;

- The Regulatory Framework,
- Accurate Charts and other Navigational Information,
- Operational Manuals & Guidelines,
- Operating Procedures,
- Emergency Plans and Procedures,

- Permanent Notices to Mariners,
- Notices to Mariners,
- Ship Information System – POLARIS (vessel notification – PLA River Information System),
- Formalised Training and Assessment,
- radars,
- VHF communication systems,
- The PLA Vessel Traffic System equipment,
- tide gauges, and
- aids to navigation.

10.100 The pNRA also identified that there are nine hazards rated as serious, and potentially requiring additional mitigation, those being;

- A waste removal Tug and Tow collision with a material delivery Tug and Tow at or close to Bell Wharf,
- contact or grounding of a material delivery Tug and Tow as a result of a waste removal Tug and Tow,
- material delivery Tug and Tow collision with a recreational vessel while crossing authorised channel,
- A material delivery Tug and Tow collision with a waste removal Tug and Tow at or close to Bell Wharf,
- contact or grounding of a waste removal Tug and Tow as a result of a material delivery Tug and Tow, and
- dredge material removal Tug and Tow collision with a recreational vessel while crossing authorised channel.
- A material delivery vessel collision with a recreational vessel while crossing authorised channel,
- two material delivery vessels collide at or close to Bell Wharf, and
- contact or grounding of a material delivery vessel as a result of another material delivery.

10.101 These hazards would be mitigated by the following actions;

- Marine Contractors to undertake detailed construction phase NRA,
- Timing of vessel movements to be planned in order to avoid periods of highest traffic,
- Engage with local stakeholders, especially around recreational race events etc.,
- Preparation of Port Passage Plans for all vessel movements to be reviewed by the PLA,
- Navigation routes should be chosen to achieve good visibility where crossing the authorised channel,
- Speed control prior to crossing the authorised channel (maximise opportunity to observe oncoming vessels),
- Limitations on vessels carrying hazardous material associated with the Development,
- Setting appropriate weather parameters to maintain safe operations,

- Permission to proceed for crossing the navigation channel, specifically relating to the passenger ferry operations,
- Encourage operators to undertake pushing operations for barges rather than tug and tow,
- Vessels to approach certain locations on ebb flow to avoid peak tidal flow periods.

10.102 It was further identified that the site layout and in particular potential interference with existing navigational sightlines and aids to navigation will require consideration during the detailed design. Should interference be unavoidable alternative mitigation in the form of relocation of existing or provision of additional aids to navigation may be required. Any alterations or additions to aids to navigation would be developed in conjunction with the PLA and subject to approval by both PLA and Trinity House in their function as General Lighthouse Authority (GLA) for the UK (as applicable). Following further consultation with the PLA it is noted that the PLA are looking into placing CCTV at strategic positions to mitigate the risk of the Proposed Development affecting the PLA Pilot Sightlines. The PLA have also noted that Pilots use the existing electricity pylons, one of which is located within the Order Limits as a navigational aid. The Applicant is currently working with the PLA to understand if the Proposed Development will have any impact on this navigational aid. LRCH is actively consulting with the PLA on the topic of sightlines and navigation around the Swanscombe Peninsula, in order to understand and mitigate any negative impact of land raising and buildings on navigation.

10.103 The potential for lighting in the London Resort to interfere or be confused with navigation lighting will require consideration during the detailed design, the use of lighting directed along the river should be avoided and final lighting designs should be discussed with PLA. This aspect of the Resort is further discussed in the Lighting Statement (document reference 7.10)

10.104 The detailed design of the marine infrastructure will take account of the proposed vessels and will be designed to minimise the potential for navigation hazards, it is expected that this will include berth fendering and navigation lighting which will require agreement with PLA as the SHA, and potentially Trinity House as the GLA.

10.105 Any further assessments of dredge materials required will be undertaken during the detailed design of the London Resort, assessments will be conducted to satisfy the requirements of both the PLA and the MMO's dredging and disposal licencing regimes.

RESIDUAL EFFECTS

Residual effects

10.106 The residual effect of the river transport associated with the London Resort would be an increase in vessel movements. Following the implementation of the mitigations recommended in the NRA this increase is not expected to result in an increase in navigation risk.

10.107 Due to the limits of detailed design and operational information at this stage of the project, it is not possible to determine if any residual effects will be created as a result of the landside infrastructure of the London Resort. However, mitigation strategies will be developed as part of the NRA process where required and the post-mitigation residual effects in relation to river transport are expected to be 'not significant' in EIA terms.

10.108 Provisions in the DCO requiring the implementation of mitigation measures identified in the NRA process will ensure that the London Resort does not create unacceptable navigational risks to either new or existing vessel operations.

CLIMATE CHANGE

10.109 While climate change and more specifically sea-level rise has the potential to impact on river transport, the range of impacts is associated with the design and operation of ship to shore interfaces rather than navigational aspects.

10.110 Climate change effects have been considered during the design of all marine infrastructure in the London Resort and for this reason, it is not considered that climate change factors would materially affect this assessment.

10.111 The potential for the London Resorts river transport operations to affect climate change is considered in chapter 16: Air Quality (document reference 6.1.16).

CUMULATIVE, IN-COMBINATION AND TRANSBOUNDARY EFFECTS

Cumulative and In-combination effects

10.112 Any in-combination effects on river transport would manifest as an increased incident risk during navigation. The total numbers of anticipated vessel movements associated with the other identified projects is considered small in compared to the existing numbers of vessel movements, it is therefore considered that any associated risk increase would not be significant.

Transboundary effects

10.113 The transboundary impacts are the impact of the London Resort on countries outside of the UK and in the EEA (European Economic Area). In river transport terms, this would be the residual impact of the additional vessel movements associated with the London Resort upon other countries.

10.114 It is anticipated that all vessel movements to the London Resort during both construction and operation will originate from in the UK. It is likely that some component deliveries for the London Resort will originate from outside the UK, however it is considered that

these would be shipped to Tilbury via existing port operations rather than directly to the Resort Site, this is due to the limitations of the proposed terminals at the Kent Project Site.

10.115 It is therefore considered that no transboundary effects will result from the London Resorts river transport.

UNCERTAINTIES

10.116 The extent of use of the river for construction material deliveries and construction staff movements is uncertain due to the need to have the necessary marine infrastructure in place to make this feasible, how this would fit with the overall construction programme and the potential for disruption if services were unable to sail. This will include the potential location of any river-based accommodation for construction staff. Furthermore, the level of construction staff required on site is unknown, therefore the assessment has taken advice from construction expertise on the likely workers from overseas or from a location requiring staff to stay nearby.

10.117 The overall level of passenger ferry operations will be dependent on demand, this will be driven to some extent by perceptions of the reliability of the service and cost factors in comparison to other modes of transport. These factors are addressed further in the Transport Assessment (Appendix 9.1 of this ES). The Assessments in both the ES and Transport Assessment consider a worst case of based on the ferry services that would be required for the proposed 15% visitor forecast travelling by river.

SUMMARY AND CONCLUSION

10.118 An assessment of the potential navigational effects associated with the river transport aspects of the London Resort has been carried out, and it is discussed in this chapter of the ES.

10.119 A pNRA (Appendix 10.1 of this ES) has been undertaken to consider the specific risks associated with the development of the London Resort and concludes that there are no significant risks to navigation beyond those present under current conditions. Two items were identified that could not be assessed at the current stage of design development, the potential impact of construction and site layout, including lighting, on the sightlines over the peninsula and hazards associated with the operation of marine infrastructure constructed as part of the Resort, these items would be addressed as the scheme design progressed, however nether is considered to present risks that could not be mitigated.

10.120 It should be noted that the pNRA is a live document and will be updated throughout the course of the project as more detail is developed. The pNRA will be developed into a final version in consultation with the PLA, as the SHA and in accordance with Requirement 14 Schedule 2 Part 1 of the DCO.