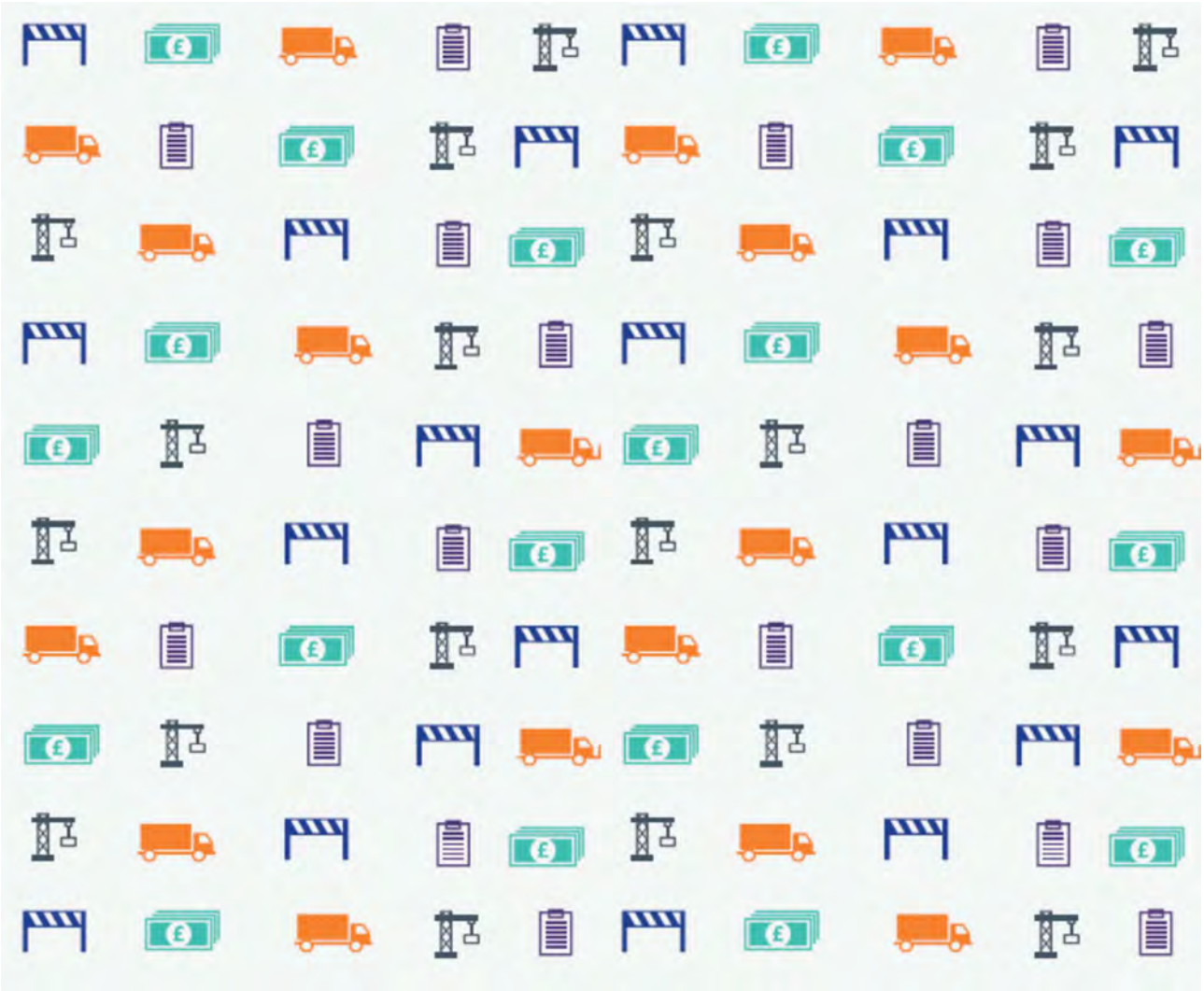
steer davies gleave

Investigating the barriers to transporting bulk construction materials and waste by river and rail

Report
July 2017

Transport for London (TfL)

Our ref: 23021201



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Overview

Construction projects by their very nature are increasingly complex, with each construction site providing its own unique set of challenges that require bespoke solutions to be delivered by designers, planners, contractors and those within its supply chain. Recognising this the research team worked to formalise an initial understanding of the issues through a desk based review of literature and case studies.

The scope of this research project was to investigate the barriers that exist in preventing the greater movement of construction materials and waste by river and rail within London. Enabling the transition from traditional construction logistics methods to a tailored sustainable approach, that reduces conflicts on London's roads, has the potential to address some of the major conflicts emerging through primary road usage.

Following a multi-staged stakeholder engagement process allowed a variety of views to be captured from across the construction industry. 160 people from 150 organisations were consulted as part of this project providing both qualitative and quantitative responses to the issues being analysed. Developers, contractors, supply chain organisations, boroughs, planners and other key stakeholders all participated in the research project, offering insight in the barriers to river and rail use.

The barriers identified through the research process were grouped into five categories: Physical, Logistical, Financial, Policy and Industry Awareness.

Key Finding 1

Physical and Logistical barriers were of most concern to the stakeholders with many citing these barriers as fundamental to determining the feasibility of river and rail use. The research identified that there was no consistency in terms of who is understood to be most responsible for determining river and rail use. Contractors were the only sector who identified themselves as being more responsible than any other sector. This reflects the complex nature of the decision-making process within these projects and the wide range of personnel from a range of sectors (developers, planners, contractors, key stakeholders and specialists within the supply chain) that work together to deliver a project. When the decision to use river and rail is made, and who has ultimate responsibility for taking this decision, is not widely understood and the research demonstrates confusion with regards to the drivers behind those decisions and the timings at which they occur.

Key Finding 2

Whilst Physical, Logistics and Financial barriers were regularly cited by respondents as being the barriers of most significance, it became apparent that the Awareness of the potential for river and rail usage, and the technical issues which surround their use was a barrier that underpinned all others. 70% of participants believed lack of Awareness is either a significant barrier or a barrier to some extent. Without having the knowledge or access to appropriate information, decision makers are unable to make an informed decision about the likely feasibility and viability of the river and rail, without expending substantial resources and costs. Awareness and communication are closely linked; improving the communication within the private sector and between the private and public sectors can help overcome many of the barriers that stakeholders identified. Initially targeting this barrier will have a positive 'knock-on-effect' with the potential to address some of the misconceptions surrounding several

physical and logistics barriers which were commonly noted by respondents but in some instances, were not considered to be significant issues that would restrict the use of river or rail.

Key Finding 3

The lack of a single resource where relevant information about river and rail is consolidated was raised as a significant barrier, this closely relates to the lack of awareness and communication across sectors. When researching the feasibility of river and rail many stakeholders found it to be an arduous process with great difficulty in identifying relevant individuals to contact and with little perceived support from the public sector. Respondents noted no one-stop resource available to use, and many items of knowledge sitting behind paywalls. Combining necessary information into one resource would help streamline the process of identifying the most appropriate and sustainable method of transporting building materials and waste.

An effective, clear, concise, coherent and up-to-date toolkit/s for the entire industry would provide a resource for decision makers to make informed choices for both river and rail. The toolkit/s should not only provide the means to initiate river and rail use but should be a resource tool that sets out the existing operational facilities available on a Borough by Borough basis, creating a comprehensive understanding of available facilities throughout London that can be used by all stakeholders to determine the likely feasibility of river and rail use at the earliest opportunity.

Key Finding 4

Timing plays a pivotal role in the ability to maximise use of river and rail during construction projects. River and rail will only be used in a substantial capacity if a clear direction is given from the project outset that river and rail usage should be maximised, or the tender documents clearly state that river and rail usage should be considered. To maximise river and rail use, it is recommended that project teams are encouraged to consider river and rail usage earlier so that opportunities can be captured in the tendering of construction projects. The planning process has a critical role in enabling the earlier consideration of river and rail, by encouraging greater consideration of river and rail feasibility prior to the submission of a planning application, as opposed to post-determination during the discharge of planning conditions.

Key Finding 5

To transfer materials and waste onto rolling stock a rail head is required. Competition for land within London puts pressure on rail heads, which are consistently under threat from development. All stakeholders who mentioned rail heads voiced concerns over the increasing pressures placed on the current infrastructure in terms of number and capacity. Unlike river wharves there is no policy to safeguard specific rail heads, therefore there is increasing pressure to develop on the valuable land they occupy. Many developments occur in close proximity to rail heads and this presents an opportunity to capture s106 finances to help safeguard and maintain rail heads for future use.

Key Finding 6

Transporting materials by river and rail requires a unique set of skills which are very specific to that sector. There was a perception that the relevant skills across the industry were dwindling due to the lack of experienced operators, thereby further limiting potential future use. 8% of

respondents believed this to be the most significant barrier to river and rail use. Despite efforts being made by large projects such as Thames Tideway to mitigate against this, there was still a belief that this would become an increasingly significant barrier.

Key Finding 7

Planning policy was identified as having a major role in encouraging river and rail use, and at times mandating the use of river and rail. Ultimate responsibility for what and how developments are assessed lies with planners and key stakeholders, who have the power to approve, reject or amend approaches to projects through the planning process. The findings from the research show that too often the planning documents and policy from different bodies fails to coherently promote river and rail at an early stage, losing the best opportunity to encourage developers and contractors to use alternate means of transport other than road. The earlier implementation of a Construction Logistics Plans was believed to be an effective way of introducing river and rail into the construction process, whilst improving the awareness and knowledge of these approving planning applications is also considered to be a significant positive step forward.

Conclusion

Enabling the transition from traditional construction logistics methods to a tailored sustainable approach, that reduces conflicts on London's roads, has the potential to address some of the major conflicts emerging through primary road usage. Reducing freight vehicle movements can positively influence many of the strategic challenges currently facing London, including: reducing air pollution, easing congestion and simplifying the construction logistics process. The findings set out in this report provide the foundation against which many of the awareness and policy barriers can begin to be addressed.

1 Introduction

Overview

1.1 Steer Davies Gleave (SDG) has been commissioned by Transport for London (TfL) to undertake this research project which seeks to investigate the barriers to transporting construction material and waste by river and rail in London.

1.2 This report provides a summary of the research undertaken by SDG on behalf of TfL, a detailed analysis of the results from a series of surveys and a set of recommendations which seek to identify major barriers and provide a sound and robust basis on which they may be addressed in the future.

Project Background

A Decade of Construction Activity

1.3 This research project was conducted in the midst of a construction boom in London which is inevitably increasing pressure on the construction and logistics industry.

1.4 London is gearing up to delivering an unprecedented pipeline of major construction projects likely to be brought forward over the next decade. Major infrastructure projects include the completion of the Elizabeth Line, Thames Tideway Tunnel, Silvertown Tunnel, Crossrail 2, High Speed 2 whilst significant large scale development is likely to occur in Opportunities Areas throughout London such as Old Oak Common, Vauxhall Nine Elms and Battersea. All of this activity is expected to test the capacity and capability of the industry in delivering these projects in the shadow of increasing pressure on the transport network.

1.5 Coupling these challenges with the daily conflicts between traditional methods of construction and the changing nature of personal transportation around the city (e.g. cycling), the construction and logistics industry is exploring new and innovative methods to meet the increasing demand and challenging existing default practices in construction and logistics.

Construction Activity in London

1.6 London continues to experience significant growth in its construction industry. The latest Office Crane Survey (2017) undertaken by Deloitte in Central London indicated that 28 new development schemes began construction during 2016, which exceeds the ten year average.

1.7 As part of any construction project there is a need for materials to be transported to site. These materials often come from outside London with certain elements of the supply chain distributed throughout the UK. Many construction projects, particularly those within London, are occurring on brownfield sites where significant volumes of waste are also a by-product of the construction process, whether this be spoil created through the excavation of the existing site or the demolition of existing buildings.

1.8 Both construction materials and waste require transportation to or from the site. In the context of London's current construction boom, this places increased pressure on the road network that is typically the most dominant mode for moving goods across London. Whilst the number of Heavy Goods Vehicles (HGVs) across Central London as a whole is decreasing, across Greater London the number of HGVs on the road is on the rise and nearing peak 2000 levels. [1]

1.9 While freight movements are essential to London's growth, increasing freight movements across London have contributed to an increase in congestion on the road network, as well as an increase in harmful CO_2 and NOx vehicle emissions. In 2010, road freight transport was responsible for 23% of CO_2 emissions and 36% of NOx emissions. The increase in freight movements has also resulted in additional vehicle-related causalities.[2] HGVs were responsible for 10% of all vehicle traffic causalities in 2010, with 17 fatalities resulting from direct collisions with HGVs. In 2015 HGVs were responsible for 18% of all killed or seriously injured (KSI) left turn cyclists[3].

River and Rail Freight

1.10 The Port of London is a collective term for a large number of wharves, docks and terminal facilities that lie along the banks of the tidal Thames. The distribution of these facilities across London illustrates the considerable amount of potential, particularly in east London, for increasing the movement of goods and waste by river.

1.11 London also has a vast rail network and certain elements of this network are accessible for the transportation of goods and waste. Throughout London there are a number of strategic rail freight interchanges, these are used for the transportation of goods and waste into the city.

1.12 However, river and rail freight movements are significantly lower when compared to road freight movements which remain the dominant mode of travel for moving freight. Whilst both river and rail freight modes are utilised to some degree these modes are far less significant than road which, for the overwhelming majority of organisations, has become the default option for transporting materials. According to the *London Freight Data Report (2014)* and the most recently published, Port of London freight traffic on the River Thames is greater than for rail freight movements, however in the context of historical trends the weight of freight carried by both modes in 2012 was lower than previous years. This trend is understood to be continuing.

1.13 Better utilising river and rail services to transport bulk construction material and waste will provide an opportunity to ensure freight movements are safe, reliable and efficient, meeting a range of policy objectives. Transporting materials and waste by river and rail services reduces freight movement on the road network, potentially resulting in cleaner air and improved road safety.

1.14 This research study has been undertaken to gather the views of personnel that work throughout the industry in London, it has sought views from Developers, Contractors, Supply Chain, Boroughs, Planners and Other Key Stakeholders (including Transport for London (TfL), Network Rail (NR) and Port of London (PLA)) to understand how river and rail usage is viewed

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1 Travel in London Report 9, TfL *(2016).*

[2] *London Freight Data Report, TfL* (2014).

3 Collisions and casualties on London's roads, Annual Report, TfL (2015).

across the industry and to identify the major barriers that are currently deemed to exist in preventing greater use of river and rail for the use of construction projects.

1.15 Through the course of this project we have spoken to 160 personnel who currently work in the London construction industry through a means of detailed person to person interviews, telephone interviews and online surveys. The views gathered by each individual who has volunteered to take part in this study have been provided in confidence therefore views have not been attributed to any specific individual or organisation but the trends and barriers identified by different types of organisation provide a thorough understanding of views across the industry.

Acknowledgments

1.16 SDG, on behalf of TfL, would like to thank the individuals and organisations who shared their time, knowledge and experience for the purposes of this project. A selection of organisations involved can be found in Table 1.1.

Table 1.1: Selection of organisations involved in the project

Organisation	
BAM Nutall	MACE
Barking Riverside Extension	MAN Truck and Bus UK Ltd
Battersea Power Station Development Company	Mineral Products Association
Beckett Rankine	Multiplex Construction Europe
Berkeley Group	Network Rail
Bouygues UK	Nine Elms
Carillion	O'Donovan (Waste Disposal) Ltd
CEMEX	PLA
CH2M	Port of Tilbury
City of London Corporation	Rendrive Haulage Ltd.
Coastwise	S. Walsh and Sons
CSB Logistics	Silvertown Tunnel
Day Group	Sir Robert McAlpine Ltd
Department for Transport	Tarmac
Firow Ltd.	Thames Tideway Tunnel
Hanson UK	Tideway
Heathrow Airports Limited	Total Flow
HS2 Ltd.	Transport for London
Hyva UK Limited	Turner & Townsend
Lambeth Council	Turntown
LHC	Unipart Group
London Borough of Barking and Dagenham	Wood Wharf
London Borough of Hillingdon	Westminster City Council
London Borough of Wandsworth	Westrans
London First	Wincanton

1.17 Additionally, SDG would like to thank the Construction Logistics Improvement Group (CLIG) who provided valuable insight and guidance for the research project.

Report Structure

1.18 This report is made up of seven chapters, of which this chapter, the introduction, forms the first. The remainder of the report is structured as follows:

- Chapter 2: Methodology
- Chapter 3: Project Context (Desk Based Review)
- Chapter 4: Survey Results
- Chapter 5: Assessment
- Chapter 6: Assessment Matrix
- Chapter 7: Conclusions

2 Methodology

Overview

2.1 This chapter provides an overview of the methodology that was used to capture the views of the personnel consulted across the construction industry. The approach was guided by the study's overarching objective which was to identify the types of barriers which prevent developers, businesses and operators from utilising river and rail services when transporting construction materials and waste

2.2 Throughout every stage of the project the intention was to deliver impartial insights into the barriers to river and rail movements through an appropriate methodology.

2.3 A four-stage process was used to provide robust and impartial results. The process adopted is summarised in Figure 2.1.

Figure 2.1: Methodology Overview

2.4 The project has progressed in four stages, partly in parallel with each other to ensure results from earlier stages can be fed into later stages.

2.5 The following sections will outline the methodology adopted for each stage of the project.

Desk Based Review

2.6 The desk based review consisted of a desktop study to formalise an initial understanding of the issues. Consolidating and summarising relevant secondary sources of information provided a robust contextual base from which to progress with primary research.

Policy Context

2.7 National, regional and local planning policy dictates the approach to development within London. Developing an understanding of the policies regarding rail and river construction movements formed the first part of the methodology. The documents reviewed included:

- existing GLA, TfL and key Borough planning policy relating to river and rail freight usage;
- analysis of materials produced by key stakeholders such as the Port of London Authority (PLA), Network Rail and the Rail Freight Group; and
- a review of most recent data relating to freight in the London Travel Report and London Freight Report.

Case Studies

2.8 The intention of the desk based research was to develop a contextual baseline understanding of the barriers to river and rail movements. Central to this were the case studies used in this project were identified because of their use of river and rail or their choice not to. Understanding the issues surrounding both types of examples was fundamental to developing an understanding of the barriers and shaping the later approach to the project.

2.9 Relevant case studies can be found in Appendix B.

2.10 The use of these case studies assisted in building a greater understanding of the current barriers to using the river or rail for construction. These were used to inform the more detailed data collection stages that followed.

Stakeholder Interviews

2.11 Qualitative stakeholder interviews formed the first stage of the primary research. Qualitative research was used as part of this study as it allowed for some of the issues to be examined in greater depth than alternative quantitative methods would allow. The structure, framework and direction of enquiry could quickly be revised as new information emerged.

2.12 A total of 27 face-to-face stakeholder interviews were conducted throughout the course of the project between November 2016 and April 2017. These interviews were undertaken with a range of stakeholders from both the public and private sector organisations. The sampling approach adopted aimed to develop an insight into the range of opinions from a broad range of stakeholders as well as gathering additional contacts for future stages of research.

2.13 Interviewees came from a range of sectors:

- contractors;
- developers;
- planners;
- stakeholders (e.g. PLA / TfL) and other relevant organisations.

2.14 Semi-structured interviews were used with topics identified in the desk based research being used as guidance for discussion. The topics discussed included:

- role and organisation;
- river and rail project involvement;
- experience of planning process around the use of river and rail;
- benefits and challenges to using river and rail services;
- influencing the use of river and rail services; and
- willingness to use river and rail services.

2.15 Meeting summaries were compiled and then analysed to compare key themes that emerged from the interviews. These themes were used to re-evaluate the case studies used in the previous section and inform future stages.

Quantitative Interviews

2.16 Alongside qualitative stakeholder interviews quantitative interviews were undertaken based upon the questions discussed in this chapter. Utilising quantitative interviews enabled an efficient means of understanding the views from a large number of stakeholders. This restructuring process was directly informed by the findings from the stakeholder interviews and desktop research. Incorporating quantitative methods into the methodology helps increase the reliability and objectivity of the findings.

Telephone Interviews

2.17 The gathering of quantitative data began with a series of telephone interviews with a set of stakeholders.

Sampling

2.18 Using Standard Industrial Classification (SIC) business codes, a sample of 2,488 individuals was purchased. This sample had been identified using these variables:

- SIC business code;
- location; and
- size.

Standard Industrial Classification Business Code

2.19 Using experience in the sector and liaising with experts in the field, it was identified that businesses in the following sectors would be the most relevant for the study:

- 42.110 - Construction of roads and motorways;
- 41.202 - Construction of domestic buildings;
- 41.201 - Construction of commercial buildings;
- 41.000 - Construction of buildings;
- 49.200 - Freight rail transport; and
- 50.400 - Inland freight water transport

2.20 UK2007 SIC Codes 1-5 digit provided the highest level of detail available, therefore minimising the chance of engaging with an organisation that did not have knowledge of river and rail freight movements.

2.21 As part of the survey, interviewees were therefore asked to identify themselves to one of these sectors.

Location

2.22 Given this project's specific geographic focus on London, distinguishing companies based on location was an important way of identifying the most relevant companies. Businesses were divided into the following geographies:

1. Greater London;
2. South East (outside M25); and
3. rest of the UK.

2.23 As part of the questionnaire, all companies, irrespective of where they were based, had to have worked in London in the last three years.

Size

2.24 Company size was considered important as the larger the company, the more likely they are to have worked on a sufficient scale for river and rail transportation to be relevant. Despite this, capturing the opinions of smaller organisations was also important as they could also provide a useful insight into both the perceived and actual barriers to river and rail freight movements.

2.25 Businesses were divided into three categories:

- 20-49 employees;
- 50-249 employees; and
- 250+ employees.

2.26 Figure 2.2 illustrates the increasing priority placed on companies in the most relevant geographies with the high number of staff.

Figure 2.2: Hierarchy of telephone interview participants

Questionnaire

2.27 The questionnaire structure was designed to concisely and effectively provide insight into to the primary issues identified by previous the research.

2.28 Given the broad range of sectors being targeted, the questionnaire design had to reflect a range of interests and potential opinions. Using established themes to guide the questionnaire design ensured the findings would align with the key stakeholders' guidance and contribute to an evolving picture of barriers facing movements of freight by river and rail.

2.29 The complete questionnaire used in the telephone interviews and online survey is provided in Appendix A for clarity.

2.30 Throughout January 2017 a total of 1,802 organisations were phoned to participate in the interviews. Of the 1,802 organisations contacted a total of 72 participated in telephone throughout January 2017. To supplement these 34 additional stakeholders were contacted resulting in 21 additional detailed telephone surveys being undertaken during March and April 2017 which consisted of a structured telephone interview culminating in the completion of the quantitative telephone interview questionnaire.

Online Survey

2.31 Given the limited response to the telephone interviews further data gathering has taken place in the form of an online survey. The online survey was conducted with a range of new contacts that had been developed throughout the course of the project and utilised the same core questions that were used in the telephone interviews to provide a continuous and comparable set of data.

2.32 99 people were invited to take part in the online survey with 40 actively responding.

2.33 As shown above, a total of 160 people have therefore been consulted as part of this project, a breakdown of the type of organisation by response is shown in Table 2.1 below.

Table 2.1: Proportion of participants by sector

Organisation by sector	Stakeholder interview	Telephone interview	Survey monkey	% by sector	TOTAL
Contractor	4	50	8	39%	62
Developer	2	12	1	9%	15
Supply Chain	4	8	9	13%	21
Borough/Planner	1	10	8	11%	17
Key stakeholder	16	13	14	27%	43
Total	**27**	**93**	**40**		**160**

3 Project Context

Overview

3.1 This chapter provides an overview of the existing context of river and rail usage in the London construction industry alongside a series of project specific case studies which illustrate both the opportunities for increased rail and river use, along with the barriers which developers, contractors and others involved in construction project logistics regularly face.

Modal Choice

3.2 The dominant mode for construction freight and waste in general is currently road, although as evidenced below, record levels of investment have meant that the infrastructure for increased freight via rail and river does exist. The case studies prepared for this study identify existing misconceptions and seek to explore where planners can be encouraged to use river and rail further.

3.3 The amount of freight transported by river was in decline in the decade between 2000 and 2010 but since 2011, levels have started to increase again. Conversely, the amount of rail freight grew steadily from 1995-2014 though the past three years have seen a downwards trend emerge. Despite this net reduction in movement by rail, the amount of construction freight transported has continued to rise steadily.

3.4 The case studies are provided in full in Appendix B. The first case study on the Northern Line Extension to Battersea Power Station is an example of where river has been used effectively for the transportation of materials and waste from the site of a new development. The case studies on Canary Wharf and the redevelopment of Bank Station however illustrate the barriers that developers continue to face in the transportation of bulk construction materials and waste by river and rail.

Existing Situation

3.5 The freight and logistics sector is growing in the UK and now employs 7.6% of the total workforce.[4] Despite the availability of river and rail options, road remains primarily the default mode for freight movement. In 2007 when Transport for London (TfL) released the 'London Rail Freight Strategy' they predicted that the implementation of the strategy would remove between 110 and 176 million lorry miles from the UK's roads each year equating to up to £126 million worth of savings a year. While HGV traffic decreased by 3.2% in London from 2008-2014, the number of HGVs across London grew in the last year for the first time since 2012[5] resulting in increased congestion, increased CO2 and NO2 emissions and increased fatalities,

[4] *Source: Logistics Report, FTA (2016)*

[5] *Source: London Travel Report 9, TfL (2016)*

with HGVs involved in 50% of fatal motorway accidents despite making up only 10% of the traffic[6].

3.6 London is in the middle of a construction boom, with new developments and additions to existing buildings becoming increasingly attractive thanks to rising property prices and the post-recession economy. All construction sites require the transportation of materials, many of which are sourced from outside of the city, incorporating elements of the supply chain throughout the UK. It is not only materials for construction but also the waste created by these sites that must be transported. Many London developments are taking place on brownfield sites which means that significant levels of waste are created as a by-product and must be moved to landfill. This further increases the pressure on the road network, the most dominant method for moving goods across London.[7]

River Freight

3.7 Despite the industry's dominance of the road network, the Thames has sufficient facilities to support a far higher level of use. The Port of London offer significant potential to the freight industry; the Thames is the dominant feature in the river network, carrying 60% of all goods transported by river in the UK. Typically, the materials transported on the Thames are gravel, sand, tunnel linings and waste. River freight can be a time efficient way of transporting materials too; from the east London loading wharf to Battersea in Wandsworth takes one boat 3.5 hours whereas it would take 50 lorries two hours each to transport the equivalent materials the same distance. The vessels can transport up to 1,200 tonnes of building materials at a time and travel at up to 5mph without using the engine with a favourable tide.

3.8 Fifty wharves between Rainham and Fulham have been safeguarded by the Port of London Authority and the Mayor of London meaning that they cannot be developed for non-port use. Of the 50, 43 are on the Thames and 7 are on the protected, TfL run, 'Blue Ribbon Network'. Previously unused wharves are also being brought back in to use to cope with increased demand. The first of these are Hurlingham, Orchard and Peruvian Wharf. It is estimated that the total capacity across all London wharves is 18.1 million tonnes, with 1.6 million of this located in the West London sub region, 9.5 million located in the North East sub region and 7 million located in South East sub region as illustrated in Figure 3.1.

[6] *Campaign for Better Transport, 2013 [http://www.bettertransport.org.uk/media/21-10-2013-lorry-fatalities-research]*

[7] *Travel in London Report 9 (2016)*

Figure 3.1: Map of wharves within Greater London

West sub-region

1. Hurtlingham Wharf
2. Swedish Wharf
3. Comley's Wharf
4. Smugglers Way
5. Pier Wharf
6. Cringle Dock
7. Kirtling Wharf
8. Middle Wharf
9. Cremorne Wharf
10 Walbrook Wharf

South East sub-region

11. Convoys Wharf
12. Brewery Wharf
13. Tunnel Wharf
14. Victoria Deep Water Terminal
15. Angerstein Wharf
16. Murphy's Wharf
17. Riverside Wharf
18. Middleton Jetty
19. Mulberry Wharf
20 Pioneer Wharf
21. Albion Wharf
22. Erith Wharf
23. Railway Wharf
24. Town Wharf
25. Standard Wharf

North East Sub-region

26. Northumberland Wharf
27. Orchard Wharf
28. Priors Wharf
29. Mayer Parry Way
30. Thames Wharf
31. Peruvian Wharf
32. Manhattan Wharf
33. Sunshine Wharf
34. Thames Refinery
35. Welbeck Wharf
36. Alexander Wharf (new)
37. Pinns Wharf
38. Steel Wharf
39. Rippleway Wharf
40. Docklands Wharf
41. Victoria Stone Wharf
42. DePass Wharf
43. Dagenham Wharf
44. Pinnacle Terminal
45. No.1 Western Extension
46. East Jetty
47. No 4 Jetty
48. Ford Dagenham Terminal
49. Phoenix Wharf
50. Halfway Wharf

3.9 Despite an increase in overall freight movement on the river, construction freight was in decline between 2001 and 2010. Of all the export and import volumes investigated as part of this study, construction materials displayed the most noticeable long term decline as can be seen in Table 3.1.

Table 3.1: Weight of construction materials transported on the Thames

Commodity	2001	2005	2010	Total No.	Change
Construction Materials	4,667,000	3,942,000	3,135,000	-1,542,000	-33%

Source: Safeguarded Wharves Review, 2013

3.10 However, in 2011 this historic decline started to reverse and volumes of construction materials handled at wharves within Greater London increased by 35% compared to those handled in 2010. In 2012 construction materials transported on the Thames increased by a further 1 million tonnes. General river freight levels have also increased over the same time period as shown in Table 3.2. While figures have not yet reached previous highs, a positive trend in the use of river freight is emerging.

Table 3.2: Total traffic at London Port

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
PLA Total Traffic (million tonnes)	51.9	52.7	53.0	45.4	48.1	48.8	43.7	43.2	44.5	45.4

Source: PLA Annual Report, 2015

Rail Freight

3.11 Similarly, the rail network provides a range of facilities which mean the potential for increased rail use for freight is significant. Since the rail industry's privatisation in the 1990s, rail has doubled its share of the land-based freight market, transporting 12% of all surface freight in the UK in 2014. The volume of freight transported also increased by 60% from 1995-2007. The Strategic Freight Network Fund allocated £235million to enhancements of rail freight infrastructure for 2014-19 improving the possibility of increasing rail's proportion of the market.

3.12 The provision of strategic rail freight interchanges is safeguarded by Policy 6.15 of the London Plan 2016, including enabling the potential of the Channel Tunnel Rail Link to be exploited for freight serving London and the wider region. The policy aims to support the provision of these interchanges and encourage modal-shift from road to rail and orders that the facilities must:

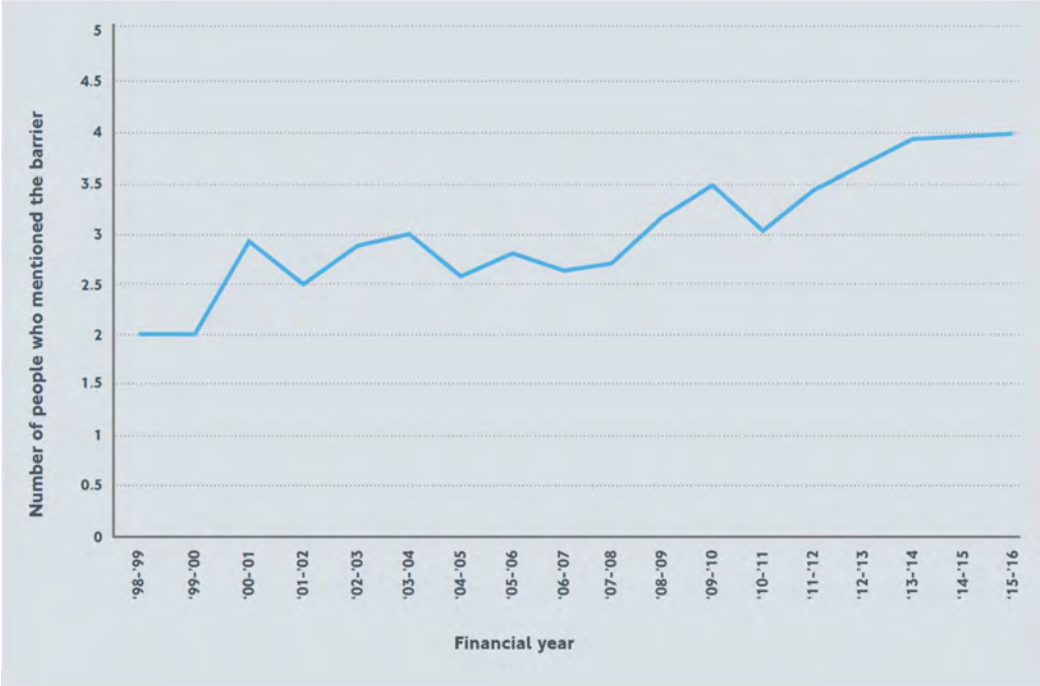
- deliver modal shift from road to rail;
- minimize any adverse impact on the wider transport network;
- be well-related to rail and road corridors capable of accommodating the anticipated level of freight movements; and
- be well related to their proposed markets.

3.13 Traditionally rail freight has been used to carry heavy bulk materials such as coal and iron, it now increasingly carries container goods between ports and industrial centres.

3.14 Despite these facilities, rail freight has experienced a downwards trend in recent years with UK freight train movements falling in 2015-16, a decrease of 16.3% from the previous year. This is the lowest number of movements since the data began in 2003-04. Total train kilometres fell

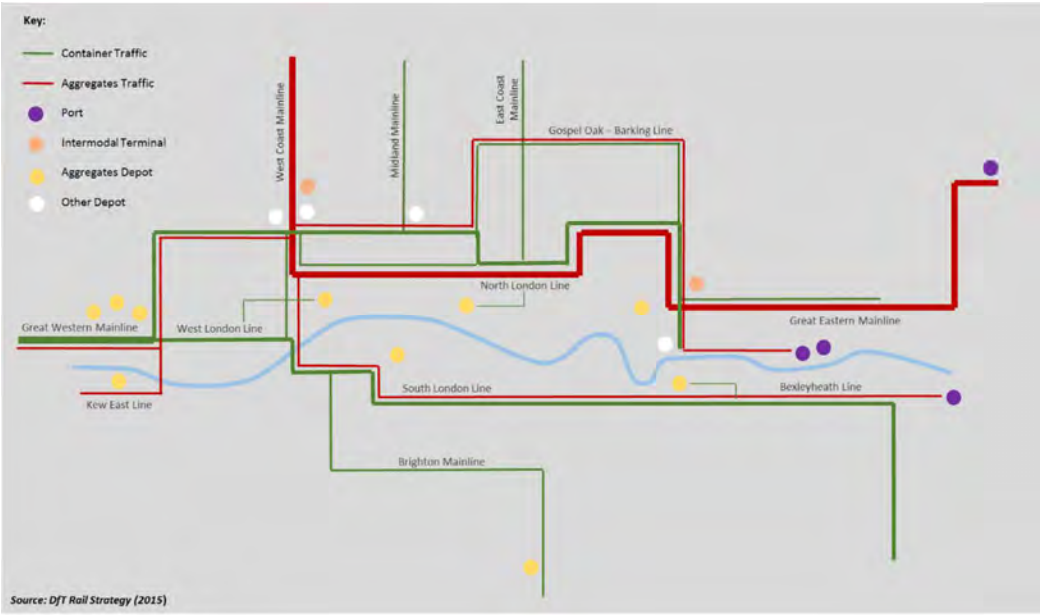
to 34.9km and the total volume of freight moved in 2015-16 was 17.8 billion net tonne kilometres, a decrease of 14.9% and 20.0% respectively on 2014-15 figures. Previously, total freight moved had grown steadily from 1995-96, peaking at 22.7 billion net tonne kilometres in 2013-14. Despite this net reduction in movement, one area in which the rail freight industry has grown is in the transportation of construction materials. Figure 3.2 illustrates the positive trend in construction movement by rail.

Figure 3.2: Amount of construction freight moved on the UK rail network



3.15 Figure 3.3 shows the key rail freight routes which run through and around London.

Figure 3.3: Location of key freight flows



Emissions

3.16 Carbon emissions from freight are also a concern in London, exacerbated by the proportion of freight that is transported by road. Road is the most polluting form of freight transport with HGVs producing average CO2 emissions of 207-280g/tonne km and in 2010, road freight transport was responsible for 23% of all CO2 emissions and 36% of NOx emissions. In contrast, rail contributes emissions of 39-48g/tonne-kg and each train removes 43-76 lorries from the roads[8]. River freight on the Thames also currently helps to keep over 265,000 HGVs off the road network each year, with average emissions of 40-66g/tonne-km[9].

Table 3.3: Average emissions by mode

Mode	CO2 Emissions (g/tonne-km)
Rail	29-48
River	40-66
Road	207-280

Planning Policy Context

The London Plan (March 2016)

3.17 The London Plan (2016) sets out the spatial development strategy for the Greater London area with the objectives of meeting challenges of economic and population growth, maintaining an internationally successful city, a city that becomes a world leader in improving the environment and a city where it is easy, safe and convenient for people to access jobs, opportunities and facilities. A key component for achieving all of these objectives is Transport. Policies 6.1, 6.4, and 6.14 which all require consideration of accommodating freight on river and rail networks.

3.18 The London Plan introduces the concept of the Blue Ribbon Network which consists of all the waterways in London including the Thames, the canals, tributary rivers, streams, docks, reservoirs and lakes.

3.19 Policy 6.14 of the London Plan specifically considers freight setting out the requirement for development proposals to:

…increase the use of the Blue Ribbon Network for freight transport…

3.20 And, in the context of borough development plan documents (DPDs), these should also:

….promote sustainable freight transport by:

a) safeguarding existing sites and identifying new sites to enable the transfer of freight to rail and water
b) identifying sites for consolidation centres and 'break bulk' facilities
c) safeguarding railheads for aggregate distribution

3.21 Accordingly, increasing the use of freight by river and rail is an important component to achieving the objectives of the London Plan. The outputs of this study will provide valuable data and understanding to assist future growth of construction materials by river and rail.

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[8] *Rail Freight Strategy, DfT (2016)*

[9] *European Commission CEC, DG XI https://www.waterways.org.uk/news_campaigns/freight/advantages_of_freight*

Mayor's Transport Strategy (May 2010)

3.22 The Mayor's Transport Strategy (MTS) sets out the transport vision for London between 2010 and 2030 with a number of strategic goals and objectives.

3.23 A key element of the MTS is increasing the use of the Blue Ribbon Network for both passengers and freight as an alternative to congested roads and public transport. The strategy sets out that using the river for transport freight (including waste) is encouraged as it is a less damaging option environmentally with the ability to reduce vehicle emissions improving the quality of life within London. The transportation of waste by river is well suited to river transport because of the bulky and low value nature of the material.

3.24 As part of the MTS and the London Plan, the Mayor has safeguarded fifty wharves which will be key to increasing the use of the river for freight.

3.25 The MTS also recognises the importance of national and international rail freight within London and sets out a proposal to work with other stakeholders to support the development of rail freight terminals in or around London.

Mayors Draft Transport Strategy (June 2017)

3.26 Issued in draft in June 2017 the latest version of the Mayors Transport Strategy continues to promote sustainability within every aspect of transport in London.

3.27 Proposal 16 summarises the Mayors ambition, through TfL, to work with Network Rail and PLA to move freight off London's streets and on to the rail and river Thames. The Mayor echoes PLA's ambition to increase the total number of river users to 20 million a year by 2035. To ensure this is done in a sustainable fashion the Mayor will work with the PLA to pressure government to enact legislation ensuring river vessels comply with emission standards.

The Vision for the Tidal Thames (July 2016)

3.28 The Thames Vision set out the framework for development on or around the tidal Thames between now and 2035 outlining the long-term strategic goals for securing development within the vicinity of the river alongside increasing the use of the river for transporting both people and freight.

3.29 The Vision sets out a number of priority actions which include increasing trade through the Port of London alongside increasing inland freight with a particularly emphasis on a shift from road to river. A key component of the Vision is protecting the existing operational wharves and encouraging the opening of wharves which are currently vacant but could serve a future purpose through expansion of the use of the river for inland freight.

3.30 The Vision also identifies opportunities in the current trends of growth in London, particularly the east of London which is well connected to the Blue Ribbon Network and suitable for the transport of construction goods and waste.

Borough Planning Policy

3.31 As part of their respective Local Plan, each borough has a Development Planning Document (DPD) which sets out the overall approach that developers should take in preparing planning application for sites within the Borough. The DPD forms part of the Local Plan which, in every Borough, provides strategic references to sustainable use of transport and freight.

Planning Conditions

3.32 Planning Conditions are issued to planning application applicants by Boroughs (and can also be requested by TfL as part of their statutory consultee status) when planning permission is granted. Any planning permission is conditional on the successful discharge of each and every condition allowing the Borough to undertake further approvals prior to certain stages of development (e.g. prior to commitment, prior to above ground works, prior to occupation).

3.33 Planning Conditions can include stipulations that concern river and rail use, however they are more commonly used to secure the further details relating to construction through the preparation of a Construction Logistics Plan (CLP).

Summary

3.34 Transporting materials and waste by road is currently the dominant form of transport in London. The case studies have demonstrated that where circumstances are appropriate, there is significant opportunity to use alternative means of transporting materials and waste

3.35 Strategic policy identifies the need for increasing the use of river and rail freight with wharves and rail heads protected through the London Plan. Increasing the use of river and rail freight also filters through into the majority of Development Plan Documents prepared by Boroughs although how effectively these are tested through the planning application process is questionable given the evidenced reduction in river and rail freight over the course of the last ten to fifteen years.

3.36 A review of planning conditions set by local authorities in the determination of planning applications has highlighted that approaches to securing river and rail usage as part of any planning application differs Borough by Borough emphasising the inconsistencies applied to applicants when seeking planning permission. There is also a question mark regarding how rigorously the Conditions set by planning authorities are applied when they are discharged by the applicant, for example it is unclear what constitutes feasible or viable in terms of the LBTH condition, nor is it clear how this is tested.

4 Survey Results

Overview

4.1 This chapter provides a detailed analysis of the findings from the key stakeholder interviews and quantitative interviews. Key trends and relevant significant factors identified by respondents with regard to barriers to river and rail usage are highlighted and form the basis of further analysis in this report.

Identification of Barriers

4.2 The research element of this project has identified a wide range of barriers that respondents to the research believe are preventing greater use of river and rail usage in construction projects.

4.3 To enable the analysis and concise reporting of the survey results, each barrier has been associated with one of the following categories:

- **Physical:** relates to barriers identified by respondents that are primarily physical in nature, i.e. relate to issues that physically prevent the movement of materials by river or rail such as lack of infrastructure or physical constraints;
- **Logistical:** relates to barriers identified by respondents associated with process and operational issues associated with the use of river and rail;
- **Financial:** relates to barriers identified by respondents associated with costs of transporting materials and waste by river and rail;
- **Policy:** relates to barriers identified by respondents associated with the development planning process alongside general planning policy adopted at both a GLA/TfL and Borough level; and
- **Industry Awareness:** relates to barriers identified by respondents that are associated with awareness, knowledge and skill sets within the industry that create a perceived barrier to the use of river and rail.

4.4 Any barrier that has been expressed by a stakeholder over the course of the project has been assessed as one of the above. This chapter provides an overall summary of the results of the survey whilst the following chapter provides a detailed description of each barrier identified. Further detail on each barrier alongside a description of the barrier and by whom it was identified is provided in Chapter 5.

Stakeholder Interviews

Overview

4.5 An initial set of 39 semi-structured qualitative interviews was undertaken in November and December 2016 with key stakeholders from all sectors involved in this study. The intention of these interviews was to understand the key themes that had emerged from the desk top research and to identify new themes to inform the later research gathering stages, alongside the detailed reporting of the barriers.

Key Themes

4.6 Throughout the interviews, it became apparent that interviewees noted a relatively consistent core number barriers to river and rail usage. For the purposes of collating the barrier type, each barrier identified within the interviews was grouped into one of five categories.

4.7 The type of barrier and the individual barriers associated with each type is shown in Table 4.1.

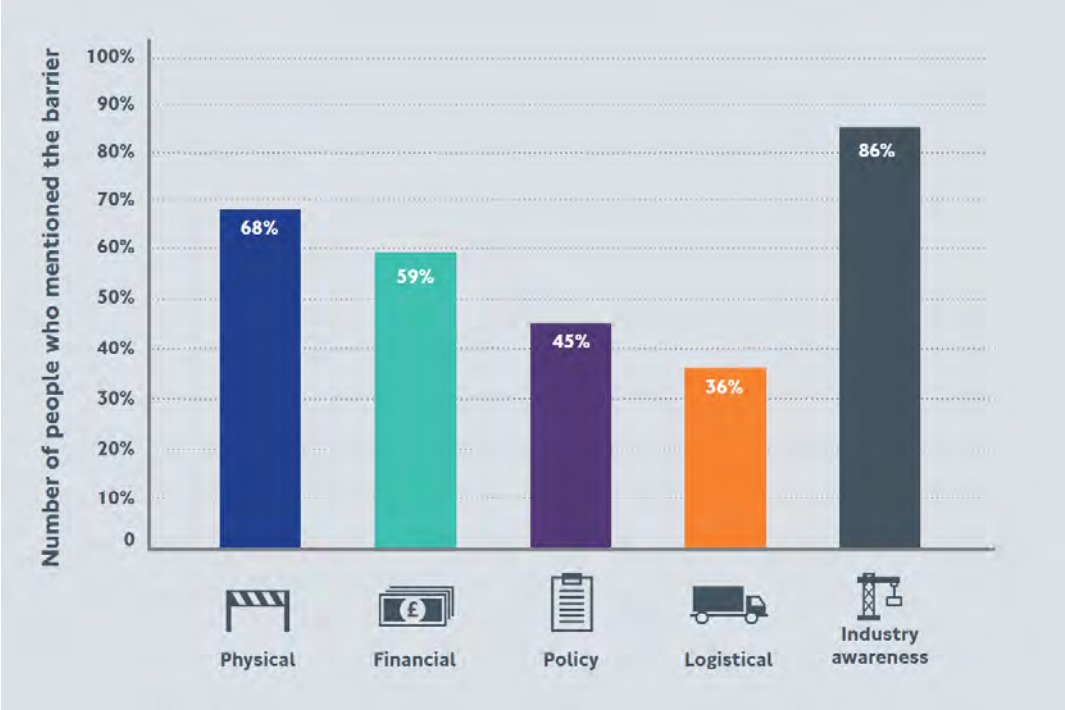
Table 4.1: Barriers to river and rail movements

Barrier	Example
Physical barriers	Rail head availability Wharf availability General accessability issues between river/rail and the site River wall suitability Tidal restrictions Bridges River capacity contraints
Logistical barriers	Double Handling Timing of deliveries (night time/early morning) Tides/rail freight paths On-site storage availability Site orientation and logistics Availability of infratsructure Geography - UK wide industry Conflicts with other users
Policy barriers	Protected wharves Application of existing policies Timing and enforecement of CLPs Enforcement of existing policy
Financial barriers	General costs - Perception of costs Known vs unknown Financial risk Lack of competion within the industry - value for money
Industry related barriers	Communication/awareness Skills and resource gaps Availability of information to potential users

4.8 It is important to note that the barriers to river and rail movements are multi-dimensional and do not necessarily sit within each type of category in isolation, however categorising them into the groups shown in Table 4.1 allowed the barriers to be quantified and compared.

4.9 Figure 4.1 provides a summary of the barriers identified by the detailed interviewees throughout the course of the project.

Figure 4.1: Identification of Barriers from 27 Interviews



4.10 As shown in Figure 4.1, the type of barrier most frequently mentioned in the detailed interviews was Industry Awareness.

4.11 Given the semi-structured format of the interviews the interviewees mentioned a broad range of barriers which are captured in Table 4.1. As shown in Figure 4.1, the most commonly noted themes from the interviews was the lack of knowledge and awareness of the capability and potential of the river and rail. Another reoccurring theme was a potential skills gap of people who could facilitate the movement of materials on the river. Stakeholders cited ageing pilots as a barrier to the movement of freight on the river, it was noted that training schemes, in particular in association with Thames Tideway, were effective ways of mitigating this barrier in the long term.

4.12 Physical barriers, such as wharf and railhead availability were also considered to be major barriers. Proximity to existing infrastructure dictates the feasibility of river and rail use before any other barrier becomes relevant. This is captured by 68% of stakeholders who mentioned Physical barriers. Barriers specific to the river were also mentioned frequently, the varying suitability of the river wall to accommodate barges was also noted by 55% of stakeholders and the significance of tidal restraints and opportunities was also mentioned.

4.13 59% of stakeholders mentioned financial barriers, these include:

- monopoly power and the associated lack of competition;

- unknown or hidden costs; and
- financial risks.

4.14 It became apparent throughout the interviews that there was a discrepancy between perceived costs and actual costs. Stakeholders mentioned that prior to investigating the feasibility of river and rail they believed it to an expensive alternative. However, others noted that once they had taken the time to understand the logistics, in some cases, they found it to be a cheaper alternative. This was largely due to the economies of scale that could be capitalised on. Given the nature of their involvement in the development process, private organisations mentioned financial barriers more frequently than public sector organisations.

Economies of Scale

4.15 A vessel transporting materials and waste on the Thames can accommodate a range of capacities with smaller vessels accommodating circa 500 tonnes and the largest circa 1,200 tonnes. In comparison, the largest vehicle capable of operating in London without specified permission is, a 6 axel articulated vehicle which can accommodate up to 44 tonnes. Accordingly, to transport 1,200 tonnes of material by road would require 28 vehicle trips equating to 56 vehicle movements. With an efficient loading and unloading process this would minimise the potentially costly extraneous variables that can have an adverse impact on overall costs.

4.16 However, the significant advantages of greater river vessel and rail wagon capacity is also a key disadvantage. As a result of the significantly greater capacity of river and rail transport, developments have to be of a certain size to capitalise upon these benefits, many of which on constrained sites in Central London fail to meet. As such, a consolidated approach to deliveries and waste transportation could allow smaller developments to capitalise upon the economies of scale previously reserved for larger developments.

Economies of scale is an essential element of determining river or rail usage – the feasibility of utilising river requires regular daily deliveries of circa 500 tonnes per day. Accordingly, river and rail use is only feasible for large developments unless there is coordination between numerous smaller developments within a similar location.

Policy

4.17 Policy barriers were mentioned by just under half of the stakeholders. 40% of public stakeholders and 50% of private mentioned policy as a barrier, this consistency across public and private stakeholders suggests a shared view in the way policy is regarded amongst the stakeholders. Policy was often mentioned in relation to Physical barriers. Regional or national policy often disguised barriers and opportunities within localised geographies. Creating a borough specific approach which takes account of the local infrastructure was mentioned.

4.18 Stakeholders had a varied opinion on the role and significance of planning policy, but there was a consensus that policy did have a unique position in how it is able to influence the construction process. The ability for policy to influence how projects are developed and progressed provides an opportunity to influence the methods of transporting materials and waste. Current local, regional and national planning policy all promote the use of sustainable methods of transport, but there is a wide variation in how these policies translate into projects

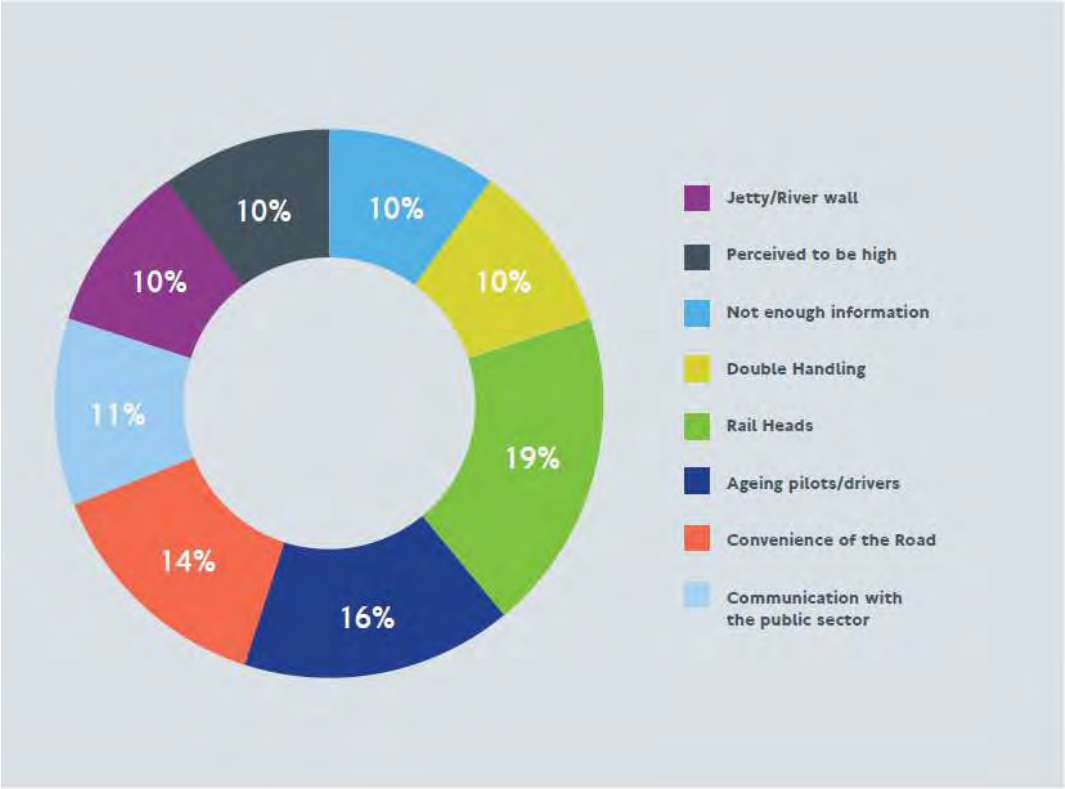
and whether the requirements to consider alternative to road use during construction is explicit enough to influence decision makers.

4.19 Planning policy has the ability to encourage and motivate decision makers to overcome barriers to river and rail movement through local and regional planning policy against which any planning application is tested upon submission. Opinion amongst the stakeholders was also varied as how policy could best achieve this, some believed policy too be excessively strict, whilst some thought policy should have a firmer stance in enforcing river and rail use. Of the stakeholders who voiced an opinion on policy the majority thought that existing policy should be better enforced. Five key stakeholders thought that the sentiment of existing policy is correct but there are limited tools to enforce that policy.

Key Stakeholder Interview Findings

4.20 The eight most frequently discussed barriers from the stakeholder interviews are shown in Figure 4.2, and described in further detail below.

Figure 4.2: Consistently identified barriers



Double Handling

4.21 Unless the development site is directly adjacent to a railhead or wharf, materials have to be transported for the final mile by road. Having to transport materials using two different methods is referred to as 'double handling'. This adds cost and complexity to the logistics programme. This barrier was mentioned by nearly all sectors, although supply chain and contractors thought it to be a particularly relevant barrier.

Appreciating the final mile element of river and rail usage is an essential component of understanding logistics and cost. For the majority of sites in London, river or rail usage will always require material to be transported to/from site by road (or in some circumstance conveyor belt if feasible) for some element of its journey simply. This is a result of the site being located without direct access to the river or a rail head.

Lack of Information

4.22 The lack of a single resource where relevant information about river / rail is consolidated was believed to be a barrier. When researching the feasibility of river / rail many stakeholders found it to be an arduous process of flicking through local policy and identifying relevant individuals to contact. Combining all of this information into one place would help streamline the process of identifying the most appropriate and sustainable method of transporting building materials / waste.

4.23 Each construction site has a unique set of challenges and opportunities and the site setup, logistics and construction techniques that are applicable at one location may not be feasible in another. Many stakeholders identified a lack of awareness, information or understanding as a reason for not having been able to maximise the use of river and rail on construction projects. There was also agreement amongst a wide range of stakeholders that a comprehensive resource, tailored to local opportunities and constraints, would assist developers, contractors and supply chain organisations quickly understand river and rail opportunities and consider them at an early stage of the development process. This resource would help reduce the need for 'hard' measures to be implemented at an early stage as key decision makers would already be aware of the opportunities and constraints.

A wide range of stakeholders identified that a lack of information regarding river and rail usage in construction made use of these modes more difficult.

River Wall Facilities

4.24 The river wall serves several functions. It acts as a tourist destination in central London, connectivity along the footpath and a foundation for residential developments. These conflicting requirements often mean that the river wall is not suitable to load / unload building materials and waste. This was a barrier highlighted by developers and supply chain companies operating on the river. Certain borough representatives also highlighted this as a significant barrier.

Perception of Costs

4.25 The perception of costs is closely related to awareness of the barriers. There was a perception amongst stakeholders who had not investigated the feasibility of using the river / rail that it was an expensive alternative to conventional methods. Although in some instances this perception was well founded in research in many cases this was a perception that was overcome once research had been undertaken.

Rail Head Availability

4.26 In order to transfer materials and waste onto rolling stock a rail head is required. Competition for land within London puts pressure on rail heads, as they have declined over the years there has been a reduction in their availability. This was identified by supply chain organisations and contractors, many of whom had direct experience of this barrier.

4.27 All stakeholders who mentioned rail heads voiced concerns over the increasing pressures on the infrastructure. Unlike wharves there is no policy to safeguard specific rail heads, therefore there is increasing pressure to develop on the valuable land they sit on. Many developments happen in close proximity to rail heads and this presents an opportunity to capture s106 finances to help safeguard and maintain rail heads.

Skills and Resource Gaps

4.28 Transporting materials by river / rail requires a unique set of skills which are very specific to that sector. There was a perception that the few individuals who have the skills in this sector are ageing and therefore will imminently leave a resource gap. Despite efforts being made by large projects, such as Thames Tideway to mitigate against this, there was still a belief that this would become an increasingly significant barrier. This barrier was especially relevant to the river where PLA staff were believed to be nearing retirement. Supply chains and contractors believed this to be a problem.

4.29 The Thames Skills Academy (TSA) is a non-profit organisation founded to facilitate and provide '*high quality and cost-effective marine and port operations skills training. It promotes jobs and careers in the maritime industries – specifically the ports and Inland Waterways sector'*. In 2016 the TSA had *'actively engaged with more than 30 potential Employers Members, Affiliate Members and Sponsors'*. Stakeholders believed programmes such as the TSA are crucial steps to helping upskill staff on the river. Increasing the number of staff available to facilitate river movements would be an effective step at reducing costs by increasing the potential supply through reducing the perceived monopoly power.

Convenience of Road

4.30 Many stakeholders felt more comfortable using the road, this comfort is derived from a career of using the road to transport building materials and waste and coupled with the lack of information, understanding and awareness of alternative means as discussed above. Stakeholders cited the reduced risk of transporting materials by road and the relationships with supply chain organisations as the main reasons they felt more comfortable using the road.

4.31 Stakeholders mentioned the increasing trend towards modularisation of large units away from the construction site. This presents challenges for vehicle movements which have to navigate congested and often narrow streets. River and rail provides the opportunity to transport large modularisation building units without coming into conflict with narrow streets and congestion. Successfully transporting pre-fabricated units overcomes the need for on-site storage and reduces the convenience of road.

Communication / awareness

4.32 Awareness of relevant information and precedent is the single barrier that underpinned many other perceived barriers. Awareness and communication are closely affiliated; a lack of awareness can be overcome with improved communication. Some stakeholders believed that

knowledge was not being communicated in order to maintain a point of difference within the market. This approach is detrimental to whole industry and will prevent sustainable objectives being reached. This barrier was identified by key stakeholders and developers.

Quantitative Interviews

Overview

4.33 Quantitative telephone interviews were undertaken between January 2017 and April 2017 to obtain objective insight into the barriers to transporting construction materials by river and rail. To supplement these interviews, an online survey using the same question structure was circulated to relevant individuals.

Screening

4.34 Before undertaking the survey, each participant was required to answer a series of screening questions regarding their profession and involvement in the industry to ensure that they had relevant experience to answer such queries. As a result, all of the data presented below has been gained from participants involved in either the planning or construction of projects in London over the last three years.

Identification

4.35 The participants in the surveys were required to self-identify themselves as primarily working in one of the following sectors:

- Contractor;
- Developer;
- Supply Chain;
- Borough / planner;
- Other Key Stakeholder (i.e. TfL, Network Rail, PLA).

4.36 Table 4.2 shows the proportion of participants from each sector.

Table 4.2: Percentage of telephone interview participants

Sector	Number of Participants	Percentage of Participants
Contractor	50	41%
Developer	14	12%
Supply Chain	15	12%
Borough / planner	20	17%
Key stakeholder	22	18%
Total	**121**	**100%**

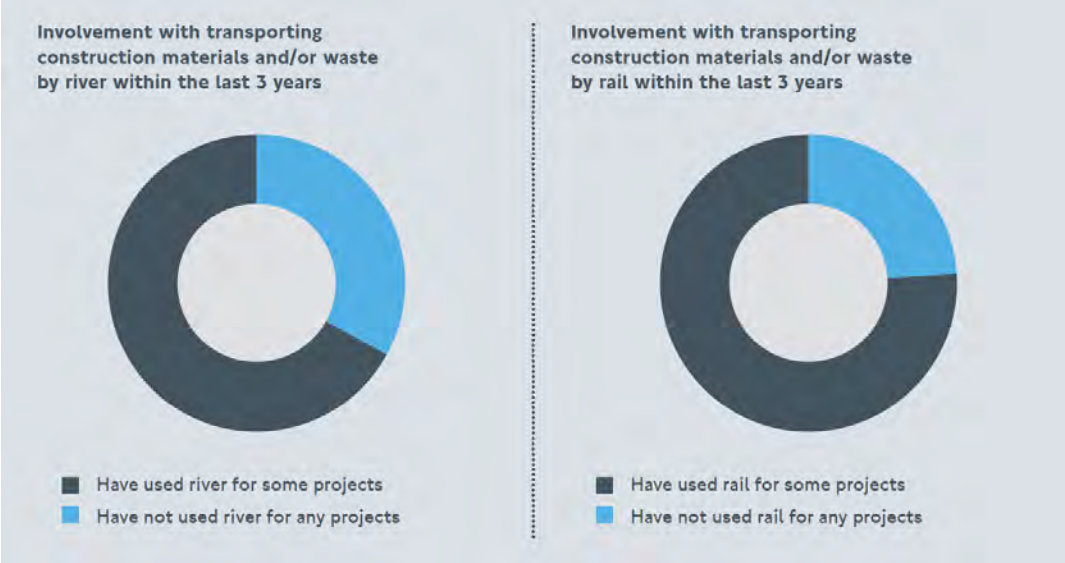
4.37 As shown in Table 4.2, the surveys captured a minimum of 14 responses from each sector.

Involvement of River and Rail Usage

4.38 The first question sought to understand each participant's recent experience in using river or rail in the planning and delivery of construction projects within the last three years.

4.39 Figure 4.3 provides a summary of the results in relation to both river and rail.

Figure 4.3: Involvement in river and rail over the last three years



4.40 As shown in Figure 4.3, a total of 33% of participants have experience operating with river transport within the last three years, whilst 24% have used rail for transporting either building materials and waste.

4.41 This level of activity enabled the survey to identify the barriers faced by those individuals who currently play a role in transporting materials by river and rail, whilst also highlighting the barriers preventing similar businesses from utilising the river and rail. It also reflects the findings from the desk-based review which shows that river and rail usage in construction projects is not currently extensive.

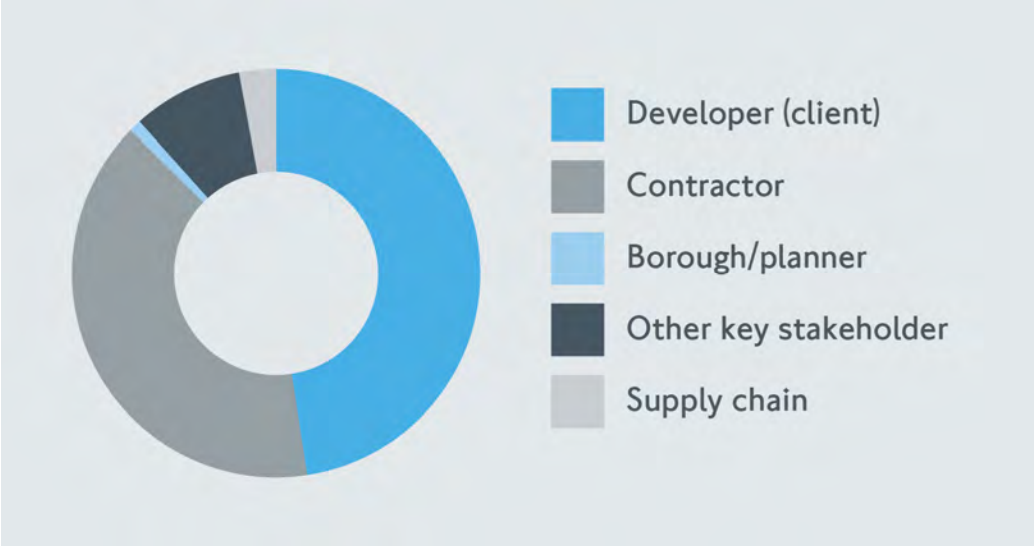
75% of respondents have not used river or rail for transporting construction material or waste in the last three years.

Responsibility

4.42 A broad range of organisations are involved in the development of a construction project. The survey sought to understand who respondents believed should be primarily responsible for determining whether to use river or rail for transporting construction materials and waste.

4.43 Figure 4.4 shows who the respondents believe to be primarily responsible for determining the use of river and rail.

Figure 4.4: Responsibility for determining river or rail use

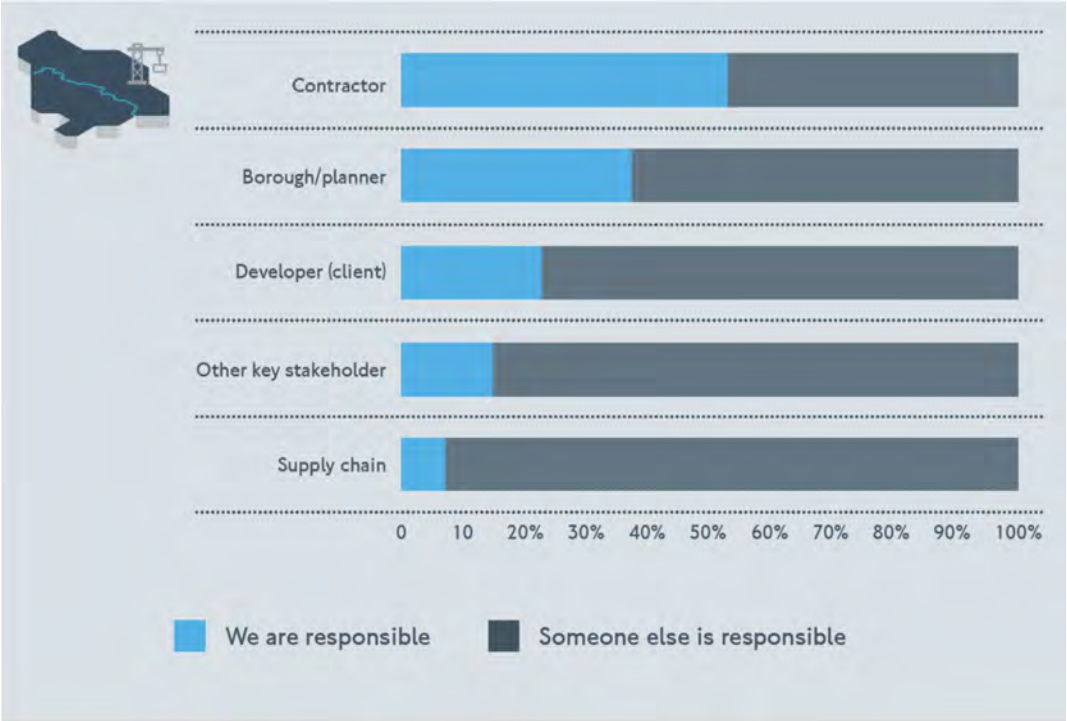


4.44 As shown in Figure 4.4, 48% of the participants believe Developers to be the primary responsible party for determining river or rail usage, whilst 40% believed it to be the responsibility of the Contractor. Notably, every sector was nominated by a minimum of three respondents as being the primary responsible party.

4.45 Comparing these results to the qualitive responses in the stakeholder engagement provides some context for responsibility within the construction process. At different stages of the development process responsibility will lie with different sectors. Inevitably initial responsibility lies with Developers in the initiation of the project but it is not uncommon for this responsibility to be delegated to a number of other sectors, most notably the Contractor. Boroughs and other Key Stakeholders such as TfL, PLA and NR who are statutory consultees for large development planning applications also bear responsibility in setting planning policy against which planning applications are tested and equally seeking to ensure these policies are applied by the applicant when planning permission is requested.

4.46 The responses demonstrate that there are mixed views as to who retains primary responsibility for determining use of river and rail. Figure 4.5 summarises the extent to which each industry believed their own sector to be responsible.

Figure 4.5: Assigned responsibility for river or rail use



4.47 As shown in Figure 4.5, Boroughs/Planners and Contractors were the two main sectors who deemed themselves responsible for determining whether to move building materials and waste by river and rail, with 53% of Contractors believing themselves to be responsible and 38% of Boroughs/Planners.

4.48 78% of Developers indicated they believed that another sector should be responsible for river or rail usage whilst 16% of Other Key Stakeholders and 7% of Supply Chain believed themselves to be responsible.

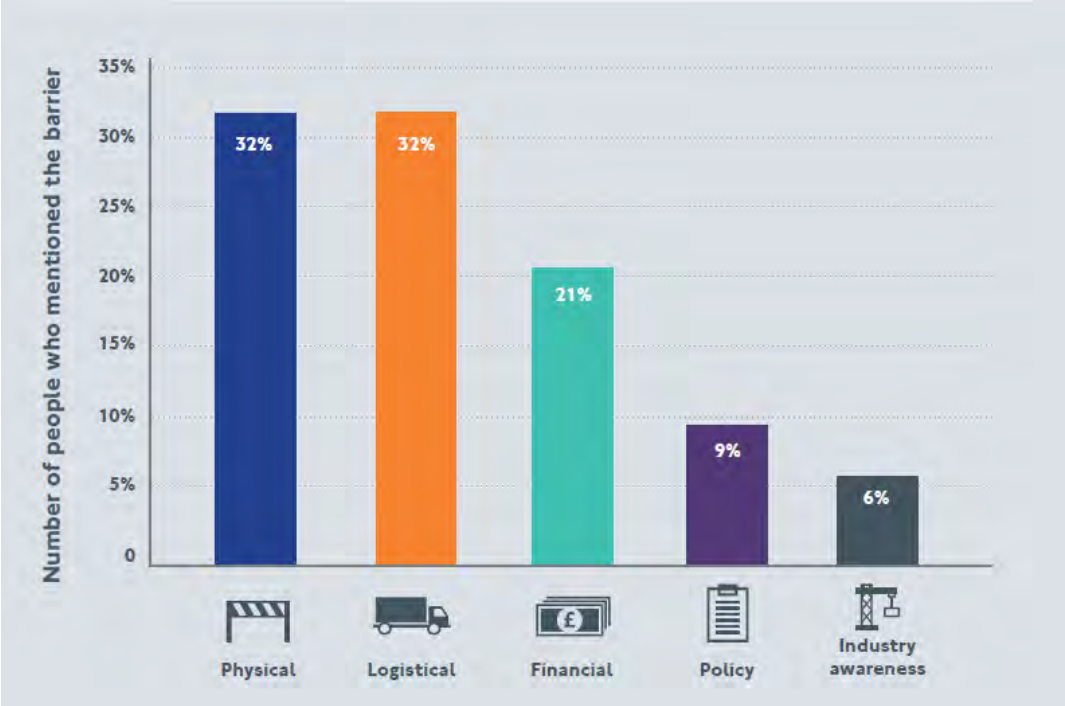
The assignment of responsibility for river and rail usage is unevenly distributed across all industry sectors, with little consensus as to which sector should take the primary responsibility for determining river or rail use.

Most Significant Barrier

4.49 To understand the greatest area of concern, in terms of barriers to river and rail usage, respondents were asked to identify the barrier which they perceived to be the most significant in preventing movement by river and rail.

4.50 Figure 4.6 provides a summary of what was considered to be the most significant barrier identified by all respondents.

Figure 4.6: Most significant barrier



4.51 As shown in Figure 4.6, Physical and Logistics barriers were identified as the most significant by all respondents. Financial barriers were also deemed to be significant whilst Policy and Industry Awareness related barriers were considered less significant.

4.52 These results differ to the findings of the key stakeholder interviews which identified Industry Awareness as the most commonly identified barrier to transporting materials by river rail. This suggests that whilst Industry Awareness barriers are most common, Physical and Logistics barriers are seen to be the most significant.

4.53 It is also notable that no one barrier type was clearly identified as being the most significant barrier type, suggesting that a range of different barriers exist and that the barriers vary according to the respondents typical type of involvement in the project. This is explored in further detail below and in the following chapter.

Physical barriers and Logistics barriers were identified as being equally significant barriers to transporting construction material and waste by river with Financial barriers also identified by a substantial number of respondents as being significant.

Key Themes

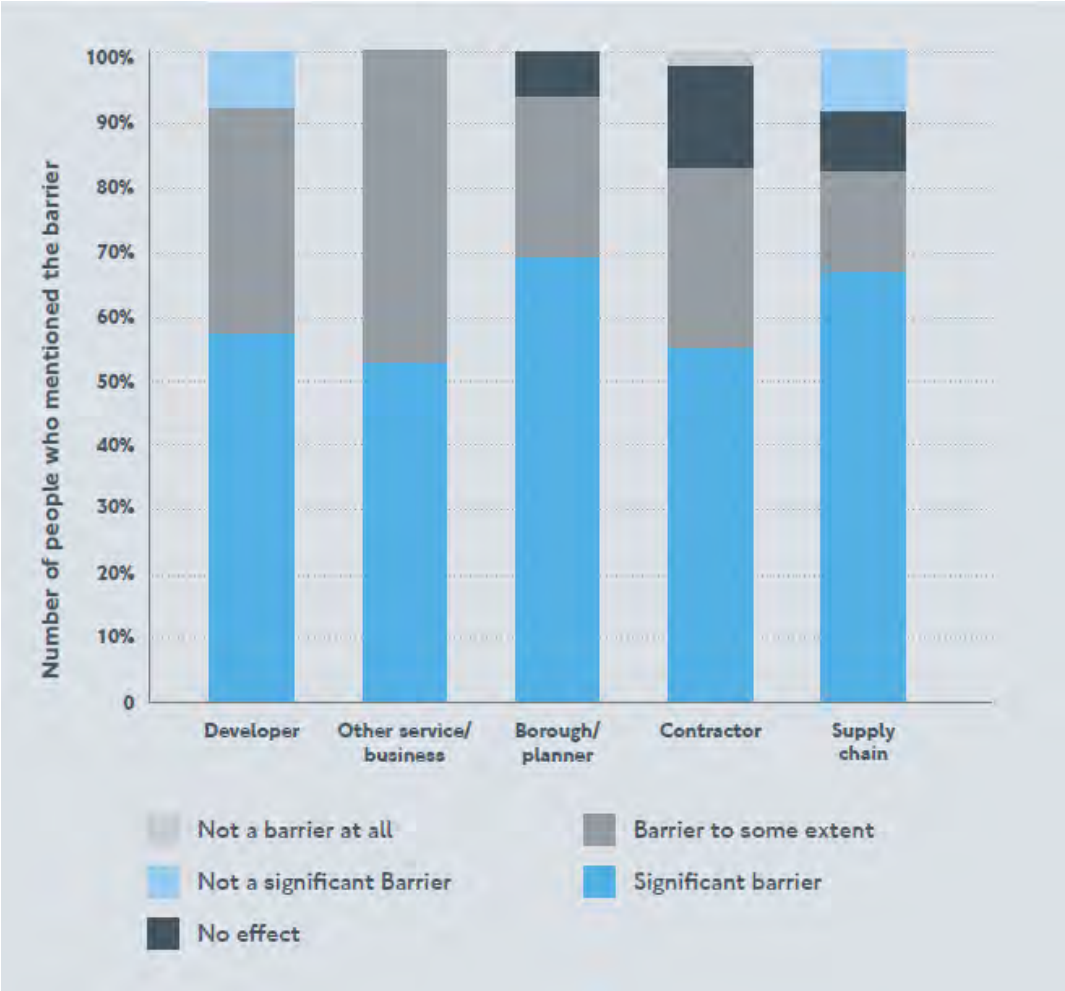
4.54 The data gathering exercise allowed for the key barriers to be analysed by sector.

Physical Barriers

4.55 As shown above, Physical and Logistics barriers are considered to be the most significant type of barrier to river and rail usage.

4.56 Figure 4.7 provides a breakdown of respondents view of the extent to which Physical barriers exist by sector.

Figure 4.7: Perception of Physical Barriers by Sector

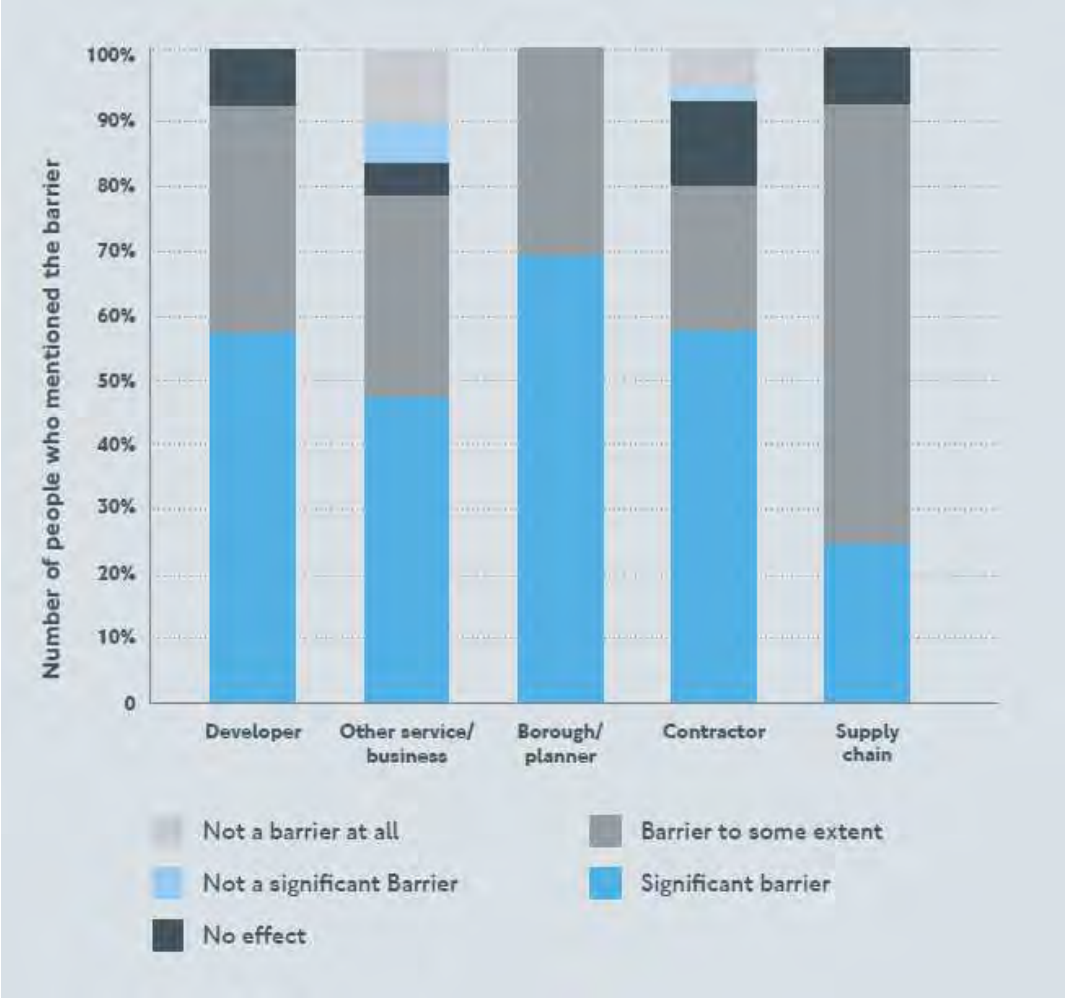


4.57 As shown in Figure 4.7, more than 50% of respondents from each sector believe Physical barriers to be a significant barrier to river and rail usage. Respondents who identified themselves as Borough/Planner believe that Physical barriers are the most significant whilst Contractors had the largest proportion of respondents (15%) who did not believe Physical barriers were a barrier or had no effect.

Logistics Barriers

4.58 Figure 4.8 provides a breakdown of respondents view by sector as to what extent Logistics barriers exist.

Figure 4.8: Perception of Logistics Barriers by Sector



4.59 As shown in Figure 4.8, the distribution of opinions as to what extent Logistics are a significant barrier by sector is substantially different to that of Physical barriers. Other Key Stakeholders and Supply Chain do not view Logistics barriers as significant whilst Boroughs/Planners see Logistics as being a more significant barrier than any other sector.

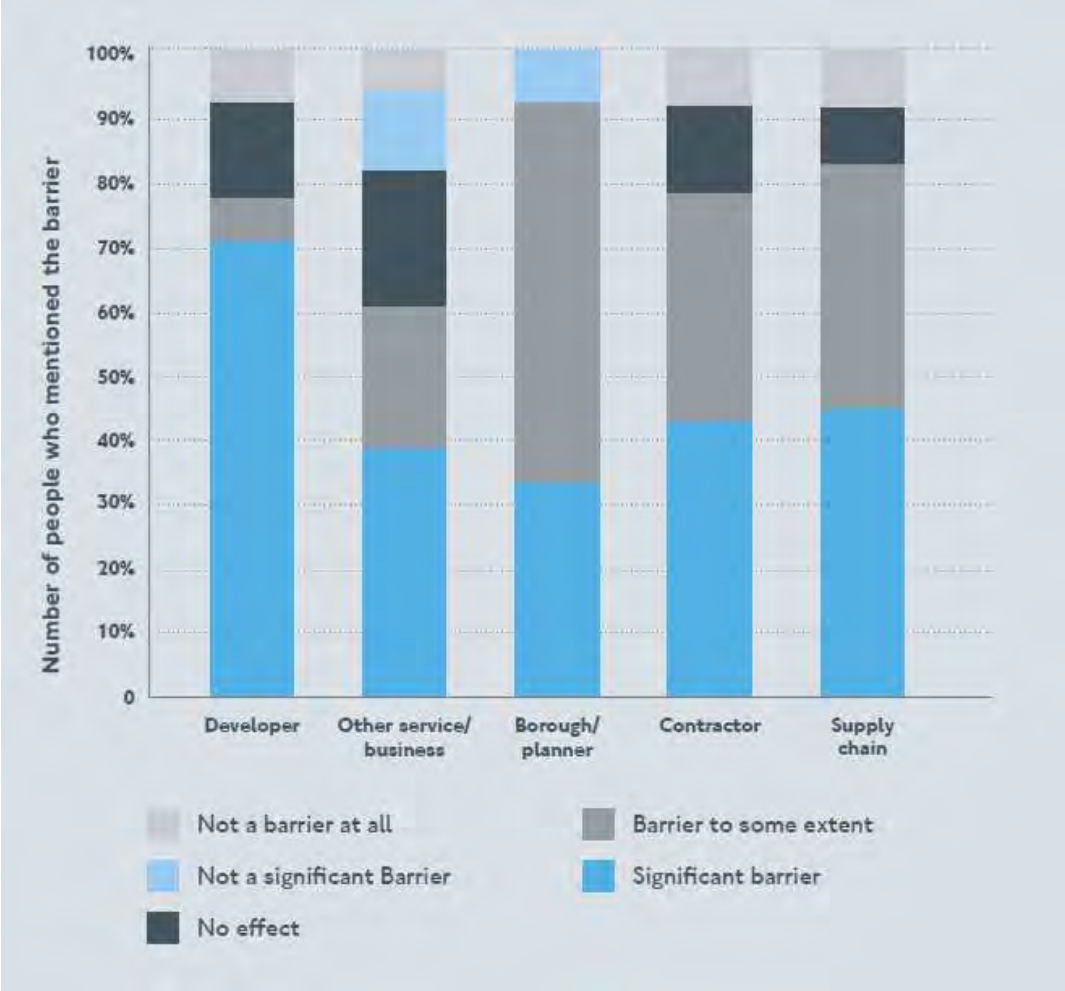
4.60 Whilst all sectors identify both Physical and Logistics barriers as being significant barriers, Boroughs/Planners see these barriers as being the most significant. Contractors and Supply Chain, who are typically those most experienced in implementing the logistics of a project, suggest greater optimism with 68% of Supply Chain respondents believing Physical barriers are only evident to some extent and 20% of Contractor respondents not believing Physical barriers to be a barrier at all.

Boroughs/Planners believe Physical barriers and Logistics barriers to be more significant of a barrier than Contractors and Supply Chain.

Financial Barriers

4.61 Figure 4.9 provides a breakdown of respondents view by sector as to what extent Financial barriers exist.

Figure 4.9: Perception of Financial Barriers by Sector



4.62 The results shown in Figure 4.9 suggest that there is also varied opinion regarding the extent to which Financial barriers are significant barriers. Developers view Financial barriers as being the most significant, with the extent to which it is a barrier or a barrier to some extent at 78%. Boroughs/Planners see financial elements as a barrier to a similar extent but with fewer respondents identifying financial considerations as significant.

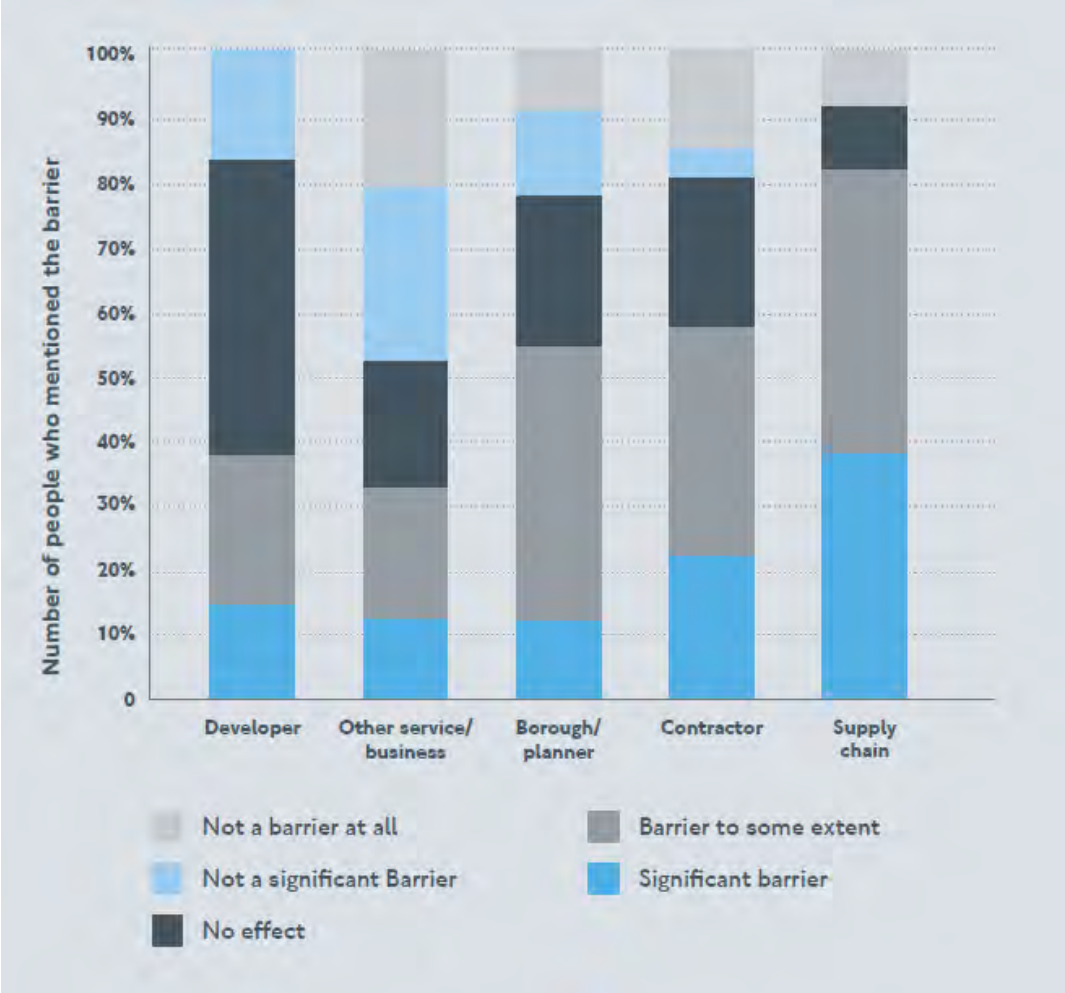
4.63 Contractors, who were generally considered to be responsible for decision making, thought that financial barriers were not as significant as other sectors with only 42% suggesting financial considerations were a significant barrier and a further 35% indicating they were a barrier to some extent.

Financial barriers are considered to be the most significant barrier by Developers but this is not reflected in responses from other sectors that see Physical and Logistic barriers as more significant.

Policy Barriers

4.64 Figure 4.10 provides a breakdown of respondents view by sector as to what extent Policy barriers exist.

Figure 4.10: Perception of policy barriers based on sector



4.65 As shown in Figure 4.10, the extent to which Policy is seen as barrier differs significantly dependent upon sector.

4.66 Supply Chain (85%) and Borough/Planner (55%) see Policy as being either a significant barrier or a barrier to some extent whilst the majority of Developers (60%) see Policy as either having no effect or positive influence.

4.67 Approximately 60% of Contractors see Policy as either being a significant barrier or barrier to some extent whilst 40% see it as either having a positive or no effect. Other Key Stakeholders have a very mixed views as to what extent Policy exists as barrier.

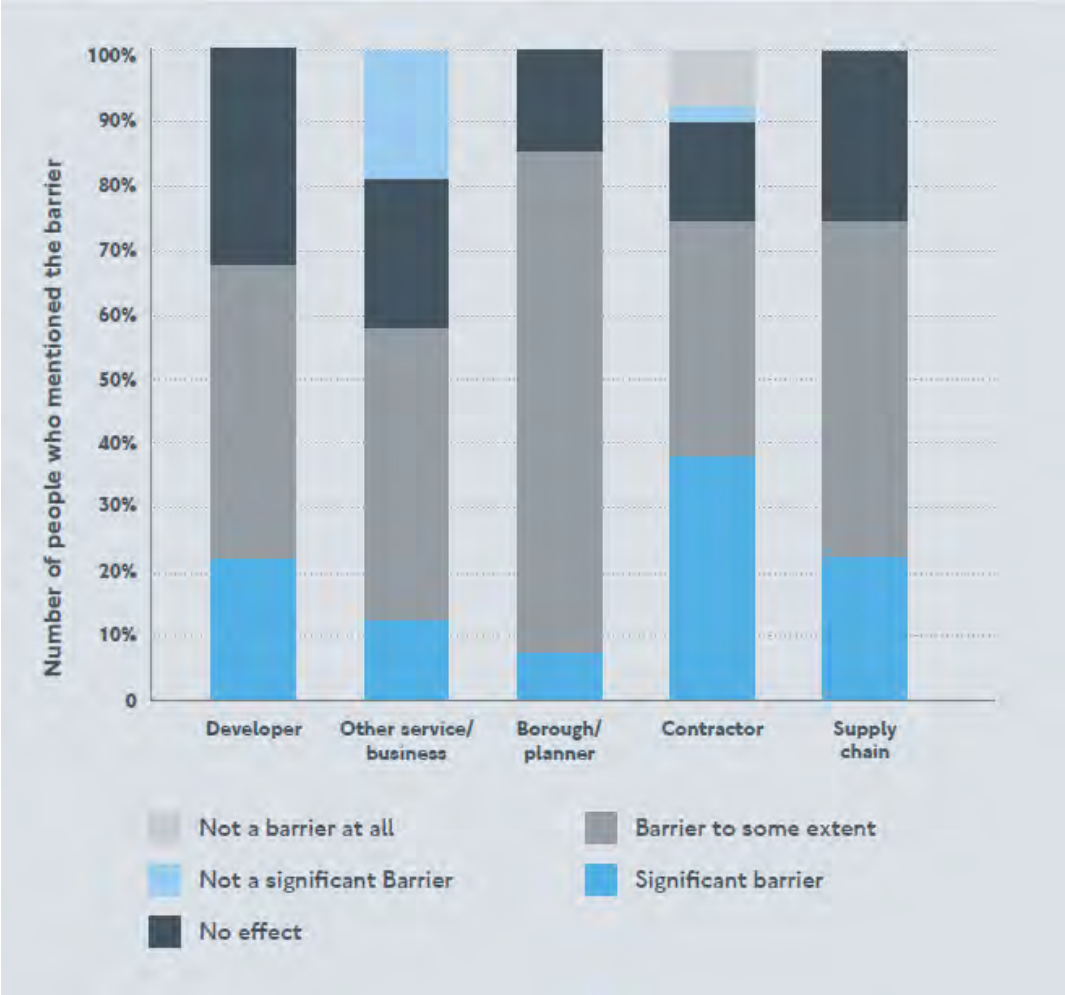
4.68 As discussed in the previous chapter, there is little consistency between how Policy at a Borough level encourages river and rail usage, particularly in terms of construction activity. There is also inconsistency in the application of planning conditions which are designed to implement river and rail freight policies through the Local Plan. This inconsistency, coupled

with the varied results to the survey would suggest that local planning policies are not promoting or enforcing the use of river and rail for construction effectively.

Industry Awareness Barriers

4.69 Figure 4.11 provides a breakdown of respondents view by sector as to what extent Industry Awareness barriers exist.

Figure 4.11: Perception of industry related barriers based on sector



4.70 There was generally a mixed view across all sectors as to what extent Industry Awareness acts as a barrier, 85% of Borough/Planners see Awareness as an issue to some extent whilst only 58% of Other Key Stakeholders take the same view. 30% of Developers believe that awareness has no effect with similar sentiments expressed by Other Key Stakeholders and Supply Chain.

4.71 The perception of the extent to which Awareness forms a barrier from private sector organisations in the key stakeholder interviews was mirrored in the quantitative interview responses. Private developers, contractors and supply chain organisations all believe that Awareness throughout the industry to be a more significant issue than the public sector organisations.

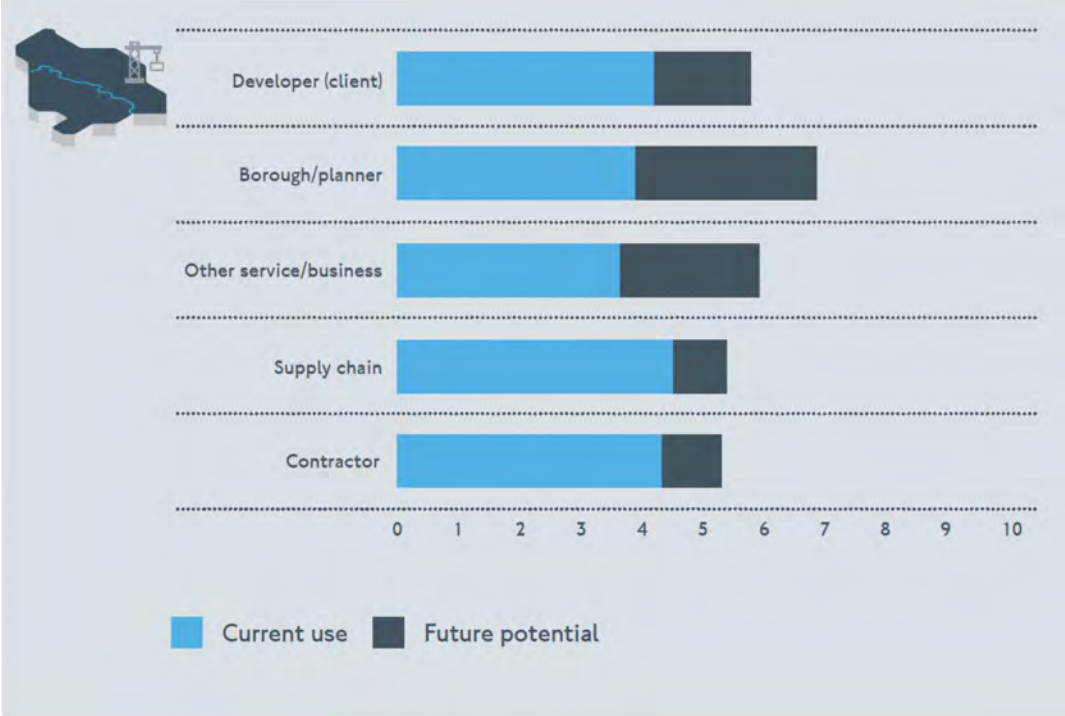
Industry Awareness related barriers were not perceived to be as significant as other barriers and there is variation in terms of the extent to which they are believed to be barriers across all sectors.

Future Potential

4.72 As part of the survey, participants were asked to rank out of ten what they perceived the existing utilisation of river and rail to be and the future potential of river and rail to be should the barriers that they identify begin to be addressed.

4.73 The results of these questions are shown in Figure 4.12.

Figure 4.12: Comparison of existing and future use of river and rail

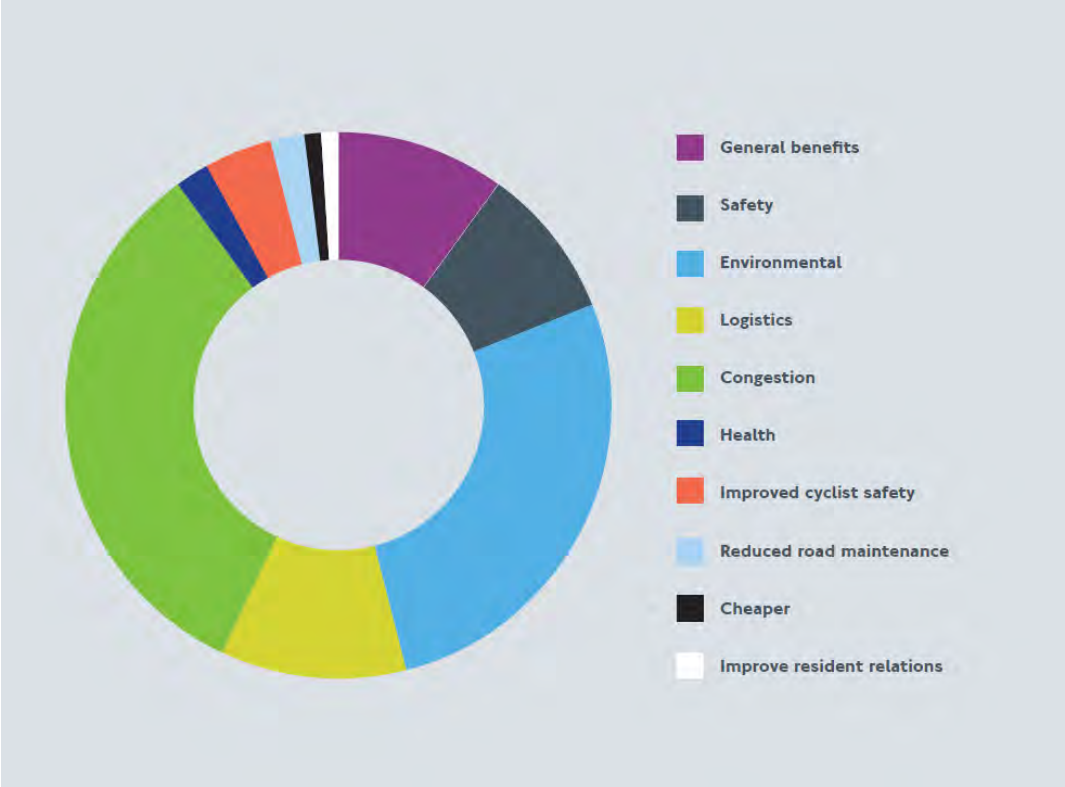


4.74 As shown in Figure 4.12 all sectors have an optimistic view of how the future potential for river and rail usage can be increased. Whilst Contractors are the least positive they see current use positively whilst Boroughs/Planners have the lowest opinion of current utilisation but the highest level of optimism regarding the future.

Benefits

4.75 As part of the research the participants were asked to identify any potential benefits from increased use of river and rail, these were open questions but after quantifying the responses some key themes emerged, these are shown in Figure 4.153.

Figure 4.13: Benefits of increased river and rail use



4.76 As shown in Figure 4.13 reduced congestion was seen as the largest benefit from increasing the use of river and rail, 38 participants cited reduced congestion without any prompts. Environmental benefits were mentioned by 31 participants as being a significant benefit to modal shift from road to river and rail. One developer noted that there is:

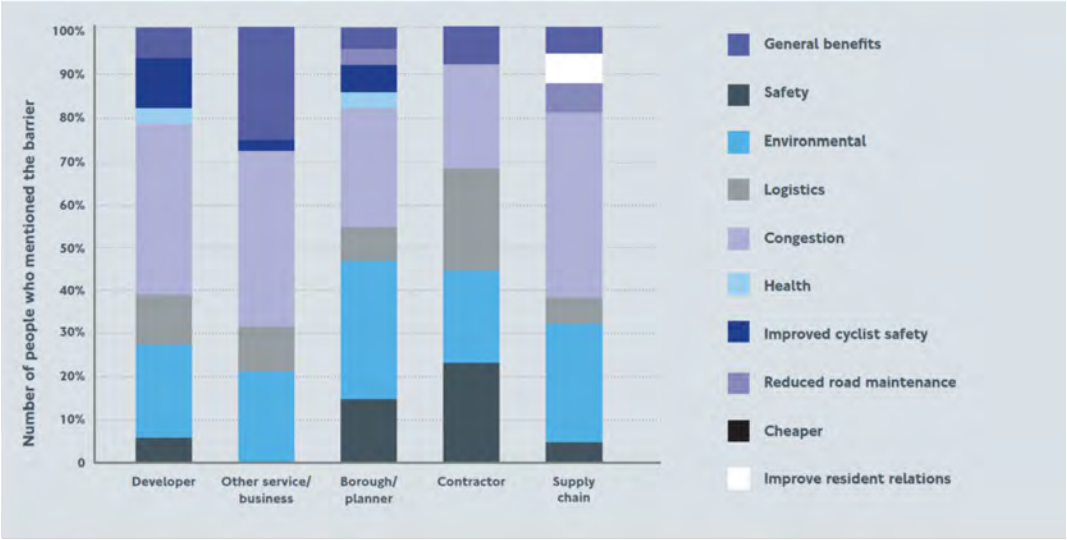
"Massive potential which is currently a missed opportunity in London. Huge upside for logistics, reducing vehicles on local road networks."

4.77 These sentiments were echoed by the public sector with one borough representative saying reduced vehicle movements would:

"Take stress from the roads providing environmental benefits."

4.78 Figure 4.14 shows the quantified benefits of river and rail use by sector.

Figure 4.14: Benefits to river and rail by sector



4.79 The results in Figure 4.14 closely align with the responsibilities assigned to each sector within the construction process. Borough's and Planners, who tend to take a more holistic view of the construction process, saw a wide variety of benefits emerging from the mode shift. Contractors and Developers viewed a reduction in congestion as a significant benefit as it increases reliability of deliveries on the road and improves the public perception of development and construction.

4.80 The benefits mentioned by the participants in this research project closely align with some of the main priorities for London:

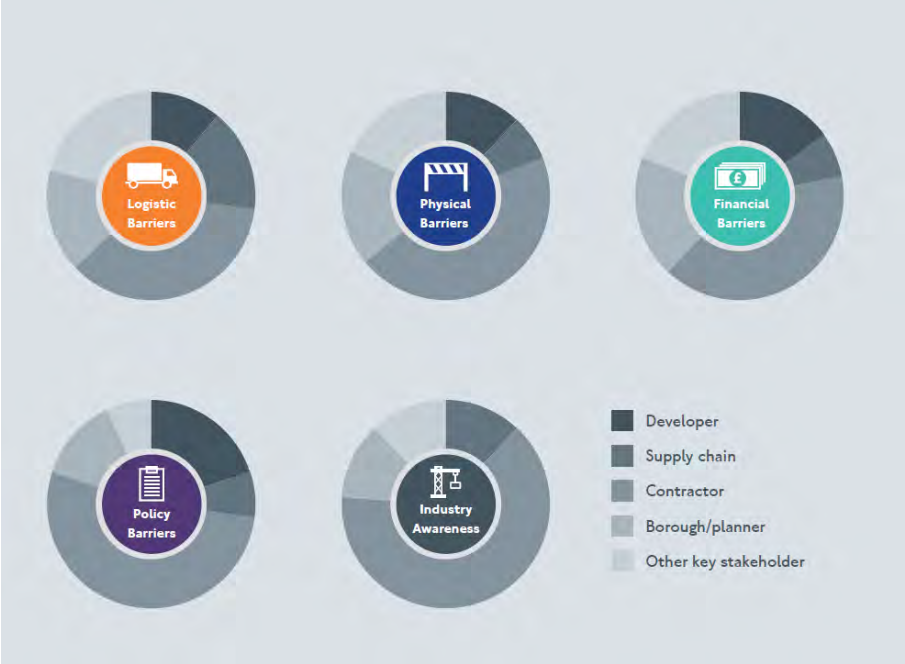
- improving air quality;
- reducing congestion on London's roads;
- a focus on the impact cities can have on its resident's health;
- improved safety for sustainable transport methods – such as cycling; and
- efficient construction logistics to facilitate construction projects.

4.81 Overcoming the barriers mentioned in this chapter will help deliver some of the benefits that arose from the research.

Summary

4.82 As shown above, the surveys have identified Physical barriers and Logistics barriers as the primary barrier type affecting the greater use of river and rail in the future. Financial barriers were identified as a significant barrier to a marginally lesser extent whilst both Policy and Industry Awareness were ranked as the least significant barriers to river and rail usage, as summarised in Figure 4.15.

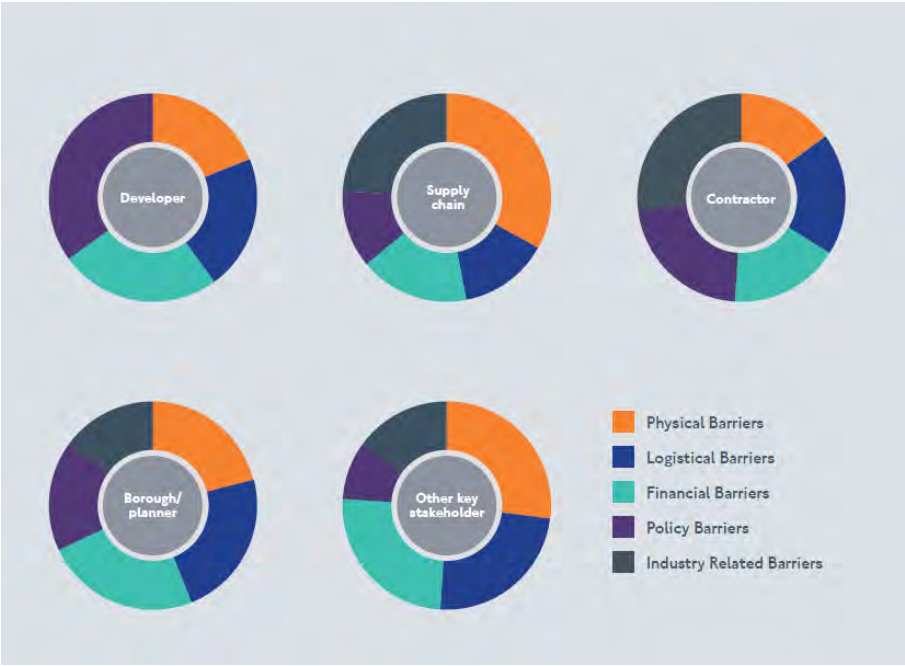
Figure 4.15: Summary of Primary Barrier Identified



4.83 Figure 4.15 highlights how Physical and Logistics barriers are deemed to be the most significant barriers in terms of responses with Financial barriers also considered to be of significance. Policy and Industry Awareness barriers were not considered by respondents as being so significant.

4.84 Figure 4.16 provides a summary of the barriers identified in terms of where they sit by sector in relation to the three main identified barrier types.

Figure 4.16: Orientation of Barriers by Sector



4.85 As shown in Figure 4.16, the sectors differ substantially in terms of which barrier is considered the most important by sector. Contractors see Logistics as the most significant barrier closely followed by Physical barriers with less concentration on the Financial aspects. The Supply Chain see Financial and Physical barriers as significant as one another with less consideration for Logistics whilst Developers are concentrated on Physical and Financial barriers with less concern regarding Logistics.

Key Findings

4.86 The research undertaken investigating the barriers to river and rail usage has identified a range of key findings, these include:

1. The assignment of responsibility for river and rail usage is unevenly distributed across all industry sectors, with little consensus as to which sector should take the primary responsibility for determining river or rail use.
2. Physical and Logistical barriers are identified as being equally significant barriers to transporting construction material and waste by river.
3. Boroughs/Planners believe Physical and Logistical barriers to be more significant of a barrier than Contractors and Supply Chain.
4. Financial barriers are considered to be the most significant barrier by Developers but this is not reflected in responses from other sectors that see Physical and Logistic barriers as more significant.
5. Industry awareness related barriers were not perceived to be as significant as other elements of barriers identified elsewhere, particularly amongst public sector organisations.

Conclusions

4.87 This chapter has presented the detailed findings of the quantitative and qualitative research undertaken as part of this project with the views of 160 personnel currently actively operating in the London construction industry.

4.88 The results of the surveys indicate a wide range of barriers to river and rail usage in the construction industry with no dominant theme or issue judged either wholly or broken down by sector as being the key barrier preventing greater usage.

4.89 Physical and Logistics barriers are shown to be those of most concern to most stakeholders with Financial barrier also contributing significantly. Industry Awareness and Policy are also highlighted as barriers by respondents as significant barriers but are not considered to be of the same significance as others.

4.90 The key issue of responsibility for determining river and rail use shows a range of views with no clear indication by sector for who is believed to be responsible for determining whether to use river of rail modes in construction projects.

4.91 These issues, alongside potential means by which they may be addressed, are explored in greater depth in the following chapters.

5 Assessment of Barriers

Overview

5.1 This chapter provides a summary of the results discussed in Chapter 4 and it seeks to provide an overview of how each barrier can be addressed, a quantification of cost, risks and impacts is provided to assist in making recommendations for addressing the identified barriers.

Assessment of Addressing Barriers

5.2 The tables below provide a summary of how each identified barrier may be addressed, looking at:

- **Estimated Cost:**
  - **£££:** High Costs greater than £1million;
  - **££:** Medium Cost circa £100k - £1million; and
  - **£**: Low Cost circa £10k - £100k.
- **Risks associated with addressing the barrier; (in terms of delivering confidence and relationships)**
  - **High:** risks are considered to be significant;
  - **Medium**: risks are considered to be tangible; and
  - **Low**: risks are considered negligible.
- **Benefits (impact):**
  - **High:** a significant immediate benefit is likely to be visible;
  - **Medium**: a moderate benefit is likely to be visible over the medium term; and
  - **Low:** benefits of addressing the barrier are considered to be negligible.

5.3 A consideration of priority has also been developed with a score attributed to each barrier ranging from 1 to 5, with 1 being the highest priority and 5 being the lowest priority. Priority has been assigned based on SDG's professional judgment.

5.4 Priorities have been awarded on the basis of the costs, risks and benefits (impact) of addressing each barrier and take into consideration the likelihood of being able to address it, i.e. if the only reasonable method of addressing the barrier is significant infrastructure in Central London the likelihood of being able to address this is low and therefore should not be considered an immediate priority.

5.5 This assessment has also been informed by the findings of the surveys and stakeholder interviews and the issues discussed in greater detail in the previous chapter.

Physical Barriers

5.6 Table 5.1 provides a summary of how each physical barrier could be addressed alongside the estimated, cost, risk, benefits and priority.

Table 5.1: Physical Barrier Summary

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Rail head availability (providing more railheads)	£££	Medium	High	3	In order to transfer materials and waste onto rolling stock a railhead is required. There is a view aired by a number of stakeholders that there is currently an insufficient number of railheads available to accommodate any significant increase in demand and that there is significant development pressure on those existing railheads that may, subject to planning decisions, result in the loss of capacity in the near future. **Identified by: Supply chain and contractors**	Introducing new railheads to handle construction material will result in a high capital cost but would generate considerable benefits. However new railheads would fail to address the Logistics issues associated with their use, particularly surrounding the final mile of the journey to site which would continue to be made by road in most circumstances. Practically, the construction of new railheads could be limited to major projects where a new facility could be delivered as part of a wider package of mitigation measures to assist in the construction of that specific project. This would be particularly prevalent for major infrastructure projects.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Wharf availability (providing more wharves)	£££	Medium	Medium	3	There are currently 50 wharves that are safeguarded in planning policy; 25 upstream and 25 downstream of the Thames Barrier. These wharves are required to transfer materials from vessels onto the river wall. Land pressure has increased demand for these wharves and like railheads are under significant development pressure particularly in areas that have seen high levels of development in recent years. **Identified by: Supply chain and contractors**	Protecting existing wharves is something that is already enshrined within the London Plan, however stakeholders have identified concerns regarding the pressure for development surrounding these facilities as a key concern for ensuring future use. Regional and local policy should seek, where reasonable and fair, to specify the use of the facilities so that they can continue to be utilised, this can be promoted using an online toolkit. Where such a facility is lost policy should dictate a reasonable alternative of equivalent means and capacity should be re-provided.
General accessibility issues between river / rail and the site	£££	Medium	Medium	5	The proximity of a site to the appropriate river and rail infrastructure largely dictates the propensity to use river and rail. If the location of a development is not close to rail / river infrastructure the perceived benefits of the using river / rail are diminished. With increasing distance the logistics also become increasingly complex with issues such as double handling encouraging lower use of river and rail. **Identified by: All sectors**	Improving accessibility to existing river and railheads is, in most circumstances likely to be extremely difficult given the ownership of land surrounding such facilities. It is considered unlikely and impractical that in the majority of circumstances these could be fundamentally addressed and therefore this is not considered to be a priority given the significant costs that would conceivably come through Compulsory Purchase Orders (CPO's) of land and the potentially significant damage to businesses and public relations that may follow. Whilst general accessibility to facilities may be possible, it would still not change the constraints that are encountered using the final mile by road.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
River wall suitability	ff	Medium	Low	3	A significant number of respondents identified the structural suitability of the river wall in being a barrier to using river transport for construction projects. It is understood that the quality of river wall throughout London varies significantly and in many riverside locations that have not previously supported river use the structure adjacent to the river is unsuitable to support heavy barges loading and unloading material alongside tidal effects. **Identified by: Boroughs/planners and contractors**	Increasing the structural suitability and integrity of the river wall in selected locations may provide opportunities for greater river use in certain locations in London. However, perceived benefits of improving the river walls in certain locations are not fully known, any changes would need to occur in locations which improve accessibility to sites otherwise several the other physical barriers discussed in this section will remain. Whilst addressing every poor section of river wall is unlikely to be suitable due to the significant costs involved a comprehensive exercise to map the structural suitability of river walls throughout the length of the river will assist in understanding which parts of the river are currently suitable and which parts could be made suitable subject to certain interventions. This would therefore assist Boroughs and Other Key Stakeholders in understanding which areas of London this barrier is reasonable for non-use of river and which areas of London may support the use of river.

Barrier Identified	Estimated Cost of addressing barrier	Risks associated with addressing barrier	Benefits of addressing barrier	Priority (1 = High 5 = Low)	Commentary	
					Description	Potential Solution
Tidal restrictions	£££	n/a	n/a	n/a	Activity on the River Thames is restricted to a certain extent by tidal constraints, however the extent to which activity is constrained was not fully understood amongst all participants. It is notable that the official PLA "Mariners Guide to Bridges on the Tidal Thames" which provides navigational information regarding the tide is not a freely available resource and is only available in hard copy subject to purchase by interested parties. This immediately restricts access to this information to a wide range of potential users. **Identified by: Supply chain and key stakeholders**	Addressing tidal restrictions by removing the tide from the river is not considered to be feasible or viable whilst it may be physically possible. However, raising awareness and knowledge of what the issues relating to tidal restrictions are and to exactly what extent they constrain capacity of the river should be communicated to stakeholders and decision makers. Making information and resources more freely available would also enable technical information to be more readily accessible.
Bridges acting as a constraint on size and height of boats.	£££	High	Low	5	A number of respondents have noted Bridges as being a key physical constraint both in terms of width and height. Whilst there are undoubtedly restrictions brought about by the width and height available for vessels navigating bridges the extent to which these barriers restrict the majority of vessels that could be used for transporting construction material and waste is considered to be low. **Identified by: Supply chain**	Physically addressing the size and height of bridges is not considered to be feasible, viable of physically possible. However as above, increasing the accessibility of detailed information regarding the navigation of bridges would assist in stakeholders having a greater understanding of what is and isn't physically possible in terms of bridge navigation.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
River and rail capacity constraints	£	Medium	Medium	2	Respondents regularly discussed the general capacity of both river and rail networks in accommodating additional vehicles on their respective networks. Both river and rail networks do have capacity available for greater use but is subject to restrictions at where capacity is available – which is generally off peak and outside of the working hours for site. **Identified by: Supply chain and contractors**	Capacity for greater use on river and rail does exist but this may not translate simply into the timings required for accessing sites. Consideration could be given to creating dispensation for sites utilising river or rail for substantial amounts of transporting material to extent their operable hours beyond typical restrictions, i.e. allowing deliveries that have arrived by rail to be delivered to the site at night. Increasing the availability of information regarding spare capacity on river and rail networks would also be useful as many respondents were unaware of the extent to which capacity on these networks is available.

Logistics Barriers

5.7 Table 5.2 provides a summary of how each logistic barrier could be addressed alongside the estimated, cost, risk, benefits and priority.

Table 5.2: Logistics Barrier Summary

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Double handling	££	Low	High	2	Double handling is likely to occur at all sites not directly situated adjacent to a wharf or a rail head. When using either river or rail, when materials arrive at the wharf/railhead they will then need to travel by road for the *final mile* to site, this requires unloading and reloading of materials onto vehicles which has an inevitable time and cost implication. **Identified by: All private sector**	There are few effective ways of reducing the risk of double handling required with river and rail usage as double handling will occur for all sites not directly situated adjacent to a wharf or railhead. Double handling can only reasonably be mitigated by removing the time and cost implications of double handing which is likely to be in the form of subsidy/stimulus for projects that use river and rail. Potential stimulus for sites using river and rail could be the ability to operate longer construction hours which would in theory result in programme and fundamentally cost savings.
Timing of deliveries (night time / early morning)	£	Medium	High	2	Many respondents noted timing of deliveries as being a significant barrier to river and rail usage in terms of the timing at which materials can be transported on and off site which is typically controlled by planning condition. **Identified by: Borough/planners and supply chain**	Addressing the ability to make river or rail deliveries (even via road as the final mile) outside of typical construction hours would create more opportunities to bring materials in and transport waste out of sites and provide greater encouragement for these sites to use river and rail as this may have associated time and cost benefits which would be attractive to some Developers/Contractors.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
On-site storage availability	£	Low	High	1	Given the spatial constraints on most central London sites many sites operate based on 'just-in-time' deliveries to ensure efficiency of space and reducing the need for vehicles to arrive and wait either within the site or, against best practice, out of the site. This is not possible with river or rail deliveries which are likely to be restricted to some extent by either: • availability of rail path or the tide; and • the economies of scale that are required to make it feasible to transport material by either river or rail. **Identified by: Developers and contractors**	Opportunities exist to encourage Developers and Contractors to think more critically about how they intend to operate the site, including how goods if delivered in bulk by river and rail could be temporarily stored through improved site planning and/or innovative methods of storing materials. This could be encouraged through greater robustness of planning submissions and/or more explicit consideration of these issues filtered through planning policy. Maximising off site pre-fabrication of building units helps to minimise the need for on-site storage. This construction technique lends itself to the use of river and rail.
Site orientation and logistics	£	Low	High	1	Each site has unique challenges and constraints which inform the phasing of construction in relation to the logistics programme. When a site is in close proximity to river / rail infrastructure phasing the construction of the site to be sympathetic to the need to bring in materials either by river or rail would create greater opportunities. **Identified by: Boroughs/planners and developers**	Through the implementation of more robust planning submissions and earlier intervention of Contractors through the design stage, site orientation and logistics can be considered earlier in the project so that this becomes less of a barrier. This intervention would come at a comparatively low cost with the potential for significant benefits.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Availability of infrastructure (i.e. barges / trains)	££	Low	Medium	2	As a result of the reducing capacity within London to accommodate rail heads and wharfs there are comparatively few organisations who have the resource to facilitate river / rail movements. **Identified by: Contactors**	Addressing this barrier would require either a capital investment in infrastructure (barges) or encouragement to procurement of additional infrastructure through private sector investment, however the benefits are considered to be relatively good.
Geography – UK wide industry	£	Low	High	1	Stakeholders identified that larger developments within London cannot be viewed in isolation and that any construction project in London is reliable on materials that are imported from elsewhere within the UK or abroad. This view also applies to the river and rail networks, both of which operate outside of London. Ensuring that the needs of London are met without compromising the requirements from outer London was also identified as a barrier. **Identified by: Supply chain**	It is important to note that the findings of this study and other related work being commissioned by TfL should not just end at the boundaries of London and that TfL should actively engage with other local authorities, particularly those sharing a London boundary to explore how similar issues may also be addressed so that these issues can be addressed holistically.
Conflicts with other users (i.e. rail passenger movements	£££	Medium	Medium	3	At any given time there are conflicting requirements placed on river / rail infrastructure, particularly in terms of conflicts between passenger services which take priority over freight services in both river and rail. Whilst appreciating that conflicts with passengers services on both modes do exist there are numerous opportunities outside of peak hours where the conflict is significantly lessened. **Identified by: Supply chain**	Reducing the number of rail and river paths for passengers is not considered feasible, however there is capacity for additional rail and river traffic outside of peak hours, the working day and at weekends. Enabling sites to receive deliveries outside of typical site working hours would assist in addressing these issues.

Financial Barriers

5.8 Table 5.3 provides a summary of how each financial barrier could be addressed alongside the estimated, cost, risk, benefits and priority.

Table 5.3: Financial Barrier Summary

Barrier Identified	Estimated Cost of addressing barrier	Risks associated with addressing barrier	Benefits of addressing barrier	Priority (1 = High 5 = Low)	Commentary	
					Description	Potential Solution
General costs – perception of costs	£	Medium	High	1	The perception of costs is closely related to awareness of the barriers. There was a perception amongst stakeholders who had not rigorously investigated the feasibility of the river / rail that it was an expensive alternative to conventional methods which is not always necessarily true, particularly for larger scale projects where economies of scale may make river or rail use more economically viable. **Identified by: Developers and contractors**	Addressing the perception of cost can only be instilled by upskilling the awareness of decision makers and providing more greater transparency in to the real costs and implications of river and rail usage.
Known vs unknown	£	Low	High	1	With uncertainty comes unexpected costs and potential risks. Often in the construction process there is a direct decision between river / rail and road as a method of transporting goods / waste. Given the significant experience of all contractors with road all eventualities and their associated costs can be more readily and comfortably mitigated against, in comparison the relative uncertainty of river / rail due to lack of experience. **Identified by: Developers**	Similarly, to the above, addressing the perception of risks and furthering industry wide understanding and awareness of river and rail freight will provide be a significant step in addressing this as a barrier.

Barrier Identified	Estimated Cost of addressing barrier	Risks associated with addressing barrier	Benefits of addressing barrier	Priority (1 = High 5 = Low)	Commentary	
					Description	Potential Solution
Financial / Safety Risk	£	Medium	High	1	To make river / rail a feasible option significant amounts of materials must be transported in a single trip, this increases exposure to risk and therefore financial loses. This is especially relevant on the river where examples of high profile sinking's have, in some instances, deterred contractors from considering river. The loss of 44 tonnes through one road traffic accident is significantly less than the loss of up to 1,200 tonnes that may occur with the sinking of a barge or rail collision. **Identified by: Developers and supply chain**	Increasing awareness and understanding that river and rail usage is only feasible financially (and practically) for larger projects should be prioritised. There is also the ability through the planning process to encourage several sites / nearby sites to coordinate their construction efforts to make use of river and rail for smaller sites more viable and therefore sharing risk.
Lack of competition within the industry – value for money	££	Medium	Medium	2	The start-up costs of introducing a fleet of vessels into the market is very high and as such there are very few operators on both the river and rail. The operators who do operate are believed by some to be artificially inflating prices given the lack of competition. **Identified by: Contractors**	A lack of competition in any industry is always unlikely to deliver value for money and it should be a strategic aim of stakeholders such as TfL and the PLA to actively encourage competition and consider methods to stimulate new investment in this part of the industry.

Industry Related Barriers

5.9 Table 5.4 provides a summary of how each industry related barrier could be addressed alongside the estimated, cost, risk, benefits and priority.

Table 5.4: Physical Barrier Summary

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Communication / awareness	£	Low	High	1	Awareness of relevant information and precedent is the barrier that underpinned many of the perceived barriers as identified previously. Awareness and communication are closely affiliated; a lack of awareness can be overcome with improved communication. Some stakeholders believed that knowledge within the industry is not being widely shared to maintain competitive advantages, this approach is detrimental to the wider industry and will prevent sustainable objectives being reached. **Identified by: Boroughs/planners**	Increasing awareness and improving the knowledge and skills of people within the industry is a key factor in unlocking greater river and rail use potential. Not only does increasing awareness address the barriers of communication and awareness in itself but it also filters through to addressing a number of other barriers identified in this chapter.
Skills and resource gaps	££	Medium	Medium	3	Transporting materials by river / rail requires a relatively unique set of personnel with specific skills which are only relevant to that sector and there is a widely-held belief that there is a shortage of these skills available for use in London. **Identified by: Contractors and boroughs/planners**	TfL and other stakeholders such as PLA and Network Rail can consider measures by which they can encourage greater investment into skills and jobs/apprenticeships in both the river and rail freight industries. There is also the opportunity to encourage Developers and/or Contractors through S106 obligations to share the knowledge and experience gained in river and rail related projects to the wider industry – such as offering apprenticeships.

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Availability of information to potential users	£	Low	High	1	The lack of a single resource where relevant information about river / rail was consolidated was believed to be a barrier. When researching the feasibility of river / rail many stakeholders found it to be an arduous process of identifying ways forward. **Identified by: Contractors**	Create and maintain an effective, clear, concise coherent and up-to-date toolkits available online for the entire industry which would provide a resource for decision makers to make informed choices for both river and rail. These toolkits should not only provide the means to initiate river and rail use but should be a resource tool that sets out the existing operational facilities available on a Borough by Borough basis creating a comprehensive understanding of facility availability.

Policy Barriers

5.10 Table 5.5 provides a summary of how each policy barrier could be addressed alongside the estimated, cost, risk, benefits and priority.

Table 5.5: Physical Barrier Summary

Barrier Identified	Estimated Cost	Risks	Benefits	Priority	Commentary	
	of addressing barrier	associated with addressing barrier	of addressing barrier	(1 = High 5 = Low)	Description	Potential Solution
Protected wharves	££	High	Medium	3	There are currently 50 protected wharves within Greater London, these provide a variety of facilities including loading and unloading. The nature of safeguarding ensures they are not removed but also prevents developers / contractors adapting them to best suit their required purpose – even if this is to load / unload building materials and waste. **Identified by: Supply chain and contractors**	TfL, PLA and Network Rail already provide safeguarding of wharves and railheads and this is enshrined through the London Plan and Local Development Plans. However, the perception from a number of stakeholders is that these facilities remain at risk from development and planning policy should be more explicit in how these can be protected and the requirements for an equivalent replacement facility should any be lost to development.
Application of existing policies	£	Low	Medium	2	Local, regional and national policy is all in favour of increased sustainability, this is either explicitly or implicitly referenced in all of these documents. The wording of these policies in many cases are not objectively quantifiable and as such they become very difficult to enforce. **Identified by: Boroughs/planners]**	Consider how emerging strategies from the Mayor (Mayor's Transport Strategy) and from refreshed Local Plans provide the basis for which river and rail use during construction should be considered. Elevate Construction Logistic Plans (CLPs) and/or Construction Management Plans (CMPs) to the same status as Travel Plans in the submission of planning applications so that issues surrounding use of river and rail can be explored at an earlier stage in the planning process.

Barrier Identified	Estimated Cost of addressing barrier	Risks associated with addressing barrier	Benefits of addressing barrier	Priority (1 = High 5 = Low)	Commentary	
					Description	Potential Solution
Clarity over Construction and Logistics Plans (CLPs) and Construction Management Plans (CMPs).	£	Low	High	1	A number of stakeholders noted confusion over the status of CLPs and CMPs in terms of what document should be prepared when. A review of current planning policy and best practice does not provide a definitive answer and in many cases the two have been considered as interchangeable. **Identified by: Contractors and boroughs/planners**	Planning policy set by Other Stakeholders and Boroughs should provide clarity on CLPs and CMPs including when they should be prepared in the planning process, what detailed should include/consider, who they should be prepared by and who they should be reviewed/approved by. Removing this ambiguity will assist in a more thorough understanding of the issues that exist.
Timing and enforcement of CLPs and CMPs	£	Low	High	1	Construction Management Plans (CMPs) are designed to clearly outline the process by which the project will be run and managed. The intention is to promote sustainable methods including river / rail. Within planning policy the submission of a CLP was often seen as being too late in the process and therefore any benefit it may have becomes reduced. **Identified by: Contractors and boroughs/planners**	See above – elevate the status of CLP's so that they are produced earlier in the planning process and are considered through planning determination as Travel Plans and Delivery and Servicing Plans currently are. Include within CLP guidance how to explore the potential for river and rail to transport bulk materials and waste.
Enforcement of existing planning policy	££	Medium	Medium	2	Enforcing planning policies and the CLPs in particular also presents an issue as in many instances river / rail methods reduce flexibility and changes to the extraneous factors means contractors resort to the road. **Identified by: Boroughs/planners**	Secure funding through S106 (or other means) to enable the monitoring of measures outlined in CLPs. Monitoring activity will equally assist in increasing the industry wide understanding and awareness of construction related issues.

6 Results of Assessment

Overview

6.1 Following the results of the surveys and the assessment of specific barriers identified by respondents discussed in the previous chapters, this chapter provides an assessment of why the barriers identified exist and explores possible interventions for addressing the barriers and opportunities to be exploited.

6.2 A summary of all the barriers identified within each of the above categories is provided in Figure 6.1 whilst Chapter 5 provided a comprehensive description of each barrier identified throughout the course of the research alongside the sector(s) that have identified with this barrier.

6.3 It is recognised that several of the barriers identified are inter-linked across a number of these categories, however for the purposes of this report they have been associated with the type of barrier most widely identified by respondents.

Figure 6.1: Summary of Barriers Identified

Addressing Barriers

Overview

6.4 It is important to emphasise that every construction project is by its very nature unique with its own set of constraints (site, budgetary, project, client, planning) working towards a unique deliverable (building/element of infrastructure, materials, demolition, excavation). In consideration of this, the industry must recognise that there is not a one size fits all process for determining the suitability of river and rail usage and that whilst it may work successfully for one project it may not work for the next for a wide range of reasons that have been outlined previously.

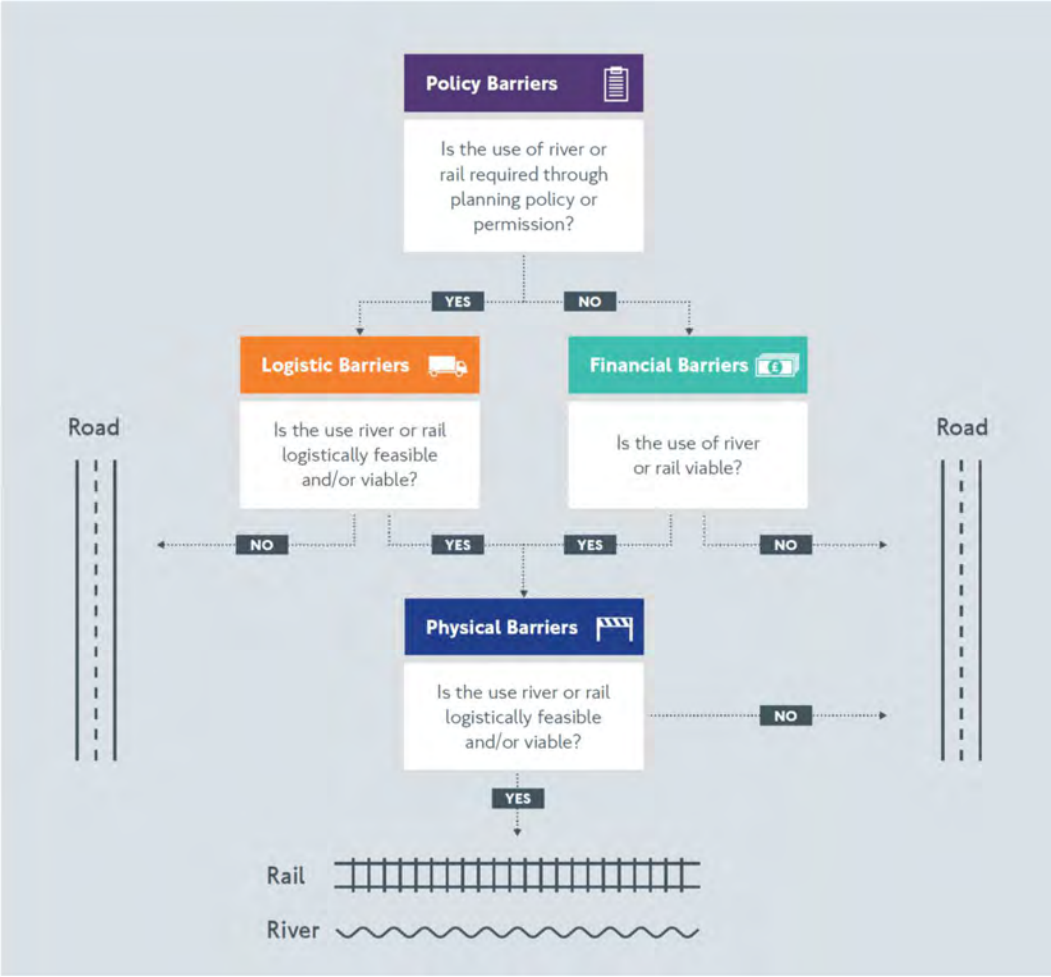
Addressing the barriers to transporting material and waste by river and rail requires appreciation of the bespoke nature of both development and construction projects.

6.5 However, there is a range of opportunities that can assist in addressing many of the barriers to river and rail usage which have been outlined in the previous chapter. The remainder of this chapter considers some of the key themes to emerge from the previous chapter.

Decision Making Process

6.6 Figure 6.2 provides a summary of the decision-making process typically employed on construction projects when considering the use of mode of travel for transporting construction materials and waste to and from site. It is important to note that Figure 6.1 does not identify the decision maker or timing of decisions, principally because both factors can differ significantly by project as discussed in greater depth later in this chapter.

Figure 6.2: Typical Project Decision Making Process



6.7 As shown in Figure 6.2, the typical project decision making process employed to consider river or rail usage consists of three primary steps:

- **Stage 1 – Policy:** is the project required to use river or rail through planning policy or a specific condition attached to the planning permission.
  - If **No**: the decision maker will invariably revert to the default option of using road to transport materials, however there will be occasions where Stage 2 is also considered because of some obvious site advantages, such as being located immediately next to a river wharf or railhead.
  - If **Yes**: the decision maker will proceed to consider the Logistic and Physical constraints (Stage 2).

- **Stage 2 – Logistics and Physical Constraints:** is the ability to use river or rail possibly logistically and physically?
  - If **No** to any: the decision maker will almost certainly revert to using road to transport materials.
  - If **Yes** to both: the decision maker will proceed to Stage 3.

- **Stage 3 – Financial:** is the ability to use river and rail financially feasible/viable?

- If **No**: the decision maker will invariably revert to the default option of using road to transport materials.
- If **Yes**: the decision maker can proceed to use of river and rail.

6.8 As shown above, for the decision maker to ultimately proceed with the use of river and rail several consecutive positive decisions are required to make river or rail usage happen, when either of these questions produce a negative answer the decision maker will invariably revert to using road transport for the project.

6.9 This decision making process highlights an important aspect of understanding barriers to river and rail usage in that principally both Physical and Logistic considerations are key questions that are asked initially (subject to the policy test) but that both remain underpinned by the Financial considerations which are a step further in any decision-making process. As such, in many cases financial considerations are not widely captured because either Physical or Logistic constraints prevent further Financial considerations. This is reflected in the survey responses which identified Logistic and Physical elements as the two most significant primary barriers with Financial barriers following as the third most significant barrier.

6.10 Accordingly, to begin unlocking the Financial barriers to river and rail usage, efforts must be made to address the Logistical and Physical barriers first so that the industry can explore ways of making river and rail cost effective which may also sit alongside further external stimulus.

Decision making involves Physical, Logistics and Financial considerations and is initially informed by a Policy requirement, however in many cases the Physical and Logistics barriers are such that Financial considerations are not fully explored. To 'access' the Financial barriers efforts must be made to firstly address the Physical and Logistics barriers.

Targeting Barriers

6.11 Whilst Logistic, Physical and Financial barriers are undoubtedly perceived by the industry to be the most significant barriers preventing river and rail usage and serve as the key elements of project decision making, addressing these barriers directly in isolation is not considered to be the most efficient, cost effective or viable means of unlocking greater river and rail usage.

6.12 As discussed in the previous chapter, many of the Physical, Logistics and Financial barriers are underpinned by Policy and general Awareness of the knowledge, means and skills to understand and assess the suitability of river and rail. Figure 6.2 shows that decision making is often underpinned by a policy requirement and the more planning permissions that set this out as a requirement the more likelihood of greater river and rail usage.

6.13 The surveys undertaken as part of this project have demonstrated that all respondents have concerns regarding how Policy both restricts and encourages river and rail usage alongside significant concerns regarding the knowledge, skills and awareness within the industry as a whole to assess the operational and commercial feasibility of projects and this is also emphasised in the previous chapter through the detailed analysis of individual barriers.

Addressing Barriers through Policy

6.14 Addressing policy related barriers (or lack of) in the planning process provides the ability to unlock further stages in the decision-making process increasing the potential for river and rail usage. For many projects, where policy or planning permission, which is inherently informed

by planning policy, does not require the applicant to consider river or rail usage the likelihood of river and rail utilisation is low.

6.15 Chapter 3 of this report outlines how river and rail usage for freight is strongly encouraged strategically in the London Plan and that this, to a certain extent also filters through to Local Plans and Development Planning Documents (DPDs) the policies against which development proposals are tested through the planning application process.

6.16 However, the review of planning policy and the planning process in general has identified numerous gaps in planning process which points to missed opportunities for greater river and rail usage.

Promoting Local Attributes

6.17 In the majority of cases, the planning policy outlined in Local Plans, including, DPDs reiterates the strategic aspirations of the London Plan to use river and rail for freight.

6.18 However, DPD's have the ability to specifically promote and highlight local attributes that would assist Developers and Contractors in determining the appropriateness of river and/or rail within their Borough. Every London Borough has access to rail facilities whilst 15 of the 33 Boroughs are situated on the River Thames with a number of additional Boroughs able to facilitate access through the remainder of the Blue Ribbon Network.

6.19 A review of DPD's and Local Plans has highlighted that most Boroughs fail to specifically promote the existing rail and river freight facilities and operators within their Borough. This inevitably results in applicants of development sites within these Boroughs not being made aware of the facilities and not requiring the applicants to fully justify (or otherwise) their use in the planning process.

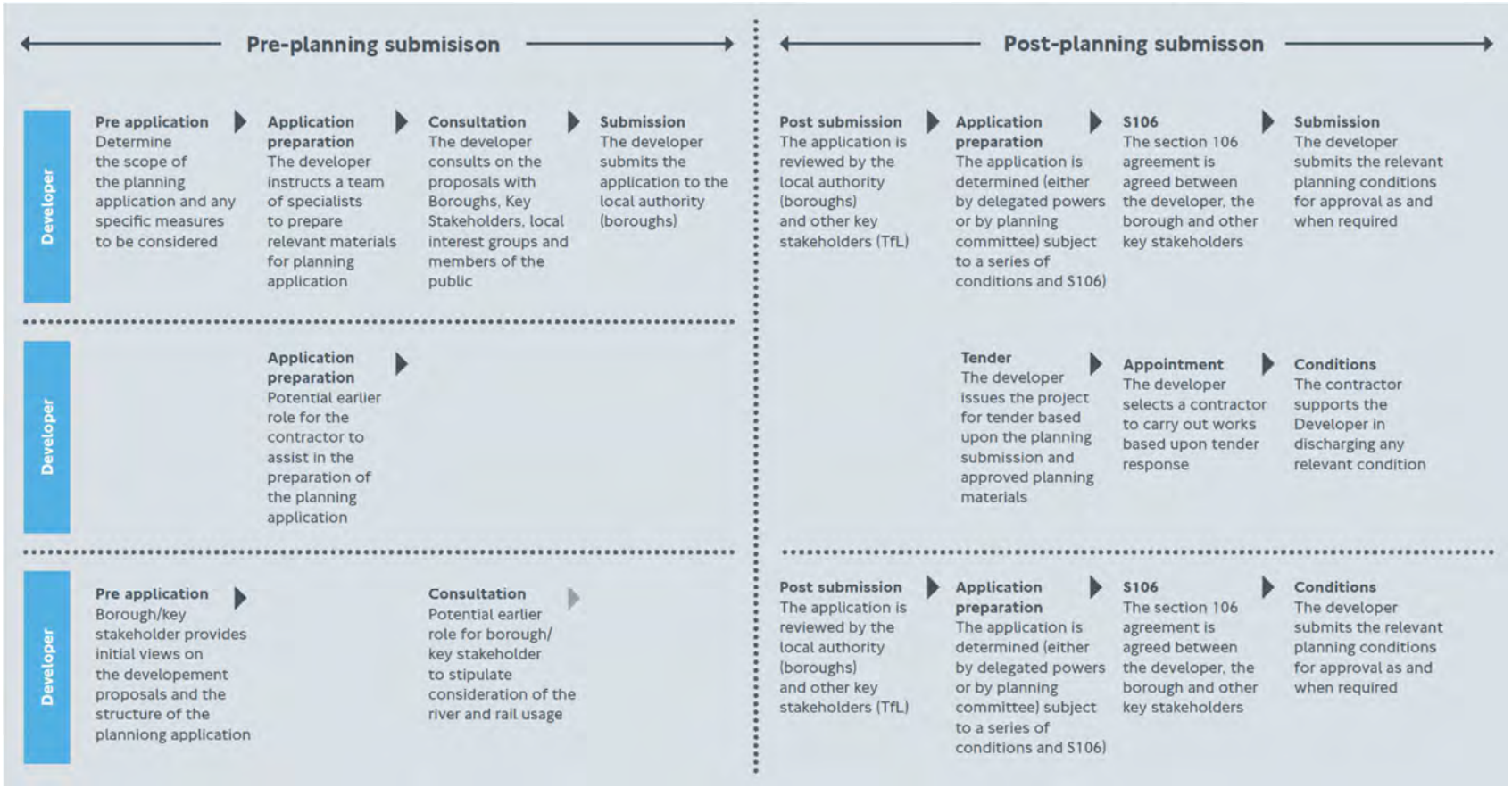
There is a key role for Boroughs and Other Key Stakeholders to better encourage and promote the local attributes that exist to enable decision makers to make more informed decisions regarding river or rail usage for any project.

Interceptions in the Planning Process

6.20 Figure 6.3 provides a summary outlining the typical planning process within the context of a major development project.

6.21 This process can take any length of time between six months and several years and will vary according to the size, scale, constraints and complexity of the site amongst many other factors.

Figure 6.3: Typical Planning Process for a Major Scheme



6.22 As shown in Figure 6.3 there are several points through the initiation of a project and preparation of a planning application at which consideration of river and rail usage could be encouraged, however the desk based research undertaken as part of this project has highlighted that in the majority of cases planning approval for the method of transporting material to and from the site occurs through Planning Conditions defined towards the end of the planning process.

6.23 Planning Conditions require the applicant to submit further detail for approval by the local authority prior to undertaking a certain element of works (to include demolition, below ground works, above ground works). Critically, providing further information for approval of a Condition occurs after the granting of planning permission by the local authority.

6.24 Once planning permission is granted Developers would typically use this point of approval to tender the project to Contractors. The research undertaken as part of this project and anecdotal evidence gathered suggests that in-depth consideration of river and rail usage typically occurs post determination of the planning application and often following the issue of tender documents to contractors. As such, by requiring applicants to consider river and rail usage through the discharge of conditions the key point of intervention for determining river and rail usage is often being missed. After this point, it is very difficult commercially for both the Developer and the Contractor to re-consider how materials will be transported to and from the site and this intrinsically forms the basis of the submission for any such planning condition.

6.25 The planning process has the ability to encourage applicants (Developers) to consider river and rail usage at an earlier opportunity than is currently the case and ensure that the organisations carrying out the works (Contractors and Supply Chain) adhere to the proposals against which planning permission was approved.

6.26 Accordingly, a key recommendation of the findings of this research is to consider changes to planning policy, to ensure greater consideration of river and rail usage is made as part of the planning submission and that for larger projects this is made with input from either a contractor or a construction and logistics specialist.

Planning policy plays a critical role in encouraging applications to consider river and rail at an earlier stage than is currently typical practice and should be more explicit with expectations highlighting local attributes available.

Construction Management Plans / Construction Logistic Plans

6.27 Through the submission of a planning application, there is currently no formal requirement for an applicant to submit details of how construction access will be formed and by which mode of transport materials and waste will be travelling.

6.28 The Mayor of London is a statutory consultee for planning applications which are considered of strategic importance for London and are known as referable schemes. As part of any referable planning applications TfL is consulted and provides recommendations for approval on behalf of the GLA. In its role as a statutory consultee on referable schemes TfL has a guidance document outlining materials to be submitted in support of a planning application, this included a Transport Assessment (TA) and a Travel Plan (TP), however the guidance

document for applicants does not include any submission requiring the applicant to justify (or not) the use of river or rail for construction of the project.

6.29 Many applicants will prepare a Construction Management Plan (CMP), also as a result of a Planning Condition. The CMP would typically consider all issues relating to the construction of the site, including transport measures such as vehicle routing, the number of deliveries, programme etc. As this document (or similar) is not currently a statutory requirement for a referable scheme it will not always be prepared until such time as the corresponding condition is required to be discharged which typically occurs after the optimal time to robustly consider river and rail usage over the course of the project.

To encourage greater consideration of river and rail usage for construction at planning application stage, *Outline* or *Framework* Construction Management Plans should be treated as formal documents to be submitted for referable schemes.

6.30 It is also recommended that officers responsible for determining these elements of planning applications from Boroughs and from within TfL have sufficient knowledge regarding the viability and feasibility of river and rail usage so that they can make reasonable and fair judgements on the proposed modes for transporting construction material during the application.

Addressing Barriers through raising Awareness

6.31 It is also important to note that Industry Awareness does not appear in the decision-making process for determining river and rail usage but has been identified by:

- numerous respondents to the research as being a barrier preventing greater use of river and rail due to the specific knowledge of river and rail facilities being readily available; and
- within Chapter 5 as being a key driver to assist in addressing several of the Physical, Logistics and Financial barriers.

6.32 With greater industry awareness of the potential for river and rail usage, particularly in relation to the decisions made in Stage 2 and Stage 3 of the decision-making process, the persons involved in decision making would be able to make more informed decisions and turn a greater number of 'no' responses at this stage into 'yes' responses.

Perceptions

6.33 Throughout the research undertaken the degree to which each barrier identified is perceived versus the actual reality of the barrier differs between the position, specific experience and background of each individual consulted. It has become evident that there were a number of misconceptions relating to barriers that likely contribute towards underutilisation of river and rail and these are identified in the previous chapter considering the means to which each barrier identified can be addressed, and the key elements are discussed in further detail below.

6.34 An illustration of the extent to which each barrier is considered to be a perceived or actual barrier is provided in Appendix C.

There is a varying degree to which all barriers are perceived or not, however, overall Industry Awareness and Policy barriers involve fewer misconceptions than Physical, Logistics and Financial barriers all of which can be better informed through improved awareness and enforcement of policy.

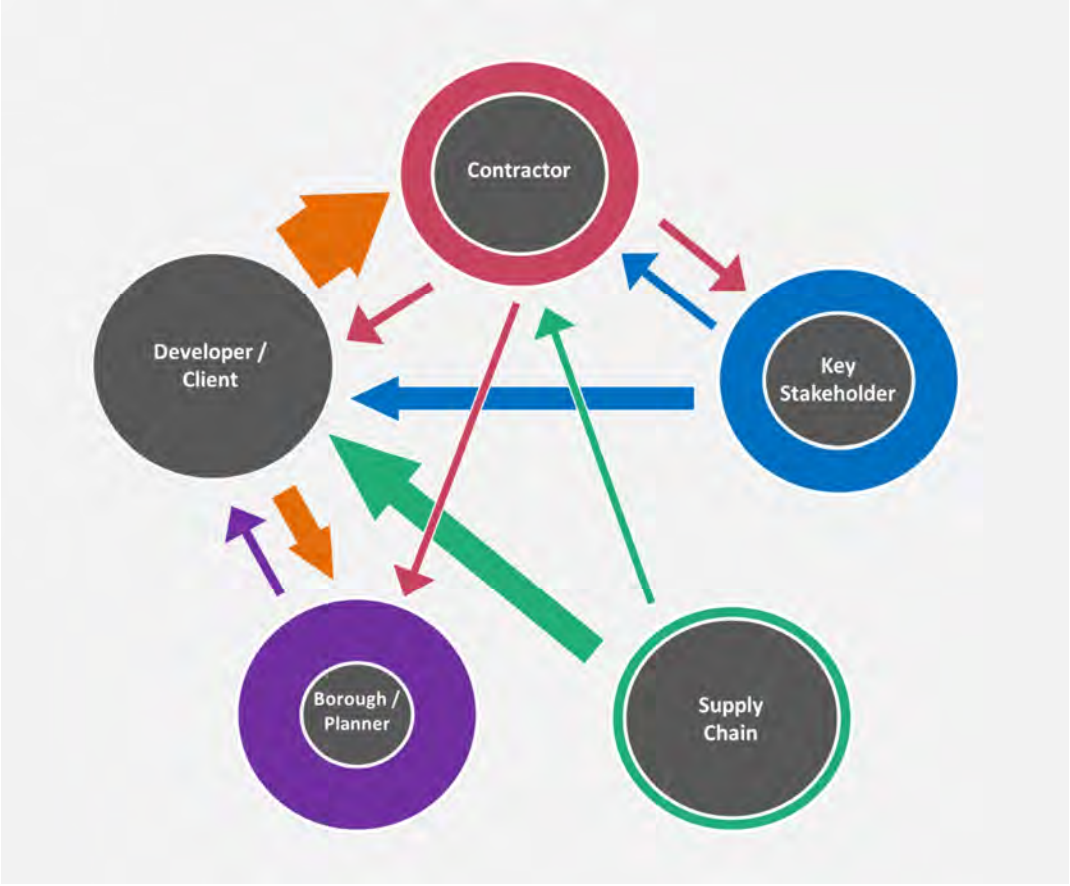
Key Misconceptions

Roles and Responsibilities

6.35 It is evident through both the interviews and surveys that sectors (organisation type) do not always fully understand the role and to an extent the responsibilities of different organisations through the development process.

6.36 Figure 6.6 summarises the results of the survey in relation to who is understood to be the primarily responsible organisation for determining the use of river and rail in any construction project.

Figure 6.4: Responsibilities



6.37 As highlighted in Figure 6.4, the research has determined that no single organisation or type or organisation takes responsibility for how river and rail usage is determined in the preparation and/or implementation of a construction project.

6.38 In responses to the question regarding responsibility there was no clear indication as to who should be the primary party, crucially very few Developers surveyed viewed themselves as being responsible for determining river and rail usage whilst significant numbers in all other sectors believed the opposite. Meanwhile for Contractors, Boroughs/Planners and Key Stakeholders have a significant number of respondents identified themselves as having the primary responsibility for determining the use of river and rail.

6.39 This indicates that there is an element of confusion within the industry and emphasises the lack of clear direction at the centre of key decision making concerning river and rail usage.

The construction and planning industry should define clear roles and responsibilities for those parties responsible for determining river and rail usage in the preparation of planning applications and construction projects alongside those responsible for implementing and monitoring actual usage

Financial Barriers

6.40 As the previous chapter discussed, several of the barriers identified as financial barriers rely to some extent on misconceptions.

6.41 In many cases, the misconceptions regarding financial barriers were honest interpretations of what is believed to be the case within the industry, in that the use of river and rail freight is simply not feasible. Whilst in many circumstances it is true that financial considerations make river and rail usage un-feasible, it is equally the case that when circumstances permit river and rail provides a viable, cost effective and efficient means of transporting material.

6.42 Through the research and discussions with decision makers regarding the decision to use river or rail, it has become apparent that the lack of available resources to assist Developers and Contractors without prior experience of river and rail has contributed towards opting for alternative means of transport, usually road.

6.43 As such, and as described above, raising awareness by increasing the accessibility of resources and knowledge available to the parties key to making decisions regarding use of river and rail is essential in encouraging greater use in the future.

Impact of Perceived Barriers

6.44 Whilst it is important to note that whether a barrier is a true barrier or not, a perceived barrier has an equal effect on capping the potential for river and rail usage in the industry.

6.45 Industry related awareness of river and rail usage in the construction industry, whilst not identified as the most significant barrier within the survey results plays a significant role in addressing perceived barriers. Increasing awareness, knowledge and skills of personnel throughout the construction industry of river and rail usage will be pivotal in addressing the perceived barriers.

Improving the knowledge and skills of stakeholders across the industry in relation to river and rail usage, availability and capacity throughout all sectors within the industry through design, planning to delivery of projects will increase opportunities for river and rail utilisation in construction projects.

Summary

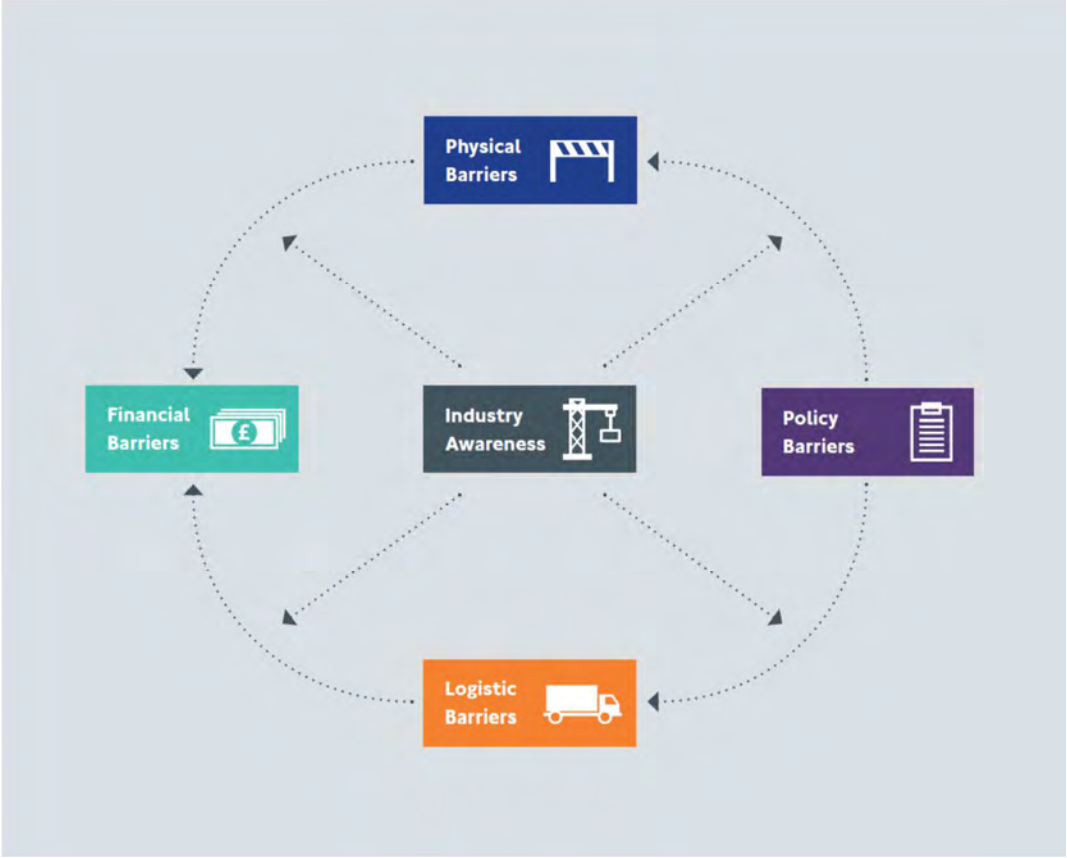
6.46 This element of the report has provided a detailed analysis of the barriers to river and rail usage in the construction industry gathered from a wide range of people currently involved in the planning and delivery of projects in London.

6.47 This research study has identified a large and varied number of barriers that exist, or are thought to exist, in transporting construction material and waste by river and rail and the means in which they can be addressed vary significantly in terms of costs, risks and residual benefits.

6.48 Whilst a number of significant Physical, Logistics, and Financial barriers can be addressed through specific interventions there is a wider element of consideration which also seeks to to address these barriers through focussing on improving the rigour of Policy and increasing Industry Awareness.

6.49 As shown in Figure 6.7, whilst Industry Awareness and Policy barriers have not been identified by respondents as being the most significant barriers, they provide the foundations upon which the Physical and Logistics barriers can be unlocked, which, in reference to the decision-making process will in turn lead to the Financial barriers beginning to be unlocked.

Figure 6.5: Targeting Awareness



6.50 As such, whilst respondents to the survey have identified Physical, Logistics and Financial barriers as being the main barriers to address, we would recommend that equal consideration

is also given to Industry Awareness and Policy given the prominent role which they can play in unlocking those identified as more significant.

6.51 Physical, Logistics and Financial barriers can most effectively be addressed through approaching improvements to Policy and Industry Awareness. Considering each barrier individually and in isolation, as set out in Chapter 5, may in the short term improve the status of that barrier for certain site specific projects they are unlikely to enable long-term change that can be affected by Policy and Awareness requiring a holistic approach to addressing key barriers. It is also notable that the most significant Physical, Logistics and Financial barriers provide significant challenges which can also only reasonably be unlocked through means of raising greater awareness of the issues surrounding these barriers to a wider audience and the means to which they can be addressed and enacted through robust policy measures.

Whilst Physical, Logistics and Financial barriers are the most significant category of barrier relevant to each sector within the industry, they can only be addressed sustainably and effectively by considering and enacting long-term changes to policy and increasing the awareness of stakeholders that design, plan and deliver construction projects.

7 Conclusions

Summary

7.1 This report presents the findings of the research that has been conducted with key stakeholders and personnel throughout the construction and development industries to identify the barriers that currently exist in transporting construction material and waste by river and rail.

7.2 Over the course of this project 160 people from a range of organisations including Developers, Planners, Boroughs, Contractors, Supply Chain and Other Key Stakeholders including organisations such as TfL, NR and the PLA have been able to share their views and insights into the current status of river and rail use in the construction industry. These views and insights have been gathered and analysed as part of this study to understand the barriers that exist and provide context within which they can be addressed going forward.

7.3 The research has led to several key findings which are summarised below.

Key Findings and Recommendations

Summary of Survey Results

7.4 The surveys undertaken as part of this study have delivered a range of views relating to the barriers to using river and rail for the purpose of transporting construction material and waste.

7.5 Key themes emanating from these findings are discussed in greater detail below whilst Appendix D provides a detailed summary of the key findings and recommendations from throughout the report.

Responsibility

7.6 The research has determined that, at present, no single organisation or sector takes responsibility for how river and rail usage is determined in the preparation and/or implementation of a construction project.

7.7 The research found that there were a wide range of views across the industry in terms of which organisation should bear the primary responsibility for determining the use of river and rail in projects. In responses given to the question regarding responsibility, there was no clear indication as to who should be the primary party. Crucially, no developers surveyed saw themselves as being responsible for determining river and rail usage whilst significant numbers in all other sectors believed that responsibility should lie with developers. Meanwhile, there are a significant number of contractors, boroughs/planners and key stakeholders identifying themselves as having the primary responsibility whilst at the same time also identifying all other sectors as being the most responsible.

7.8 This paints a picture of confusion and emphasises the lack of clear direction at the centre of key decision making around river and rail usage. This alone is a barrier to maximising the use of river and rail usage and without clearly defined responsibilities over the course of projects, it is likely that potential will continue to be restricted.

Recommendations

7.9 Whilst Developers should have responsibility for considering the use of river and rail in their projects and implementing this through the contractor tender process with subsequent supply chain, Boroughs and TfL/GLA should be equally responsible for ensuring that:

- planning policy fully promotes considering the use of river and rail at the earliest outset, preferably prior to planning submission so that river or rail usage (or not) forms part of any planning permission; and
- that officers engaging with the applicants throughout the planning process have the knowledge to reasonably and fairly determine whether river or rail should be used on the project.

7.10 By addressing the Policy and Industry Awareness barriers outlined above, applicants for will have greater responsibility for considering river and rail usage earlier in their project and officers determining the planning application will be able to reasonably assess the likelihood of river and rail usage.

Timing

7.11 The study highlights that timing plays a pivotal role in the ability to maximise use of river and rail during construction projects. Typically, river and rail will only be used in a substantial capacity should one of either two scenarios occur:

- a clear direction is given from the project outset that river and rail usage should be maximised – this is typically limited to public sector projects where there is a wider interest from key stakeholders setting the tone for the project; and/or
- the tender documents issued to the contractor clearly state that river and rail usage should be considered.

7.12 If neither of the two scenarios occur, it is unlikely that river or rail will be substantially used on a project. This is because by the time the project has been sent out to tender, it has been scoped and brought by the client, typically without consideration of river and rail unless specifically requested.

7.13 The planning process plays an important role in the timing of this consideration. A study of planning applications and subsequent permissions for key sites along the river has shown that in the majority of cases, the applicant is only required to consider river usage in the discharge of a planning condition. In many large projects, the discharge of planning conditions will occur after the tender documents have been sent to contractors meaning that the opportunity to engage contractors on river and rail usage is typically lost.

Recommendation

7.14 In order to maximise greater river and rail usage, it is recommended that project teams are encouraged to consider river and rail usage earlier so that opportunities can be captured in the tendering of construction projects.

7.15 The planning process has a critical role in enabling the earlier consideration of river and rail usage by encouraging greater consideration of river and rail feasibility prior to the submission of a planning application as opposed to post-determination during the discharge of planning conditions.

7.16 It is recommended that this takes the form of a requirement for planning applicants to submit Construction Management Plans in an outline or framework format as part of the initial planning application and that a key consideration of the CMP is justifying the use of river or rail.

Unlocking Barriers

7.17 The research central to this project has identified a wide range of barriers that are discussed in greater detail in the report.

7.18 An assessment of the barriers identified, quantifying the cost, risks and perceived benefits of each barrier if addressed has also supported the approaches which recommend focussing attention on addressing controllable Policy and Awareness factors and the significant opportunities that exists to:

- influence the timing and decision making process through more robust planning policy and planning application deliverables through Policy; and
- raising awareness, increasing skills and maximising access to knowledge for all stakeholders throughout the industry in relation to river and rail usage.

7.19 It is not considered realistic or viable for the implementation of the findings of this project to immediately create an environment in which river and rail usage becomes appropriate for every project. The industry must recognise and appreciate that every project by its very nature is bespoke and there will be circumstances where river or rail usage is simply not feasible and that it is likely to be a result of one or more of the Physical, Logistics or Financial barriers outlined in this study.

7.20 However, there are equally circumstances in which river and rail can contribute towards the movement of construction material and waste in an efficient and cost effective manner and these opportunities should be maximised.

7.21 By focussing efforts on addressing the barriers discussed in relation to Policy and Awareness the ability for projects to use river and rail in the construction of materials and waste will become easier. Developers and Contractors will be encouraged to consider usage of river and rail at an earlier stage and will have a greater ability and means by which they can make key decisions. Equally Boroughs/Planners and Other Key Stakeholders will also be provided with the means to assist development teams and contractors and make reasonable and sound judgements as to when river and rail use is appropriate.

7.22 The introduction of a package of measures targeted at Policy and Awareness has the ability to assist in reducing air pollution, ease congestion and simplify the logistics of construction projects. Reducing freight vehicle movements has the opportunity to positively influence many of the strategic challenges currently facing London.

7.23 Ultimately these recommendations will increase the likelihood of allowing projects, where appropriate, to both encourage and enable river and rail for transporting construction material to a greater extent than is currently the case.

steer davies gleave

Appendices

A Survey Questions

Steer Davies Gleave River and Rail Logistics Questionnaire

This survey is about the use of river and rail for transporting construction materials and waste, SDG has been commissioned by Transport for London to investigate the barriers preventing movement of building materials and waste by river and rail. Your responses will be used to gain a wider understanding of the issues and inform a report which will be published.

The aim of the survey is for TfL to understand the barriers to transporting bulk construction materials and waste by river and rail.

Q1. Name of organisation:

Q2. How would you would describe the **MAIN** type of service your organisation provides?

- Developer ☐
- Contractor ☐
- Supply Chain ☐
- Borough ☐
- Planner ☐
- Other relevant business/organisation type/stakeholder ☐

Q3. In which region is your business located?

- London ☐
- South East ☐
- Other ☐

Q4. Please state your involvement with transporting construction materials and/or waste by **river** within the last 3 years:

- Have used river for some projects ☐
- Have not used river for any projects ☐

Q5. Please state your involvement with transporting construction materials and/or waste by **rail** within the last 3 years:

- Have used rail for some projects ☐
- Have not used rail for any projects ☐

Q6. Using a scale of 1 to 10 (with 1 being extremely poor and 10 being extremely well) what would your assessment be of how well the **river** is currently used for transporting **construction materials**?

Q7. Using the same scale what would your assessment be of how well the **river** is currently used for transporting **waste**?

Q8. Using the same scale what would your assessment be of how well the **rail** network is currently used for transporting **construction materials**?

Q9. Using the same scale what would your assessment be of how well the **rail** network is currently used for transporting **waste**?

Q10. In the preparation of any construction project, who do you believe is **responsible** for determining whether to use river or rail for transporting construction material?

- Client ☐
- Developer ☐
- Contractor ☐
- Supply Chain ☐
- Borough ☐
- Planner ☐
- Other key stakeholder (please specify) ☐

Q11. To what extent do you believe the following are barriers to using river and rail for construction?

a) Physical Issues (e.g. distance of site from river/rail)

- i. Significant barrier ☐
- ii. Barrier to some extent ☐
- iii. No effect ☐
- iv. Not a significant barrier ☐
- v. Not a barrier at all ☐
- vi. Don't know ☐

b) Logistics (e.g. double handling)

- i. Significant barrier ☐
- ii. Barrier to some extent ☐
- iii. No effect ☐
- iv. Not a significant barrier ☐
- v. Not a barrier at all ☐
- vi. Don't know ☐

c) Policy (e.g. use of river/rail not stated within local plan)

- i. Significant barrier ☐
- ii. Barrier to some extent ☐
- iii. No effect ☐
- iv. Not a significant barrier ☐
- v. Not a barrier at all ☐
- vi. Don't know ☐

d) Cost (e.g. monopoly power)

- i. Significant barrier ☐
- ii. Barrier to some extent ☐
- iii. No effect ☐
- iv. Not a significant barrier ☐
- v. Not a barrier at all ☐
- vi. Don't know ☐

e) Awareness (e.g. communication of river/rail capabilities)

- i. Significant barrier ☐
- ii. Barrier to some extent ☐
- iii. No effect ☐
- iv. Not a significant barrier ☐
- v. Not a barrier at all ☐
- vi. Don't know ☐

f) Other Industry Related Issues (e.g. knowledge of river feasibility)

i. Significant barrier ☐
ii. Barrier to some extent ☐
iii. No effect ☐
iv. Not a significant barrier ☐
v. Not a barrier at all ☐
vi. Don't know ☐

Q12. Please identify what you perceive to be the most significant barrier to transporting building materials and waste by **river**, for projects you are involved in, out of the following barriers?

- Physical Barriers ☐
- Logistical Barriers ☐
- Policy Barriers ☐
- Financial Barriers ☐
- Industry Related Barriers ☐

Q13. Please identify what you perceive to be the most significant barrier to transporting building materials and waste by **rail**, for projects you are involved in, out of the following barriers?

- Physical Barriers ☐
- Logistical Barriers ☐
- Policy Barriers ☐
- Financial Barriers ☐
- Industry Related Barriers ☐

Q14. Using a scale of 1 to 10 (with 1 being very little potential and 10 being a lot of potential), if the key barrier you identify were addressed, what would your assessment of the future potential for **river** to be used for transporting construction materials to be?

Q15. Using the same scale, if the key barriers you identify were addressed, what would your assessment of the future potential for **rail** to be used for transporting construction materials, for projects you are involved in to be?

Q16. Do you perceive any benefits related to the increased use of river for transport construction material?

Q17. Do you perceive any benefits related to the increased use of rail for transport construction material?

Q18. Would you like to discuss any of the matters outlined above further or provide any further information?

If you would like more information or would like to participate further in the study please contact:

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B Case Studies

Investigating the barriers to transport construction material and waste by river and rail.

Case Study A: Northern Line Extension/ Battersea Power Station

The Battersea Power Station is one of Europe's largest mixed-use developments providing 4500 new homes, 90,000sqm retail floorspace and 150,000 office floorspace. In association with the developers Transport for London (TfL) secured the extension of the Northern Line from Kennington to Battersea via Nine Elms to serve the development.

The use of river for transporting excavated waste was considered very early in the planning process and was assessed as part of the planning application submitted in 2010. The Transport Assessment accompanying the planning application recommended that, where appropriate, the river should be used given the close proximity of the site to the river. The Transport Assessment concluded that:

- Each barge would have the capacity to move over 1000 tones;
- two barge movements per tide were achievable;
- Road transport would also play a role though the river barges would transport most of the excavated material; and
- material and waste moved by water would result in a decrease of 30 lorry trips per day.

Early consideration of river use during the planning process, far before any contractors were appointed by the developer, meant that all future discussions regarding construction of the site were underpinned by the abilities and benefits of using river that had been identified at a more earlier stage.

Ultimately both the developer of the Battersea Power Station site and TfL's contractor for the Northern Line Extension have been able to utilise the river for significant amounts of excavated material. It is estimated that 180,000 tonnes of material and waste will be removed from site between 2015 and 2017 resulting in approximately 160,000 lorry journeys will being removed from the road network replaced by two large barge movements a day.

It is estimated that the reduced vehicle movements will result in a 30% transport carbon footprint reduction and will save enough carbon to fill 73 Olympic-sized swimming pools. It will also improve local air quality, mitigate against the negative health impacts associated with poor air quality and create safer pedestrian and cyclist environments.

Investigating the barriers to transport construction material and waste by river and rail.

Case Study B: Canary Wharf

Canary Wharf is a major business district located on the east London Docklands, Borough of Tower Hamlets. Canary Wharf has a number of long term development projects all of which take place within reasonably close proximity to the river and is regularly encouraged by the London Borough of Tower Hamlets (LBTH) to undertake feasibility studies as part of planning conditions into the feasibility of using river for transporting construction material and waste.

1 Bank Street is situated on the South Dock canal within the Canary Wharf Estate, consisting of a 27 storey 70,00sqm office development and is currently under construction.

As part of a planning condition post planning submission a freight by water feasibility study was undertaken to determine the optimal method of transporting construction materials to the site.

The study reviewed the benefits and challenges of moving construction material and waste using the river, as well as providing a comparison of freight movements by road.

The results of the feasibility study determined that the use of river was not economically viable for excavated waste due to the significant additional costs associated with the hiring of river barges and charges for the use of the river and associated locks required to access the site.

Transporting material to site by river was considered to be of little value due to a range of operational and commercial factors including:

- Due to site constraints, the majority of materials are required to be delivered *'Just in Time'* therefore not compatible with the mass transporting of all materials within a small number of large deliveries by river;
- The site is to be constructed from a number of materials delivered from across the country thereby coordinating a single point of delivery to a barge to be transported to the site by river is logistically difficult and requires significant additional costs due to double handling; and
- Road transport was known to be more reliable and considered less risky, particularly given incidents in the past involving river barges which has resulted in delays and costs to other projects within the vicinity.

Investigating the barriers to transport construction material and waste by river and rail.

Case Study C – Bank Station Upgrade

A new upgrade programme at Bank station, All Change at Bank, was approved at the end of 2015. The redevelopment, which is being undertaken by London Underground, is expected to be completed in 2021 and will increase the number of passengers able to interchange between lines within the station as well as enter and exit, primarily the project consists of constructing additional Norther Line platforms and a new entrance in Cannon Street whilst largely maintaining an operational station. .

The creation of an additional subterranean platforms for the Northern Line inevitably result in the excavation of significant materials. The Bank Station site is extremely constrained with the need to ensure continued operation of a wide range of businesses and institutions, including the Bank of England, throughout the construction process. Whilst the site lies approximately 0.5km from the river access to river is also significantly constrained through the density of existing development between the site and the river and the uses of the river bank within the vicinity.

The design team explored the ability to use the river for transporting at a relatively early stage in the planning process with assessments undertaken as part of the Transport and Works Act Order (TWAO) material preparation. The works for the TWAO concluded that due to a number of specific site constraints the use of river or rail for transporting materials was neither feasible or viable for a number of reasons, including:

- the size of the construction tunnels for material handling and equipment were deemed unsuitable for transporting materials to site without significant additional impacts beyond the use of road only;
- the potential impact and difficulty of works in the river within the vicinity of the site along the north bank of the river Thames; and
- the limited impact of using the river which was unable to significantly reduce the construction programme.

Accordingly, due to the range of site constraints and the limited positive impact the design team concluding that use of the river was impractical in this instance.

The scheme application was submitted in September 2014 and then approved in December 2015. The scheme is currently under construction and is due to open in 2021.

C Perception of Barriers

Assessment of Barrier Perception

Overview

1.1 This note provides draws upon the knowledge and understanding gained from within the development and construction industry to assess the misconceptions that exist within the industries surrounding the use of river and rail as a form of transport.

Methodology

1.2 It is difficult to assess misconception as by its nature the extent of which something can be perceived does not have an intrinsic value.

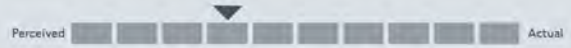
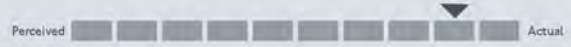
1.3 As such, the extent of perception as assessed in this note is based upon professional judgement drawing on the knowledge and understanding of the industry, river and rail use and the interviews held with 160 stakeholders during the course of this project.

Assignment of Barriers

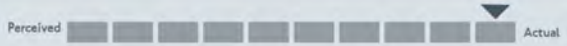
1.4 Each barrier has been assigned a number on a scale of one to ten, with one considered to be the most perceived barriers, i.e. a barrier that we do not believe to exist; and, ten to be the actual barriers, i.e. a barrier that we do believe to fully exist. This assignment is based upon the knowledge and experience gained through the data gathering process alongside the feedback received from respondents in relation to each barrier.

1.5 The assessment of barrier perception for each individual barrier identified all stakeholders within this project is summarised in Figure 1.

Figure 1: Assessment of Barrier Perceptions

Barrier type	Barrier	Assessed perception of barrier
Physical	Rail head availability (providing more railheads)	
Physical	Wharf availability (providing more wharves)	
Physical	General accessibility issues between river/rail and the site	
Physical	River wall suitability	
Physical	Tidal restrictions	
Physical	Bridges acting as a constraint on size and height of boats	
Physical	River and rail capacity contraints	
Logistics	Double handling	
Logistics	Timing of deliveries (night time/ early morning)	

Barrier type	Barrier	Assessed perception of barrier
Logistics	On-site storage availability	
Logistics	Site orientation and logistics	
Logistics	Availability of infrastructure (i.e brages/trains)	
Logistics	Geography - UK wide industry	
Logistics	Conflicts with other users (i.e rail passenger movements)	
Financial	General costs - preception of costs	
Financial	Known vs unknown	
Financial	Financial/safety risks	
Financial	Lack of competition within the industry	

Barrier type	Barrier	Assessed perception of barrier
Industry awareness	Communication/ awareness	
Industry awareness	Skill and resource gaps	
Industry awareness	Availability of information to potential users	
Industry awareness	Protected wharves	
Policy	Application of existing policies	
Policy	Clarity over CLPs vs CMPs	

1.6 As shown in Figure 1, each type of barrier assessed results in a varied degree to which barriers are perceived compared to how they exist as actual barriers within a real-world context.

1.7 Figure 2 presents the average extent of perceived vs actual for each barrier group for all barriers identified and discussed in Figure 1.

Figure 2: Average Assessment of Perceived Barriers (all barriers)

1.8 As shown in Figure 2, the extent to which barriers are considered to be perceived is greater in the Physical, Logistics and Financial group of barriers than the Industry Awareness and Policy group of barriers.

Summary

1.9 The assessed perception of barriers supports many of the findings from this research project which has identified issues surrounding awareness and policy as being those which create the barriers, and, to a varying extent, result in the misconception to some degree for the physical, logistics and financial barriers.

1.10 It is important to note, that whilst a barrier is assessed as being perceived or not, the fact that it has been identified by one or more of the respondents through the course of this research project is, in itself, ensuring it is a barrier which is preventing greater utilisation of river and rail. As such, further emphasis is also placed on raising industry awareness regarding barriers to breakdown these perceptions.

D Findings and Recommendations

Findings and Recommendations

A collated summary of key findings and recommendations are provided below.

Key Findings

- Economies of scale is an essential component in determining rive or rail usage, accordingly river and rail use is only feasible for large developments unless there is coordination between smaller developments within a similar location;
- Understanding fully the final mile aspects of river and rail usage is essential to understanding and appreciating logistics and cost. The majority of construction sites will always require transportation by road for some element of its journey;
- A lack of information was identified as the most common barrier to river and rail use in the Key Stakeholder interviews;
- Other barriers regularly identified in Key Stakeholder interviews included the perception of costs, quality of river wall facilities, rail head availability, skills and resource gaps, convenience and communication;
- 75% of respondents to the qualitative research had not used river or rail for transporting construction material or waste in the last three years;
- The assignment of responsibility for determining river and rail usage is unevenly distributed across all industry sectors, with little consensus as to which sector should take the primary responsibility;
- Physical and Logistics barriers were identified as being the most significant barrier types when asked to rate the extent to which all types of barrier are significant;
- Financial barriers are considered to be the most significant barriers to Developers although this is not reflected by any other sector;
- Industry Awareness barriers were not perceived to be as significant as other barriers and the extent of significance varied across all sectors;
- Addressing the barriers to transporting materials and waste by river and rail requires appreciation of the bespoke nature of development and construction projects;
- Decision making involves Physical, Logistics and Financial considerations and is initially informed by a policy requirement, however in many case the Physical and Logistics barriers are such that Financial barriers are not fully explored. To 'access' the Financial barriers efforts must first be made to address the Physical and Logistics barriers;
- There is a key role for Boroughs and Other Key Stakeholders to better encourage and promote the local attributes that exist to enable decision makers to make more informed decisions regarding river of rail use for any construction project;
- There is a varying degree to which all barriers are perceived or not, however, overall Industry Awareness and Policy barriers involve fewer misconceptions than Physical, Logistics and Financial barriers all of which can be better informed through improved awareness and enforcement of policy;
- Improving the knowledge and skills of stakeholders across the industry in relation to river and rail usage availability, and capacity throughout all sectors within the industry through design, planning to delivery of projects will increase opportunities for river and rail utilisation; and
- Whilst Physical, Logistics and Financial barriers are deemed to be the most significant category of barrier they can only be addressed sustainably and effectively by considering

and enacting long-term changes to policy and increasing the awareness of stakeholders that design, plan and deliver construction projects.

Key Recommendations

- Planning policy plays a critical role in encouraging applicants to consider river and rail at an earlier stage than is currently typical practice and should be more explicit with expectations highlighted local attributes available.
- Planning policy should fully promote consideration of the use of river and rail at the earliest outset, preferably prior to planning submission so that river or rail usage (or not) forms part of any planning permission;
- Officers engaging with the applicants throughout the planning process should have the knowledge to reasonably and fairly determine whether river or rail should be used on the project;
- To encourage greater consideration of river and rail usage for construction at the stage of a planning application *Outline* or *Framework* Construction Management Plans should be treated as formal documents to be submitted for referable schemes;
- The construction and planning industry should define clear roles and responsibilities for those parties responsible for determining river and rail usage in the preparation of planning applications and construction projects alongside those responsible for implementing and monitoring their usage;
- For public sector projects a clear direction should be given from the project outset that river and rail usage should be maximised – this is typically limited to public sector projects where there is a wider interest from key stakeholders setting the tone for the project; and/or
- For private sector projects, efforts should be made through the planning system to ensure that the tender documents issued to the contractor clearly state that river and rail usage should be considered.
- Efforts to increase river and rail usage for construction projects should focus upon raising awareness, increasing skills and maximising access to knowledge for all stakeholders throughout the industry so unlock the complex Physical, Logistics and Financial barriers that are deemed by many to exist, examples of raising awareness and understanding should include:
    - Making use of better and improved free to access online tools and resources available to all sectors;
    - Promote the availability of these online tools and resources to all sectors;
    - Conduct further studies to fully understand the actual availability/capacity on river and rail networks for barges and wagons so that this can be clearly communicated;
    - Encourage Boroughs to actively map, understand and promote the key local facilitators for river and rail usage; and
    - Encourage technical information related to river and rail capacity and constraints to be made more readily available.

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