TRANSPORT FOR LONDON

RIVER CROSSINGS: SILVERTOWN TUNNEL

SUPPORTING TECHNICAL DOCUMENTATION

EAST LONDON RIVER CROSSINGS:

ASSESSMENT OF NEEDS

Transport for London

October 2012

This report sets out in detail the need for additional river crossings in east London and to provide the context to the development of the outstanding proposals which were outlined in Mayor's Transport Strategy.

This report is part of a wider suite of documents which outline our approach to traffic, environmental, optioneering and engineering disciplines, amongst others. We would like to know if you have any comments on our approach to this work. To give us your views, please respond to our consultation at www.tfl.gov.uk/silvertown-tunnel

Please note that consultation on the Silvertown Tunnel is running from October – December 2014

Transport for London

East London River Crossings: Assessment of Need

Date: October 2012

MAYOR OF LONDON

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1. STRATEGIC CONTEXT

1.1. There is a clearly defined policy framework for London which looks forward to 2031 and defines the key challenges that London has to address over this period.

1.2. This is set out in the London Plan (the Mayor's special development strategy) and the Mayor's Transport Strategy (MTS), finalised in 2011 and 2010 respectively and providing clear policy direction through to 2031. These two documents provide the statutory framework for the boroughs to develop their own local development frameworks.

1.3. The overall thrust of these documents is that London is a growing city, with growth at the highest levels since the inter-war period. There is a focus on generating jobs and growth to meet the demands of a rising population, and transport is a critical component in helping to achieve this.

1.4. Investment in transport has helped London secure an overall reduction in the amount of car use and sustained increases in public transport, walking and cycling. It is essential that this trend continues into the future and further investment in public transport capacity is a fundamental part of this strategy. In addition, the scale of growth and concentration of this growth in the eastern parts of London means that further investment in the road network is also required.

London Plan (2011)

1.5. The London Plan (LP), published in 2011, is the statutory spatial plan for London, which sets out the strategic vision for Greater London up to 2031. The LP considered the strategic issues of the scale of growth London will need to accommodate over the next two decades, and considered alternative spatial development policies which could be adopted to meet the forecasts for population and employment growth. This included options of intensification of central London, a decentralised policy with higher levels of development in outer London, and other options including the potential of brownfield land to accommodate growth.

1.6. The LP concludes that east London, with its large areas of ex-industrial brownfield land and improving transport links, should play a major role in London's growth, and that with investment in infrastructure, many of London's new jobs and homes can be accommodated in the east sub-region (which comprises boroughs in both east and south east London). However achieving this development is likely to require investment in the infrastructure, including the road infrastructure and improving cross-river connectivity.

1.7. The London Plan forecasts an additional 650,000 jobs and an increase in population of 1.2 million up to 2031. Of these increases, 37% of the additional employment and 22% of the additional population will be in the east sub-region.

1.8. The London Plan clearly sets out the need for additional river crossings in Policy 6.4, Policy 6.12, and Table 6.1.

Mayor's Transport Strategy (2010)

1.9. The Mayor's Transport Strategy (MTS), published in 2010, sets out the transport strategy for London, based upon the work undertaken by the GLA for the London Plan. This includes the strategy for delivering the transport infrastructure needed to accommodate growth in the east sub-region, which is a key part of the London Plan's strategic vision.

1.10. The MTS identifies a wide range of policies and proposals to support this growth. It is based around three key policy areas:

(i) Better co-ordination and integration of planning and transport;

(ii) Providing new capacity;

(iii) Managing the demand to travel.

1.11. Overall, the implementation of the strategy would see the existing increase in public transport usage continue, together with an increase in cycling, and a corresponding decrease in car use.

1.12. Nevertheless, the London Plan and Mayor's Transport Strategy identify a clear need to progress a package of river crossings for east London, to help deliver growth and to meet the overall objectives of the MTS. Part of this need is a need to improve river crossings for road users, addressing the existing problems with the current infrastructure and to plan for the substantial growth that is identified for the surrounding area.

1.13. Figure 1.1 below outlines the MTS policy on river crossings.

Figure 1.1: MTS Proposal 39: River Crossings

The Mayor, through TfL, and working with the London boroughs and other stakeholders, will take forward a package of river crossings in east London, including:

a) A new fixed link at Silvertown to provide congestion relief to the Blackwall Tunnel and provide local links for vehicle traffic

b) An upgraded Woolwich Ferry and consideration of a new vehicle ferry at Gallions Reach to improve connectivity

c) Local links to improve connections for pedestrians and cyclists

d) Consideration of a longer-term fixed link at Gallions Reach to improve connectivity for local traffic, buses, cyclists and to support economic development in this area

e) The encouragement of modal shift from private cars to public transport, using new rail links including High Speed One domestic services, Crossrail and the DLR extension to Woolwich, reducing road demand, and so road congestion at river crossings, where possible

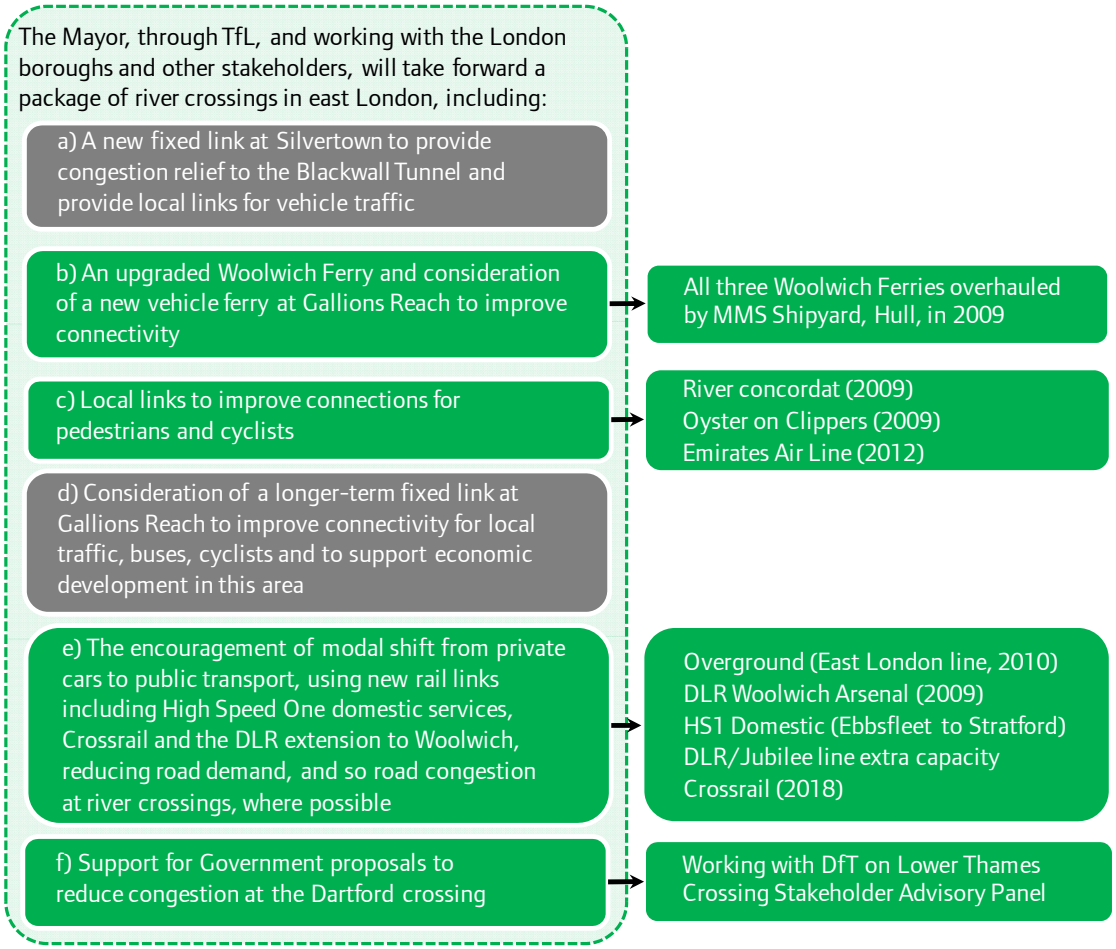
f) Support for Government proposals to reduce congestion at the Dartford crossing

1.14. Significant progress has been made in providing improved public transport services, with Crossrail still to come from 2018. Work on local cross-river links for those on foot or using cycles has resulted in the River Concordat and extension of Oyster Pay As You Go to Thames Clipper services, and the introduction of the Emirates Air Line between Greenwich and Newham. Each of the three Woolwich ferries has been overhauled, although further decisions will be required as to their eventual replacement.

1.15. Transport for London has also been engaging closely with the Department for Transport on the options for the Dartford Crossing, including the replacement of the toll plazas with free-flow tolling, and the development of plans for new capacity at or downstream of Dartford.

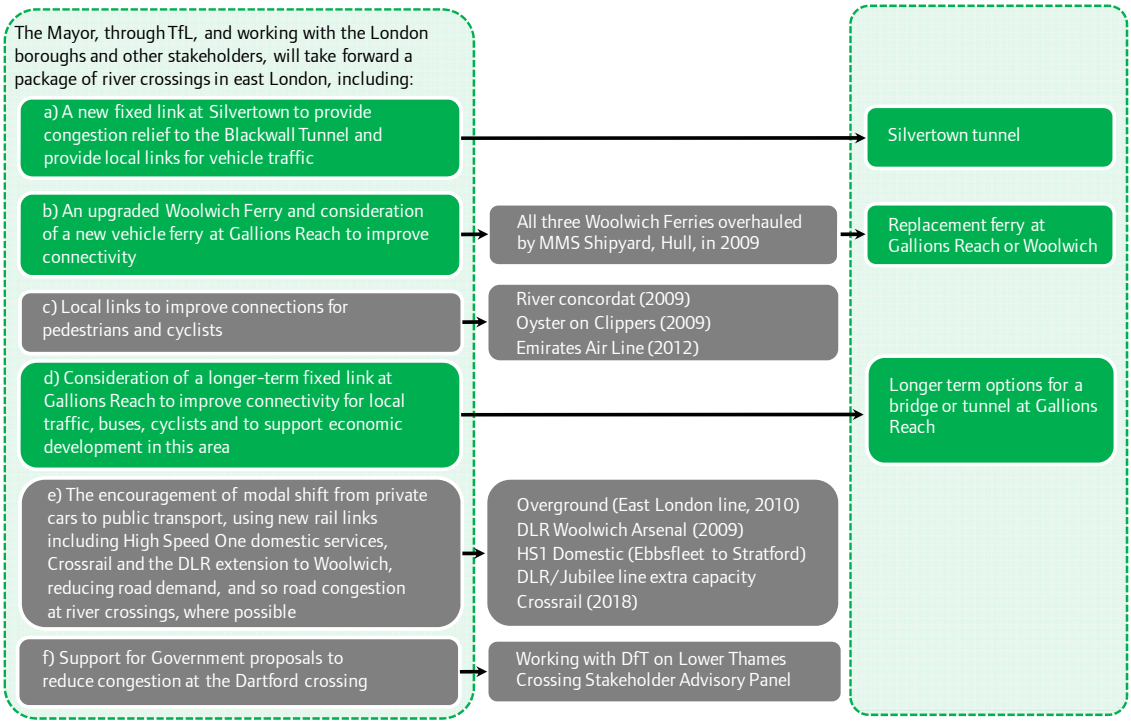
1.16. Figure 1.2 below illustrates the progress made to date.

Figure 1.2: MTS Proposal 39: River Crossings progress to date



1.17. This report therefore focuses on the outstanding proposals for river crossings, namely the progression of new crossing infrastructure for road traffic between east and south east London, in the form of fixed links (bridges or tunnels), or vehicle ferries, as illustrated below.

Figure 1.3: MTS Proposal 39: River Crossings outstanding issues



2. PURPOSE OF THIS REPORT

2.1. The purpose of this report is to set out in more detail the need for additional river crossings in east London and to provide the context to the development of the outstanding proposals which were outlined in MTS Proposal 39, notably:

- A new fixed link at Silvertown to provide congestion relief to the Blackwall Tunnel and provide local links for vehicle traffic
- An upgraded Woolwich Ferry and consideration of a new vehicle ferry at Gallions Reach to improve connectivity
- Consideration of a longer-term fixed link at Gallions Reach to improve connectivity for local traffic, buses, cyclists and to support economic development in this area

Report structure and key issues

2.2. The next chapter of this report presents a historical and geographical background to the study area. Chapter four summarises the statutory planning context for the study area. Chapter five provides an account of changing levels of population and employment in the study area. Chapter six presents the public and stakeholder context. Chapter seven focuses on the highway network and describes the capacity and usage restrictions of cross-river links, provides an assessment of the condition of highway river crossing assets, reviews information on the travel patterns of cross-river highway traffic, considers the extent to which highway crossings are affected by routine congestion and the vulnerability of crossings to unplanned closure. Chapter eight summarises the public transport, walking and cycling cross-river networks.

2.3. The report addresses various aspects of the river crossings including their capacity and utilisation, the condition of the assets themselves, and their reliability. In the event of a significant issue in any of these areas being identified, careful consideration should be given to how it could be addressed.

In order to ensure that these key issues are both placed in context and that sufficient attention is drawn to them, key issues for further consideration are highlighted in a grey box.

2.4. Conclusions are summarised in chapter nine.

3. BACKGROUND

The River Thames and London's early development

3.1. The River Thames provided the essential means by which London was linked to the rest of the world, allowing it to develop as a great trading city. At the same time, it has always acted as a natural barrier to travel between north and south within the city.

3.2. There are significant differences in the size/scale of the river across London and this has helped to dictate the historic pattern of crossing points. In west London, there are frequent bridges across the Thames, as the bridges need to take no account of large ships, and can therefore have low clearances above the river, and frequent piers, making construction relatively simple and low cost.

3.3. However, downstream of London Bridge, the river becomes gradually wider, and a right of navigation for large ships exists, adding very significant barriers to construction of bridges. There are only two bridges downstream of London Bridge, Tower Bridge – which includes its famous bascule lifting section – and the Queen Elizabeth II bridge at Dartford, which had to be built with 54 metres of clearance above high water, and is consequently a very large (and expensive) structure.

3.4. There are two tunnelled road crossings, the Rotherhithe tunnel and Blackwall tunnel, the latter of which has two tunnel bores.

3.5. The Figures below illustrate the difference in road crossings in east and west London, from the edge of the central London congestions charging zone to the M25 London orbital motorway.

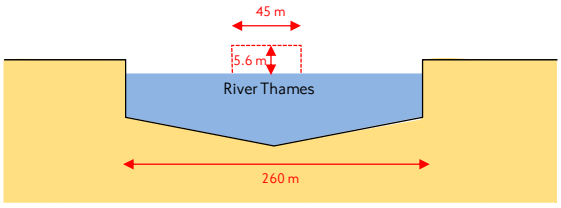
Figure 3.1: Tower Bridge to M25: 3 crossings in 23 km

3.6. Of the three east London crossings, one is a limited capacity ferry and the other two are tunnels with restrictions on large vehicles.

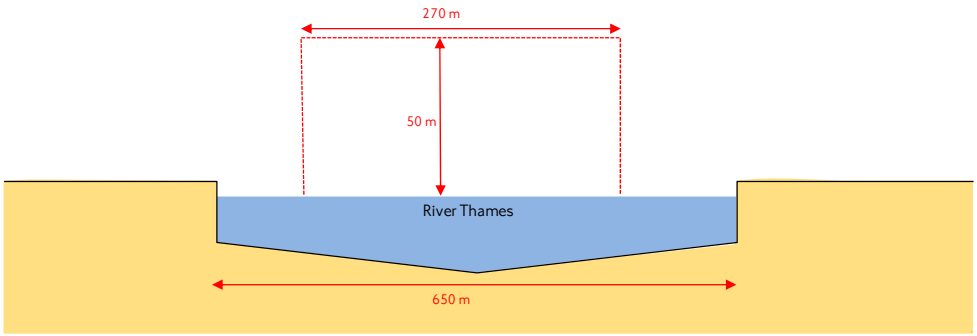
Figure 3.2: Vauxhall Bridge to M25: 17 crossings in 29 km

3.7. The sketch below illustrates the difference in navigational requirements in west and east London. At the Vauxhall Bridge, the bridge is low, with a maximum clearance at high water of 5.6 metres. The bridge has five arches with a width of 45 metres. By comparison, the previously proposed Thames Gateway Bridge in east London had to allow 50 metres air draft above high water, and a span of 270 metres.

Figure 3.3: Sketch of navigational clearances, Vauxhall and former proposed Thames Gateway Bridges



Vauxhall Bridge



Former proposed Thames Gateway Bridge

3.8. The difference in navigational clearance requirements illustrates the much greater difficulty, and therefore cost, in providing river crossings in east London compared with west London.

Post-war economic and social change

3.9. Economic and social conditions changed in the decades following World War II with the decline or disappearance of most of the traditional industries which lined the eastern section of the Thames in London as a result of various factors. The population in London's east sub-region fell from almost 2.5 million in 1939 to around 1.75 million in 1991.

3.10. During the same period many of the docks and large industrial sites alongside the river were abandoned as the traditional docks were unsuited to the new ships and handling facilities required following containerisation. The barrier effect of the river and of the large old industrial sites which lined it meant these areas were generally isolated and unattractive for alternative uses. As a result large swathes of the Docklands lay derelict for several decades.

3.11. Over the last 20 years, however, regeneration has transformed much of the former Docklands and many previously derelict sites now have successful new uses, particularly those in inner London boroughs. This has been accompanied by a diversification of the economic base and a substantial increase in employment in the area. Clusters of specialist activities have emerged. For example, many high value services which would traditionally have been confined to central London now have bases in Canary Wharf, while a major concert arena (the O2 Arena) on the Greenwich Peninsula and an international conference centre (ExCeL) at the Royal Victoria Dock have also been established. Most recently, the Olympic Park at Stratford occupies formerly industrial land within the Lea Valley, slightly to the north of the Docklands area but closely linked to it by the River Lea, the A12 and the DLR and Jubilee line.

3.12. Much of this growth has been facilitated by new fixed public transport infrastructure. Public transport links in the wider area have already seen very significant investment, with new cross-river links provided on these routes:

(i) Jubilee line (opened 1999, and subsequently enhanced with more frequent and longer trains);

(ii) Docklands Light Railway (extended to Greenwich and Lewisham in 1999, and subsequently enhanced with longer trains, and to Woolwich in 2009);

(iii) High Speed 1, which started operating frequent high speed trains between Kent and east London in 2009;

(iv) London Underground's East London line was transferred to the London Overground network, with new services to a much wider range of destinations from 2010, and further services from 2012;

(v) Emirates Air Line, providing a new cross-river link from the Greenwich peninsula to the Royal Docks, opened in 2012;

(vi) Crossrail, now under construction and which will provide a new high frequency cross-river link to Woolwich from 2018.

3.13. These improvements have already led to a large increase in cross-river public transport trips in the area, with public transport to places like Canary Wharf on the Isle of Dogs attracting as high a share of trips as central London. However, the growth in demand due to the major economic growth is such that highway demand by users not catered for by the new public transport links has continued to outstrip highway capacity considerably.

3.14. While there have been significant improvements in cross-river public transport provision, there have been no corresponding increases in cross-river highway provision within London since the construction of the southbound Blackwall Tunnel in the 1960s, although outside London's boundaries the Queen Elizabeth II Bridge on the M25 corridor at Dartford opened in 1991.

3.15. Since traffic using the Blackwall Tunnel includes both private and commercial vehicles, with a wide range of origins, destinations and journey purposes, it is considered unlikely that yet further new rail capacity could in itself achieve a significant degree of modal shift.

Implications for cross river travel

3.16. The changes that have taken place in the study area since the 1980s, which are expected to continue and in some respects intensify, have made the study area a hub of the knowledge economy, a leisure destination, and home to a rapidly growing population.

3.17. As a result, people and businesses in much of London's growing eastern sector are now dependent on a few cross-river links for access to the full range of the capital's jobs, markets, services and amenities. This means they are acutely vulnerable to disruption of one or more of these links, the impact of which on the transport network can in some cases be dramatic.

4. STATUTORY PLANNING CONTEXT

4.1. A framework of national, regional and local spatial development and transport policies and plans provide strategic context and principles to inform the development of transport projects such as new river crossings. National planning guidance is concerned with high level principles governing the relationship of planning policies to other policies. These principles are embedded in London-wide strategies, policies and plans, which are then developed further through sub regional plans; finally more local and specific plans including borough level planning frameworks are also applicable.

4.2. In summary the following policy documents and plans are considered:

- National Infrastructure Plan
- National Networks National Policy Statement
- National Planning Policy Framework
- Sustainable Communities Plan (re. The Thames Gateway)
- The London Plan
- The Mayor's Transport Strategy
- London City Charter
- London Borough Core Strategies

National policies and plans

National Infrastructure Plan

4.3. The National Infrastructure Plan[1] is a comprehensive and detailed strategy for coordinating and planning public and private investment in UK infrastructure. The plan was published in November 2011 and provides political commitment for investment in infrastructure, which is a key part of the Government's economic strategy.

4.4. In regards to transport the plan sets out a commitment to 'improving the performance, capacity, connectivity and environmental impacts of the UK's transport networks' (page 6). There is specific reference to river crossings. The new Lower Thames Crossing is identified as one of the top 40 priority infrastructure investments (table 2.B). The plan states that the Government will work with the Mayor of London and Transport for London to explore options for proposed additional river crossings, for example at Silvertown (para 3.57).

4.5. There is also a commitment to explore new sources of revenue to support investment. The use of tolls is being investigated as a way of financing improvements to the A14 and the Government will also consider tolls to fund other new road capacity, if appropriate, including a new Lower Thames Crossing (para 5.29).

[1] http://cdn.hm-treasury.gov.uk/national_infrastructure_plan291111.pdf

National Networks National Policy Statement

4.6. National Policy Statements (NPSs[2]) set out Government Policy on different types of national infrastructure development including transport. The National Networks NPS will cover road and rail schemes. There has been some delay in the publication of this policy and at the current time no draft version is available. This policy statement will need to be taken into consideration, once it is published.

National Planning Policy Framework

4.7. The National Planning Policy Framework[3] is the means by which the Government provides guidance to local authorities and others on planning policy and the operation of the planning system in relation to a series of topics and policy areas. The Framework was published in March 2012 and replaces a large number of Planning Policy Guidance notes (PPGs) and Planning Policy Statements (PPSs), including PPG13 (Transport). The document is the responsibility of the Department for Communities and Local Government.

4.8. The Framework sets out the Government's planning policies for England and how these are expected to be applied. It must be taken into account in the preparation of local authorities' development plan documents (DPDs) and may also be a material consideration in the determination of planning applications.

4.9. Section 1 focuses on building a strong, competitive economy. The Government is committed to securing economic growth in order to create jobs and prosperity, and the framework states that 'significant weight should be placed on the need to support economic growth through the planning system' (para 19).

Thames Gateway

4.10. The Thames Gateway was designated by the Government as a growth area as part of the 2003 Sustainable Communities Plan[4]. The aim was to focus large scale growth in areas where it could be accommodated through the creation of new communities which would be sustainable, well designed, high quality and attractive places in which people would choose to live and work.

4.11. The Thames Gateway is also an area in need of regeneration, encompassing many areas within London, Kent and Essex which suffer social, economic and environmental problems as a legacy of the port and industrial activities which have declined or disappeared.

4.12. The current government has reiterated the importance of regeneration of the Thames Gateway in supporting the continued growth of greater London and the greater south east as a driver of the UK's prosperity. In the Government's view London's continued growth is seen as critical to the future prosperity of the greater south east and the United Kingdom as a whole. Crucial to that continued growth is the regeneration of the Thames Gateway, which offers London the space to grow.

[2] http://infrastructure.planningportal.gov.uk/legislation-and-advice/national-policy-statements/
[3] http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf
[4] http://www.communities.gov.uk/publications/communities/sustainablecommunitiesbuilding

4.13. The intention is for a network of public bodies to stimulate and coordinate the development of sustainable communities, including their infrastructure needs, and in so doing to accommodate much of the population and employment growth expected in London and the south east over the coming decades in a sustainable way.

Regional policies and plans

Role and status of the London Plan

The London Plan[5] is the Mayor's statutory spatial development strategy and plays a central role in the strategic planning of London, responsibility for which is shared between the Mayor, the Boroughs and the City of London Corporation. The London Plan is the overall strategic plan for London, and sets out an integrated economic, environmental, transport and social framework for the development of the city. It brings together the geographic and locational (although not site specific) aspects of the Mayor's other strategies - including those dealing with transport, economic development, housing and culture and a range of environmental issues such as climate change. It provides the framework for the development and use of land in London, and links this to infrastructure requirements, especially transport.

4.14. The current version was published in July 2011. It supersedes the first version published in 2004 (including its revisions).

4.15. The following section focuses on the population and employment growth anticipated in the London Plan and the role of London's east sub-region in accommodating it.

London Plan: context and strategic vision

4.16. The London Plan sets out the context and overall strategic vision for the development of London to 2031. This takes account of London' growing population, changing economy and growing employment market. It notes that the employment sectors which are expected to experience strong growth are in central and inner London while those expected to experience lower growth or decreases are more dispersed geographically (para 1.25). The plan also identifies persistent problems of poverty and disadvantage as a major set of issues facing London and notes the increasingly polarised nature of the city (para 1.27).

4.17. It goes on to state that 'the labour market, and how individuals fare in it, is of central importance. Households with children in London are much more likely to be workless than childless ones... Disabled people are almost twice as likely to be unemployed as non-disabled people... Making sure Londoners can get better access to the jobs in their city will be a key priority at a time when population is likely to grow, but the economy's growth may be less robust' (para 1.28).

4.18. Deprivation tends to be geographically concentrated with 'concentrations of disadvantage especially in inner north-east London, running from Tower Hamlets northwards through Hackney to Haringey and eastern Enfield, eastwards to Newham and Waltham Forest and on both sides of the Thames to Barking and Dagenham and the southern part of Havering and from Lambeth and Southwark eastwards to Bexley' (para 1.29).

[5] http://www.london.gov.uk/sites/default/files/The%20London%20Plan%202011_1.pdf

4.19. A further issue facing London is ensuring the infrastructure to support growth is provided. It is noted that transport infrastructure will have a vital part to play in supporting the capital's success and a good quality of life. It goes on to state 'the planning of transport services and the physical infrastructure they require will need to be carefully co-ordinated with the growth and development envisaged by this Plan. This is a key theme both of this plan and of the Mayor's Transport Strategy' (para 1.39).

4.20. The plan also aims to bring a new focus on quality of life and recognises that there is a growing concern for a range of issues related to this including 'ensuring Londoners in all parts of the city have adequate efficient transport networks and services... to enable them to access job, social and other life opportunities, while minimising any adverse impacts on the environment or quality of life' (para 1.44).

4.21. The plan states that the only prudent course is to plan for continued growth. Any other course would require fundamental changes in policy at national level or could lead to London being unprepared for growth. The projections in the plan are not targets, and for the most part it is not a question of choosing growth (para 1.47).

4.22. Against the above context, the Mayor has put forward a vision for the sustainable development of London over the period covered by the plan which states that over the years to 2031 and beyond London should 'excel among global cities - expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change' (para 1.52).

4.23. This is supported by six detailed objectives which other mayoral plans and strategies, decisions on development proposals and investment priorities, and borough DPDs and development decisions should aim to realise (policy 1.1). These include:

- A city that meets the challenges of economic and population growth;
- An internationally competitive and successful city;
- A city of diverse, strong, secure and accessible neighbourhoods;
- A city that delights the senses;
- A city that becomes a world leader in improving the environment;
- A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities

4.24. The plan (para 6.10) requires that future transport policies, proposals and projects should be developed and implemented in order to support the spatial priorities set out in the plan, including:

- The development and continued growth of inner London in ways that improve the quality of local environments and enable deprived communities to access jobs and other opportunities and facilities they need;
- the sustainable development of new communities in east London, to support the successful delivery of the 2012 Olympic and Paralympic Games and to secure a lasting legacy from the Games;
- support the development of the opportunity areas and areas for intensification.

4.25. Policy 6.4B states that 'the Mayor will work with strategic partners to improve the public transport system in London, including cross-London and orbital rail links to support future development and regeneration priority areas, and increase public transport capacity by …(k) providing new river crossings.' This is developed in para 6.20 which states that the Mayor is developing proposals for further new and enhanced river crossings in east London to improve accessibility and the resilience of local transport networks, supporting economic growth in the area and link local communities. The proposals include:

(i) A new road-based tunnel crossing between the Greenwich Peninsula and Silvertown;

(ii) Consideration of ferry-based options east of a crossing at Silvertown; and

(iii) Consideration over the longer term of a fixed link at Gallions Reach.

4.26. Para 6.41 states that the Mayor is investigating the possibility of additional road-based river crossings in east London. 'Drivers are heavily dependent on the congested Blackwall and Rotherhithe tunnels, each of which have restrictions on the size of vehicle which can use them, and the Woolwich Ferry. Beyond London, the Dartford crossing, forming part of the M25 orbital motorway, also regularly operates at, or close to, capacity. There is little resilience in the event of an incident at one of these crossings, and local businesses, particularly in south east London, suffer from this unreliability. The projected increases in jobs and population in the Thames Gateway will increase the problem of highway congestion and road network resilience at river crossings further. The Mayor is therefore supportive of additional road-based river crossings in east London as part of a package of transport improvements.'

4.27. Policy 6.11 states that the Mayor wishes to see DPDs and Local Implementation Plans (LIPS) take a coordinated approach to smoothing traffic flow and tackling congestion. Para 6.39 states that there is an urgent need to smooth traffic flow and reduce congestion and traffic levels. A number of measures are suggested including improved public transport, better management of the road network, smarter travel initiatives and support for a shift to walking and cycling. If these measures prove unsuccessful then it may be necessary to examine road-user charging as a demand management tool.

4.28. Policy 6.12A states that '[the] Mayor supports the need for limited improvements to London's road network, whether in improving or extending existing capacity, or providing new links, to address clearly identified significant strategic or local needs'. Policies 6.12B and C addresses road network capacity with respect to planning decisions and states:

B: In assessing proposals for increasing road capacity, including new roads, the following criteria should be taken into account:

- the contribution to London's development / regeneration including improved connectivity
- the extent of any additional traffic and any effects it may have on the locality, and the extent to which congestion is reduced
- how net benefit to London's environment can be provided
- how conditions for pedestrians, cyclists, public transport users, freight and local residents can be improved;

- how safety for all is improved for all.

C: Proposals should show, overall, a net benefit across these criteria when taken as a whole. All proposals must show how any dis-benefits will be mitigated.

4.29. While acknowledging the limited capacity for tackling urban congestion by increased road capacity and also the limits to the extent that demand can be met and managed effectively by simply providing additional road capacity, para 6.40 states 'there will continue to be a place for road-based modes in London's future development, and… there may well be cases where new roads are needed to support regeneration, improve the environment, increase safety or provide essential local access. Local road improvements may sometimes be required, particularly in areas of substantial regeneration or development activity'.

4.30. In addition to the policies which fall within the transport section of the plan there are a number of policies in other sections which new river crossings might help directly deliver, in particular the following:

- Policy 3.1A- Ensuring equal life chances for all. The Mayor is committed to ensuring equal life chances for all Londoners. Meeting the needs and expanding opportunities for all Londoners - and where appropriate, addressing the barriers to meeting the needs of particular groups and communities - is key to tackling the huge issue of inequality across London.
- Policy 4.12A - Improving opportunities for all. Working with strategic partners, principally the London Enterprise Partnership, the Mayor will provide the spatial context to co-ordinate the range of national and local initiatives necessary to improve employment opportunities for Londoners, to remove barriers to employment and progression and to tackle low participation in the labour market.

Mayor's Transport Strategy

4.31. The Mayor's Transport Strategy (MTS)[6] was published by the Mayor of London in May 2010. The document sets out the Mayor's Transport Strategy for London for the period up to 2031. It supersedes the first version published in July 2001 (including its revisions).

4.32. The MTS is the principal policy tool through which the Mayor exercises his responsibilities for the planning, management and development of transport in London, for both the movement of people and goods. It was published before the current London Plan however it takes into account the policies that were emerging in the draft version, and the Mayor's Economic Development Strategy. It provides the policy context for the more detailed plans of the various transport related implementation bodies, particularly TfL and the London boroughs.

4.33. The six goals the MTS seeks to achieve are:

- To support economic development and population growth
- Enhance the quality of life for all Londoners

[6] http://www.london.gov.uk/publication/mayors-transport-strategy

- Improve the safety and security of all Londoners
- Improve transport opportunities for all Londoners
- Reduce transport's contribution to climate change, and improve its resilience
- Support delivery of the London 2012 Olympic and Paralympic Games and its legacy.

4.34. Within these six overarching goals, a number of more specific challenges and outcomes were identified, and these are given in the Figure below.

Figure 4.1: Mayor's Transport Strategy goals, challenges and outcomes

Goals	Challenges	Outcomes
Support economic development and population growth	Supporting sustainable population and employment growth	· Balancing capacity and demand for travel through increasing public transport capacity and/or reducing the need to travel
	Improving transport connectivity	· Improving people's access to jobs · Improving access to commercial markets for freight movements and business travel, supporting the needs of business to grow
	Delivering an efficient and effective transport system for people and goods	· Smoothing traffic flow (managing delay, improving journey time reliability and resilience) · Improving public transport reliability · Reducing operating costs · Bringing and maintaining all assets to a state of good repair · Enhancing use of the Thames for people and goods
Enhance the quality of life for all Londoners	Improving journey experience	· Improving public transport customer satisfaction · Improving road user satisfaction (drivers, pedestrians, cyclists) · Reducing public transport crowding
	Enhancing the built and natural environment	· Enhancing streetscapes, improving the perception of the urban realm and developing 'better streets' initiatives · Protecting and enhancing the natural environment
	Improving air quality	· Reducing air pollutant emissions from ground-based transport, contributing to EU air quality targets
	Improving noise impacts	· Improving perceptions and reducing impacts of noise
	Improving health impacts	· Facilitating an increase in walking and cycling
Improve the safety and security of all Londoners	Reducing crime, fear of crime and antisocial behaviour	· Reducing crime rates (and improving perceptions of personal safety and security)
	Improving road safety	· Reducing the numbers of road traffic casualties
	Improving public transport safety	· Reducing casualties on public transport networks
Improve transport opportunities for all Londoners	Improving accessibility	· Improving the physical accessibility of the transport system · Improving access to services
	Supporting regeneration and tackling deprivation	· Supporting wider regeneration
Reduce transport's contribution to climate change and improve its resilience	Reducing CO_2 emissions	· Reducing CO_2 emissions from ground-based transport, contributing to a London-wide 60 per cent reduction by 2025
	Adapting to climate change	· Maintaining the reliability of transport networks
Support delivery of the London 2012 Olympic and Paralympic Games and its legacy	Developing and implementing a viable and sustainable legacy for the 2012 Games	· Supporting regeneration and convergence of social and economic outcomes between the five Olympic boroughs and the rest of London · Physical transport legacy · Behavioural transport legacy

4.35. Any projects promoted by TfL should seek to address the challenges set out above; however, any individual scheme or package of schemes will be seeking to address specific problems, and will be unlikely to tackle all MTS objectives.

4.36. In addition, the MTS contains specific policies which are relevant to consideration of new crossings:

Proposal 35

The Mayor, through TfL, and working with the London boroughs and other stakeholders will give consideration to new road schemes where there is an overall net benefit when judged against the following criteria:

a) The contribution to London's sustainable development/ regeneration including improved connectivity
b) The extent to which congestion (average vehicle delay, unreliable journey times and poor levels of network resilience) is reduced
c) How net benefit to London's environment can be provided
d) How conditions for pedestrians, cyclists, public transport users, freight transport and local residents can be improved
e) How safety for all is improved

All proposals will demonstrate how any disbenefits will be mitigated.

4.37. The current MTS policy on river crossings is as follows:

Proposal 39

The Mayor, through TfL, and working with the London boroughs and other stakeholders, will take forward a package of river crossings in east London, including:

a) A new fixed link at Silvertown to provide congestion relief to the Blackwall Tunnel and provide local links for vehicle traffic
b) An upgraded Woolwich Ferry and consideration of a new vehicle ferry at Gallions Reach to improve connectivity
c) Local links to improve connections for pedestrians and cyclists
d) Consideration of a longer-term fixed link at Gallions Reach to improve connectivity for local traffic, buses, cyclists and to support economic development in this area
e) The encouragement of modal shift from private cars to public transport, using new rail links including High Speed One domestic services, Crossrail and the DLR extension to Woolwich, reducing road demand, and so road congestion at river crossings, where possible
f) Support for Government proposals to reduce congestion at the Dartford crossing

4.38. The current MTS policy on road user charging is as follows:

Proposal 130

The Mayor, through TfL, and working with the London boroughs and other stakeholders, if other measures are deemed insufficient to meet the strategy's goals, may consider managing the demand for travel through pricing incentives (such as parking charges or road user charging schemes). This would depend upon there being a reasonable balance between the objectives of any scheme and its costs and other impacts.

Any scheme would need to take account of local conditions, as well as the impact on surrounding regions, and to be fair and flexible relating charges to the external costs of travel with sensitivity to time of day, and with scope for discounts or exemptions for specific user groups. The Mayor will also consider imposing charges or tolls to support specific infrastructure improvements, such as river crossings.

4.39. Given that there is no capital budget for any new crossings, and that tolling may be useful as a means of managing demand and protecting the existing assets, tolls may be required as part of the package of measures.

London City Charter

4.40. The London City Charter[7] was signed by the Mayor of London and Cllr Merrick Cockell, Chairman of London Councils, in 2009. This is not a statutory document, but a voluntary agreement between the Mayor and the London Boroughs to work collaboratively in the interests of the city as a whole.

4.41. With specific regard to transport, the City Charter states that:

> *London's councils, GLA and Transport for London will deliver the best possible transport outcomes for London. To do this, we commit to working closely and effectively, relying on a relationship based on trust, respect and partnership. Only by working together can we rise to meet the challenges facing London and deliver the maximum benefits to everyone who lives and works in London.*
>
> *Together the Mayor, Boroughs and Transport for London will work together to make common objectives a reality, to help make London a better place in which to live, work, and do business.*

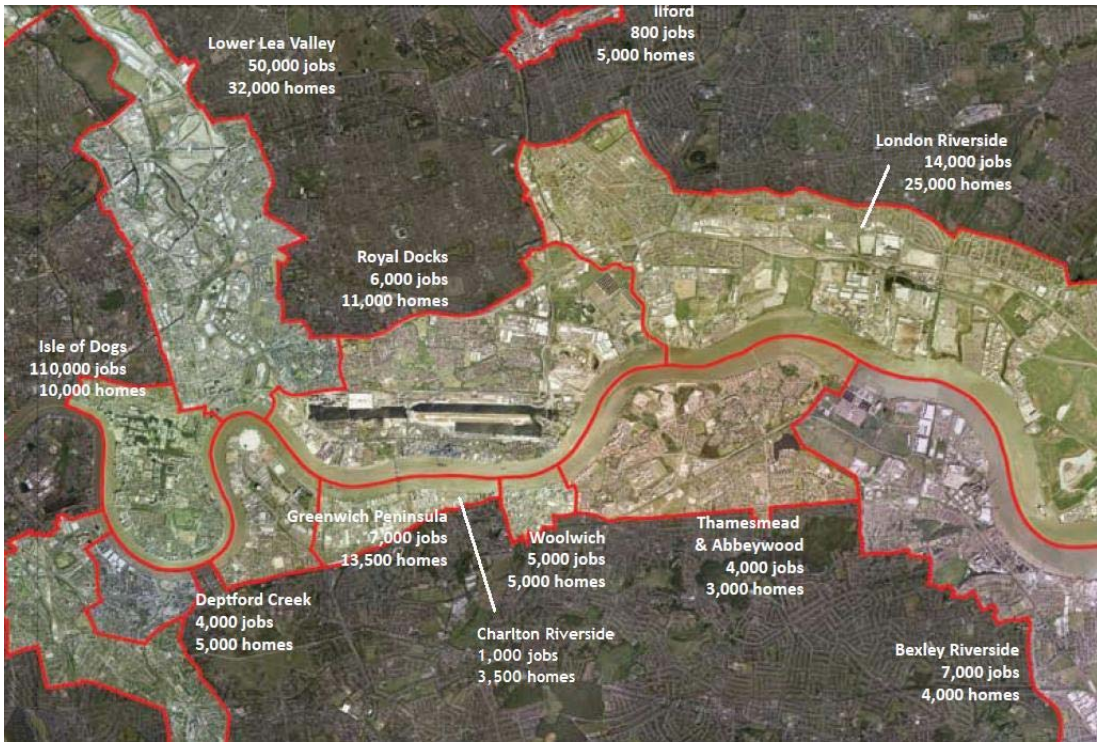
[7] http://www.london.gov.uk/city-charter

Role of Opportunity Areas

4.42. The London Plan states that 'growth will be supported and managed across all parts of London to ensure it takes place within the current boundaries of Greater London without: a) encroaching on the Green Belt, or on London's protected open spaces, and b) having unacceptable impacts on the environment' (policy 1.1B). The plan goes on to state that 'in spatial terms, this will mean renewed attention to the large areas of unused land in east London where there are both the potential and need for development and regeneration' (para 2.4).

4.43. The London Plan therefore identifies London's reservoir of brownfield land and particularly the larger sites in the east as the key to accommodating its growth requirements over the next 20 years (para 2.58). The east sub region contains 14 opportunity areas and areas for intensification, accounting for 27 percent of London's overall land use potential. The east sub-region's opportunity areas and areas for intensification are shown in the Figure below, with indicative capacity for new homes and new jobs from 2011 to 2031, subject to provision of infrastructure.

Figure 4.2: Opportunity Areas in east sub-region – growth potential 2011 to 2031



Source: London Plan 2011 (table A1.1)

4.44. Within the catchment area of the river crossings (those OAs labelled above) there is the potential capacity for 200,000 new jobs and 100,000 new homes, which could be created up to 2031 if the infrastructure allows. River crossing capacity will be important to achieving the levels of development envisaged.

Local policies

London Borough of Newham

4.45. Newham's Core Strategy[8] was published in January 2012 and gives support for provision of new river crossings. 'The Council supports the development of bridge, tunnel or ferry crossings at these locations [Gallions Reach and Silvertown] to provide resilience to the Blackwell Tunnel and to support future growth' (para 6.197). This supersedes policy T12 from the 2001 Unitary Development Plan which also supported a package of Thames crossings.

4.46. Newham's Local Implementation Plan (LIP)[9] for 2013/14 states that the council has a 'serious concern that its [east London's] further development will be hindered by the lack of a suitable road-based river crossing ensuring the efficient flow of both goods and visitors to the centre both north and south of the Thames' (para 2.6.21). The council position is in favour of a package of river crossing improvements, which will need to include a new crossing at Gallions as well as at Silvertown (para 3.2.8). The council is concerned about the impact of the Silvertown crossing on the Canning Town area and mentions various traffic restraint mechanisms such as tolling (para 3.2.8).

4.47. Newham's Unitary Development Plan (UDP)[10] was adopted in June 2001. It is being replaced by the emerging Local Plan (which includes the Core Strategy). In early 2012 a number of UDP policies were 'saved' and these policies continue to inform planning decisions. Of relevance is policy T28: development must have regard to the operational requirements of the Port of London Authority's radar stations at Beckton and North Woolwich (proposal no.T39).

Royal Borough of Greenwich

4.48. Royal Borough (RB) of Greenwich's Draft Core Strategy[11] was consulted on in February 2011, and it is intended that the final version will be adopted in autumn 2012. The draft version states that the Council will 'advocate and work in partnership with relevant agencies to deliver a new package of Thames river crossings in east London, including the continued safeguarding of the Silvertown Link and the Gallions Reach Bridge (policy C3).

4.49. RB Greenwich's LIP[12] was approved in October 2011. One of its aims is it 'continue to promote and support a package of Thames River Crossings (including the development of a fixed crossing at Gallions Reach) ... to improve access to key employment areas and address severance in the east of the Borough' (para 2.5).

4.50. RB Greenwich's UDP[13] was published in 2006. It is supportive of river crossings including 'a bridge between Barking and Thamesmead, which would have dedicated lanes for public transport... and a third Blackwell crossing between North Greenwich and Silvertown. Should this crossing proceed the Council will require a tunnel, not a bridge' (para 7.33).

[8] http://www.newham.gov.uk/planning/localdevelopmentframework/corestrategy.htm
[9] http://www.newham.gov.uk/parkingandtransport/transportplanning/localimplementationplan.htm
[10] http://www.newham.gov.uk/Planning/UnitaryDevelopmentPlan/default.htm
[11] http://www.royalgreenwich.gov.uk/downloads/download/299/core_strategy
[12] http://www.royalgreenwich.gov.uk/info/493/planning-transport_policy/844/local_implementation_plan
[13] http://www.royalgreenwich.gov.uk/info/1004/planning_policy/880/unitary_development_plan

London Borough of Bexley

4.51. Bexley's Core Strategy[14] was adopted in February 2012 and states 'the Council is supportive of proposed improvements which will ease congestion, improve connectivity and enhance resilience of the existing crossings at Blackwall and Dartford. Additional river crossings are also supported in principle subject to no adverse impacts within the borough, such as increased traffic flows' (para 4.7.12). This supersedes and reiterates policy G22 from the 2004 Unitary Development Plan.

4.52. Bexley's LIP[15] for 2013/14 states that 'there is potential to make greater use of existing passenger ferries' (para 2.46).

London Borough of Barking and Dagenham

4.53. Barking and Dagenham's Core Strategy[16] was adopted July 2010. Policy CM4: Transport Links states that 'land will be safeguarded for transport infrastructure schemes that could be implemented within the lifetime of the Plan' and that the Council will continue to press for and support the transport infrastructure improvement projects including the Thames Gateway Bridge, further supported by para 4.4.7.

4.54. Barking and Dagenham's LIP[17] for 2013/14 offers support for Thames Gateway Crossings (para 1.3.6). No specific mention is given in either the Core Strategy or the LIP to the Woolwich Ferry or other replacement options.

London Borough of Tower Hamlets

4.55. The Tower Hamlets LIP[18] was adopted in May 2011 and it gives the Council's support for improving the provision of river crossings to relieve pressure on the borough's road network (page 38). The document mentions both passenger ferries and fixed links (page 78).

4.56. The Tower Hamlets Core Strategy[19] was adopted in September 2010. It seeks to improve the accessibility, permeability and connectivity of Leamouth as part of the redevelopment and regeneration of the area, including river crossings to North Greenwich (LAP 7&8, Leamouth).

London Borough of Lewisham

4.57. Lewisham's Core Strategy[20] was adopted in June 2011 and the LIP[21] was adopted in April 2011. These documents make no mention of the Thames river crossing package.

[14] http://www.bexley.gov.uk/index.aspx?articleid=4027
[15] http://www.bexley.gov.uk/index.aspx?articleid=10875
[16] http://www.lbbd.gov.uk/Environment/PlanningPolicy/LocalPlan/Documents/core-strategy-development-plan-jul-2010.pdf
[17] http://www.lbbd.gov.uk/TransportAndStreets/Pages/LocalImplementationPlan.aspx
[18] http://www.towerhamlets.gov.uk/lgsl/451-500/493_planning_policies_for_tran.aspx
[19] http://www.towerhamlets.gov.uk/lgsl/851-900/855_planning_consultation/core_strategy.aspx
[20] http://www.lewisham.gov.uk/myservices/planning/policy/Documents/CoreStrategyAdoptedVersion.pdf
[21] http://www.lewisham.gov.uk/mayorandcouncil/aboutthecouncil/strategies/Documents/Local%20Implementation%20Plan%202011-31.pdf

London Borough of Redbridge

4.58. Redbridge's Core Strategy[22] was adopted in March 2008 and the borough is currently reviewing this document with a view to adopting an updated version in 2014. The LIP[23] was adopted in April 2011. These documents make no mention of the Thames river crossing package.

[22] http://www2.redbridge.gov.uk/cms/planning_land_and_buildings/planning_policy__regeneration/local_development_framework.aspx

[23] http://www2.redbridge.gov.uk/cms/parking_rubbish_and_streets/general_street_information/travel_plans_and_strategies/local_implementation_plan.aspx

5. POPULATION, EMPLOYMENT AND ECONOMIC DEVELOPMENT

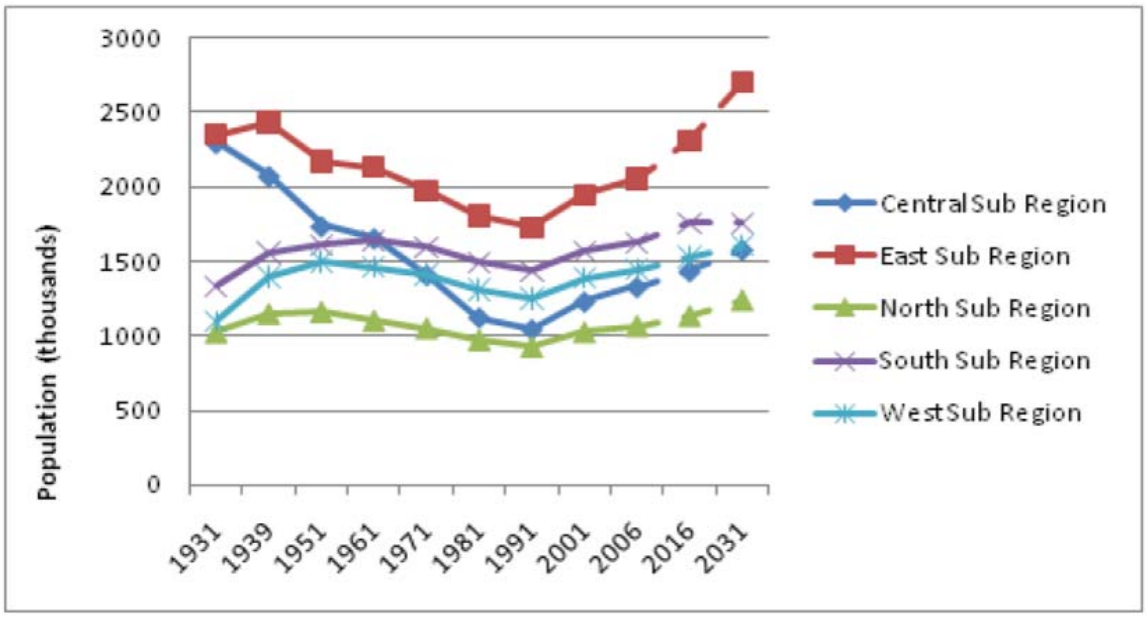
Population

5.1. The regeneration of the former Docklands has taken place within the context of broader historic population and employment trends in London which are set out in the London Plan. The population in all of London's sub-regions declined in the decades following World War II, a process which slowed to a halt during the 1980s.

5.2. The Figure below shows that while the east sub-region has historically had the highest population of the sub-regions in absolute terms, the rate of decline between the 1930s and the 1980s outstripped that of all other non-central sub-regions.

5.3. Population growth since 1991 has been most rapid in the areas where it had previously declined most quickly - the central and east sub-regions. The London Plan anticipates that population growth between 2011 and 2031 in the east sub-region will be considerably more rapid than in the other sub-regions, and by 2031 its population is expected to have comfortably exceeded the previous peak reached in the 1930s.

Figure 5.1: Population change 1931 to present and projections to 2031 in London's sub-regions



Source: East sub-regional plan, 2010 [24]

5.4. GLA forecasts predict that London's population will grow by around 1,150,000 people, or 14%, between 2011 and 2031. The Table below shows that the forecast population growth in all but two of the nine boroughs in the east sub-region is expected to exceed the London average of 14% between 2011 and 2031, in many cases dramatically so. Together, the boroughs in the east sub-region are expected to account for 37% of London's total population growth over this period, while the four

[24] http://boroughs.tfl.gov.uk/sub_regional_transport_plans.aspx

with the highest rates of growth (Tower Hamlets, Newham, Greenwich and Barking & Dagenham) are expected to account for 23% of London's growth.

Table 5.1: Forecast development of population in east sub-region

Resident Population:	2011	2031	% growth
Tower Hamlets	**245,710**	**325,723**	**32.6%**
Newham	**295,777**	**361,181**	**22.1%**
Greenwich	**245,586**	**313,282**	**27.6%**
Bexley	223,811	240,254	7.3%
Hackney	235,334	273,496	16.2%
Havering	233,207	269,676	15.6%
Barking & Dagenham	180,895	233,462	29.1%
Redbridge	266,175	300,212	12.8%
Lewisham	271,275	311,853	15.0%
East sub-region	*2,197,770*	*2,629,139*	*19.6%*
Greater London	*7,991,889*	*9,144,126*	*14.4%*

Source: GLA Population Projections 2011 Round, SHLAA, High Fertility, Borough SYA (Jan 2012, GLA)[25]

5.5. Since the GLA forecasts were published, more recent information from the 2011 census has become available. The census shows that the 2011 London population is already around 180,000 people, or 2%, higher than had been forecast by the GLA. The east sub-region alone accounts for 75,000 of the additional population.

5.6. Further work will be required to understand whether this is growth coming forward earlier than expected, or whether this means that the 2031 end state is likely to be higher than forecast. If population growth exceeds the forecast then future congestion is also likely to be worse than forecast, and this will have implications for the river crossing programme.

[25] http://data.london.gov.uk/datastore/package/gla-population-projections-2011-round-shlaa-borough-sya

Table 5.2: comparing GLA 2011 population forecasts with 2011 census data

Resident Population:	2011 (GLA)	2011 (census)	Difference (absolute)	Difference (of GLA forecast)
Tower Hamlets	**245,710**	**254,096**	**8,386**	**3%**
Newham	**295,777**	**307,984**	**12,207**	**4%**
Greenwich	**245,586**	**254,557**	**8,971**	**4%**
Bexley	223,811	231,997	8,186	4%
Hackney	235,334	246,270	10,936	5%
Havering	233,207	237,232	4,025	2%
Barking & Dagenham	180,895	185,911	5,016	3%
Redbridge	266,175	278,970	12,795	5%
Lewisham	271,275	275,885	4,610	2%
East sub-region	*2,197,770*	*2,272,902*	*75,132*	*3%*
Greater London	*7,991,889*	*8,173,941*	*182,052*	*2%*

Source: GLA Population Projections 2011 Round, SHLAA, High Fertility, Borough SYA (Jan 2012, GLA) and the Census (2011)[26]

5.7. As the population grows, absolute numbers of trips would be expected to grow – both as a result of the travel of residents, and reflecting the increase in freight and servicing that a larger population would require.

[26] http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-274670

Employment

5.8. In contrast to the 37% share of London's total population growth which the east sub-region is expected to accommodate, the share of total employment growth expected to take place in the sub-region is smaller at around 22%.

5.9. Such employment growth as is anticipated is highly concentrated, with three of the nine boroughs in the east sub-region forecast to experience growth rates significantly above the London average; growth of some 33% and 22% is envisaged in Tower Hamlets and Newham respectively, while Hackney is expected to experience growth of around 17% (all these boroughs lie north of the river Thames).

Table 5.3: Current and forecast employment in east sub-region

Employment forecasts:	2011	2031	% growth
Tower Hamlets	**227,000**	**301,000**	**32.6%**
Newham	**88,000**	**107,000**	**21.6%**
Greenwich	**80,000**	**87,000**	**8.8%**
Bexley	74,000	79,000	6.8%
Hackney	95,000	111,000	16.8%
Havering	83,000	89,000	7.2%
Barking & Dagenham	51,000	56000	9.8%
Redbridge	74,000	81,000	9.5%
Lewisham	77,000	83,000	7.8%
East sub-region	*849,000*	*994,000*	*17.1%*
Greater London	*4,797,000*	*5,452,000*	*13.7%*

Source: Borough Employment Projections, 2009, GLA (presented in the London Plan, 2011[27])

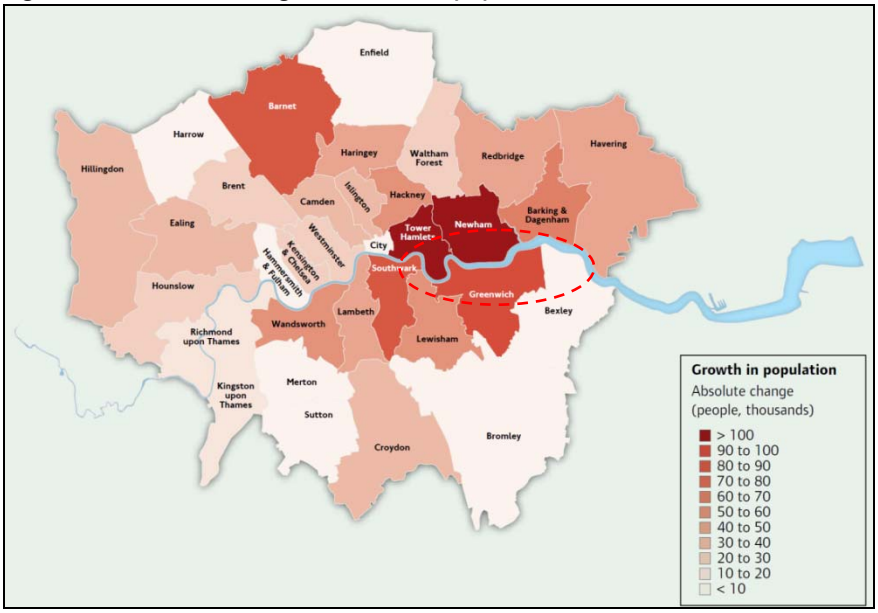
5.10. Some boroughs in the east sub-region, in particular those south of the river and in outer east London (LBs Lewisham, Greenwich, Barking & Dagenham, Havering) are expected to experience significantly greater growth in population than employment over the next twenty years.

5.11. The Figures below illustrate these differences in growth patterns. Employment growth is concentrated in areas north of, and relatively near, the River Thames as well as in central London. The number of jobs in certain areas further north and east are expected to actually decline. In contrast, significant population growth is anticipated across a broader area of the sub-region, including more areas south of the river and in outer east London.

5.12. The red ellipse outlines the area of east/south east London which is most directly affected by the river crossings policy.

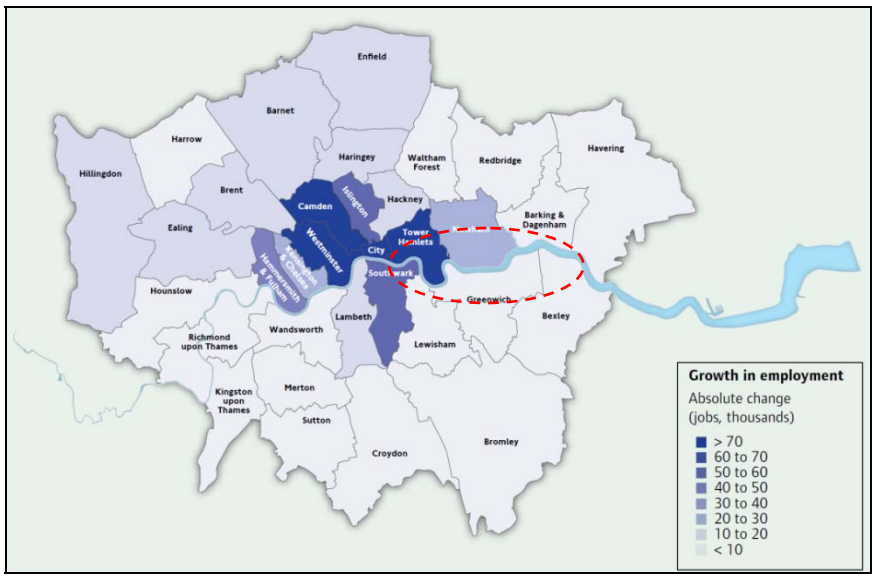
[27] http://www.london.gov.uk/sites/default/files/The%20London%20Plan%202011_1.pdf

Figure 5.2: Forecast changes in London's population, 2006 to 2031



Source: East sub-regional plan, 2010 [28]

Figure 5.3: Forecast changes in London's employment, 2006 to 2031



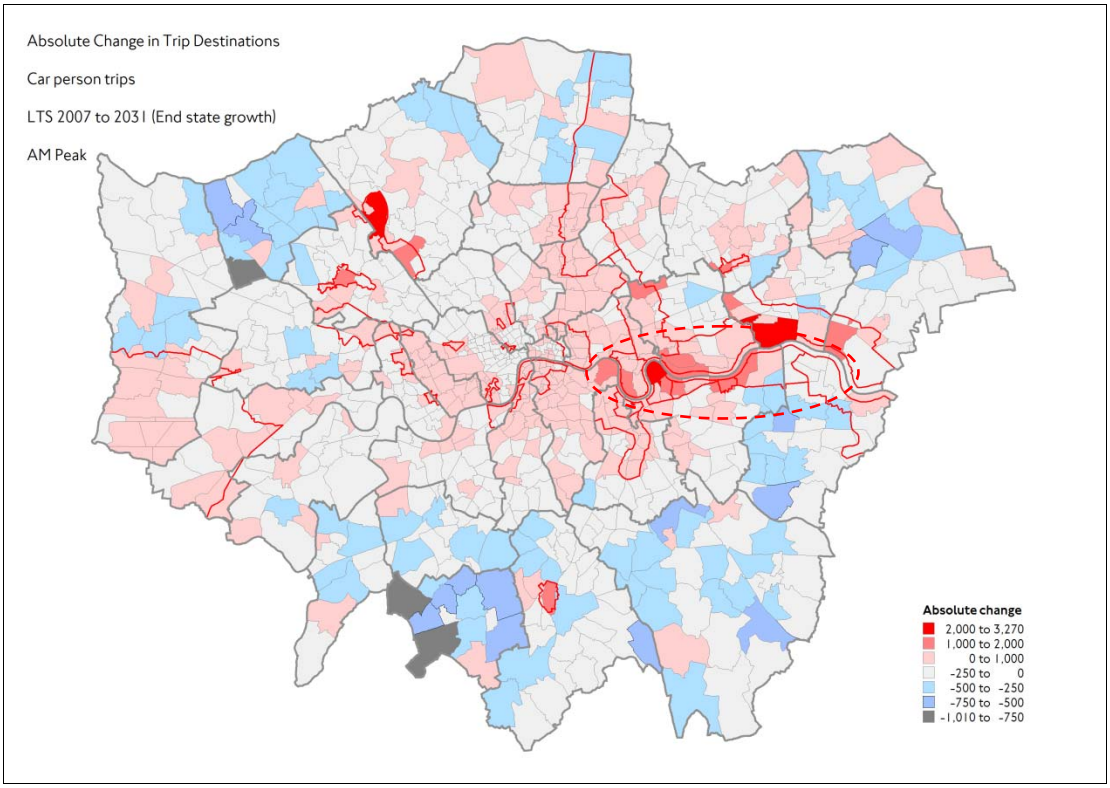
Source: East sub-regional plan, 2010

5.13. The implication of this disparity is that if employment rates are to be maintained or increased, residents of the study area will increasingly often need to find employment outside their home borough, leading to an increased need for travel within and beyond the study area - including cross-river travel.

5.14. TfL has modelled the changes in population and employment, and the implications of this on demand to travel. The Figure below shows the forecast of the change in car trip ends – that is, the number of car drivers' or car passengers' journeys ending in a particular area.

[28] http://boroughs.tfl.gov.uk/sub_regional_transport_plans.aspx

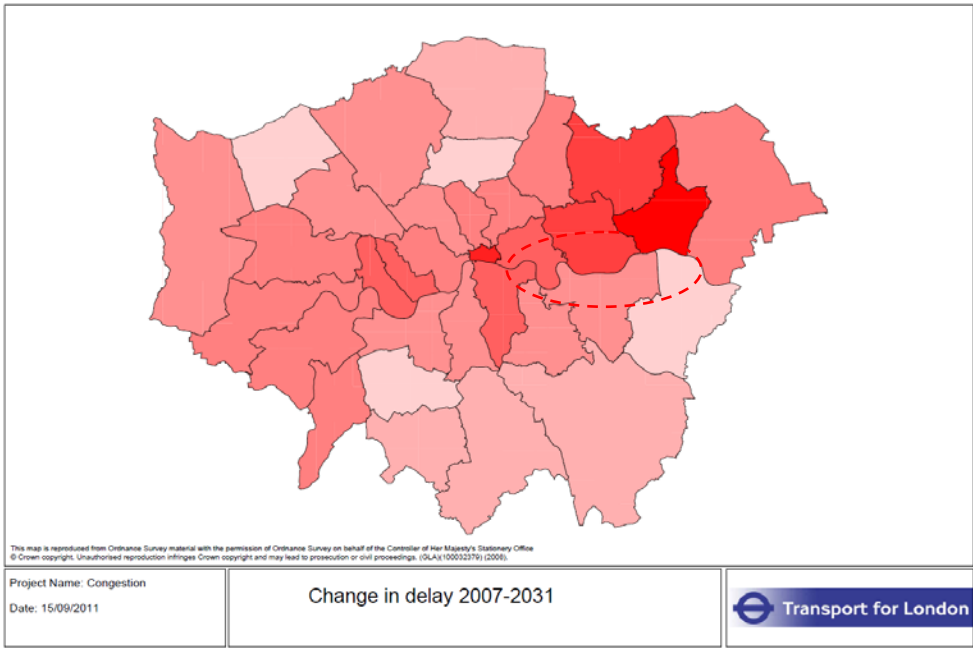
Figure 5.4: Change in vehicle trip ends, AM peak, 2007 to 2031



Source: TfL Strategic Analysis, LTS model

5.15. TfL's traffic forecasts suggest that levels of congestion will increase most in the east sub-region, as the foregoing data would suggest. The Figure below illustrates the forecast change in levels of congestion by borough from 2007 levels to 2031.

Figure 5.5: Forecast change in congestion by borough, 2007 to 2031

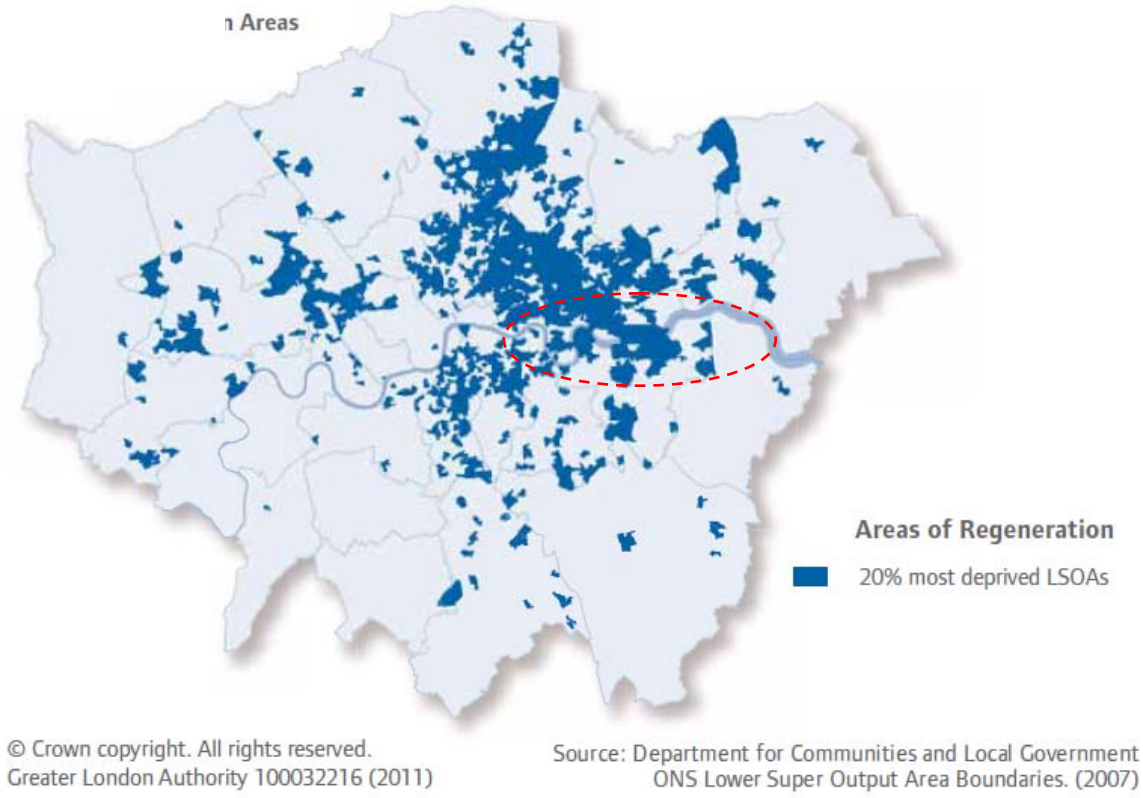


Source: TfL Strategic Analysis, LTS model

Economic development

5.16. The Figure below shows that the inner parts of the east sub-region are heavily over represented in the 20% most deprived lower layer super output areas (LSOAs) in London. (Note that LSOAs are geographic areas which have been automatically generated to be as consistent as possible in terms of population size. The minimum population is 1,000 and the mean is 1,500. The London Plan identifies the 20% most deprived LSOAs as areas for regeneration.)

Figure 5.6: Location of 20% most deprived LSOAs in London



Source: London Plan, 2011

5.17. There is variation within the sub-region, but in general the boroughs in the study area perform significantly worse than the London and national averages across a range of social and economic indicators. In particular, participation in the labour market tends to be lower, while unemployment and dependency on key state benefits is higher. This relative poor performance is illustrated in the following Table which shows that the London Boroughs of Greenwich, Newham, and Tower Hamlets perform significantly worse than the average for London and England as a whole.

Table 5.4: Key social indicators in selected boroughs in study area, with London and England averages (rounded)

	Activity rate (%)	Employment (%)	Unemployment (%)	Proportion of working age population who claim out of work benefits (%)
Barking and Dagenham	75	60	15	20
Bexley	75	70	5	10
Greenwich	80	70	10	15
Newham	70	55	15	20
Tower Hamlets	75	60	15	15
London	80	70	10	10
England	80	70	10	10

Source: GLA London Borough Profiles, based on 2011 Census [29]

** Note: Activity rate (%) measures the proportion of the working age population (16-64) who are active or potentially active members of the labour market.*

** Note: Working age out of work benefits include jobseekers allowance, income support for lone parents, incapacity benefits and other income related benefits.*

5.18. The level of deprivation in the east sub-region may be further exacerbated by the fact that population is expected to grow at a faster rate than employment within the sub-region. More people will need to travel within and beyond the study area, including cross-river travel, in order to reach employment. The comparative deprivation may be somewhat alleviated by improving connectivity across the region, allowing better access to employment and improved links for business.

East London contains areas of high deprivation and the population is rising rapidly.

Levels of congestion are forecast to rise alongside an increase in both population and employment.

[29] http://data.london.gov.uk/datastore/package/london-borough-profiles

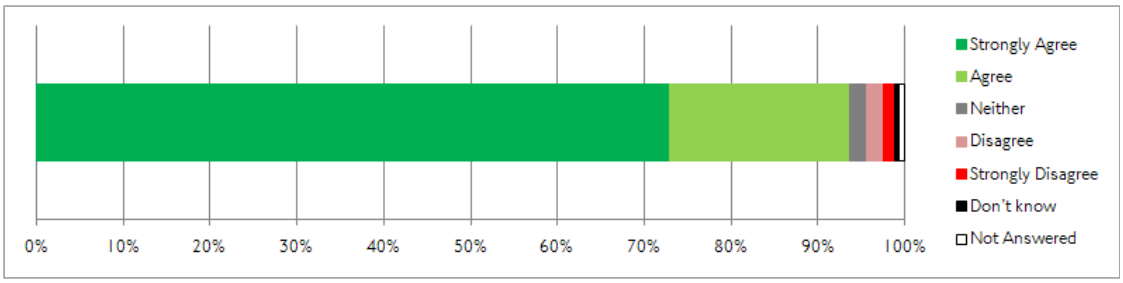
6. PUBLIC AND STAKEHOLDER CONTEXT

Public Consultation

6.1. In February 2012 TfL held an informal consultation with stakeholders and members of the public on proposals for a package of new highway river crossings in east and southeast London. There were around 3,900 respondents. The first four questions are relevant in an assessment of need for new river crossings.

6.2. Question 1 was 'to what extent do you agree that it can be difficult to cross the river in east/south east London?' Overwhelmingly, respondents agreed that it can be difficult to cross the river in east and southeast London, with just 6% of respondents not either agreeing or strongly agreeing.

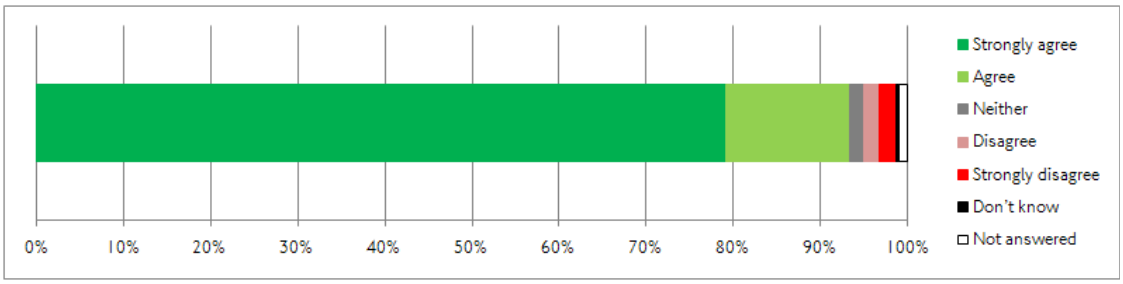
Figure 6.1: Responses to Q1 from respondents



Source: River crossing consultation report, 2012

6.3. Question 2 was 'to what extent do you agree that there is a need for more river crossings in east/south east London?' Respondents also agreed strongly that there is a need for more river crossings in east and southeast London. Only 4% disagreed.

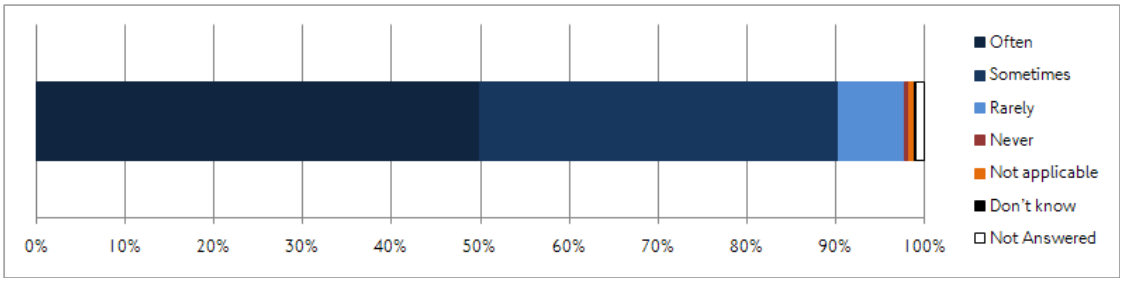
Figure 6.2: Responses to Q2 from respondents



Source: River crossing consultation report, 2012

6.4. Question 3 was 'how often do you need to cross the river in east/south east London?' 90% of respondents reported that they need to cross the river in east and southeast London either often or sometimes. 7% said they rarely needed to cross the river.

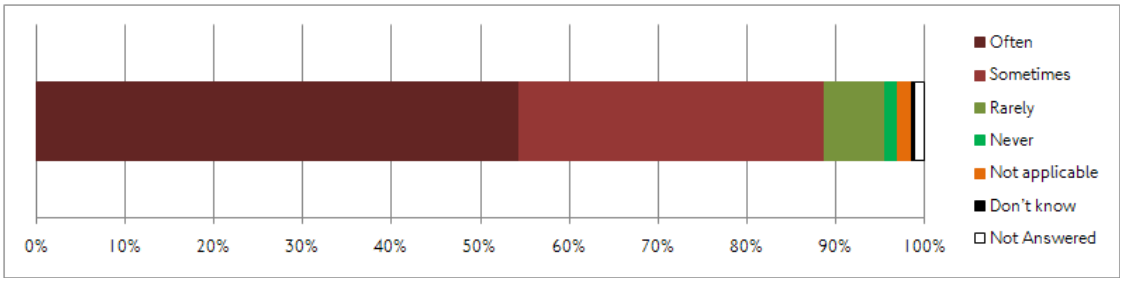
Figure 6.3: Responses to Q3 from respondents



Source: River crossing consultation report, 2012

6.5. Question 4 was 'how often do you experience problems crossing the river in the east/south east London?' More than 50% of respondents reported experiencing problems in crossing the river in east and south east London often. Only 8% either rarely or never experience problems.

Figure 6.4: Responses to Q4 from respondents



Source: River crossing consultation report, 2012

There is very strong support among local residents for improved river crossings.

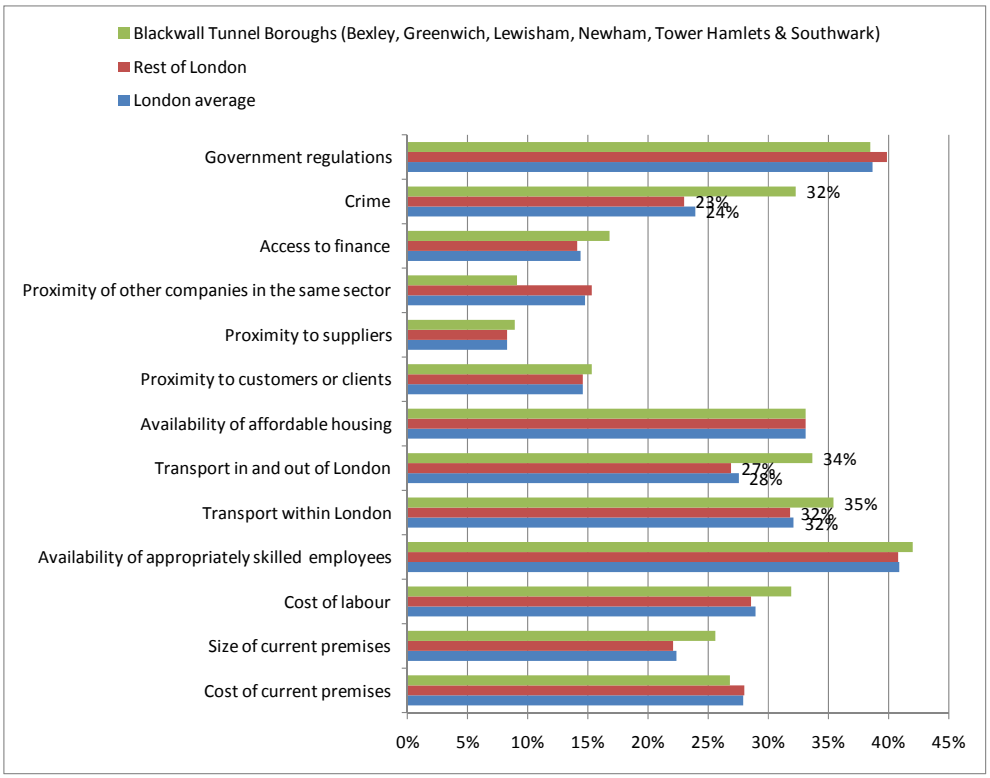
Business surveys

6.6. In November 2009 TfL commissioned an investigation into the business impacts of congestion at the Blackwall Tunnel. The analysis was based on the London Annual Business Survey 2007 (LABS) and ONS data. The LABS survey is based on interviews with around 4,500 firms across London. Among other operational issues, firms were asked about the extent to which 'transport within London' and 'transport in and out of London' was a problem for business located in London.

6.7. The analysis demonstrates that transport is a significant or very significant business constraint for more than one third of the firms around the Blackwall Tunnel. In 2007 more than one third of firms in the six boroughs located around the Blackwall Tunnel reported that 'transport within London' (35%) and 'transport in and out of London' (34%) was a significant or very significant business issue. This compares to 32% and 28% respectively for London.

6.8. After crime, 'transport in and out of London' shows the biggest difference over and above the London average for the six Blackwall Tunnel boroughs, with an additional 6% of firms rating it as a significant or very significant problem.

Figure 6.5: Business issues for firms in boroughs around the Blackwall Tunnel, rated significant or very significant, 2007 LABS survey

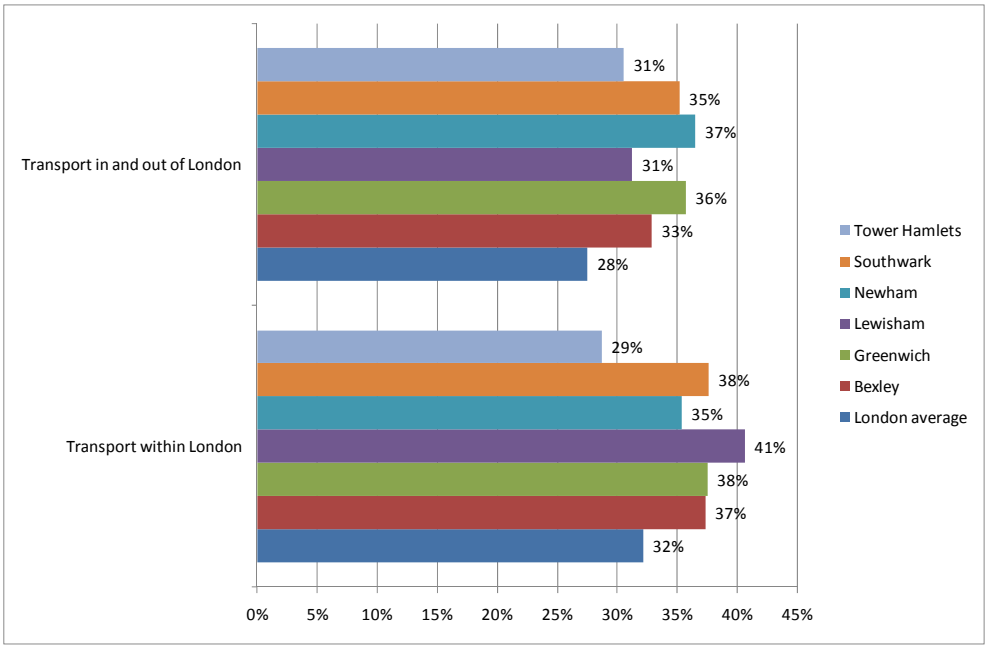


Source: Business impacts of congestion at Blackwall Tunnel report, 2009. Sample of 4,527 firms across London and 421 firms for six boroughs around the Blackwall Tunnel

6.9. At a borough level the 2007 LABS shows that 'transport in and out of London' is a significant or very significant issue for 37% of firms in Newham, 36% of firms in Greenwich, 35% of firms in Southwark and 33% of firms in Bexley, compared to the average of 28% of firms across London.

6.10. Also at a borough level the 2007 LABS survey shows that 'transport within London' is a significant or very significant issue for 41% of firms in Lewisham, 38% of firms in Greenwich and Southwark and 37% of firms in Bexley compared to the average of 32% of firms across London. All of these boroughs are located south of the Thames in east London, which is less well served by river crossing options. Tower Hamlets is the only borough around the Blackwall Tunnel where 'transport within London' is a significant or very significant issues for fewer firms than the London average (29%). It is expected that this reflects the high level of investment into public transport services at Canary Wharf.

Figure 6.6: Firms in boroughs around the Blackwall Tunnel reporting transport problems as a business issue in 2007 (rated significant or very significant)



Source: Business impacts of congestion at Blackwall Tunnel report, 2009. Sample of 4,527 firms across London, 77 in Bexley, 72 in Greenwich, 65 in Lewisham, 66 in Newham, 109 in Southwark and 109 in Tower Hamlets

Local businesses in the area rate transport as a significantly greater problem than businesses elsewhere in London, with businesses in every local borough rating transport in an out of London as a significant problem in higher numbers than the London average.

7. PUBLIC TRANSPORT, WALKING AND CYCLING NETWORKS

7.1. There has been a period of sustained investment in public transport capacity across the whole of east London over the past 20 years and this will continue with the introduction of Crossrail services from 2018. Prior to 1999 there was only one rail crossing of the River Thames in east London in the form of London Underground's East London line, which provided only a local shuttle from New Cross to Shoreditch.

7.2. Since 1999, new cross-river rail links have been provided on these routes:

(i) Jubilee line (opened 1999, and subsequently enhanced with more frequent and longer trains);

(ii) Docklands Light Railway (extended to Greenwich and Lewisham in 1999, and subsequently enhanced with longer trains, and to Woolwich in 2009);

(iii) High Speed 1, which started operating frequent high speed trains between Kent and east London in 2009;

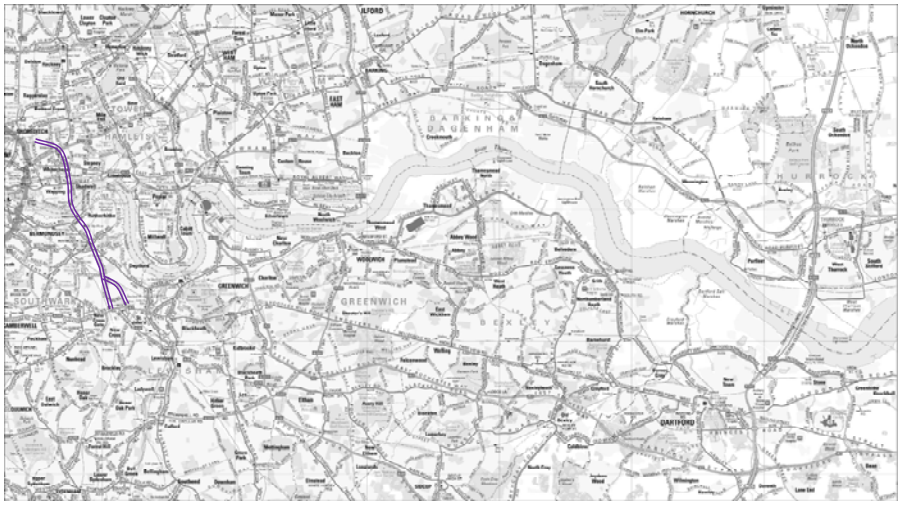
(iv) London Underground's East London line was transferred to the London Overground network, with new services to a much wider range of destinations from 2010, and further services from 2012.

(v) Crossrail, now under construction and which will provide a new high frequency cross-river link to Woolwich from 2018.

7.3. The Figures below show the progression of rail links across the Thames east of central London from 1945.

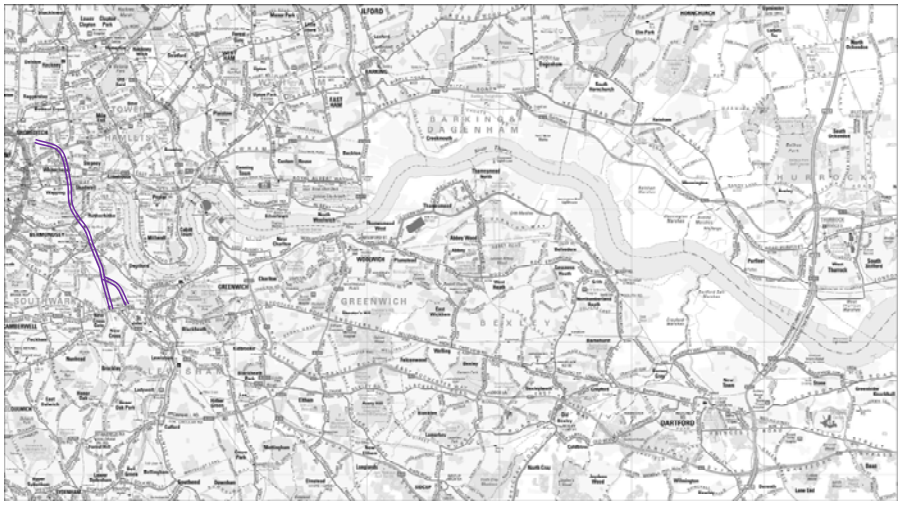
Figure 7.1: Cross-Thames rail links, 1945 to 2025

1945



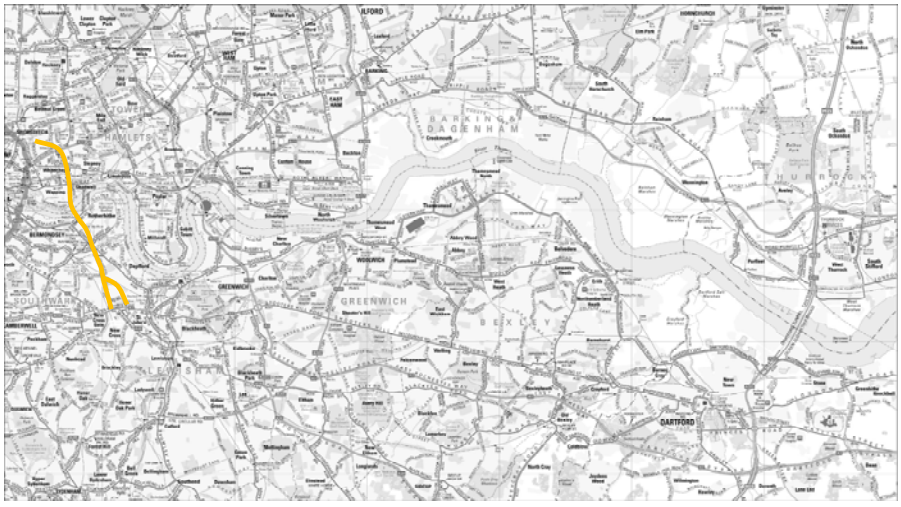
LU Metropolitan line (East London branch)

1985



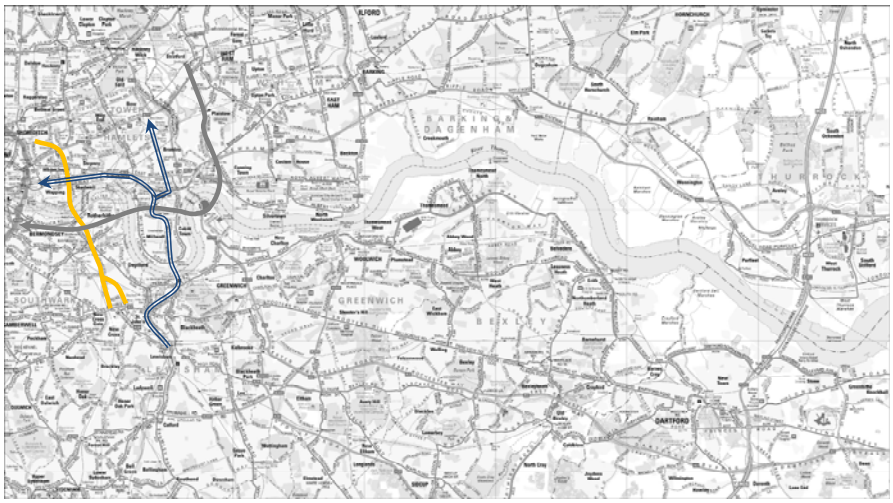
LU Metropolitan line (East London branch)

1995

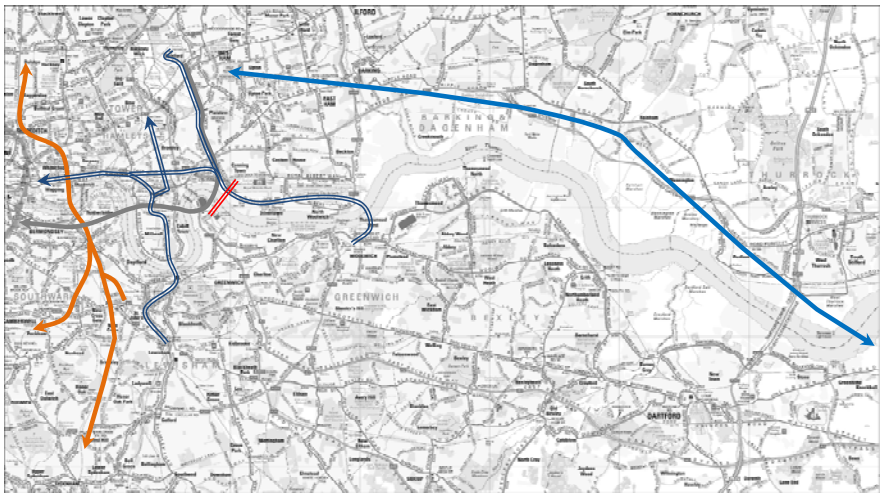


LU East London line

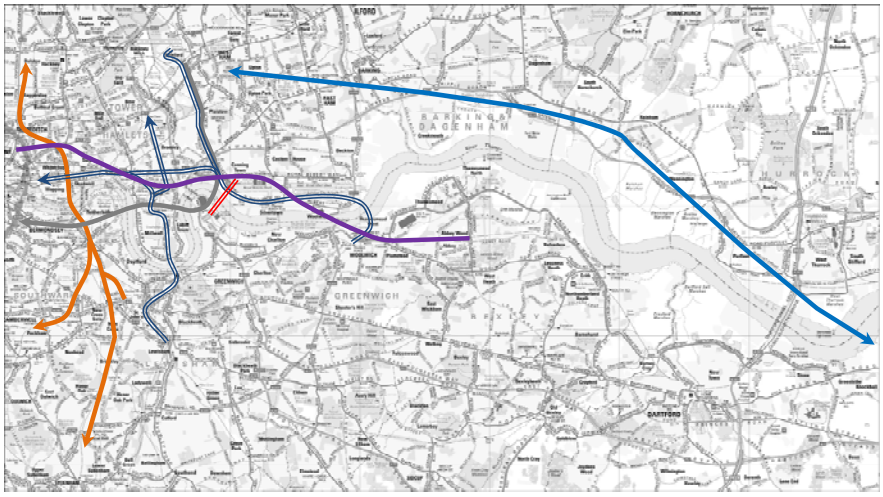
2005



2015

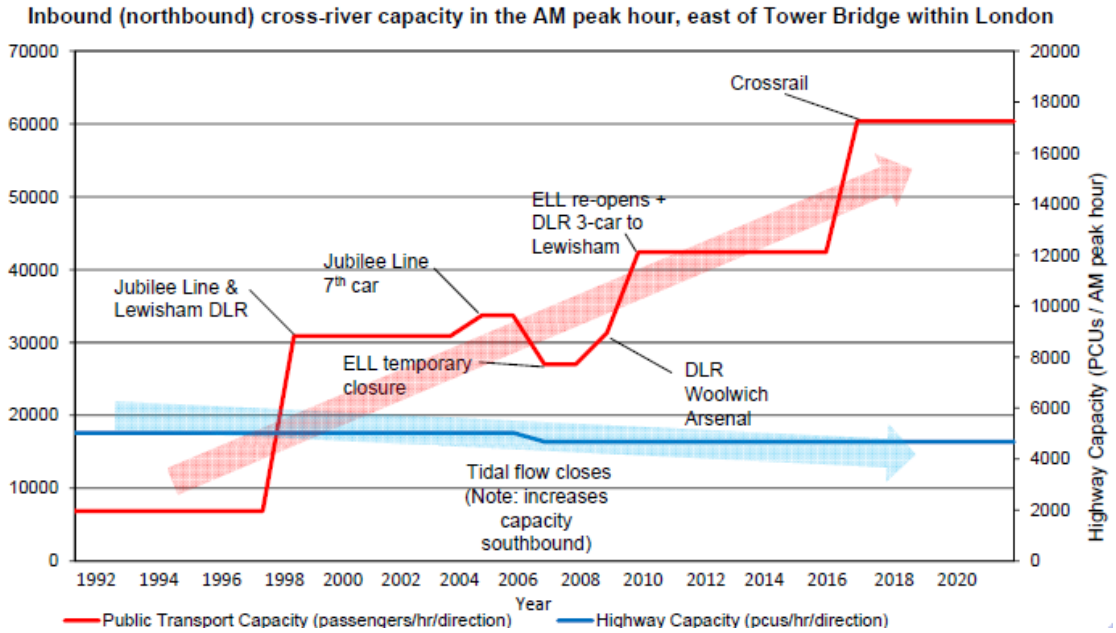


2025



7.4. The Figure below illustrates the scale of new public transport capacity across the Thames in east London compared with highway capacity over the same period.

Figure 7.2: public transport and highway capacity, 1992-2022



7.5. The existing and committed public transport crossings have very significant levels of capacity, and there is scope with additional services to increase the capacity of several of these links without major construction.

7.6. The Table below illustrates the reference case capacity of various crossings in the area (that is, including only committed enhancements); it also shows the maximum potential capacity should the crowding levels demand it, through provision of additional and/or longer trains.

Table 7.1: Reference case and potential maximum capacity of public transport river crossings in east London

Crossing	Ref case capacity~ (pax/hr)	Potential max capacity~ (pax/hr)
DLR Cutty Sark – Island Gardens	11,900	17,850*
Jubilee North Greenwich – Canary Wharf	24,720	27,192#
Jubilee Canning Town – North Greenwich	19,776	27,192#
DLR Woolwich Arsenal – King George V	7,425	17,850**
Crossrail Woolwich – Custom House	12,000	18,000***
Emirates Air Line	2,500****	2,500****

~ If standardised at seated plus 4 standees per square metre

* With additional vehicles and North Route (Bow-Stratford) double tracking in place

** With additional vehicles and higher frequencies (although a more likely intermediate step would be to ~9,000pax/hr with solely additional vehicles to put 3-car Stratford-Woolwich in place)

*** With 30tph core service, 18tph on Abbey Wood branch

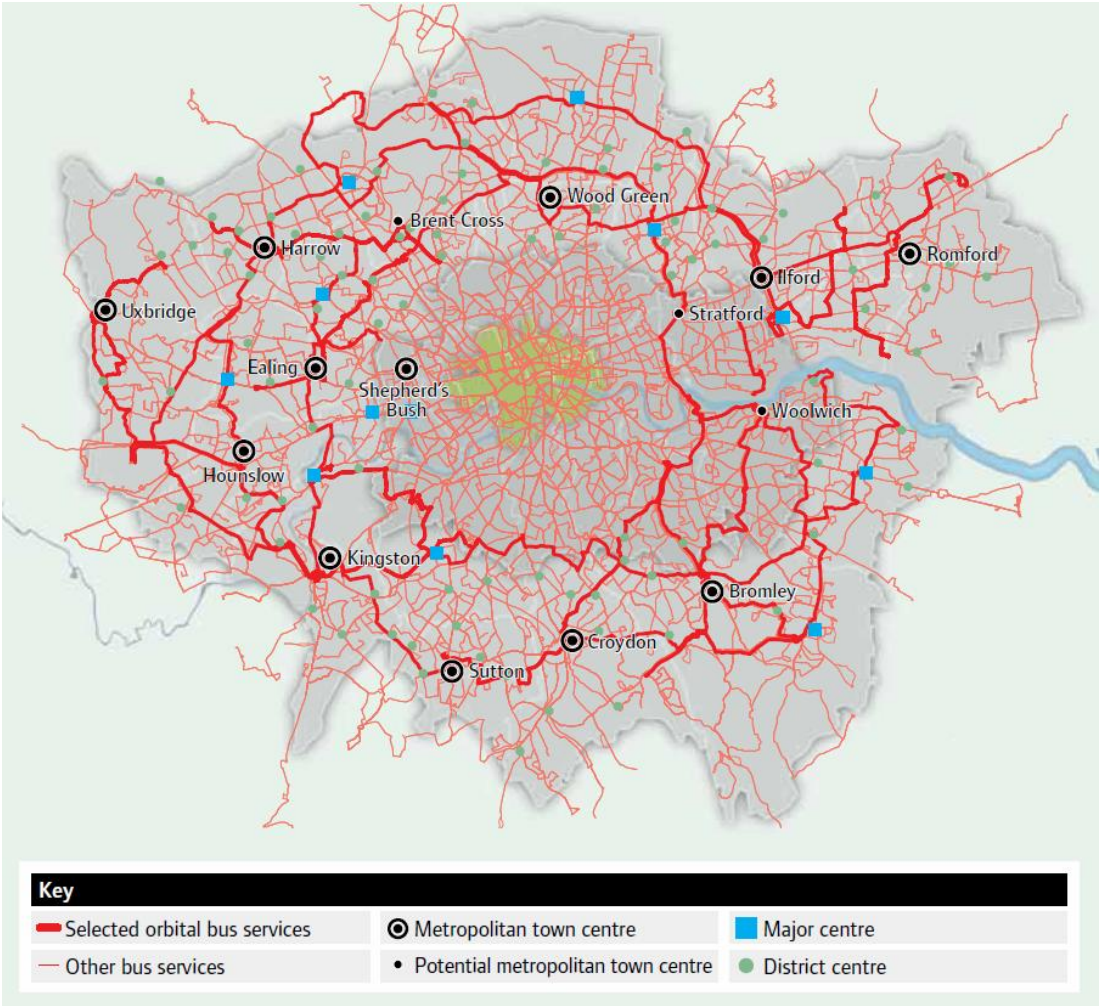
**** Theoretical maximum, all cabins full, system at full speed. Typical actual capacity lower

With additional trains cascaded from Northern line fleet to give 33tph service

7.7. In line with the MTS, it is TfL's policy to maximise the use of the existing and planned public transport infrastructure wherever possible; as the table shows, there is scope to increase the capacity of several cross-river services within further investment, as and when the demand warrants further capacity. Nevertheless, further measures are necessary to meet the elements of the MTS related to the highway network and vehicle-borne trips.

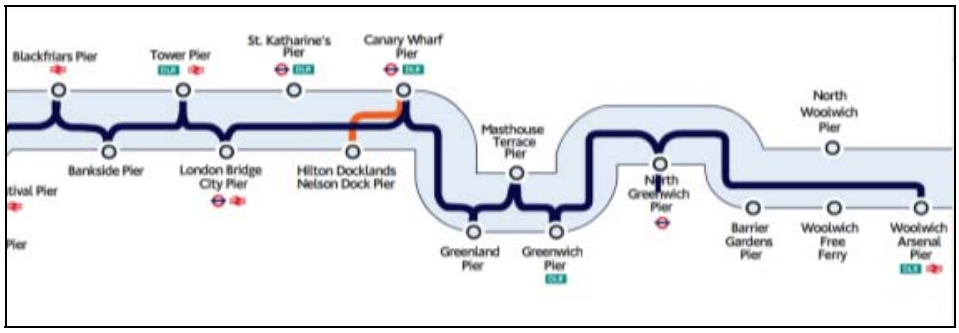
7.8. London's cross-river bus network reflects the limited highway crossing provision to the east of Tower Bridge. Overall there are comprehensive networks of services on both sides of the river in east and south east London, but these networks operate largely independently of one another. The only bus route crossing the river to the east of Tower Bridge is the 108 service between Stratford and Lewisham, which uses the Blackwall Tunnel. Bus connections are available at both ends of the foot tunnel and ferry at Woolwich, and at all cross-river rail stations.

Figure 7.3: London's bus network with orbital routes highlighted



7.9. Some passenger river services operate in this section of the Thames as illustrated below; east of Canary Wharf these are of limited utility for crossing the Thames, as services are more focused on journeys along the river than across it.

Figure 7.4: River Bus services in the study area



7.10. It should also be noted that while public transport is well used, it is forecast even in future years that peak demand can be accommodated on cross-river public transport links, albeit with some degree of standing and crowding. This is different from the highway situation, where all the highway crossings are already operating at full capacity throughout the peak period.

Pedestrian and cycle networks

7.11. Improving conditions for pedestrians and cyclists is a key part of the Mayor's Transport Strategy. However, the scale of the River Thames in east London is such that convenient pedestrian and cycle links are very difficult and costly to provide compared with other areas, such as west London, where crossings do not need to pass over a major shipping channel.

7.12. Existing dedicated foot tunnels exist at Greenwich and Woolwich, built in the early years of the twentieth century and currently undergoing refurbishment and lift replacement by Greenwich Council.

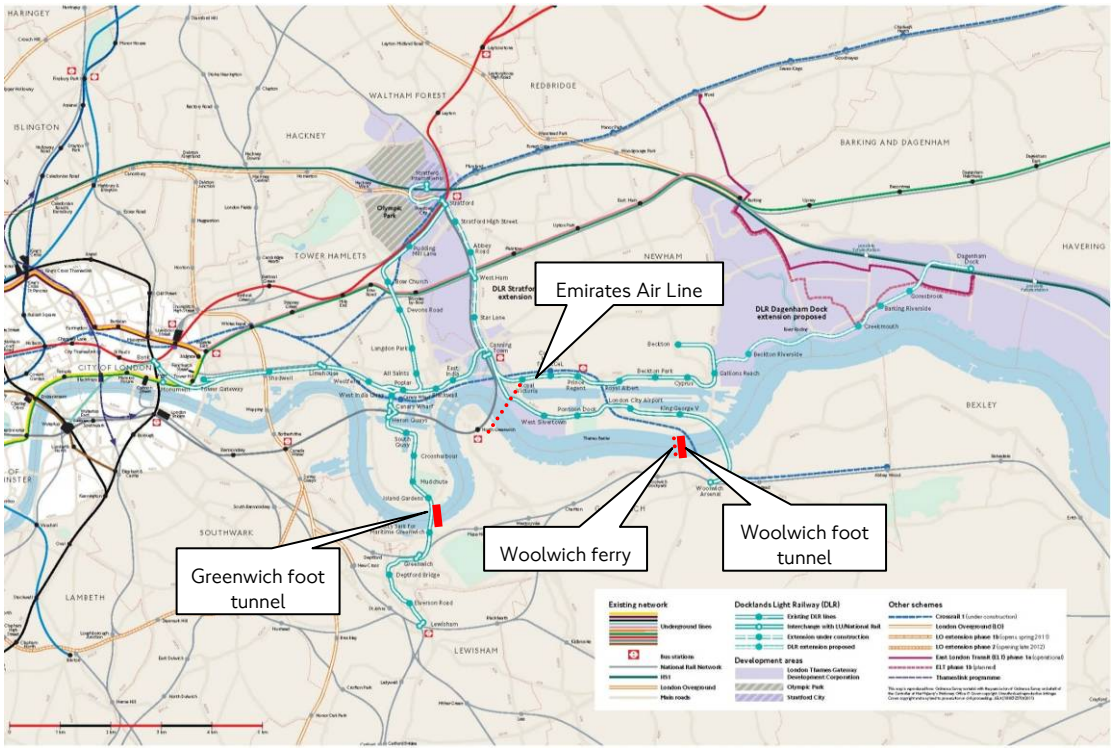
7.13. A footbridge spanning the navigational channel in this part of the river is likely to cost over £100 million to build, and therefore to provide a new link between the Greenwich Peninsula and Royal Docks, an innovative cable car solution was sought. This was around half the cost of a footbridge and was largely funded by sponsorship and regeneration funding, reflecting its role in helping to develop the visitor economy in the Royal Docks and Greenwich Peninsula.

Figure 7.5: Emirates Air Line

7.14. In addition, pedestrians can use public transport links to cross the river in places, as part of a walking trip; this includes the DLR, Jubilee line and Emirates Air Line. They can also use the free Woolwich Ferry.

7.15. Cyclists have slightly fewer public transport options, due to restrictions on the carriage of (non-folded) cycles on the Jubilee line and DLR. However cyclists can use the foot tunnels (but must do so on foot) and Woolwich Ferry free of charge. Cycles may also be carried on the Emirates Air Line, which provides an important link for the Greenwich peninsula as neither cyclists nor pedestrians can use the Blackwall tunnel.

Figure 7.6: River crossings in the study area for pedestrians and cyclists



Summary

Sustained investment in public transport in east London has resulted in a step change in cross-river rail links over the last 20 years, with a further high capacity rail crossing in the form of Crossrail still to come.

Local pedestrian and cyclist trips across the river can be undertaken by means of one of the public transport links, the Emirates Air Line between the Greenwich Peninsula and Royal Docks, and by one of the foot tunnels.

While not a driving factor in pursuing a new crossing compared with the highway needs, there is an opportunity to connect the bus networks if new road infrastructure is built.

8. HIGHWAY NETWORK

INTRODUCTION

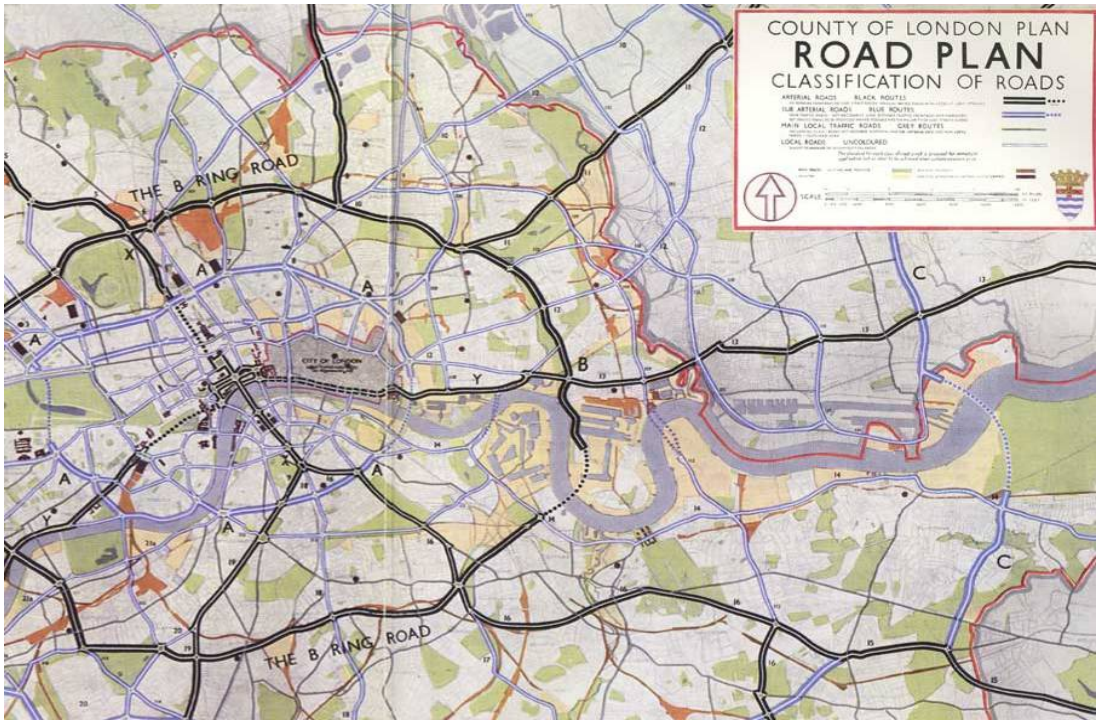
8.1. This chapter provides an overview of the highway network in the study area. It is organised under the following headings:

- Highway network development
- Current highway network and performance
- Spotlight on the crossings:
  - Tower Bridge
  - Rotherhithe Tunnel
  - Blackwall Tunnel
  - Woolwich Ferry
  - Dartford Crossing
- Future network performance

HIGHWAY NETWORK DEVELOPMENT

8.2. Since the 1930s, various proposals for new highway capacity in east London have been put forward, including new crossings over the Thames. The County of London Plan of 1943 identified a major programme of road building which would be desirable in the post-war reconstruction of London; this included plans for a second Blackwall Tunnel, and two new strategic river crossings, one at Deptford and another at Gallions Reach, shown in the Figure below.

Figure 8.1: Extract from the County of London Plan, 1943



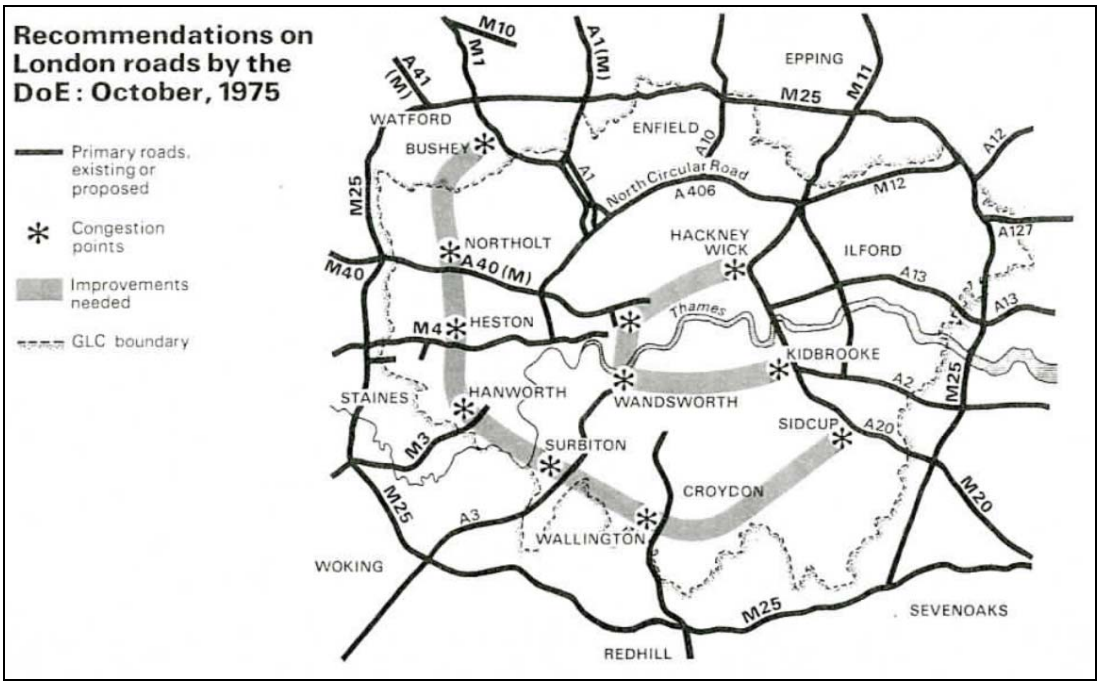
Source: County of London Plan, 1943

8.3. Few of the more ambitious highway plans from that era were built, although the second Blackwall Tunnel opened to traffic in 1967.

8.4. Under the Greater London Council (GLC), a series of Ringways were proposed; these proved to be highly controversial in the 1970s and the programme was abandoned after a few years in which only small elements of the proposed network were built.

8.5. Following the abandonment of the wider Ringways programme, only a small number of highway schemes remained proposed; one of these was a new river crossing between Thamesmead and Gallions Reach, with a link from the M11 and North Circular to the A2 at Falconwood.

Figure 8.2: London's proposed primary highway network as of 1975



8.6. The scheme to link the North Circular to the A2 at Falconwood was progressed by the government in the 1990s as the "East London River Crossing", but included a major cutting through residential areas and Oxleas Wood, an ancient woodland which provoked strong environmental protests. The scheme was abandoned in 1993.

8.7. In the 2000s, the Mayor of London proposed a bridge at Gallions Reach; called the Thames Gateway Bridge (TGB), this would have been a dual carriageway river crossing on the same alignment as the East London River Crossing, but stopping on the southern side at Western Way in Thamesmead, without a direct link to the A2. This incorporated a busway linking Thamesmead to Gallions Reach DLR station.

8.8. The bridge was supported by some key stakeholders, including the London Boroughs of Greenwich and Newham, within which the proposed crossing would have been built.

8.9. However, it was opposed by the London Borough of Bexley, which lies close to the southern end of the bridge. A key concern for Bexley was the impact of traffic passing through roads in the area to access the bridge, in particular the corridor south from Abbey Wood through Welling and Bexleyheath towards the A2.

8.10. Following the 2008 London election, the Mayor confirmed that he would not progress the Thames Gateway Bridge scheme.

Despite several decades in which a new road crossing of the Thames between Blackwall and Dartford has been proposed, a crossing has not yet been built.

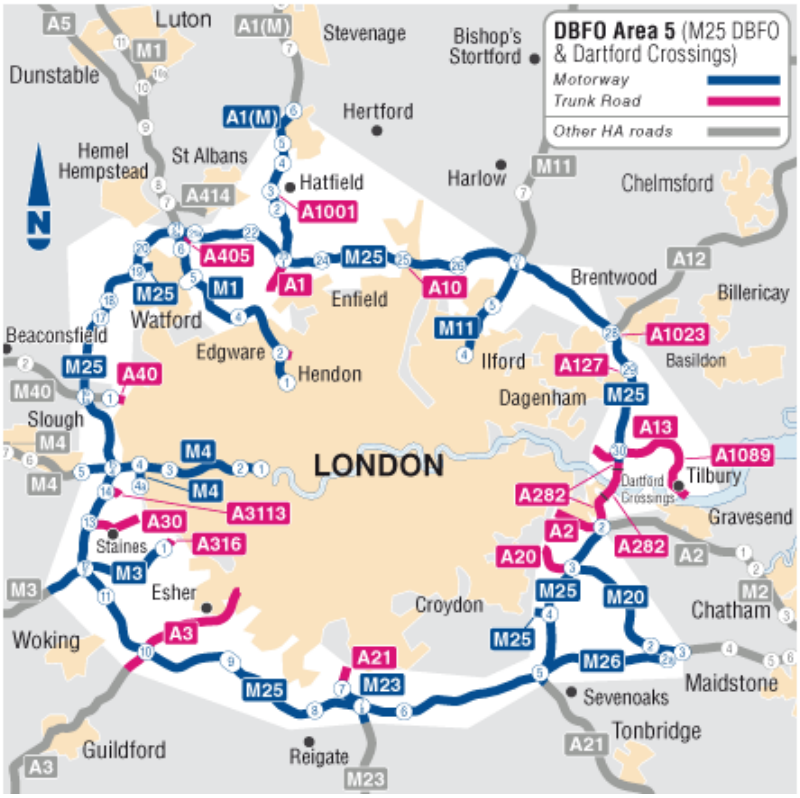
CURRENT HIGHWAY NETWORK AND PERFORMANCE

International and national road network

8.11. The Department for Transport has designated a Strategic National Network for roads within England, designating the network of roads which are of primary importance for national and international traffic.

8.12. The Figure below shows the extent of the network around London. The principal routes for long distance traffic bypass London using the M25. This means that none of the crossings in the study area are part of the national strategic road network, though the A282 Dartford Crossing, forming part of the M25 London Orbital, is a part of the national network.

Figure 8.3: Strategic national road network in and around London



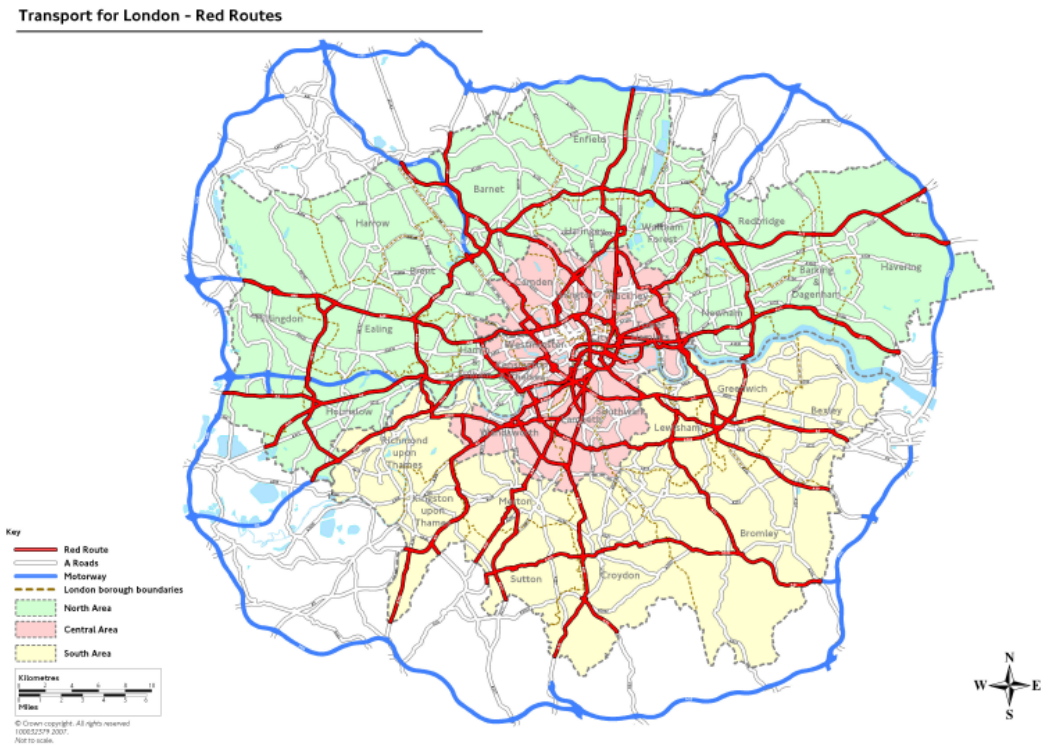
Source: Highways Agency[30]

London-wide road network

8.13. Within the M25, the London-wide road network caters for London wide trips, as well as providing a means of accessing the national and international road networks. The London wide road network is principally composed of the Transport for London road network (TLRN), which at 580km covers 4% of London's road length but carries over 30% of its traffic; the London-wide network also effectively includes those sections of motorway and primary routes managed by the Highways Agency which connect the TLRN to the M25.

[30] http://www.highways.gov.uk/our-road-network/managing-our-roads/highways-agency-areas/area-teams/

Figure 8.4: Transport for London road network (TLRN)



Source: TfL[31]

8.14. All of the river crossings within London, east of central London, lie on the TLRN, due to their strategic importance. This includes the Woolwich Ferry, which has a low capacity but is of strategic importance as a link between the North and South Circulars, and for freight movements. The crossings are described in more detail later in this chapter.

Vehicle restrictions on highway crossings

8.15. For certain categories of commercial road user, the number of highway river crossings available in the study area is much more limited since some crossings impose restrictions on the weights, heights, lengths and/or widths of vehicles that may use them. There are also restrictions on the nature of loads which may be carried in tunnels under the terms of legislation which meets the UK's obligations related to the European Agreement on the International Carriage of Dangerous Goods. The relevant restrictions are shown in the Table below.

[31] http://www.tfl.gov.uk/roadusers/redroutes/953.aspx

Table 8.1: Usage restrictions for commercial vehicles on east London and Dartford crossings

	Max height	Max width	Max length	Max weight	Load restriction
Tower	None	None	None	18 t	None
Rotherhithe	4.4 m	2.0 m	10.0 m	None	Cat E
Blackwall NB	4.0 m	None	None	None	Cat E
Blackwall SB	4.7 m	None	None	None	Cat E
Woolwich	4.8 m	3.5 m	None	None	None
Dartford NB	4.75 m	2.75 m	18.3 m	38 t	Cat C
Dartford SB	None	3.65 m	27.4 m	38 t	None

** Note: Load restriction categories denote the type and quantities of dangerous goods that are allowed to enter the UK's larger road tunnels. Each regulated tunnel is assigned a particular category, A to E, with A being the least restrictive and E being the most restrictive. New restrictions were put in place in January 2010.*[32]

*** Note: Some discrepancies appear to exist at the Dartford tunnel; the legal order*[33] *proscribes vehicles over 4.75 m; the actual signing is in imperial units only and equates to 5.03 m on the eastern tunnel and 4.80 m on the western tunnel.*

8.16. An implication of the above is that vehicles which are restricted from certain crossings may need to take very lengthy diversionary routes, possibly on inappropriate roads, in order to cross the Thames. In this respect, the Woolwich Ferry provides a particularly valuable service in that, despite carrying a relatively small number of vehicles, it affords a river crossing opportunity for vehicles which would be barred from using the Blackwall or Dartford crossings.

The London Lorry Control Scheme

8.17. The London Lorry Control Scheme represents a further consideration for some traffic, restricting HGVs to a network of main roads for the majority of their trip during the night time to limit noise impacts. During scheme operating hours, the Blackwall Tunnel is the only permitted river crossing route between Richmond and the Dartford Crossing (a crow-flies distance of some 22km).

Typical network performance

8.18. Given the failure of previous crossing proposals to come to fruition, the crossings which do exist today suffer from high levels of saturation, with congestion on a daily basis, and poor levels of reliability and resilience.

8.19. Two fixed highway crossings (the Rotherhithe and Blackwall tunnels) and a vehicle ferry service (the Woolwich Ferry) are available to road users within the study area. The next available crossing to the west of the study area is Tower Bridge, while the Dartford Crossing (which lies just outside Greater London) is effectively part of the M25 orbital route around London (although designated as the A282).

8.20. Several of the crossings in the study area are operating close to - or above - their estimated maximum capacity during the morning peak period. Any traffic demand

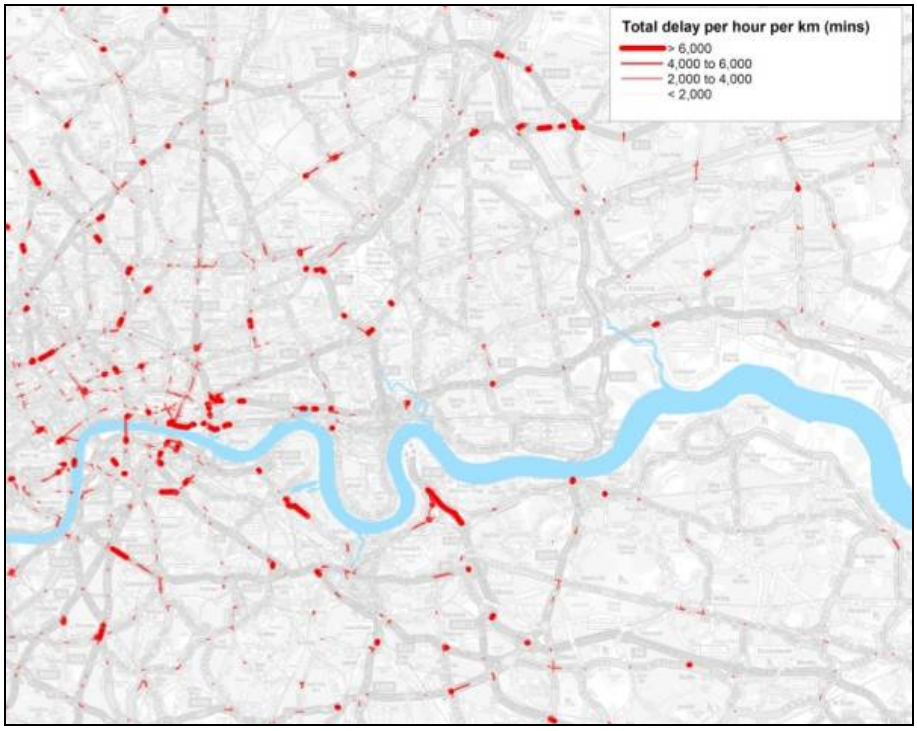
[32] For more information: http://www.roadsafeeurope.com/useful_info/Tunnel_Restrictions
[33] http://legislation.data.gov.uk/uksi/1998/1908/made/data.htm?wrap=true

above the crossing capacity cannot pass through the crossing and will form a queue; this typically occurs at all these crossings.

8.21. The following Figures highlight stretches of the road network in and around the study area where average delay exceeds 2 minutes per kilometre.

8.22. While the plots indicate numerous locations around the road network where severe delays are experienced, and the approaches to the Rotherhithe Tunnel and Woolwich Ferry are also noticeable, the approaches to the Blackwall Tunnel in particular demonstrate extremes of congestion otherwise not seen outside the highly congested central London area.

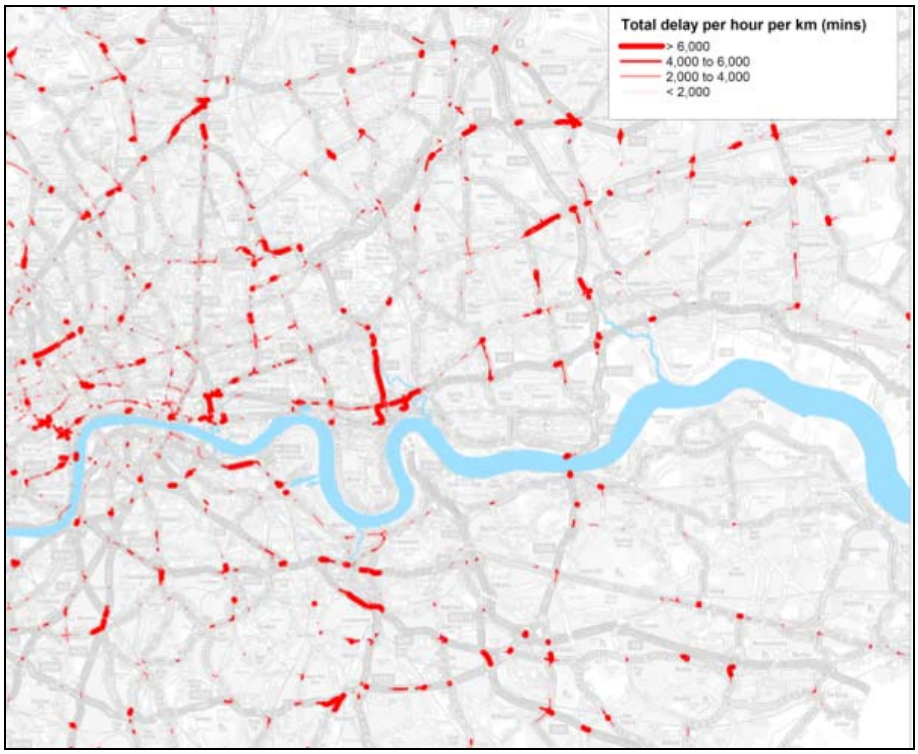
Figure 8.5: Links with delays over 2 min/km (morning peak, 2008-9)



Source: TfL, based on data from Trafficmaster[34]

[34] This data is presented in more detail in 'Travel in London: Report 3', chapter 4. http://www.tfl.gov.uk/assets/downloads/travel-in-london-report-3.pdf.

Figure 8.6: Links with delays over 2 min/km (evening peak, 2008-9)



Source: TfL, based on data from Trafficmaster

TOWER BRIDGE

Description

8.23. Tower Bridge is one of London's iconic tourist sites, an opening bascule bridge which opened in 1894. It is also an important part of central London's road network, carrying the inner Ring Road across the Thames, and forming the boundary road for the central London Congestion Charging Scheme.

8.24. The bridge is subject to an 18 tonne weight limit, and is therefore not available to all large vehicles.

8.25. The bridge carries a single lane of traffic in each direction, which would in theory provide a capacity of around 1800 PCUs/hour per direction. However, as the bridge is located in an urban area, its real capacity is limited by the ability of the junctions to feed traffic onto and off the bridge.

8.26. As the signalled networks are optimised in real time depending on actual traffic demand, the capacity will vary, but tends to be around 1100 PCUs/hour per direction. Increasing this significantly is not likely to be possible, given the other demands on the adjacent junctions to allow for other traffic movements and pedestrians.

Traffic profile

8.27. The bridge is located on the boundary of the congestion charging zone and is uncharged. Three scheduled bus routes use the bridge, as well as a large number of tourist services. The bridge is a popular route for cyclists, and carries high numbers of pedestrians, many of them tourists.

Figure 8.7: Tower Bridge traffic routes in the AM peak hour (0800-0900), 2009

Source: TfL Highway assignment model output; Green represents traffic using Tower Bridge, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

8.28. In the Figure above, the green routes show the roads which Tower Bridge traffic is using before or after using the bridge in the morning peak. It is clear from this that Tower Bridge plays a predominantly local and sub-regional role in the highway network, and a limited London wide role.

8.29. Few trips start or end outside London, with a large majority of trips starting or ending within central or inner London.

Bridge lifts at Tower Bridge

8.30. The bridge opens for shipping, but the delays associated with this are relatively low, as most such vessels are relatively small (albeit with masts taller than the road deck) and these vessels can pause close to the bridge while the bridge opens, and therefore the opening time is limited. However, the opening of Tower Bridge is reactive to the needs of shipping, which is affected by tides. This means that at times, lifts of Tower Bridge can coincide with busy periods for traffic, and can cause queues and congestion on the approach roads, affecting busy junctions on the highway network including Tower Hill.

ROTHERHITHE TUNNEL

Description

8.31. The Rotherhithe Tunnel comprises a single bored tunnel below the Thames, carrying one lane in each direction. It is around 1.5 km long. It was originally designed to serve foot and horse-drawn traffic passing between the docks on either side of the river and the roadways are narrow, with each lane only some 2.4m wide, and two footways of between 1.2 and 2m wide on either side. The tunnel is shallow, with a maximum gradient of 1 in 36 (2.8%), to cater for non-mechanised traffic. Its route includes sharp, nearly right-angled bends at the points where the tunnel goes under the river bed.

8.32. The tunnel has a height limit of 4.4m and a width restriction of 2.3m. Traffic entering the tunnel passes through physical width barriers to enforce the width restriction, and this reduces the effective capacity. In addition, the adjacent junctions have a finite capacity to feed traffic into the tunnel or allow it to leave, and therefore the effective capacity of the tunnel is around 1200 PCUs/hour per direction.

8.33. This has made it difficult for motorised vehicles to traverse the tunnel safely. Large vehicles cannot easily pass the sharp bends and are therefore banned from entering the tunnel. The speed limit is 20 miles per hour. However, despite these issues, the tunnel is considered to be in reasonably good condition and TfL recently implemented some major improvements to the tunnel, including installing a state of the art communication system and replacing loose, damaged and discoloured tiles.

8.34. On the south side of the tunnel, the road network is relatively constrained, with few opportunities to avoid congested routes through south London town and district centres.

Figure 8.8: Entrance to the Rotherhithe Tunnel

Figure 8.9: Inside the Rotherhithe Tunnel, showing a bend and the narrow footway

Traffic profile

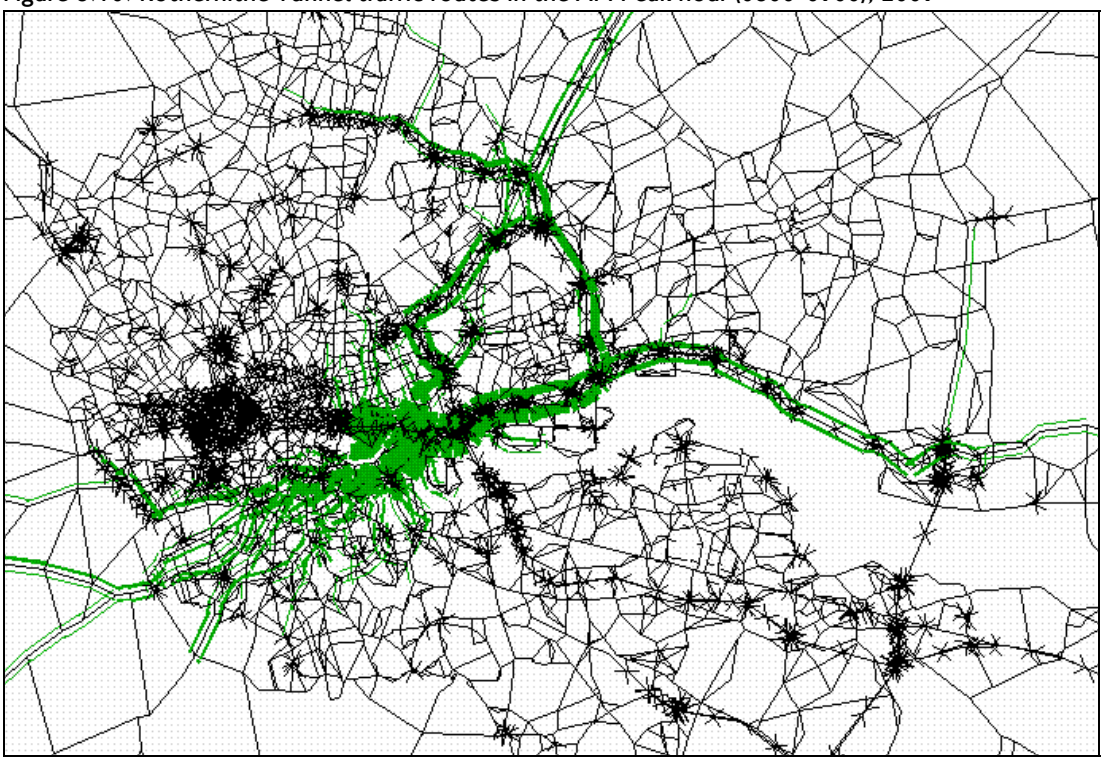
8.35. The tunnel is not subject to a toll or within a congestion charging area. There are no scheduled bus services through the tunnel.

8.36. Cyclists can use the tunnel, and are technically required to ride in the carriageway. However numbers are very low due to the inhospitable environment, and those that do use the tunnel tend to ride along the narrow footway. Pedestrians are permitted to walk through the tunnel, but the environment for pedestrians is poor and very few pedestrians do so.

8.37. The Figure below shows that Rotherhithe Tunnel traffic is generally making trips on a southwest to north easterly alignment, with very little traffic to or from south east London (except the very local area west of the Isle of Dogs).

8.38. The data also suggests that the tunnel plays a more strategic role than Tower Bridge, with some traffic originating outside London and accessing the area via strategic routes (the A13, M11, A12 and A406). Nevertheless, the greatest density of trip ends is fairly close to the crossing itself, though in contrast to other crossings these appear rather dispersed even relatively close to the tunnel.

Figure 8.10: Rotherhithe Tunnel traffic routes in the AM Peak hour (0800-0900), 2009



Source: TfL Highway assignment model output; Green represents traffic using the Rotherhithe tunnel, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

Incidents at the Rotherhithe Tunnel

8.39. The Rotherhithe Tunnel experiences relatively few unplanned incidents and closures. Between January and September 2012, there were between 9 and 26 incidents each month, mainly as a result of vehicle breakdowns or emergency road works. By way of comparison, over the same period the northbound bore of the Blackwall Tunnel had between 93 and 144 incidents each month.

Expected future performance

8.40. With the forecast increases in population and employment within the east sub-region, it is expected that demand for the Rotherhithe Tunnel may increase. Both the tunnel and the local road network is already operating at maximum capacity however and there is limited scope to improve the ability of the local road network to feed traffic into the crossing. This may lead to an increase in congestion in the local area if overall demand to travel in the area increases but this increase in demand cannot be accommodated at the tunnel.

BLACKWALL TUNNEL

Description

8.41. The Blackwall Tunnel comprises two bored tunnels below the Thames, approximately 1.5 km long, one carrying two lanes northbound, and another carrying two lanes southbound. For a period of years the southbound bore also carried a lane of northbound traffic during the morning peaks, although following safety concerns this is no longer the case.

8.42. The northbound tunnel is the original tunnel, and opened in 1897. It is of a relatively small bore diameter, resulting in a low headroom (4.0m over the nearside lane, and 2.8m over the offside lane) and narrow running lanes, and also has a number of bends. Pre-dating the motorisation of road traffic, the tunnel was originally designed with horse-drawn traffic in mind.

Figure 8.11: Northbound entrance to the Blackwall Tunnel in 1910

Figure 8.12: Northbound entrance to the Blackwall Tunnel in 2010

Figure 8.13: Northbound tunnel entry control

8.43. The southbound tunnel was built in the 1960s and has a slightly large diameter, with wider lanes, shallower bends and a height restriction of 4.7m.

Traffic profile

8.44. One scheduled bus service operates through the Blackwall Tunnel, route 108, which runs between Lewisham and Stratford 24 hours a day. Bus priority measures on the route to the tunnel allow buses to largely by-pass the worst of the queuing. In addition, longer distance commuter coaches also use the tunnel, including frequent commuter services from Kent to Canary Wharf and central London.

8.45. Neither cyclists nor pedestrians are permitted through the tunnel.

8.46. The Table below summarises vehicle flows at the Blackwall tunnel on a weekday, based on a manual traffic count survey (2009).

Monday - Friday (1 hour average)						
	Northbound			**Southbound**		
	7am - 10am	**10am - 4pm**	**4pm-7pm**	**7am - 10am**	**10am - 4pm**	**4pm-7pm**
Car	2718	1839	2651	1849	1932	2509
LGV	430	334	295	353	435	287
HGV	283	320	138	336	395	122
Other	41	22	21	23	21	27
TOTAL	**3472**	**2515**	**3105**	**2561**	**2782**	**2945**

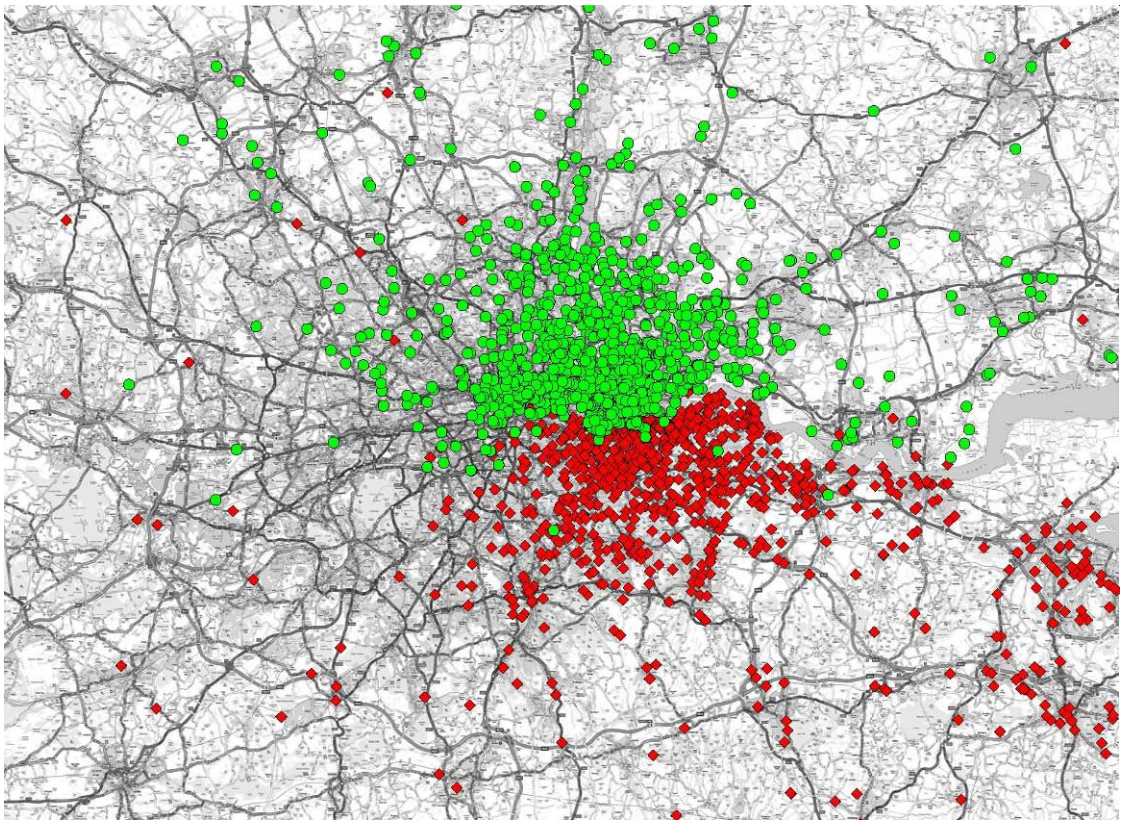
Surveyed driver origins/destinations

8.47. In roadside interview surveys undertaken at the Blackwall tunnel, motorists were interviewed to obtain information on the origins and destinations of those using the Blackwall tunnel.

8.48. The analysis is based on northbound survey data only, due to the difficulties in safely undertaking a southbound survey. In the survey, the Metropolitan Police directed a random sample of vehicles off the Blackwall Tunnel southern approach into Tunnel Avenue, where the driver was asked questions about their journey; data on vehicle type etc. was also noted by the interviewers.

8.49. The Figure below illustrates the origins and destinations of Blackwall tunnel users as a whole (all vehicle types, all day). There is a clear bias toward trips with an origin or destination within Greater London; 75% of all origins and 83% of all destinations are within Greater London. A secondary cluster is visible in the Medway/Maidstone area of Kent, from where the A2 and Blackwall tunnel provide a convenient route to Docklands and central, north and east London.

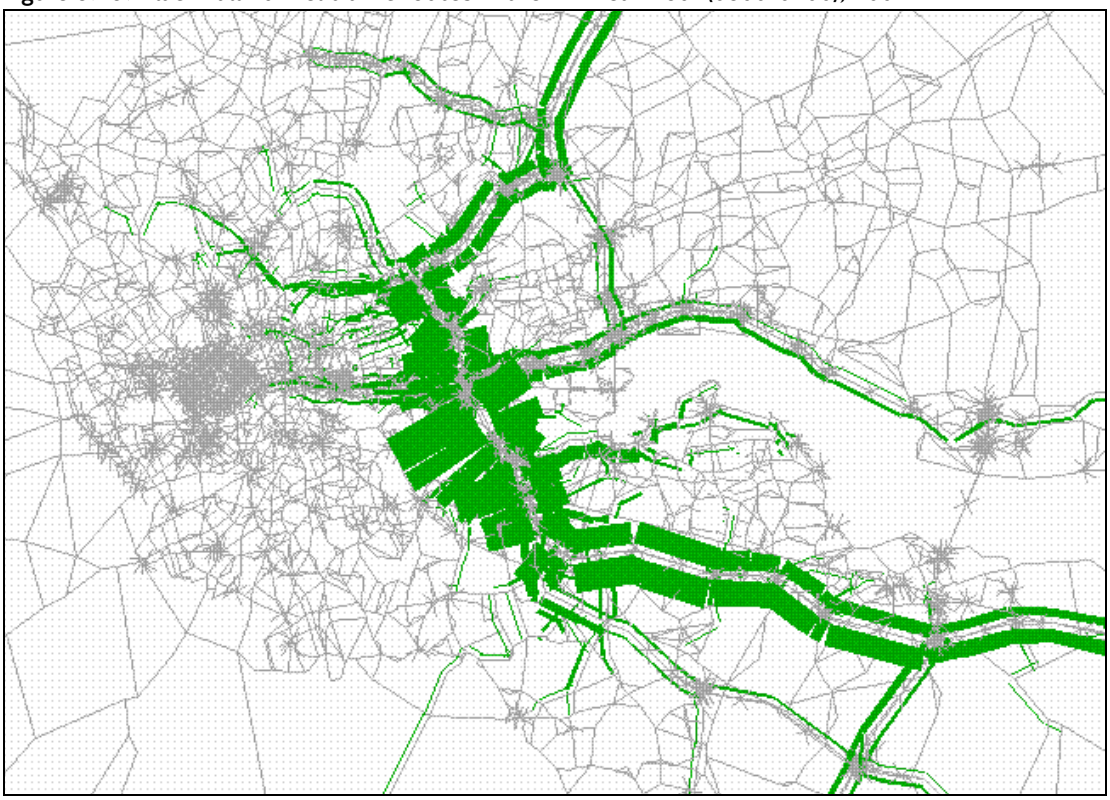
Figure 8.14: Blackwall tunnel (northbound) origins in red, destinations in green (all day, all vehicles)



Modelled driver origins/destinations

8.50. The Figure below suggests that the Blackwall Tunnel caters for traffic from a much wider area than Tower Bridge or the Rotherhithe Tunnel, as well as flows that are significantly greater (the bandwidths on the plots are at the same scale as the other plots in this report). Although many of the trips using it are local and sub-regional trips, serving origins and destinations entirely within the east sub-region, many longer distance trips also use this crossing, with sizeable flows appearing on the M11 to the north east and the A2 to the south east.

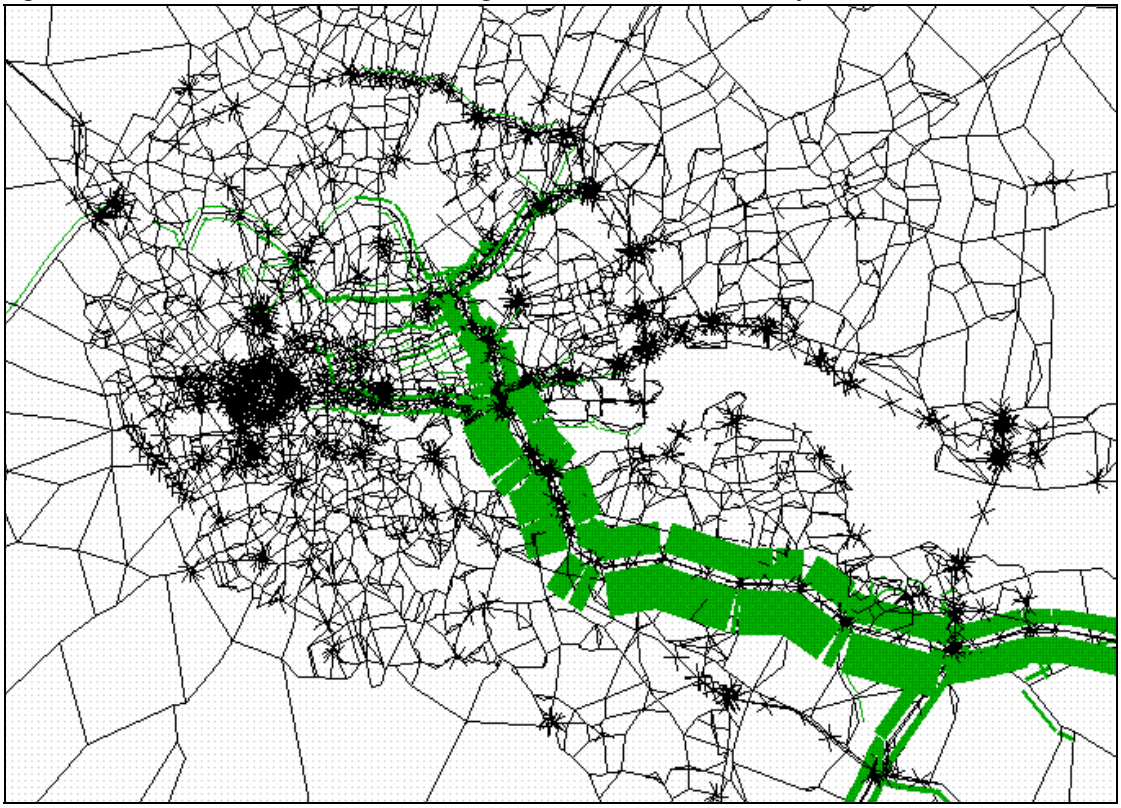
Figure 8.15: Blackwall Tunnel traffic routes in the AM Peak hour (0800-0900), 2009



Source: TfL Highway assignment model output; Green represents traffic using Blackwall tunnel, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

8.51. The Figure below shows only those Blackwall Tunnel trips which cross the Greater London / Kent boundary, and demonstrates that such trips use the tunnel because they have an origin or destination within central, east or north London. The Blackwall Tunnel is therefore not carrying non-London to non-London trips, which are staying on the M25. Nevertheless, for many of these journeys the Dartford Crossing could be a viable alternative route.

Figure 8.16: Blackwall Tunnel traffic crossing the London / Kent boundary on the A2, 2009



Source: TfL Highway assignment model output; Green represents traffic using Blackwall tunnel, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

8.52. In terms of capacity, the crossing operates with two lanes in each direction, but the effective capacity will vary over time depending on the vehicle mix and weight of traffic. TfL's observations on the tunnel's performance suggest that a flow of up to 3600 vehicles per hour (300 per 10 minutes) can be achieved only briefly at the end of free-flow traffic conditions at around 6am, with congestion on the approaches steadily reducing the effective capacity to an average of around 3000 vehicles per hour (250 per 10 minutes) by 7am.

Over height vehicle incidents

8.53. A significant number of the incidents which lead to closures of the Blackwall Tunnel are caused by vehicles over the four metre height limit attempting to use it. The western (and now northbound) bore of the Blackwall Tunnel was opened in 1897, and its limited physical dimensions make it unsuitable for the largest HGVs.

8.54. Despite the multiple signs warning of this height limit displayed on the network of roads approaching the Blackwall Tunnel, drivers of HGVs over four metres tall sometimes attempt to use it. In general these vehicles are led away up a dedicated slip road after triggering traffic signals set some way back from the tunnel. In extreme cases, HGVs have been known to strike the tunnel mouth itself.

8.55. Even when an over height HGV is identified before it actually collides with the tunnel mouth (as in the vast majority of incidents), the process of removing it is not straightforward, and the need to stop all traffic to accomplish it imposes delays on other road users queuing to use the tunnel. Depending on the time that the incident occurs, even a brief incident closing the entry to the tunnel can have far reaching and long lasting effects on congestion.

It is estimated that the annual cost of delays to vehicles wishing to use the Blackwall Tunnel resulting from its closure due to attempted use by over height vehicles is in the region of £10 million. A key conclusion of this report is that a long term solution to this issue is required to provide a resilient road network for east and south east London.

Impact of a severe incident at Blackwall Tunnel on 29 November 2009

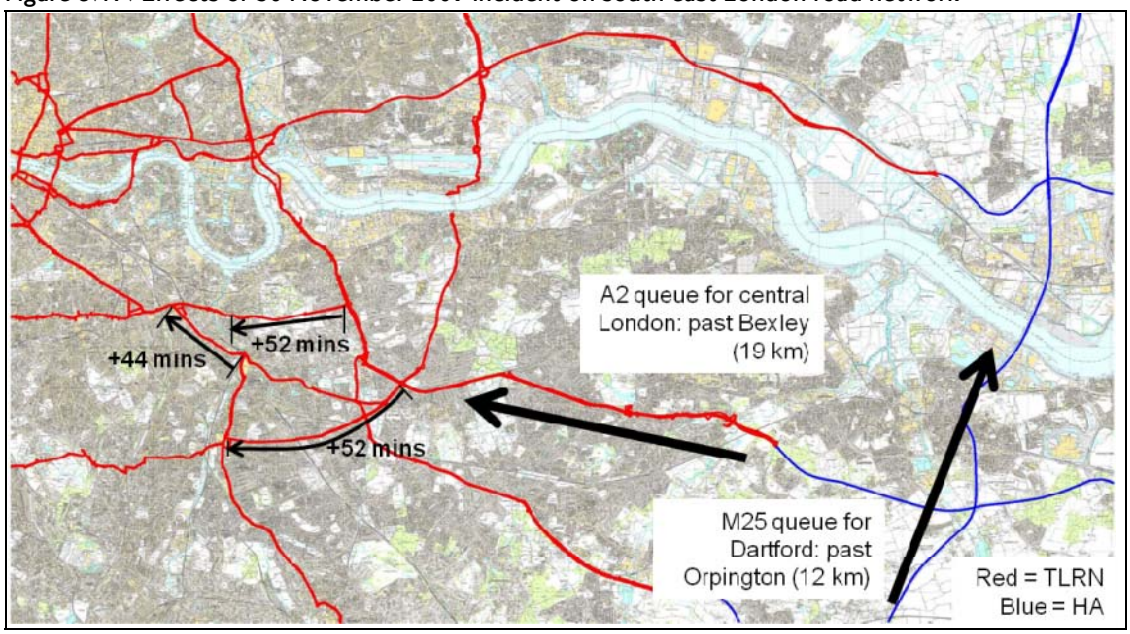
8.56. The potential for serious and severe incidents at the Blackwall Tunnel to have a far-reaching impact on London's road network can be illustrated through an analysis of an incident which occurred on the evening of Sunday 29 November 2009. On this occasion, a vehicle fire in the northbound bore of the Blackwall Tunnel caused the closure of the tunnel in both directions on Sunday evening and the closure of the northbound bore most of Monday 30 November. The closure caused considerable delays to traffic across large sections of the road network, and particularly in south east London as drivers sought alternative routes and river crossings.

8.57. On the Sunday evening drivers experienced congestion on routes in both north east and south east London, in particular on the A13 and A2 northbound and Commercial Road towards Rotherhithe Tunnel, before it started to ease between midnight and 1am. Later in the morning (Monday) congestion started to build before 6am in south east London, particularly around Rotherhithe Tunnel. Conditions in the Rotherhithe Tunnel area improved around 9am, but widespread congestion was observed by the London Traffic Control Centre around the areas of Blackheath, Deptford, Greenwich, Lewisham and Surrey Quays.

8.58. Heavy congestion also persisted on the A2 northbound, spreading back into Eltham and Bexley. By 7.20am congestion was observable around the Woolwich Ferry southern terminal. Only one boat was in operation and by mid morning there were delays of over 2 hours. Despite the introduction of a second boat shortly after 11am, lengthy delays persisted for the rest of the day and the ferry service was extended until 9pm to clear the backlog. The northbound tunnel was re-opened at around 6.30pm on Monday and the London Traffic Control Centre observed a return to normal traffic conditions by 8pm that evening.

8.59. These impacts are illustrated in the Figure below which gives an impression of the wide geographical area affected by the incident (black lines represent the worst delays and red the next worse). The A2 Shooters Hill Road and the A200 Evelyn Street/Lower Road, which form the diversion route to the Rotherhithe Tunnel, are two of the worst affected roads.

Figure 8.17: Effects of 30 November 2009 incident on south east London road network



Effect of 29 November 2009 incident on bus services

8.60. A small sample of iBus data collected before and immediately after the Blackwall Tunnel closure (following last year's fire) illustrates the effects of crossing closures to non-crossing traffic. Route 161, which runs close to, but not through, the Blackwall tunnel, operated only 35% of the scheduled trips on Monday 30 November, suggesting major disruption to local bus users as a result, with the maximum journey times on one short section increasing from 11 to 34 minutes.

Expected future performance

8.61. The Blackwall Tunnel is operating at or near to capacity for long periods of the day, and journey time is unreliable due to the effect of congestion in the peak and unplanned closure events. Demand is expected to grow. Without any further investment it is expected that this will lead to an increase in congestion and delays on this already unreliable link.

Summary

The Blackwall Tunnel is a key link in London's strategic road network, linking east and south east London.

It is highly congested, with demand higher than capacity for long periods of the day.

The tunnel experiences a high number of unplanned closures which has a detrimental impact on its performance; the impacts of these incidents can extend over a wide area of east and south east London.

WOOLWICH FERRY

Description

8.62. A ferry service of some description has existed at Woolwich for centuries, but the current service can date its history to the Metropolitan Board of Works (Various Powers) Act 1885, which established a free municipal ferry to carry pedestrians and vehicles across the Thames. The new ferry would provide links to the large Woolwich Arsenal from the areas of east London and Essex across the river, while also providing access to the Royal Docks from south east London and Kent.

8.63. Prior to the construction of the Blackwall and Dartford Tunnels, the Woolwich ferry provided a key link across the Thames downstream of London. The Woolwich Arsenal and Royal Docks have now closed (or are subject to other less intensive uses) and the Dartford Crossing and Blackwall Tunnels provide crossings for more strategic traffic.

8.64. The current incarnation dates from 1963, when the current boats were introduced. The service is now operated on behalf of TfL, having previously been operated by the Royal Borough of Greenwich. There are three ferries, of which two are normally in service on weekdays.

8.65. The ferry operates between 6am to 8pm Monday to Saturday and between 11.30am to 7.30pm on Sundays. On weekdays two boats run simultaneously which provides a ferry approximately every ten minutes. At these times the ferry has an hourly capacity of around 150-180 vehicles per hour, depending on the vehicle mix, turnaround times and any interference by passing river traffic. One boat runs on weekends and as a result both the frequency of service and the hourly capacity are reduced.

8.66. Most types of vehicle can be accommodated, up to 44 tonnes. There is no charge to users of the Woolwich ferry.

8.67. Assessments by TfL and its appointed consultants suggest that the ferry infrastructure is approaching the end of its life and will need to be replaced or undergo significant refurbishment works in the near future. This includes both the ferry vessels (which are almost 50 years old) and the boarding and alighting facilities which make use of mechanical support linkspans. Unlike some ferry operations there are no floating pontoons at Woolwich and the change in water levels due to tidal fluctuation is accommodated by the linkspans, which are mechanically operated.

8.68. All three boats are diesel-powered, using Voith Schneider propulsion units. Since these are no longer manufactured, any replacement would have to be purpose built, with implications for cost and time. Based on the latest engineering survey of the vessels and landing infrastructure, it is likely that without further capital investment the existing infrastructure will not pass the next major survey due in 2024. There is also a growing risk that the service could be terminated at short notice as a result of a technical failure.

Figure 8.18: Current Woolwich Ferry

Traffic profile

8.69. No scheduled buses operate across the ferry, although buses serve both terminals. Pedestrians and cyclists are both carried on the ferry service and there is also a foot tunnel very nearby.

Monday - Friday (1 hour average), 2009								
	Northbound				Southbound			
	7am - 10am	10am - 1pm	1pm-4pm	4pm-8pm	7am - 10am	10am - 1pm	1pm-4pm	4pm-8pm
Car	82	62	71	65	56	54	72	89
LGV	32	31	20	14	33	28	24	15
HGV	25	23	15	11	19	17	11	7
Other	19	4	4	5	7	5	8	13
TOTAL	**158**	**121**	**110**	**94**	**115**	**104**	**115**	**123**

Surveyed driver origins/destinations

8.70. In 2010, a survey of users of the ferry was undertaken for TfL. Users of the ferry were asked to record the origin and destination of the journey they were making when the questionnaire was handed out.

8.71. Table 8.1 below shows the origin and destination of all northbound journeys.

Table 8.1 - Woolwich Ferry northbound origins/destinations, surveyed 2011

	To					
	Newham	Barking & Dagenham	Other North London Boroughs	East of England**	Other	**Total**
From						
Greenwich	32%	10%	18%	5%	6%	**71%**
Bexley	7%	1%	4%	1%	*	**14%**
Other South London Borough	4%	*	3%	*	*	**9%**
Other	2%	*	3%	*	*	**6%**
Total	**46%**	**12%**	**28%**	**7%**	**7%**	**100%**

* = less than 0.5%

** East of England Government Office region includes: Bedfordshire, Buckinghamshire, Cambridgeshire, Essex, Hertfordshire, Huntingdonshire, Norfolk and Suffolk

8.72. The majority (94%) of northbound journeys started in a London Borough south of the river, most notably Greenwich (71%) or Bexley (14%). Almost one half of these journeys finished in Newham (32%), with a total of 86% ending in a north London borough. The single most common northbound journey started in Greenwich and ended in Newham (32%).

8.73. Table 8.2 below shows the origin and destination of southbound journeys for all users.

Table 8.2: Origin and Destination of Southbound Journeys, surveyed 2011

	To				
	Greenwich	Bexley	Other South London Borough	Other	**Total**
From					
Newham	12%	6%	1%	3%	**23%**
Barking & Dagenham	11%	1%	7%	1%	**20%**
Other North London Borough	25%	4%	4%	4%	**37%**
East of England**	5%	3%	3%	2%	**14%**
Other	2%	1%	1%	2%	**7%**
Total	**55%**	**16%**	**17%**	**12%**	**100%**

** East of England Government Office region includes: Bedfordshire, Buckinghamshire, Cambridgeshire, Essex, Hertfordshire, Huntingdonshire, Norfolk and Suffolk

8.74. Eight in ten (80%) southbound journeys started in one of the London boroughs north of the river, primarily Newham (23%) or Barking and Dagenham (20%). Greenwich stood out as the most common southbound destination (55%) compared with 16% to Bexley.

Reasons for Using Ferry (LGV and HGV users)

8.75. LGV and HGV users were asked why they were using the ferry in preference to using other crossings such as the Blackwall Tunnel or the Dartford Crossing.

Table 8.3: Reasons for Using the Ferry in Preference to Other Crossings, LGV and HGV users surveyed 2011

All HGV and LGV users	**LGV**	**HGV**
	%	%
Next stop is nearer the Ferry	42	29
Last stop was nearer the Ferry	43	31
Vehicle is over the height limit for Blackwall Tunnel	4	51
There is a toll at Dartford Crossing	19	27
Can take a rest period in the Southside car park	8	17

8.76. The majority of LGV and HGV users cite geographical proximity to the next stop as the main reason for using the ferry with 85% of LGV and 60% of HGV users saying the next or last stop was nearer the ferry.

8.77. Amongst HGV users, height restrictions of the Blackwall Tunnel were also a key reason for usage of the ferry over the tunnel (51%).

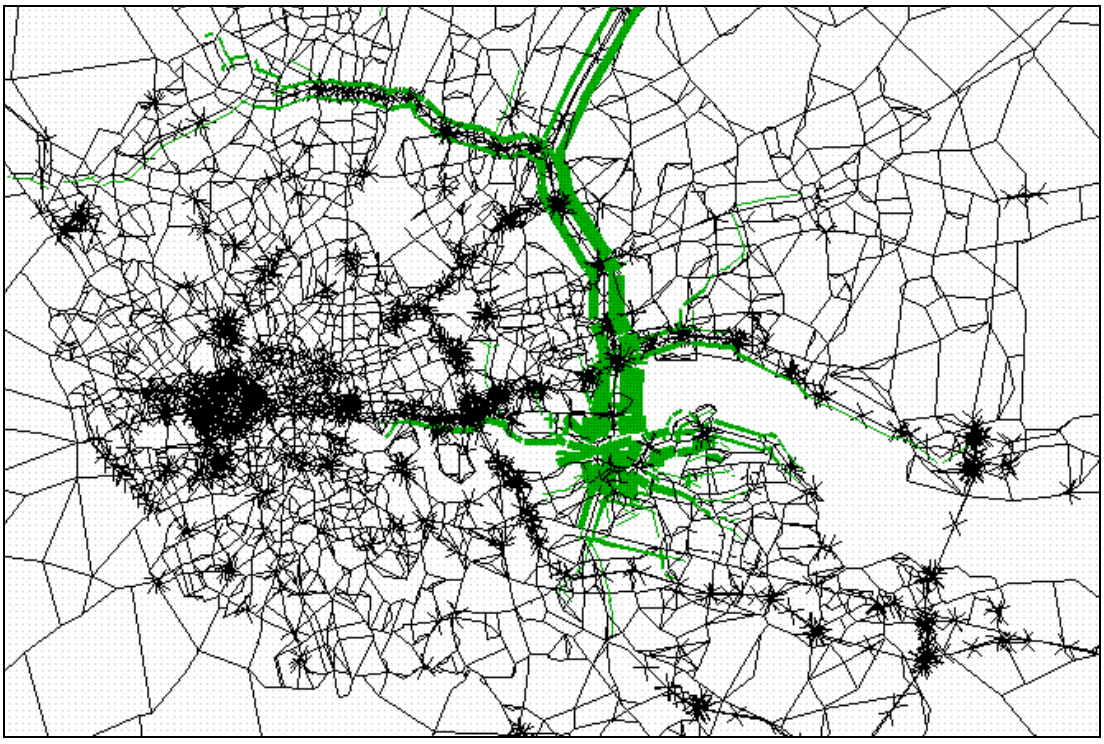
8.78. For both types of user, the fact that there is a toll at Dartford Crossing was cited as a reason for using the ferry (LGV 19% and HGV 27%).

8.79. Taking a rest period at the Southside car park is more popular amongst HGV users (17%) than LGV users (8%).

Modelled driver origins/destinations

8.80. The Figure below demonstrates that a high proportion of the traffic using the Woolwich Ferry has an origin and/or a destination in Greenwich or Bexley. A strong axis of demand also follows the A406, some of which then uses the M11, but most traffic using the Woolwich Ferry appears to be local or sub-regional in nature.

Figure 8.19: Woolwich Ferry traffic routes in the AM Peak hour (0800-0900), 2009



Source: TfL Highway assignment model output; Green represents traffic using Woolwich Ferry, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

Performance of the Woolwich Ferry

8.81. During 2009/10 the ferries were each given a significant overhaul to improve the reliability of the vessels. However, as the vessels and infrastructure are almost 50 years old, it is likely that they will reduce in reliability over the coming years. While the ferries have benefitted from a recent overhaul, the other elements of the infrastructure such as the piers, linkspans, mechanical and electrical equipment are not removable and therefore can only be repaired in situ – they cannot be taken away and overhauled. Repairs to the infrastructure are increasingly required, and some work could trigger an extended closure of service.

8.82. Compared to a fixed link, the ferry is also subject to a wider range of potential disruptive factors including the weather and interaction with river traffic.

Effects on the wider network

8.83. Woolwich Ferry services run every ten minutes during the daytime on weekdays. At busy times, the queue for traffic wishing to board the Woolwich Ferry often builds up considerably, sometimes significantly affecting other road users.

8.84. On the north side, the ferry is accessed by a dedicated queuing area accessed from Pier Road. Generally, this is sufficient to cope with queuing demand, however there are occasions when the queue goes beyond the queuing area and this can impact on non ferry traffic. Access to the highway network in north east London is through a priority junction at Pier Road. Although this has sufficient capacity for normal operation, the road network is not well suited to the peaks in demand which arise from vehicles leaving the ferry, turning right to travel onwards to the North Circular and queues inevitably form following the arrival of a ferry, but then clear relatively quickly.

Figure 8.20: Woolwich Ferry (north side)

8.85. Congestion is more of an issue on the south side, where the ferry pier is closer to the main road network. There is only a short length of access road between the pier and the Woolwich Road roundabout, which is regularly affected by queues. A queuing area exists immediately to the west of the access road, but this has only finite capacity and is not sufficient to prevent queuing problems occurring at the roundabout, especially when there is disruption elsewhere on the network.

Figure 8.21: Woolwich Ferry (south side)

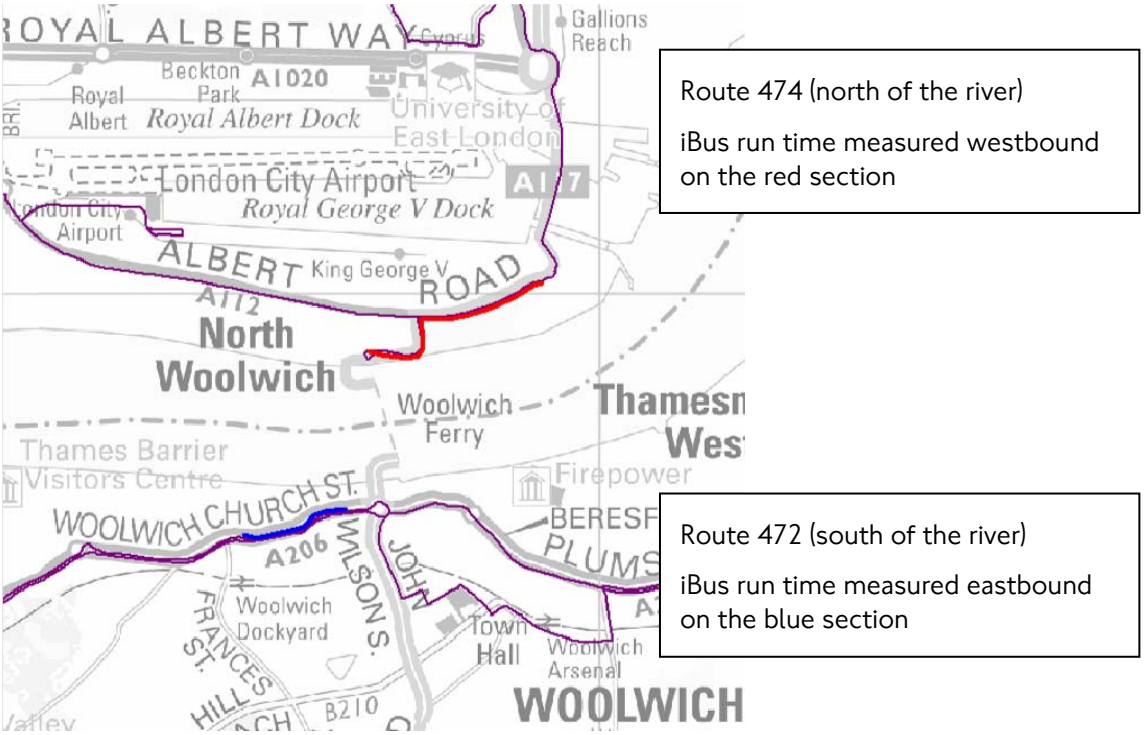
8.86. The build up of traffic waiting to board the Woolwich Ferry on the south side of the river can sometimes reach back to the Woolwich Ferry roundabout, with implications for other traffic.

8.87. The Figures below illustrates an occasion where the queue for the ferry extended back through the roundabout and caused significant queuing on the eastbound and northbound approaches to the junction. A large majority of traffic on these roads is not seeking to use the ferry, but the ferry is causing significant delays to other local traffic around Woolwich town centre.

Figure 8.22: Woolwich ferry queues blocking back through the roundabout (south side)

8.88. Bus route 474 passes the Woolwich Ferry on the north side of the river and route 472 passes it on the south side of the river. Run time data from iBus for both of these routes has been reviewed, for a short section of around 800 metres approaching the ferry. The Figure below shows the sections of route that have been considered.

Figure 8.23: Bus routes 474 and 472 approaching Woolwich ferry



8.89. Over a six month period (January to June 2012) the mean weekday run time on route 474 on the westbound section approaching Woolwich Ferry is 3.2 minutes, however the maximum run time is 38.4 minutes. Over the same period the mean weekday run time on route 472 on the eastbound section approaching Woolwich Ferry is 1.1 minutes, however the maximum run time is 42.6 minutes. These very long run times are infrequent and irregular, but they are indicative of occasional disruption to the bus network and other traffic on the roads immediately approaching the ferry, on both sides of the river.

8.90. This level of variability is unusual and chimes with reports from boroughs and other stakeholders that the Woolwich ferry queue can extend back beyond the queuing facilities and cause issues for other traffic.

Expected future performance

8.91. The Woolwich Ferry is almost 50 years old and it is expected that the ferries and infrastructure will continue to deteriorate and eventually fail. If nothing is done it is expected that this link will be lost from the highway network.

Role of the ferry for pedestrians and cyclists

8.92. The Woolwich Ferry carries pedestrians and cyclists as well as vehicular traffic. However, its role in this regard is very different from that when the service started.

8.93. The current boats entered service in 1963 and have a carrying capacity of 500 passengers; this allowed the ferry to provide a major role in bringing workers to the main drivers of local employment, the Woolwich Arsenal on the southern side, and Royal Docks to the north. However, both the Arsenal and the Royal Docks have since closed, with the main centre of gravity for employment in the Docklands area moving to the Isle of Dogs, and Canary Wharf in particular.

8.94. In 2009 the Docklands Light Railway (DLR) was extended to Woolwich Arsenal, with a new station in the town centre, with an intermediate station at King George V on the northern side, closer to the main population of North Woolwich. There are direct trains to central London and Stratford, with easy access to Canary Wharf via a single change of train. The function of the ferry for foot passengers has therefore fallen dramatically.

8.95. In addition, the 500 metre long Woolwich foot tunnel runs parallel to the ferry. It opened in 1912 to provide another route for those on foot, to supplement the ferry and to provide a highly resilient means of crossing the river for workers (the ferry could be suspended due to fog, for example). This is still open and is currently being refurbished by Greenwich Council, and provides an alternative free crossing for those on foot. It also provides a crossing for cyclists (albeit cycles must dismount within the tunnel); cycles cannot be carried on the DLR.

The Woolwich Ferry infrastructure is now nearly 50 years old and nearing the end of its serviceable life.

The ferry provides a valued crossing for local traffic, and goods vehicles in particular, and its closure without replacement is likely to be detrimental to the local area. Plans should therefore be put in place for a replacement facility which serves the same local catchment, and classes of vehicle, as the current ferry operation.

Given the impacts that the current alignment imposes on non-ferry traffic in and around Woolwich, consideration should be given to the relocation of any replacement for the Woolwich Ferry within the local area, including the potential for a new crossing are Gallions Reach.

DARTFORD CROSSING

Description

8.96. The Dartford Crossing lies just beyond the Greater London boundary and comprises two road tunnels, each carrying two lanes of northbound traffic, and a four-lane road bridge carrying southbound traffic. The crossing is part of the Strategic National Road Network.

8.97. Between 6am and 10pm the Dartford Crossing is tolled. The tolls were increased in October 2012 and the Department for Transport is proposing to increase the tolls again in October 2014. The current toll is £2.00 for cars, £2.50 for 2-axle goods vehicles and £5.00 for multi-axle goods vehicles and coaches and there are discounts available for local residents.

Table 8.4: Dartford Crossing toll charges (2012)

	Current cash toll	Current DART-tag (local resident discount)	Proposed cash toll (2014)	Proposed DART-tag (2014)
Motorcycles	Free	Free	Free	Free
Cars	£2.00	£1.33	£2.50	£1.67
2-axle goods vehicles	£2.50	£2.19	£3.00	£2.63
Multi-axle vehicles and coaches	£5.00	£4.33	£6.00	£5.19

Figure 8.24: Dartford Crossing toll plazas, tunnels and bridge

Traffic profile

8.98. The crossing is used by one scheduled local bus route, commercial service X80 operated by Ensignbus between Lakeside and Bluewater shopping centres. This operates hourly but can be disrupted by heavy traffic at the Dartford Crossing; the timetable states *"PLEASE NOTE: At times of major disruption or closure of the Dartford Crossing, this service may be subject to severe delays or suspension. We accept no liability for when this occurs as it is completely beyond our control. Please call us on 01708 86 56 56 if you have been waiting for a significant amount of time."*

8.99. No TfL bus services use the crossing. Cyclists can use the crossing free of charge by being carried over the crossing in a Land Rover operated by the crossing operator. Pedestrians cannot use the crossing.

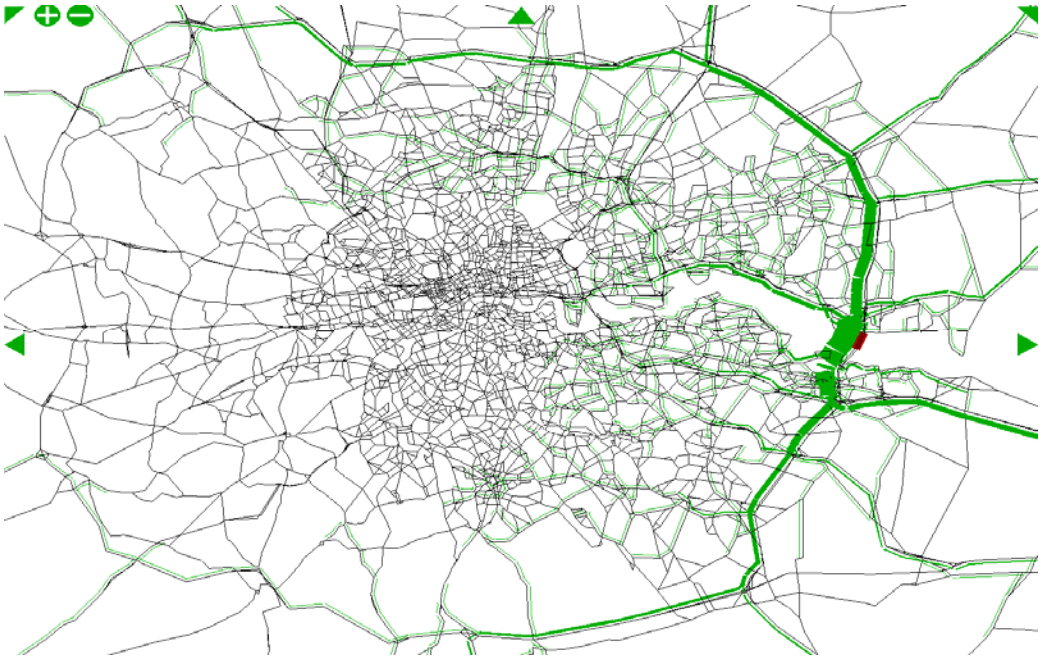
8.100. The Figures below show that the great majority of traffic using the Dartford Crossing has both its origin and its destination outside London, befitting its role as a bypass route around the capital. Accordingly it appears to cater principally for inter-regional, national and international travel demand and to be of relatively minor importance for local, sub-regional or London-wide trips.

8.101. The biggest flow in or out of London is traffic originating in areas south of the Dartford Crossing, using the crossing in the northbound direction and then heading into London on the A13. It may be the case that for some of these trips, going via the Dartford Crossing is a longer route but it may be more reliable than using one of the more central river crossing points.

Figure 8.25: Dartford Crossing traffic routes in the AM Peak hour (0800-0900), 2009, southbound

Source: TfL Highway assignment model output; Green represents traffic using Dartford Crossing, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

Figure 8.26: Dartford Crossing traffic routes in the AM Peak hour (0800-0900), 2009, northbound



Source: TfL Highway assignment model output; Green represents traffic using Dartford Crossing, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

Reliability of the Dartford Crossing

8.102. As with any river crossing, there is more potential for disruption at the Dartford Crossing than on any other part of the M25; for example, the bridge, at over 50 metres above the Thames, can be subject to problems during high wind or icy weather. The tunnels, lacking in hard shoulders and with restrictions on vehicle recovery or maintenance staff working with live traffic in the tunnel, sometimes need to be closed to facilitate recovery of a broken down vehicle or for maintenance.

8.103. Nevertheless, the presence of two independent tunnels as well as the bridge means a much greater degree of resilience than, for example, Blackwall. If a tunnel is closed, traffic can still use the other tunnel. If the bridge has to close, one of the tunnels is used for southbound traffic. Therefore, while some disruption is inevitable in the event of such an incident, traffic can continue to flow, albeit at a reduced capacity.

Expected future performance

8.104. The Department for Transport is currently considering proposals for a new Lower Thames Crossing which would go some way towards alleviate congestion on the Dartford Crossing.

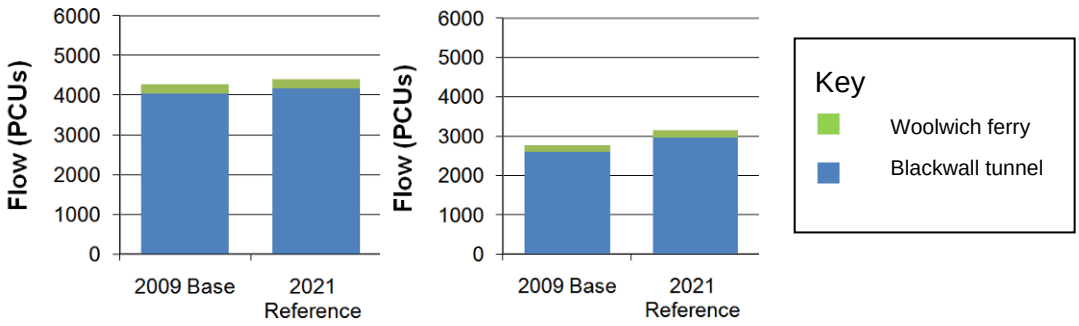
FUTURE HIGHWAY NETWORK PERFORMANCE

Future traffic demand at Blackwall

8.105. With half of London's projected population and employment growth over the next 20 years occurring in the east sub-region, the crossings are forecast to come under increasing strain. TfL's highway models forecast that demand in the morning peak will increase in the years to 2031. This will bring a significant increase in congestion, and it is likely that there would be an accompanying rise in incidents, with more accidents, breakdowns and over height vehicle incidents.

8.106. The Figure below show the forecast changes in flow at the Blackwall tunnel and Woolwich Ferry between the modelled base year 2009, and the 2021 reference case.

Figure 8.27: forecast morning peak flow changes northbound (left) and southbound (right)



Source: TfL Highway assignment model output

8.107. The growth is limited, especially in the peak direction, by the capacity of the road network to accommodate additional traffic. Underlying demand growth constrained by capacity will result in increased delays and unmet demand to make trips.

8.108. The models forecast an increase in traffic demand in the morning peak hour between the 2009 base and the 2021 reference case on all the major routes in the area: the A2, A13, A406 and M25, although much of the increase on the M25, particularly north of Dartford, can be attributed to the M25 widening between junctions 27 and 30. Comparing the 2009 base and the 2031 reference case suggests that in addition to increases on all the major routes in the area, increases in flows on some of the smaller roads also become apparent.

Figure 8.28: AM peak 2021 reference case – 2009 base case peak hour demand

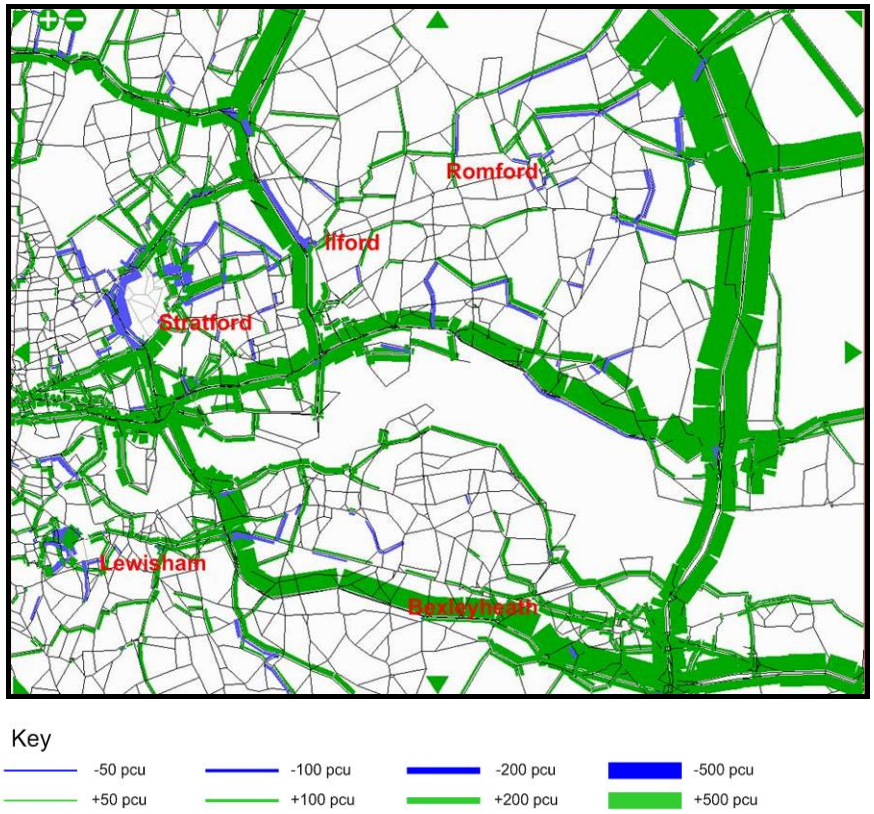
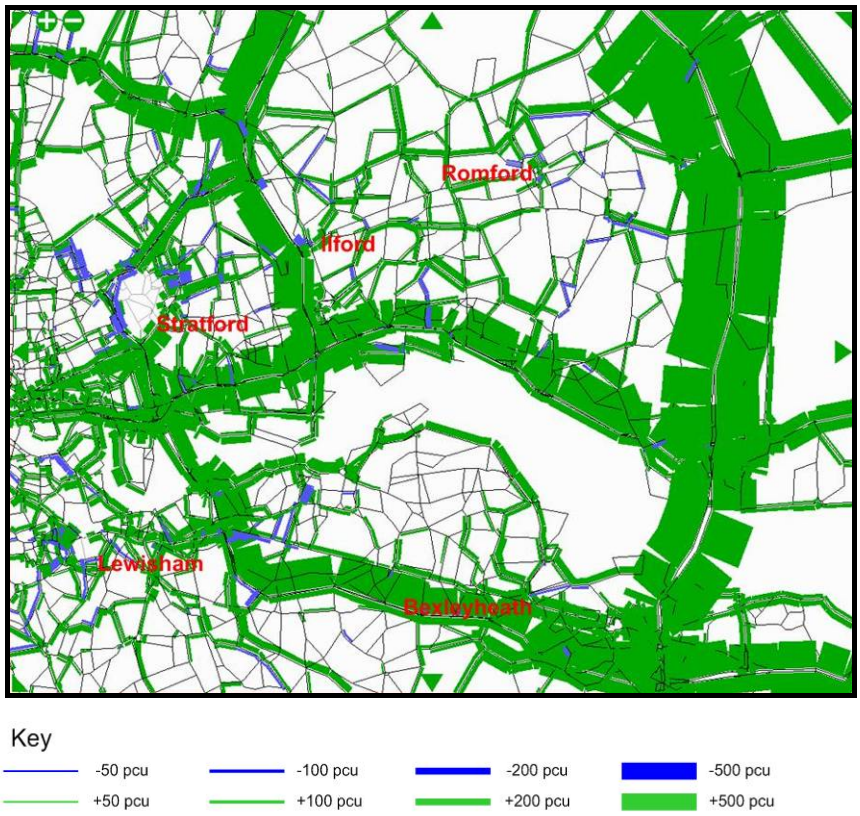


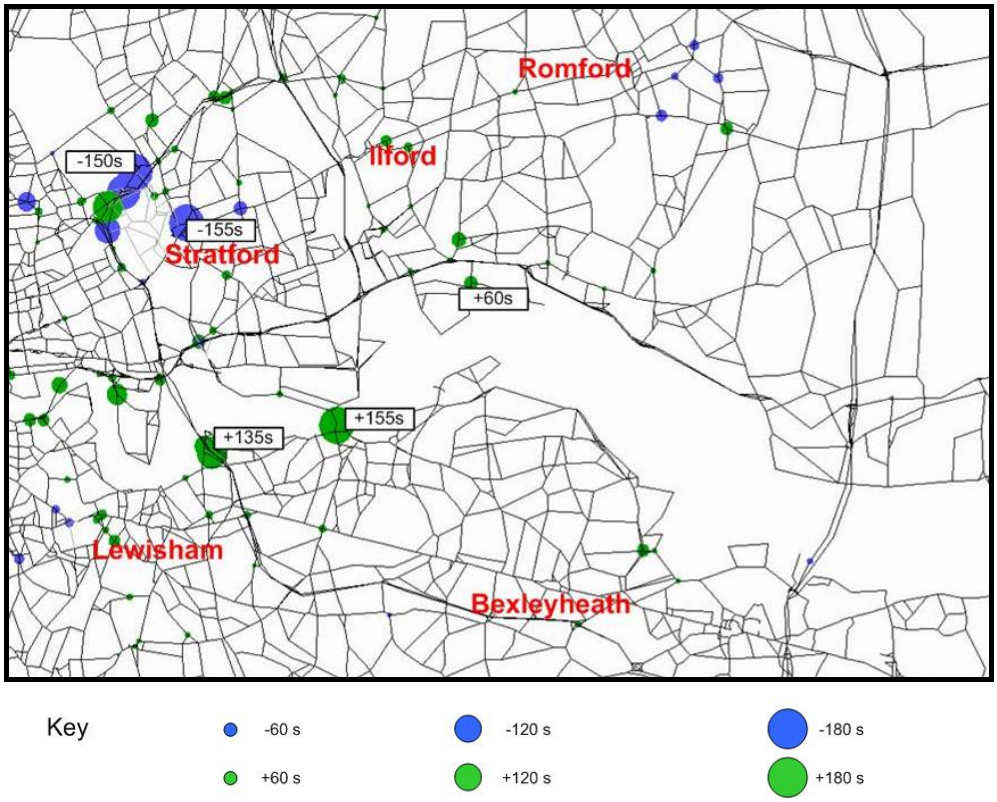
Figure 8.29: AM peak 2031 reference case – 2009 base case peak hour demand



Source: TfL Highway assignment model output; Green represents traffic using crossings, indicating primary routes used to access the crossing. The thickness of the line represents relative traffic flow.

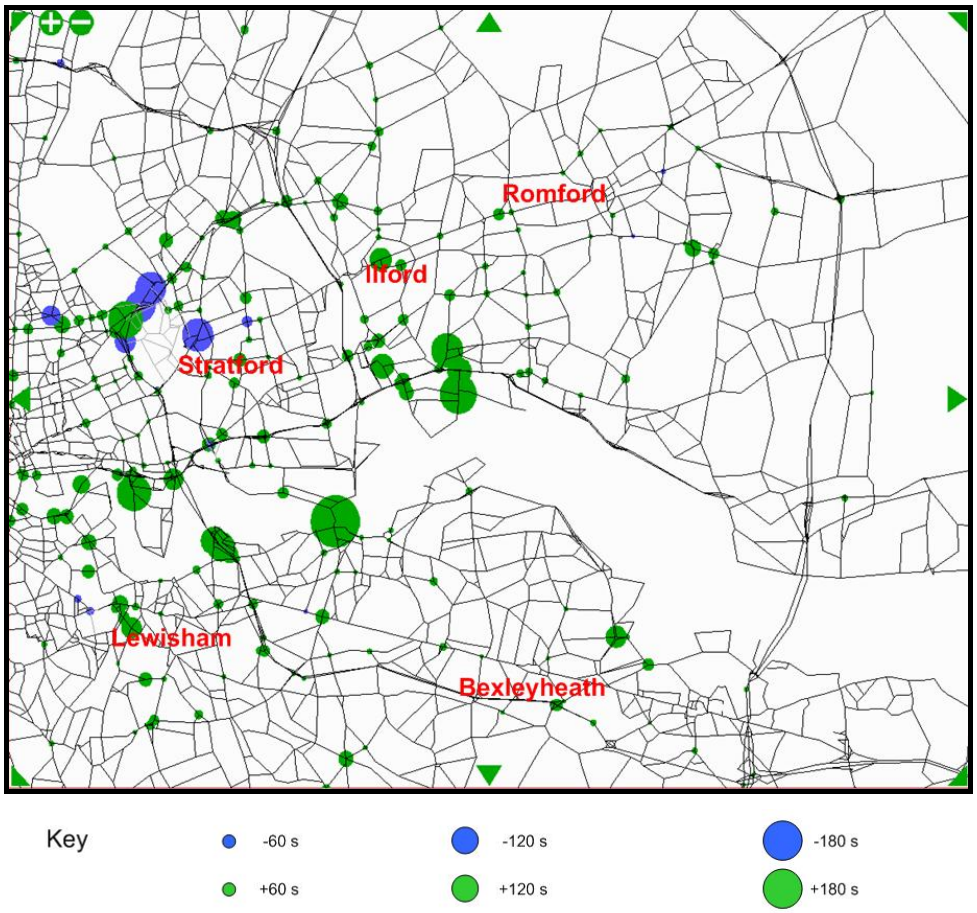
8.109. The increase in demand between 2009 and the future years 2021 and 2031 leads to an increase in delays in the northbound direction at Blackwall Tunnel and the Woolwich Ferry. The forecast is for an increase in delay of over 2 minutes at both crossings by 2021, increasing to 3 minutes at Woolwich Ferry by 2031. There are also some other localised changes around the A13 feeder link A1153 Lodge Avenue and Renwick Road. By 2031, the model forecasts an increase in delays of around 2 minutes on the A13 signalised junction with Renwick Road. It should be noted that the reference case network changes in Stratford alter flow patterns and delays in the area both in 2021 and 2031. The forecast increases in delay will be at the heart of an ever busier part of London.

Figure 8.30: AM peak 2021 reference case – 2009 base case peak hour, forecast change in delay (seconds)



Source: TfL Highway assignment model output

Figure 8.31: AM peak 2031 reference case – 2009 base case peak hour, forecast change in delay (seconds)



Source: TfL Highway assignment model output

8.110. As described earlier in the document, it is expected that the Woolwich Ferry will eventually need to be closed, or replaced. If the ferry closes then local cross-river trips currently undertaken by means of the Woolwich Ferry would be diverted after its closure to other, more distant crossings; for many cars and some goods vehicles, this would entail a diversion to the Blackwall Tunnel, which is already severely congested at certain times of day, and has no spare capacity to accommodate diverted ferry users during the peaks.

8.111. Even the relatively small flows carried by the Woolwich ferry would increase congestion, increasing both journey length and times for existing ferry users, and adding journey time for other users of the Blackwall tunnel.

8.112. For certain vehicles, notably those over 4 metres in height, or carrying certain flammable loads, the Blackwall tunnel is not a viable location, and these vehicles would have a longer diversion, many likely to opt for the Dartford crossing. This also operates at capacity at certain times of day, so even a small diversion of traffic, especially large goods vehicles, would have a negative effect on congestion and delays.

9. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

9.1. Heavy investment in public transport in the area over the last three decades and continuing now with Crossrail has led to a large increase in cross-river public transport trips in the area, but the growth in demand due to the major economic growth is such that highway demand by users not catered for by the new public transport links has continued to outstrip highway capacity considerably.

9.2. The limited number of east Thames river crossings for highway traffic gives rise to two principal and interrelated problems. First, large volumes of north/south traffic are funnelled through only a few routes, resulting in congestion for this traffic and other road users.

9.3. Second, with only three crossings accessible to general road traffic between Tower Bridge and the Dartford Crossing (and even fewer available to certain vehicles), there is an acute lack of resilience in the network. When unplanned incidents disrupt or prevent use of one or more of the crossings, this can lead to significant delays on the approaches to the crossing in question (which can sometimes spread over sizable portion of the road network). Such incidents also tend to compound the original problem of excess demand at the remaining operational crossings as traffic seeks alternative routes.

9.4. Coupled with the inherent vulnerability of some of the existing crossing infrastructure to disruption and closure, these factors mean that north/south traffic in the eastern half of London is regularly subject to significant delays, and that this risk is likely to increase in the absence of intervention.

9.5. Furthermore, the Woolwich Ferry is almost 50 years old, and at some point in the coming years it will need to be replaced. Its closure would reduce the opportunities to cross the Thames for its current users, and would result in its traffic diverting to other already congested crossings.

9.6. Given the rapid growth in population and employment in the study area, these are critical problems which are likely to grow both in severity and impact.

Recommendations

9.7. It is recommended that consideration should be given to options to address the following key areas:

- the imbalance between highway network capacity and demand around the Blackwall Tunnel, which results in significant congestion;
- the unreliability of the Blackwall Tunnel, and the limited ability of the surrounding road network to cope with incidents when they do occur;
- the possibility that the Woolwich Ferry may be withdrawn from service due to the condition of the asset, which would significantly reduce connectivity in the area. In assessing options for addressing this issue, consideration should be given to means of reducing current and future impacts of crossings on the road network.

9.8. Addressing these issues will be the "investment criteria" for the programme of improved river crossings.