Transport for London

Cable car need and business case

CONTENTS

EXECUTIVE SUMMARY

In November 2008, following his decision not to pursue plans for the Thames Gateway Bridge, the Mayor asked TfL to review the provision of crossings over the River Thames between Tower Bridge and the Dartford crossing, to inform the Mayor's updated Transport Strategy.

TfL has undertaken an analysis of the need for improved river crossings for all users of transport services, including road users as well as pedestrians and cyclists.

This report focuses on the results of analysis of existing cross-river travel options for pedestrians and cyclists.

This report has reviewed the need for improved cross-river connectivity in east London, and found that:

- The strategic plans for London envisage a high level of new development in east London, including areas close to the River Thames in Tower Hamlets, Greenwich and Newham;
- Investment in rail links has provided many new opportunities to access regeneration areas in the east London, but the Greenwich Peninsula in particular is forecast to host significant development but is dependent on a single rail station and line;
- A new link to the Royal Docks would provide much greater resilience to the Greenwich Peninsula, encouraging investment to bring new jobs and homes to the area, and would link two areas of potential complementary growth.

A range of potential options has been considered to address the need for improved crossings, and a cable car has the potential to provide a new crossing from the Greenwich Peninsula, which meets the geographic constraints at a much lower cost than a footbridge, and would deliver pedestrians and cyclists to the area around Royal Victoria, which provides opportunities for complementary development linking the leisure hubs of the O2 Arena and ExCeL.

Furthermore, a cable car would be an innovative scheme offering a spectacular view of London’s Docklands, and is likely to provide a point of interest for those already visiting the O2 Arena and ExCeL, making these more attractive destinations for events. In addition, it is likely to attract some new visitors to the area, who would be likely to visit other local attractions; this would create new secondary jobs in the local area.

The cost of the cable car is significantly less than a footbridge, and its ability to attract users who are visiting the O2 Arena or ExCeL, or especially to visit the cable car, allows revenues from these visitors to contribute to scheme costs. It is also likely to attract secondary revenue from sponsorship opportunities, due to its innovative nature and high profile location on the Rover Thames.

If opened prior to the 2012 Olympic Games, it would also be of major benefit in handling the crowds visiting the O2 Arena and ExCeL for events.

The central case has a Benefit : Cost Ratio of 2.7:1, delivering transport benefits (captured within this business case) and wider economic benefits (which are not captured within this ratio).

Given the uncertainties around demand and impacts, the scheme impacts should be monitored, and the operations and fare structures kept under review, to ensure that the right balance is maintained between delivering local benefits and providing overall value for money for TfL.

1. INTRODUCTION

Purpose of report

1.1. In November 2008, following his decision not to pursue plans for the Thames Gateway Bridge, the Mayor asked TfL to review the provision of crossings over the River Thames between Tower Bridge and the Dartford crossing, to inform the Mayor's updated Transport Strategy.

1.2. TfL has undertaken an analysis of the need for improved river crossings for all users of transport services, including road users as well as pedestrians and cyclists.

1.3. This report focuses on the results of analysis of existing cross-river travel options for pedestrians and cyclists, in particular in the area around the Greenwich Peninsula, which is experiencing a particularly high level of growth and has a very high dependence on only a single station and rail service.

1.4. Wider cross-river travel issues and options, including those of highway users, will be presented in a separate report.

Scope of report

1.5. TfL made the following assumptions in its analysis:

- The study area covers all parts of the east sub-region which are, or are potentially, affected by issues related to Thames river crossing provision between Tower Bridge and the boundary of the Greater London Authority (GLA) area
- The study period extends to 2031 - the planning horizon of the London Plan and the Mayor's Transport Strategy

2. ANALYSIS OF NEED

Background

2.1. While there are many river crossings over the Thames in central London and in the west of the city[1], until relatively recently it had not proved attractive to provide more than a few to the east. The river is substantially wider downstream of Tower Bridge than to the west and fixed crossings require either tunnelling or bridging with high clearances to accommodate shipping, which raises costs. For centuries this gave areas to the west an advantage in transport terms and this was reflected in patterns of land use and development.

2.2. While higher value, more prestigious activities clustered in the relatively more accessible areas, industrial and dock related activities, which required a cheaper supply of land, were attracted to the east. Neither these activities, nor the communities of workers which grew up around them, had high demand for cross river travel and differentials in land values and patterns of development between west and east became entrenched.

2.3. Economic and social conditions changed in the decades following World War II with the decline or disappearance of most of the traditional industries which line the eastern section of the Thames in London. The population in London's east sub-region[2] declined from almost 2.5 million in 1939 to about 1.75 million in 1991. During this period many of the docks and large industrial sites alongside the river were abandoned. The barrier effect of the river and the poor physical permeability of the sites which lined it meant these sites were generally isolated and unattractive for alternative uses. As a result large swathes of the Docklands lay derelict for several decades.

2.4. Regeneration over the last 20 years has transformed much of the former Docklands and many of the previously derelict sites now have successful new uses. 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[3] which would formerly have been confined to the Central Activities Zone (CAZ) are now based in Canary Wharf, while a major concert arena (the O_2 Arena) on the Greenwich Peninsula and an international conference centre (ExCeL) at the Royal Victoria Dock have also been established.

2.5. Despite the substantial regeneration which has taken place, London's east sub-region continues to suffer the consequences of its earlier economic and social dislocation and there are persistent pockets of severe deprivation and

[1] There are 23 road and / or footbridges over the Thames within the GLA boundary of which Tower Bridge is the easternmost. There are two road tunnels and two foot tunnels under the Thames within the GLA area all of which are to the east of Tower Bridge. A further major river crossing is provided by the Woolwich Free Ferry.
[2] This comprises the London Boroughs of Tower Hamlets, Hackney, Newham, Barking & Dagenham, Havering, Redbridge, Lewisham, Greenwich, and Bexley.
[3] Including major bank headquarters, business service firms and media organisations

environmental degradation. A decisive aspect of London's winning bid for the Olympic and Paralympic Games was the transformative effect the Games would have in areas of deprivation in the host boroughs. The host boroughs have made a commitment to achieving convergence of key economic, social and environmental indicators with those of the rest of London through securing, and building on, the legacy of the Games.

2.6. Furthermore, over the course of the next twenty years London's population is expected to grow by almost 880,000 people and employment by 655,000. The former Dockland areas are needed to accommodate much of this growth, with over half of London's total population growth forecast in the east sub-region alone.

2.7. There has been a fundamental and permanent change in the role of the areas which line the Thames in London's east. Rather than being London's backyard they have become key to the Mayor and others' vision of the city's future, as poles of growth and development. If they are to fulfil this central role in addressing London's challenges it is vital that their potential is unlocked and it is in this context that the case for the cable car is made.

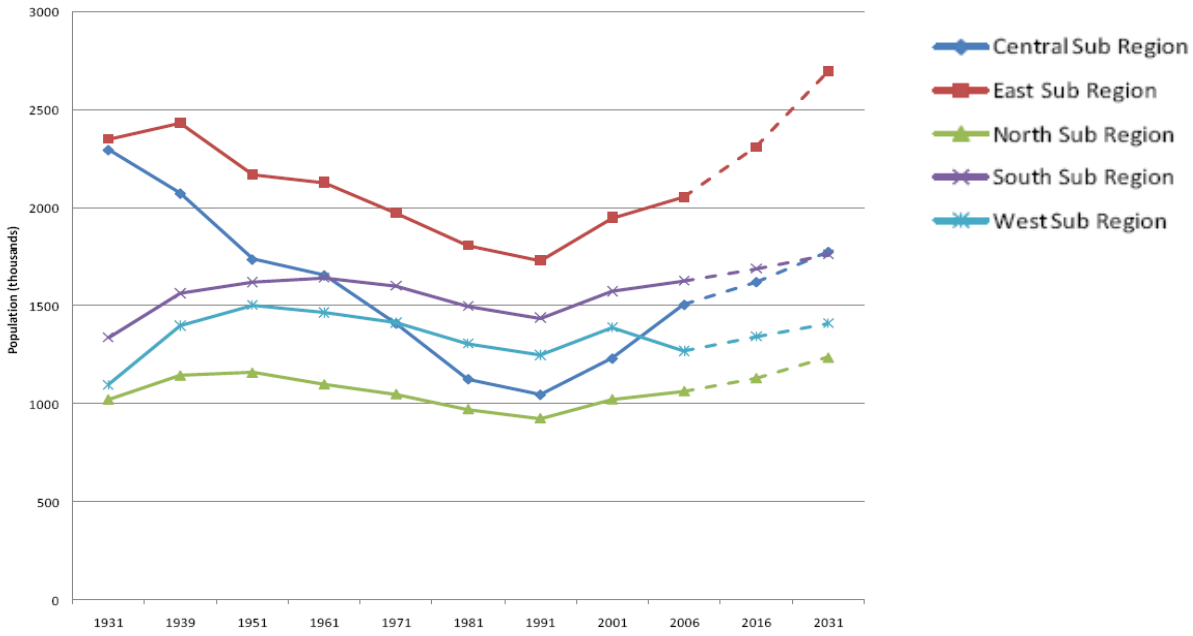
3. PLANNING CONTEXT

Background

3.1. The regeneration of the former docklands has taken place within the context of broader historic population and employment trends in London. While there were population declines in all of London's regions in the decades following World War II, the decline in the east was more precipitous than in other areas.

3.2. Since 1991 there have been increases in population in all of London's sub-regions and these are projected to continue until the end of the London Plan's planning horizon in 2031. Over the course of the next twenty years London's population is expected to grow by almost 880,000 people and employment by 655,000. Furthermore, within this total, the east is expected to experience much stronger growth than other sub-regions, as shown in Figure 3.1 below. There is a similar pattern with regard to employment growth.

Figure 3.1: Development of population 1931 to present and projections to 2031 in London's sub-regions



Source: Census data

3.3. The Thames-side inner London boroughs are expected to experience particularly high population and employment growth as shown in the Tables 3.1 and 3.2 below.

Table 3.1: Forecast development of population in east sub-region

Resident Population:	2011	2031	% growth
Tower Hamlets	**248,700**	**313,836**	**26.2%**
Newham	**267,900**	**326,599**	**21.9%**
Greenwich	**238,100**	**289,253**	**21.5%**
Bexley	217,400	226,752	4.3%
Hackney	231,490	261,886	13.1%
Havering	231,585	262,243	13.2%
Barking & Dagenham	177,850	219,827	23.6%
Redbridge	258,751	276,834	7.0%
Lewisham	272,702	314,861	15.5%
Greater London	*7,806,800*	*8,684,468*	*11.2%*

Source: GLA 2009 Round (Revised) London Plan Population Projections (August 2010), GLA

Table 3.2: Forecast development of 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%
Greater London	*4,797,000*	*5,452,000*	*13.7%*

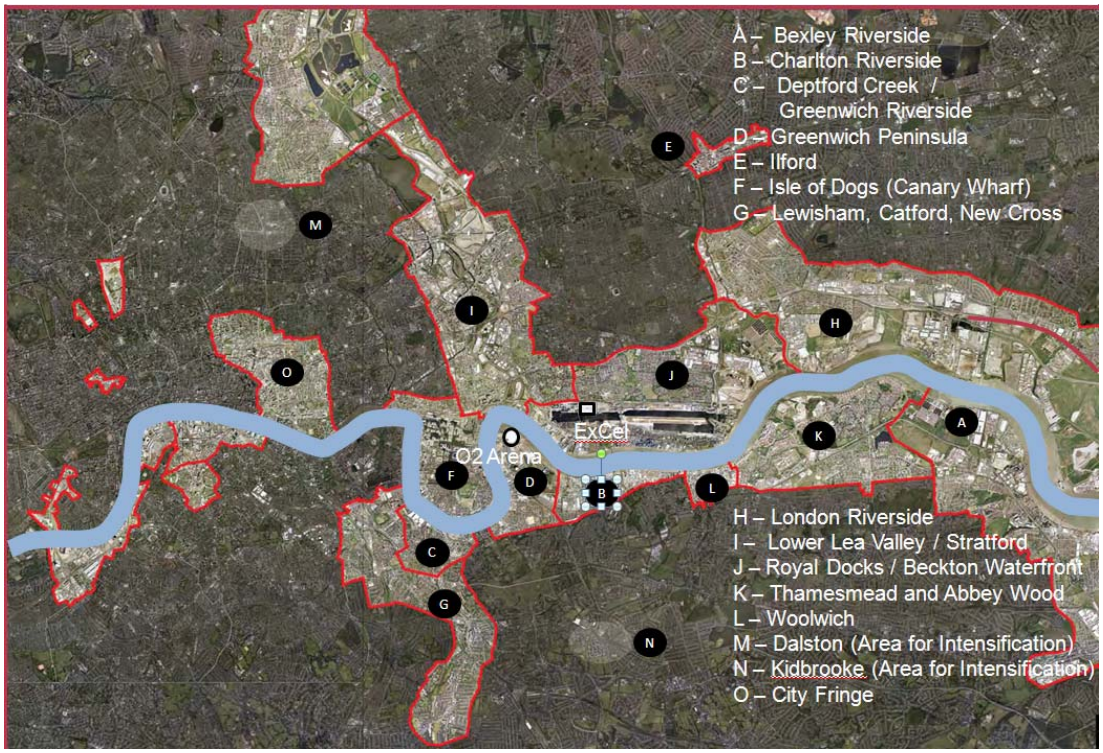
Source: GLA Borough Employment Projections, 2009, GLA

Role of Opportunity Areas

3.4. The Mayor's general approach to the development and use of land in London as set out in the London Plan[4] is "not simply to support and welcome growth but to ensure that it contributes positively to the quality of life in London and to enable it to take place within its current boundaries without encroaching on the Green Belt or on London's open spaces, [and without] having unacceptable impacts on the environment." 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 is both the potential and need for development and regeneration."

3.5. 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. 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 / Areas for Intensification are shown in Figure 3.2 below.

Figure 3.2: Opportunity Areas in east sub-region and locations of the O2 Arena and ExCeL



3.6. The indicative employment capacities and indicative capacities for new homes in the east sub-region are shown in Figure 3.3 below. The combined minimum

[4] Consultation Draft Replacement London Plan , 2009

number of new homes in the Royal Docks and Greenwich Peninsula is 24,500 and the combined employment capacity is 13,000.

Figure 3.3: Indicative employment capacities and minimum new homes in east sub region Opportunity Areas

Opportunity Area	Indicative employment capacity	Rank in sub region	Minimum new homes	Rank in sub region
Bexley Riverside	7,000	4=	4,000	11
Charlton Riverside	1,000	11	3,500	12
Deptford Creek/Greenwich Riverside	4,000	9=	5,000	7=
Greenwich Peninsula	7,000	4=	13,500	3
Ilford	800	13	5,000	7=
Isle of Dogs (Canary Wharf)	110,000	1	10,000	5
Lewisham, Catford and New Cross	6,000	6=	8,000	6
London Riverside	14,000	3	25,000	2
Lower Lea Valley/Stratford	50,000	2	32,000	1
Royal Docks and Beckton Waterfront	6,000	6=	11,000	4
Thamesmead and Abbey Wood	4,000	9=	3,000	13
Woolwich	5,000	8	5,000	7=
Dalston (Area for Intensification)	1000	11=	1700	14
Kidbrooke (Area for Intensification)	400	14	4,400	10

Source: "Developing a Sub-Regional Transport Plan: Interim report on challenges and opportunities," February 2010

3.7. The London Plan provides strategic policy direction for each Opportunity Area:

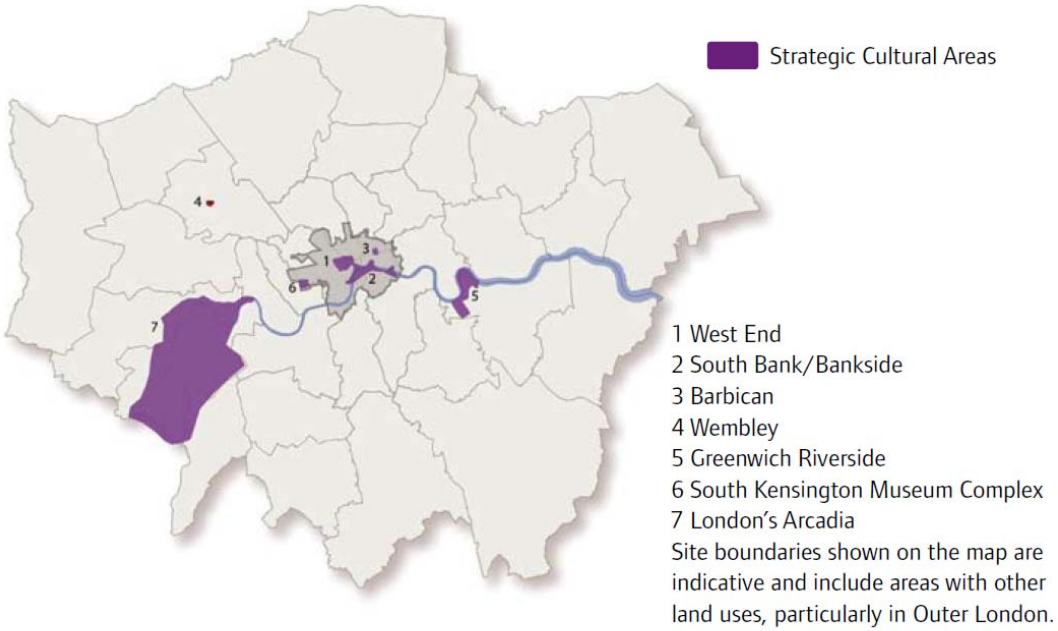
- For the Greenwich Peninsula the strategic policy direction gives recognition to two key strategic roles: as an internationally significant leisure attraction and as a major contributor to meeting London's need for additional housing. It also notes that river paths, parks and squares should become part of the wider East London Green Grid "with potential to improve pedestrian and cycle linkages from the O2 to Greenwich town centre."
- For the Royal Docks the key issues which the strategic policy direction identifies include maximising the benefits of the Crossrail station at Custom House and capitalising on the success of ExCeL and its potential

as a focus for further visitor / business related growth. It also notes that the management of safeguarded wharves including scope for consolidation will be an important issue in realising the potential of these sites.

- On the Isle of Dogs the strategic policy is for continued major employment-based regeneration, with Crossrail providing much greater peak period capacity and new connections to allow the Canary Wharf business centre to grow further, supported by additional residential development.

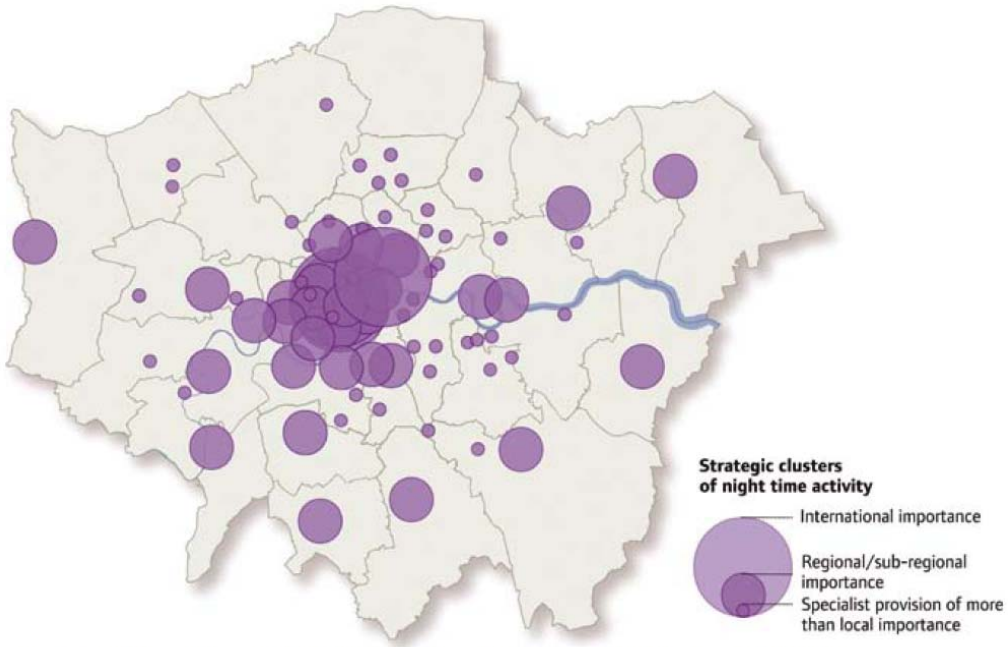
3.8. The draft replacement London Plan also designates the Greenwich Peninsula as part of a Strategic Cultural Area, Greenwich Riverside. This policy aims to support and build upon the peninsula's existing cultural offer, anchored by the O2 Arena, and is the only such designation in the eastern half of London.

Figure 3.4 – draft London Plan Map 4.2 London's Strategic Cultural Areas



3.9. In addition, the Greenwich Peninsula and Isle of Dogs are both designated as sub-regionally important centres for London's night time economy, as shown below.

Figure 3.5 – draft London Plan Map 4.3 London's night time economy



Royal Docks Enterprise Zone

3.10. In 2011, the Government announced the creation of a number of Enterprise Zones around the country to encourage growth in key regeneration areas. The Royal Docks was selected within the first batch of zones, and will enjoy measures to foster inward investment and job creation. The final details of how the enterprise zone will operate, including its precise boundary, have yet to be confirmed at the time of writing.

4. TRANSPORT CHALLENGES AND OPPORTUNITIES

Policy Background

4.1. The Mayor's Transport Strategy (MTS) is written to support the London Plan. The transport vision which drives it is that "London's transport system should ExCeL among those of world cities, providing access to opportunities for all its people and enterprises, achieving the highest environmental standards and leading the world in its approach to tackling urban transport challenges of the 21st century."

4.2. To achieve the vision, the MTS sets out a series of goals, challenges and proposed outcomes. Further detail is provided at the sub-regional level in a sub-regional transport plan for the east (east SRTP) which TfL published in November 2010. There are a number of policies of relevance to transport serving the Royal Docks and the Greenwich Peninsula Opportunity Areas.

4.3. The MTS sets out the framework within which London's transport problems should be analysed. Within London five levels of transport demand are distinguished: international, national, regional, sub-regional and local. The MTS states that it is essential that the "...the nature, location and scale of the transport issues arising at each of these levels" are addressed.

4.4. Defining the structure of London's transport geography at each of these levels, through the identification of networks of multi modal strategic transport corridors, gateways and interchanges was important in designing the strategy. The analysis in this chapter reflects this structure, with the regional and sub-regional transport network serving the area considered separately from the local transport network. Firstly, however, a set of overarching transport related issues are identified which transcend the different levels of transport geography.

Overarching issues

4.5. There are a number of transport related issues which do not apply to specific levels of network, but which apply to all transport interventions under consideration. In summary:

- an important aspect of meeting the population and employment challenge is the potential for encouraging sustainable travel which focusing development on Opportunity Areas provides. This includes making such areas attractive to people within the context of low car ownership and use;
- transport should promote quality of life through aiming to improve local air quality, reduce noise impacts, enhance the natural and built environment and improve health outcomes particularly through encouraging more walking and cycling;
- increasing use of sustainable modes helps achieve the Mayor's climate change reduction targets;

- an important aspect of achieving the Mayor's vision is improving transport opportunities for all through both improving accessibility to services, particularly amongst deprived communities and improving the physical accessibility of the transport system.

Regional and sub-regional transport

4.6. It was recognised at an early stage that the successful regeneration of the Docklands would require the area's historic poor accessibility to be addressed. Consequently there has been massive investment in new or upgraded infrastructure in the past 20 years or so.

4.7. Major road schemes have included the Limehouse Link and upgrades of the A12 and A13[5] and A20 which have provided better strategic radial access to many of the Opportunity Areas in the east, although cross river road capacity has not been improved west of the M25. Road congestion and unreliability remain a huge issue for the Blackwall Tunnel, the only road crossing between the Rotherhithe Tunnel and the Dartford Crossings.

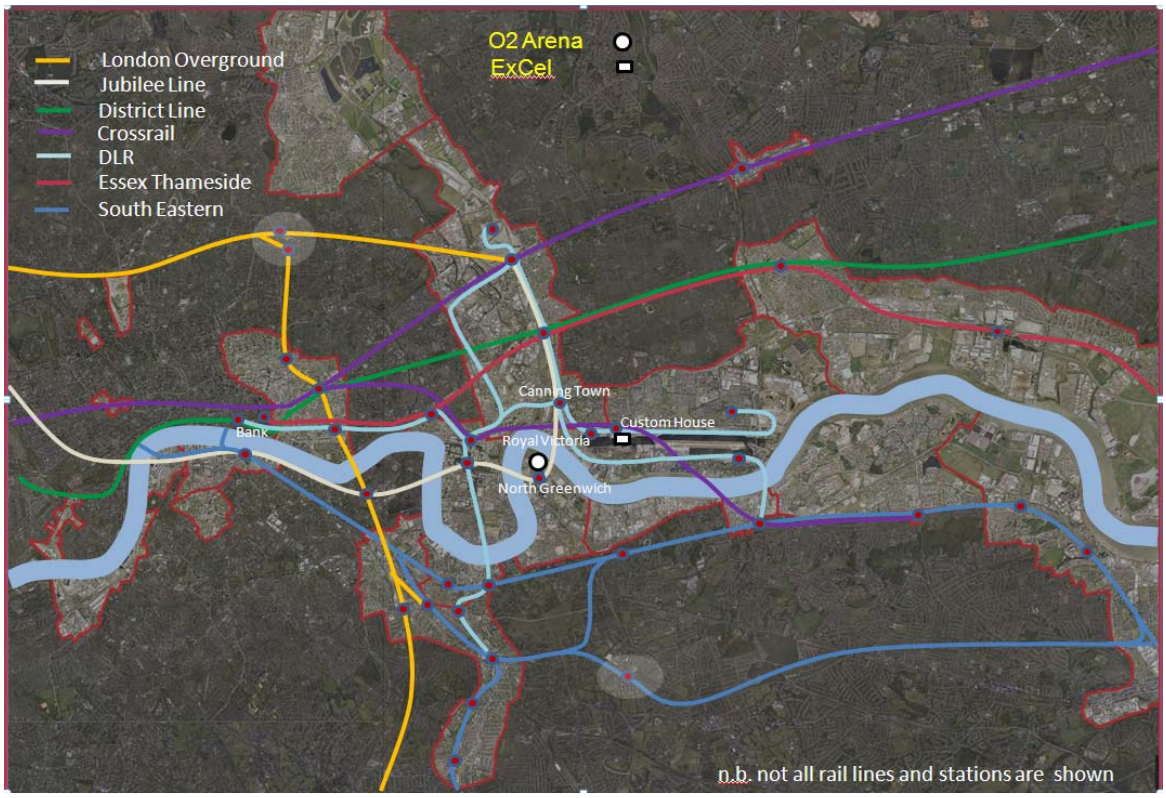
4.8. As a result, although it directly serves the Greenwich Peninsula its efficiency and effectiveness for all levels of trip is severely compromised.

4.9. A much enhanced rail network serving the Opportunity Areas now exists and this investment has been successful at integrating key locations into London's regional transport network and providing the capacity both for the development of both major employment centres such as Canary Wharf and large visitor attractions such as O2 and ExCeL.

4.10. Figure 4.1 shows the existing and planned network of lines and interchanges (with committed investment to 2018) which link the Opportunity Areas in London's east at the regional and sub-regional level.

[5] The A20 was upgraded in the 1980s

Figure 4.1 Rail connections between Opportunity Areas in east sub-region



4.11. In the case of the Greenwich Peninsula, the Jubilee line extension was critical to regeneration since, as Figure 4.1 shows, the area was remote from high capacity (i.e. rail based) public transport alternatives. It is particularly constrained by its geography since the Thames acts as a barrier on two sides. The Jubilee line provided an excellent solution by creating two high capacity new river crossings and this allowed large numbers of people to access the area from across London. However this also resulted in an unusually high degree of dependence on a single Underground line.

4.12. The accessibility of the area therefore deteriorates severely during interruptions to line service. The main alternative routes for crossing the river are the single bus route which goes through Blackwall Tunnel, which is itself very congested, river boats and buses to Greenwich for the DLR, which neither individually nor in combination provides an adequate solution. As an example, whereas there is relatively little delay for O_2 visitors following the end of evening events when the Jubilee line is in normal operation, there can be a delay of up to 40 minutes for visitors leaving the site at other times.

4.13. The best solution for improving the resilience of the regional and sub-regional transport network in serving the Greenwich Peninsula would be for a new high capacity transport route to serve the area directly. However there are no realistic proposals for this at present and it is unlikely that any will be forthcoming during the next twenty years.

4.14. However, a ‘next best’ and far more cost effective solution could be provided if an independent means of accessing the Royal Docks could be provided since

this area is connected to the regional transport network independently of the Jubilee line through the DLR at Royal Victoria and Custom House, as shown in Figure 4.1 above. Furthermore the area will be served from 2018 by Crossrail which will provide massive additional capacity and connectivity to the area.

4.15. It is clear that the Mayor's strategic policy for the Greenwich Peninsula of supporting it as an internationally significant leisure attraction (see Chapter 3) requires high quality regional and sub-regional transport. The above analysis indicates that there is a strategic weakness in provision at this level resulting from the area's excessive reliance on the Jubilee line and that there is a clear rationale for a new link between the area and the Royal Docks where there is alternative high quality access to the regional and sub-regional public transport network.

Local transport

4.16. The Mayor's Transport Strategy notes that local transport networks provide for trips to work, visit friends, go shopping, access local amenities and other services including health facilities. They are important if local services are to be planned efficiently and if London's districts are to be properly integrated with each other. Clearly where local transport shares infrastructure with regional and sub-regional networks it is not independent of problems elsewhere and may suffer because such infrastructure is not designed specifically to meet local needs.

4.17. One of the issues that has emerged with the regeneration of Docklands is the perception that locations such as the Greenwich Peninsula and the Royal Docks remain relatively isolated from the established communities which surround them, many of which are amongst the most deprived in the UK. Equally, as residential locations some Opportunity Areas are perceived as lacking in the range of local services and facilities associated with many more established areas. This suggests that despite the investment which has taken place in regional and sub-regional transport networks, more local needs may in some cases have been neglected to date.

4.18. The issue is exacerbated by the presence of the River Thames and aspects of the industrial and docks legacy of the area. Since industrial and dock related activities in the east generally occupied large sites, permeability of these areas at the local level was relatively low. This suited the commercial activities which once took place for which security of goods was paramount, but less favourable for the establishment of well functioning new communities.

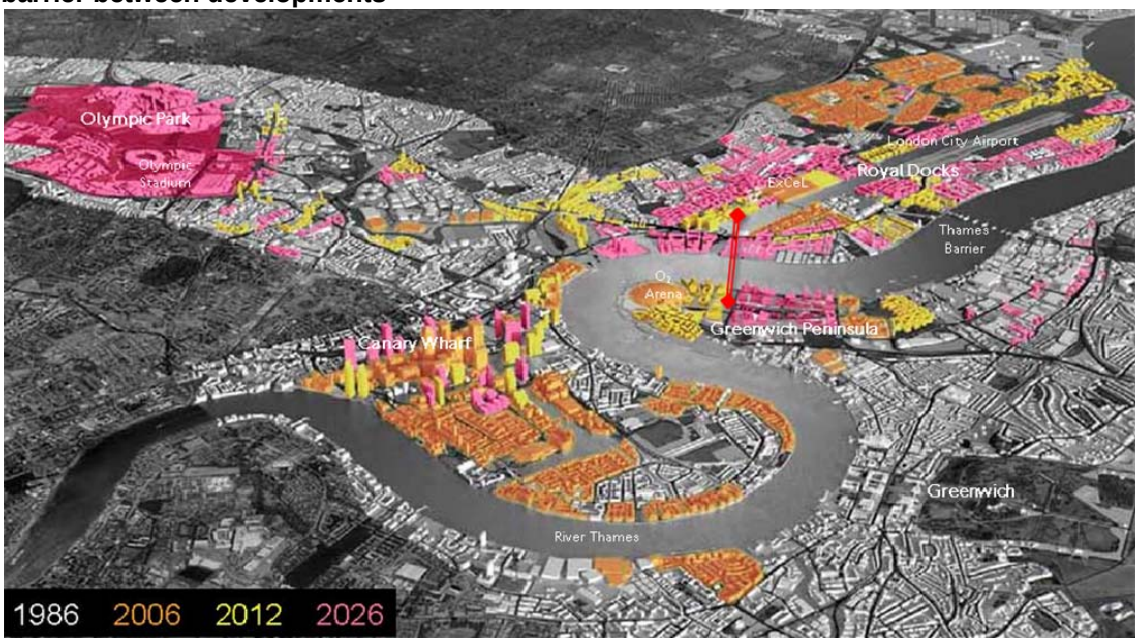
4.19. Nevertheless as these areas have been redeveloped earlier land use patterns have in some cases survived, particularly where development has been piecemeal, and permeability often remains low. As a result the barrier effect of the river is often compounded by an additional barrier caused by the historic activities which grew up alongside it.

Thames Peninsulas

4.20. The River Thames creates peninsulas within inner east / south east London, which have the Thames on three sides and therefore limited local transport options to adjacent – but cross-river – communities, depending instead on new rail links to support major development of surface links.

4.21. As this area was the heart of London's now closed Docklands, this area has been the heart of the new intensive development, which has lead to a large increase in the number of people living, working and visiting the peninsulas.

Figure 4.2 – London Docklands development phases, with the River Thames as a barrier between developments



4.22. The peninsulas can be seen in the image above, with prominent peninsulas enjoying rapid growth but enjoying no surface links to adjacent areas across the river. These are described below, from west to east.

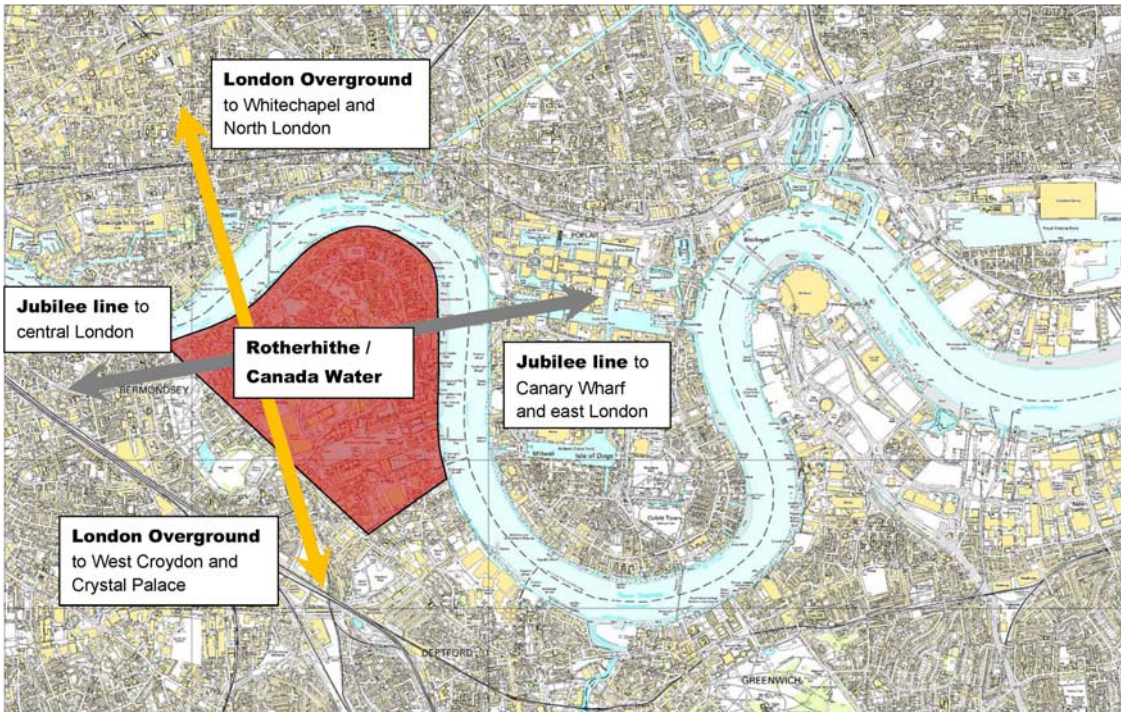
Rotherhithe

4.23. The Rotherhithe peninsula is the westernmost peninsula within the study area. It is south of the Thames in the London Borough of Southwark, and bounded by the river on its northern and eastern sides, and by Greenland Dock to the south.

4.24. Until the 1990s its transport connections were relatively poor, with the East London underground line providing the only rail service (and for an extended period in the 1990s, even this was closed for tunnel reconstruction works). Since then, the Jubilee line has provided a new station in the heart of the area, with direct trains to both central London and Canary Wharf and points east.

4.25. In 2010, after a period of works, the East London line re-opened as part of the extended London Overground network, offering more services to more destinations.

Figure 4.3 – Rotherhithe peninsula fixed link transport options



4.26. The area therefore has two good rail services which offer alternative modes of transport to a range of destinations. While there was disruption in the course of the construction of these improved links, the local resilience is now very good; in the event of a closure on one line, there is an alternative service which can be used to make alternative journeys.

Isle of Dogs

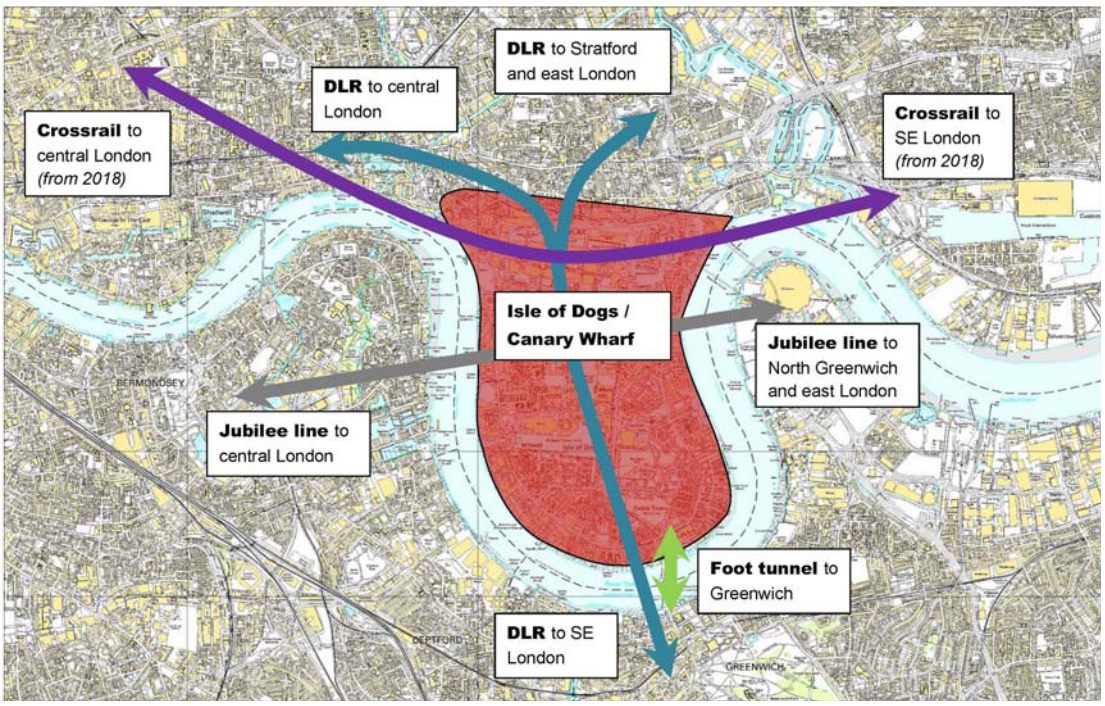
4.27. The Isle of Dogs is on the northern bank of the Thames within the borough of Tower Hamlets, and up to the 1980s had very poor public transport links. In 1987 the DLR radically transformed transport in the area by providing a service through the heart of the island and into the edge of the City. Nevertheless, with a dependence on only a single line, the fledgling Canary Wharf development suffered from a lack of resilience, with any disruption on the DLR potentially stopping workers from arriving at or leaving the area.

4.28. Canary Wharf was therefore instrumental in lobbying for, and in some cases funding, a series of improvements to the infrastructure, including higher capacity on the DLR and its extension to new areas including the heart of the City at Bank, and most notably in extending the Jubilee line through Canary Wharf to central London, North Greenwich and stations to Stratford.

4.29. In addition, at the southern end of the island, there is a foot tunnel to Greenwich, which provides a means to leave the peninsula and access other places on foot or cycle, or access alternative transport options.

4.30. From 2018, Crossrail will be added to the transport options on the Isle of Dogs, with direct trains from Canary Wharf to a range of destinations including central London and Heathrow. The station box at Canary Wharf is being funded by Canary Wharf Group, given the importance of building additional rail capacity and resilience to allow for the planned growth in employment.

Figure 4.4 – Isle of Dogs peninsula fixed link transport options



4.31. As a result of this investment in new lines, there is a high level of resilience for the Isle of Dogs; in the event of planned or unplanned closure of one of these links, there are alternative transport options available, which will only increase with the arrival of Crossrail.

Greenwich Peninsula

4.32. The Greenwich Peninsula lies on the southern side of the Thames, and again had very poor transport connections until recent years. Since 1999, the Jubilee line has provided services to the west and north from North Greenwich station, which has supported the construction the O2 Arena (originally the Millennium Dome), a new commercial district around the station, and the first phases of what will become a very large residential district.

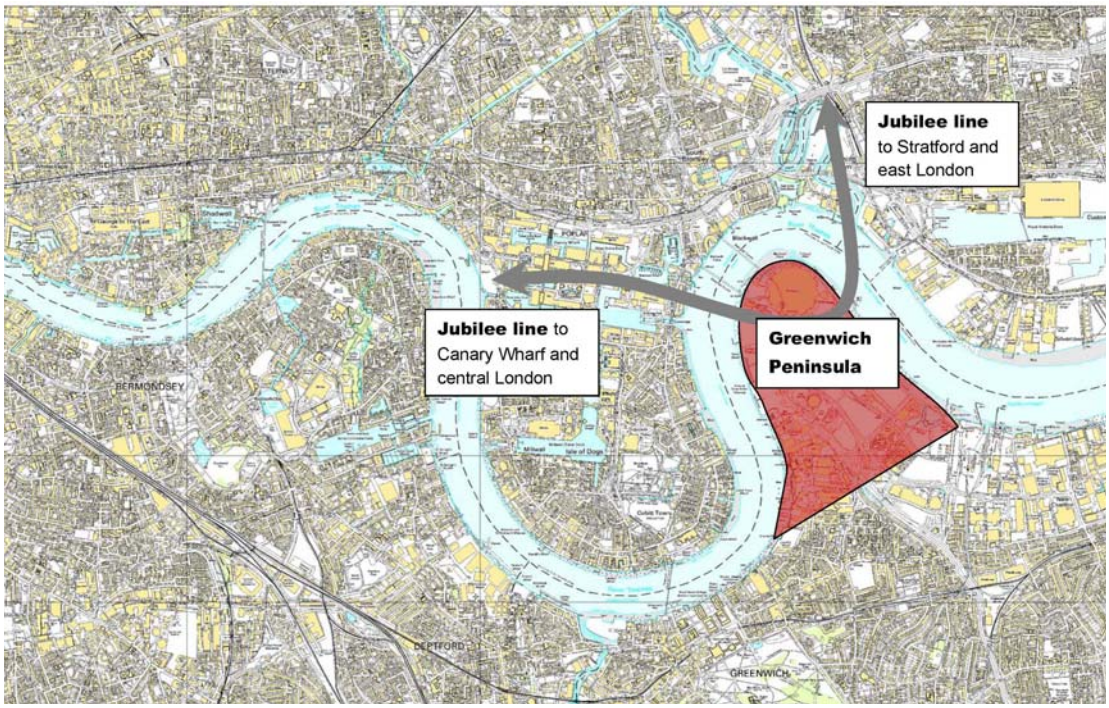
4.33. The area has a planned employment capacity of 7,000 jobs, residential capacity of 13,500 homes (or over 25,000 people), and the leisure elements of the O2 Arena can attract large crowds of over 20,000 for Arena events as well as customers for the associated attractions including restaurants and cinemas.

4.34. Unlike both Rotherhithe and the Isle of Dogs, the Greenwich Peninsula has only a single rail link, in the form of the Jubilee line. Other transport options are provided by buses, with one route – the 108 – crossing the Thames by

way of the Blackwall tunnel, but the capacity of buses to carry passengers across the Thames is limited, and certainly not sufficient to meet demand in the event of the Jubilee line being unavailable.

4.35. Pedestrians and cyclists cannot cross the Thames in this vicinity as the Blackwall tunnel is restricted to motor vehicles.

Figure 4.5 – Greenwich Peninsula fixed link transport options



4.36. Line disruption or engineering works on the Jubilee line thus have a very significant effect on passengers seeking to access or leave the area, with insufficient bus capacity to disperse either peak period or event crowds. The 2,600 capacity nightclub Matter, formerly within the O2 at North Greenwich, cited Jubilee line engineering works as a major factor in its closure in 2010.

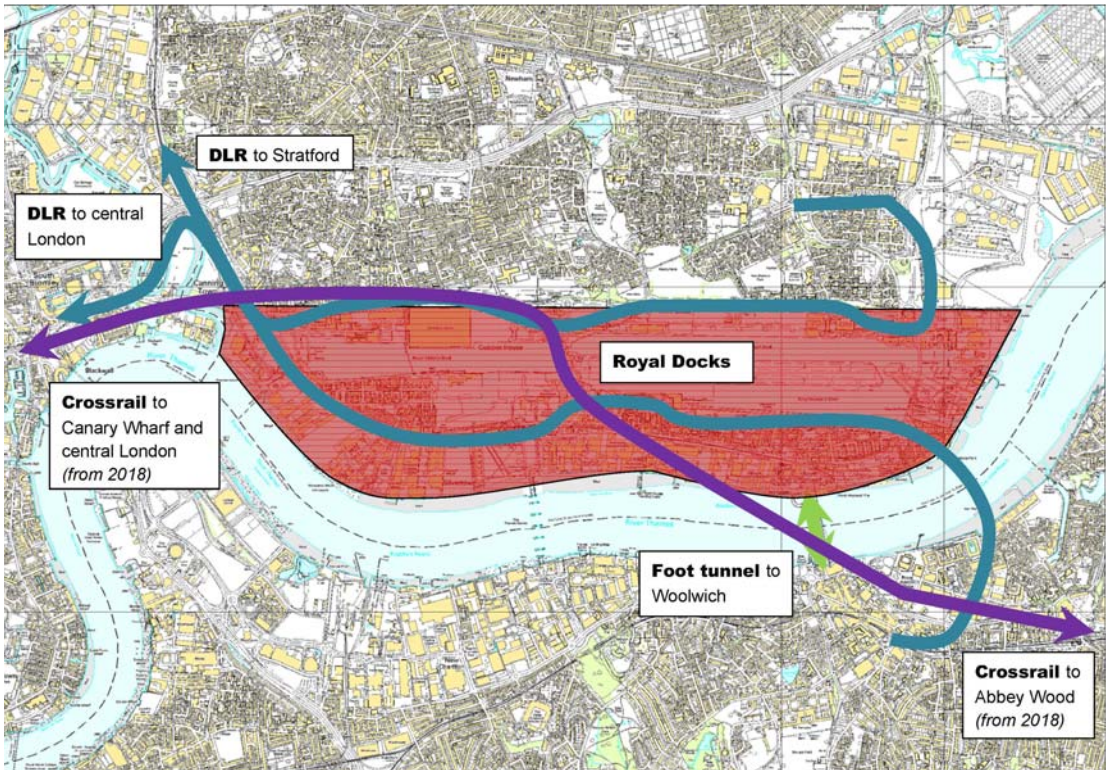
4.37. While this cannot be certain, and occurred at a time of considerable engineering work to re-signal the line, it demonstrates that a lack of resilience and alternative travel options can have a negative effect in the local area, where the physical geography hinders the provision of alternative public transport options as well as simply walking and cycling.

4.38. Even when the Jubilee line is in normal service, local connectivity between the Greenwich Peninsula and the Royal Docks is relatively poor for pedestrians and in particular for cyclists, considering the areas' geographic proximity to one another and potentially complementary development. The Jubilee line provides no direct connection between the two areas, and interchange with DLR services is required at Canning Town, adding inconvenience, dependence on two lines, and adding a second wait for a train of potentially several minutes each.

Royal Docks

4.39. The peninsula nature of the Royal Docks is less pronounced, as the Thames is straighter in this section giving a long connection between the Royal Docks area and the residential areas to the north, Canning Town and Beckton. However, the area is assessed here because it formed an intergral part of London's Docklands and therefore has a very large amount of available development land, as discussed in the previous section.

Figure 4.7 – Royal Docks fixed link transport options



4.40. Until the early 1990s, the Royal Docks had only one rail link, the low frequency North London line from North Woolwich to Stratford and beyond through north London.

4.41. In 1994 the DLR extension to Beckton opened, providing a new light rail service along the northern edge of the Royal Docks to Canning Town and on to central London and (via interchange) Canary Wharf. In 2005 a further section of the DLR opened along the southern side of the Royal Docks to City Airport, with a final extension to Woolwich Arsenal opening in 2009, providing a new river crossing to south east London.

4.42. The North London line closed through the Royal Docks in 2006 to allow new DLR services from Canning Town to Stratford, providing new connections and a higher frequency on existing DLR routes through the area from 2011. In 2018, part of the route will be re-used for the new Crossrail services, which will provide services from Abbey Wood and Woolwich in south east London to Canary Wharf, central London and beyond, via Custom House.

4.43. The area will therefore have a good connections to centres of employment, and to the wider transport network within London.

4.44. Certain local links, however, are poorer, and are not provided with the current network. The cross-river links to Woolwich are increasingly good, but there is no direct link to the Greenwich Peninsula, lying to the south-west of the Royal Docks.

4.45. Given the presence of potentially complementary development on the Greenwich Peninsula, provision of a link to this area could help local businesses in the Royal Docks; for example, both the O2 Arena and ExCeL host many major events, and each have associated restaurants, hotels, and bars to service these visitors. In both cases these are very busy on event days, but relatively under-utilised when there are no events. The transport networks on both sides are inevitably very busy when handling irregular but very large crowds for these events.

4.46. There would be clear synergies by providing a direct link between the two areas, both to assist in transport to and from events, but also to encourage local employment in the complementary development which could be spurred by the creation of a single 'hub' of leisure-related activities.

River Thames as a barrier to cycling

4.47. Whilst the new rail links described above allow for pedestrians to cross the Thames as public transport passengers, cyclists are not generally able to use these links, as they travel in deep tunnel where cycles cannot be carried.

4.48. Cyclists can cross at the Greenwich and Woolwich foot tunnels, providing a route into and out of the Isle of Dogs and Royal Docks. From the Greenwich Peninsula, these routes are some distance away, and make cycling a poor alternative (in journey time terms) to public transport. Providing a new cross-river link from the Greenwich Peninsula that cyclists can use could unlock cycling as a much more attractive mode from this rapidly growing area.

Summary of local transport challenges

4.49. As noted above the Greenwich Peninsula is unusually severely constrained by its geography and is now very largely reliant on the Jubilee line for overcoming the barrier effect of the river on two sides. Furthermore cycles cannot be carried[6] on the Jubilee line and the nearest alternative routes involve using either the Greenwich or Woolwich Foot Tunnels, which involves a diversion of several kilometres.

4.50. There are both resilience and connectivity issues at the local level to warrant better local transport links between the Greenwich Peninsula and the northern bank of the Thames, ideally towards the Royal Docks; while there are currently more trips the Isle of Dogs, a second link would duplicate the Jubilee line and would not create a new link for pedestrians, although it would provide a useful link for cyclists unable to use the Jubilee line.

[6] Although folding bicycles are permitted

5. LOCAL CONSTRAINTS

5.1. The previous chapter has highlighted the strategic case for improving river crossings in the eastern part of London to help deliver the planned regeneration and accompanying employment and new homes. It also summarises the planned intensive development within the areas close to the Thames which have poor cross-river connectivity, and which would benefit from improvements.

5.2. A link from North Greenwich to the Royal Docks is most likely to provide a step change in transport connectivity and resilience for an area of major planned growth, and would be most likely to spur development by linking together to areas identified in the London Plan as sites with a high potential for development bringing in new residents and jobs.

5.3. This section briefly looks more closely at these areas, identifying the physical constraints against which any proposals should be considered.

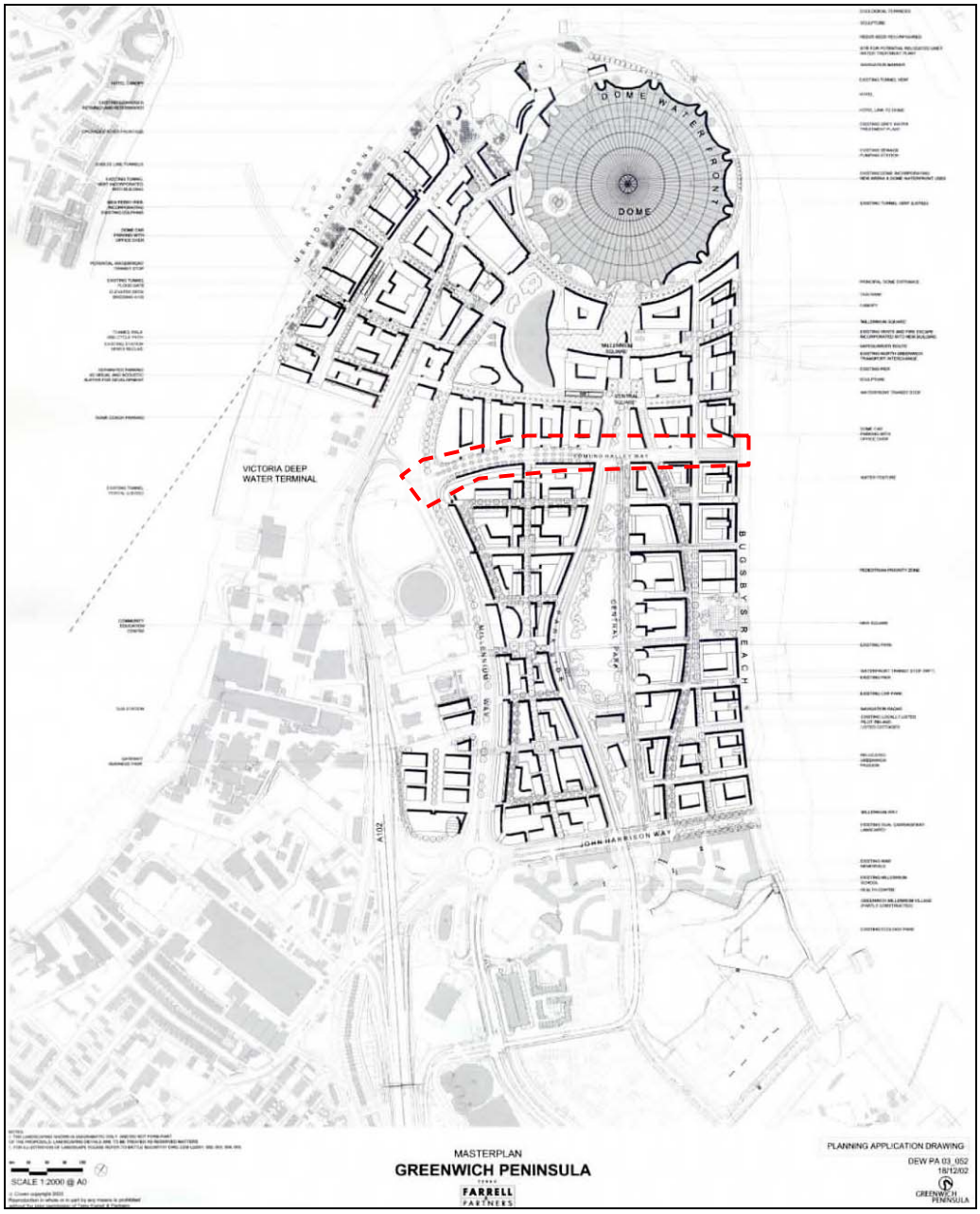
Greenwich Peninsula

5.4. Within the Greenwich Peninsula, there are local constraints imposed by the existing, and consented, development currently under way. In 2003, the London Borough of Greenwich granted planning permission for a major regeneration scheme on the Greenwich Peninsula.

5.5. This application included detailed planning consent for the conversion of the then-closed Millennium Dome into a major new arena (now The O_2), with ancillary uses including additional entertainment space, a cinema, restaurants and new public realm between North Greenwich London Underground station and The O_2.

5.6. As part of the same application, outline consent was granted for the masterplan for a large part of the peninsula to the south-east of The O_2, including new retail and office space around the station, and 10,000 new homes in residential districts to be built through a large part of the rest of the peninsula.

Figure 5.1 - Greenwich Peninsula masterplan



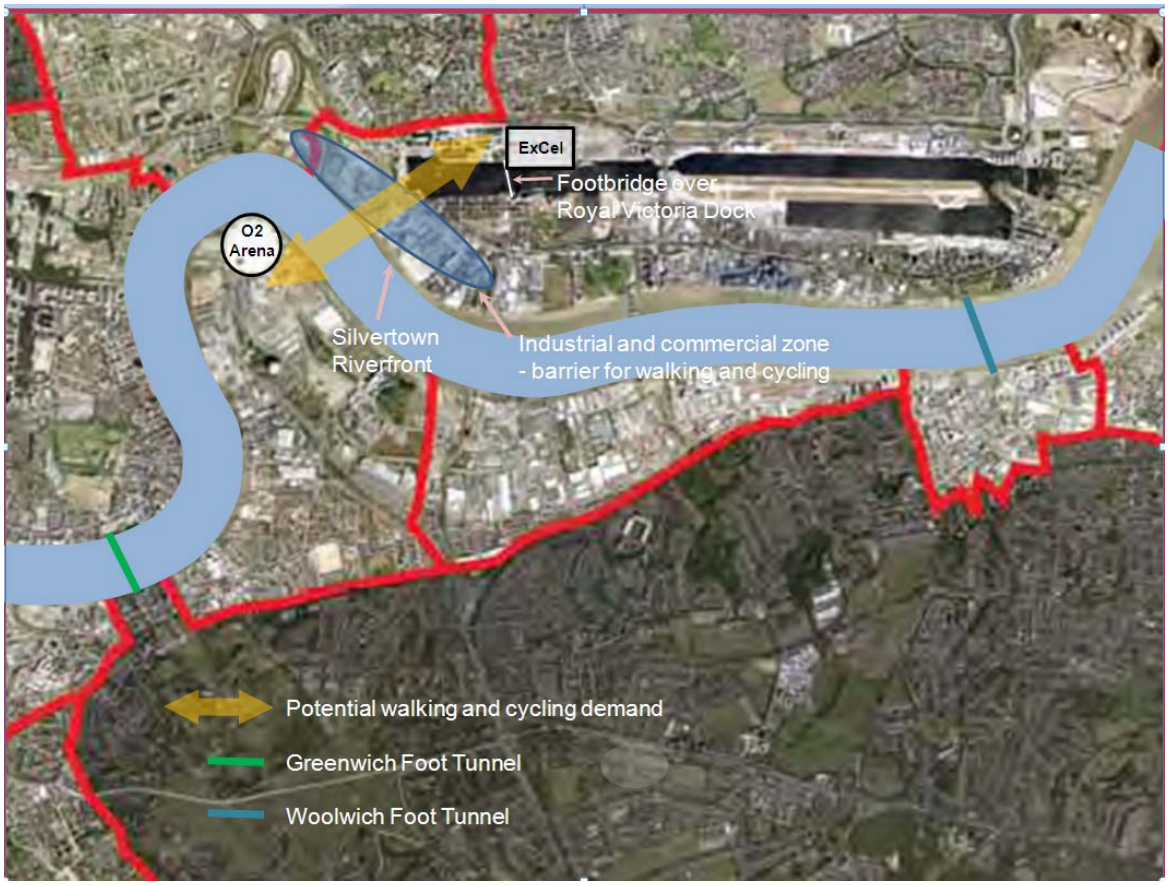
5.7. In addition, there is safeguarding in place for the construction of a road crossing, the Silvertown Crossing (area shown in red above). The safeguarding allows for the construction of the road link in either a bridge or tunnelled form. However, the development masterplan granted since the safeguarding was established allows for the construction of a dense urban quarter around the crossing route, including large blocks of residential units alongside the crossing corridor. As a result, a bridge option would not be acceptable locally; the London Borough of Greenwich's adopted UDP states that:

> *"Should this crossing proceed the Council will require a tunnel, not a bridge."*

Royal Docks

5.8. There are a number of sites which remain in industrial and commercial use between the Royal Victoria Dock and the Silvertown Riverfront including a site occupied by Laing O'Rourke and the Silvertown Quays area. These prevent easy pedestrian and cycle access between ExCeL and the Silvertown Riverfront despite the existence of a footbridge over the Royal Victoria Dock. In combination with the river this creates a double transport barrier between the core areas of the Greenwich Peninsula and the Royal Docks Opportunity Areas, as shown in Figure 5.2 below.

Figure 5.2: Barriers to local transport between the Greenwich Peninsula and the Royal Docks



5.9. Redevelopment plans for the area have been under consideration by the London Thames Gateway Development Corporation (LTGDC), Newham and the London Development Agency (LDA).

5.10. An illustrative masterplan for the area has been drawn up, with the area known as Thameside West. This has not been adopted, pending the outcome of the Royal Docks 'Visioning' exercise to consider strategic planning issues in the Royal Docks, but indicates a preference among some of the key stakeholders for a mixture of uses, including the retention of active wharfage, consolidation of the ancillary landside wharf uses, and the release of some land for high-density residential development.

Figure 5.3: Illustrative masterplan for Thameside West

5.11. It is unclear at the time of writing what impact the government's proposed Enterprise Zone will have on development plans within the Royal Docks.

6. OPTION ASSESSMENT FOR GREENWICH PENINSULA PEDESTRIAN / CYCLE CROSSINGS

Objectives

6.1. Given the needs highlighted above, and the overall programme objectives, the following objectives have been used to consider options for addressing the pedestrian / cycle connectivity at the Greenwich Peninsula:

- To support the provision of public transport services in the London Thames Gateway
- To improve access to new rail links being provided in the area
- To integrate with local and strategic land use policies
- To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs
- To provide attractive new walking and cycling links
- To support the needs of existing businesses in the area and to encourage new business investment
- To achieve value for money for TfL and the wider GLA

6.2. The table below summarises how proposals will be considered against these objectives.

Objectives	**Measure**
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich
To improve access to new rail links being provided in the area	Links to new rail services
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case

Scheme options

6.3. A range of options exist which could potentially address some or all of the objectives for reducing the problems of severance around the growing peninsula areas in east London, as well as the option of doing nothing and accepting the status quo. The options are assessed within this chapter, and include the following:

- Do nothing;
- New/improved passenger ferries;
- New foot/cycle bridges;
- New cable car.

Option: Do nothing

6.4. The current river crossing options in the area around Blackwall and North Greenwich are the Jubilee line, the Thames Clipper passenger boat services. Due to the geographical make up of the area and the growing level of homes, residents and jobs in North Greenwich, additional capacity is required as well as an increased resilience to the Jubilee line in the event of suspension or closure. Under the do nothing scenario, increased crowding would be felt during peak hours for commuters as well as before and after events at the O2 Arena and ExCeL.

6.5. The table below summarises how the Do Nothing scenario measures against the objectives.

Objectives	Measure	Do Nothing
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	FAIL
To improve access to new rail links being provided in the area	Links to new rail services	FAIL
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS – although it is likely that poor resilience will discourage or slow planned regeneration schemes
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	NEUTRAL
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	FAIL

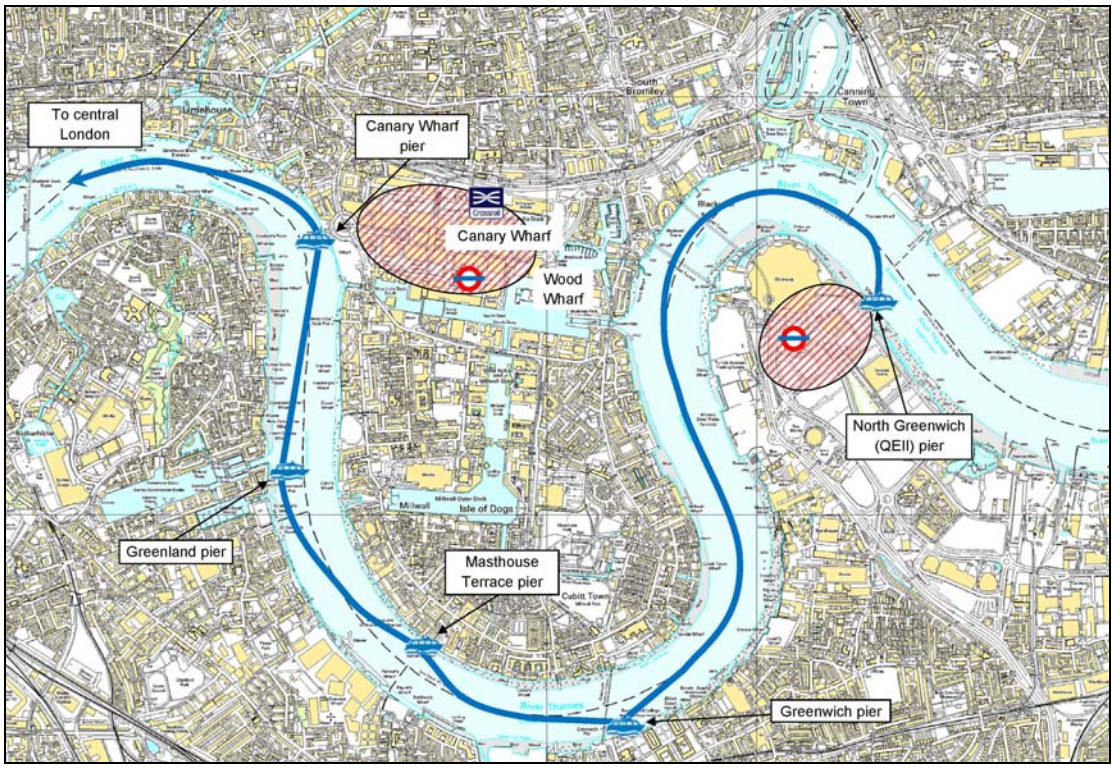
Objectives	Measure	Do Nothing
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	NEUTRAL
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	PASS

6.6. The Do Nothing option is clearly deliverable, but doing nothing would mean that the problems of resilience would remain, and become more pressing as the resident population, as well as commercial and leisure activity, continues to grow. This is likely to discourage inward investment to the area.

Option: New / improved passenger ferries

6.7. There is an existing passenger ferry service from North Greenwich which serves Canary Wharf, on the northern bank of the Thames. However, due to the location of piers this service operates from the eastern side of North Greenwich to the western side of Canary Wharf, with a journey time of 21 minutes and relatively infrequent service.

Figure 6.1 – Current route for Thames Clipper services from North Greenwich to Canary Wharf



6.8. The provision of new piers on the western side of North Greenwich and eastern side of Canary Wharf could allow a fast and frequent direct ferry to operate across the river, similar to the Rotherhithe (Hilton) ferry on the other side of Canary Wharf.

6.9. A new pier on the western side of the Greenwich Peninsula is planned as part of the longer term development of the masterplan on this side of the peninsula; however there is no firm timetable for its construction. A new pier would be located some distance from the commercial centre of North Greenwich; at present the walking route is poor, although as part of the development of the peninsula this should in time change into a high quality route.

6.10. A new ferry pier on the northern bank would also be required to allow an effective cross-river service to be provided.

6.11. The key centres of activity on the northern bank are Canary Wharf, and the ExCeL area, and these are taken in turn below.

6.12. A link to Canary Wharf – avoiding the long route around the Isle of Dogs – would require a new pier on the eastern side of the Isle of Dogs. A potential

site has been identified next to a former entrance into the West India Docks. This has no planning history for use as a passenger pier and is relatively close to residential properties, but the PLA advise that the location is probably suitable for a passenger pier, and Thames Clippers believe that this location would pose few problems in terms of proximity to residents, based on their experience of other piers.

6.13. The pier would be located within a few hundred metres of Canary Wharf 'as the crow flies', but the walking route is poor; it is obstructed by Wood Wharf, which is currently light industrial but is planned over the next 15 years to be developed into a dense new commercial and residential district, with improved permeability for pedestrians.

6.14. Prior to the development of the two major sites impeding access on either bank – the western part of the Greenwich Peninsula on the south side, and Wood Wharf on the northern side – a cross-river ferry between these locations would entail a walk of around 10-15 minutes on each side through an area of – in some parts – poor quality. Even with a high frequency service of around every 10 minutes, it is clear that this would provide a very poor service in comparison to the Jubilee line which already links these two sites, and as a result would be likely to carry very few passengers.

6.15. With the cost of new piers and costs to operate the ferry, it is likely that this service would require both capital and operating subsidy.

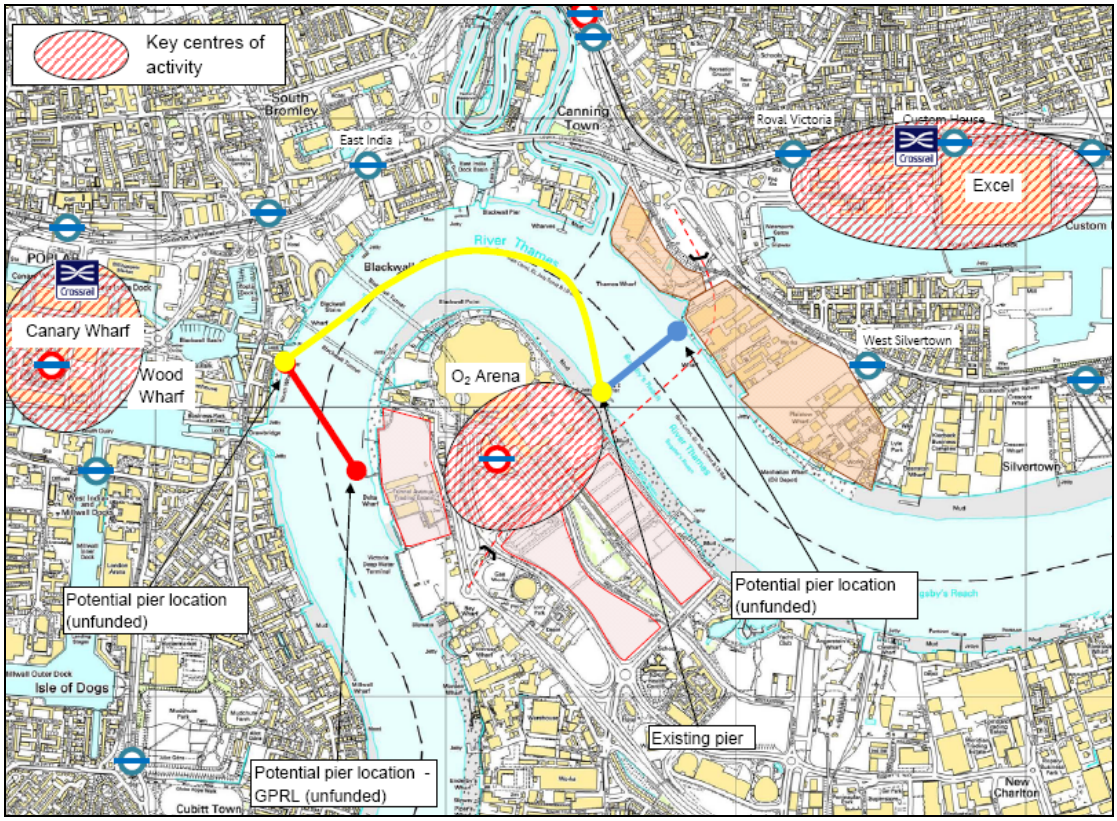
6.16. In the medium term, the walking routes on both banks should be significantly enhanced, both in terms of environment, and in length, as new routes are opened up through new development. The new developments would themselves create an increase in trips to and from these development sites, which bring residents and employees closer to the river.

6.17. It is therefore likely that when these developments have been built, the case for a new cross-Thames passenger ferry will be much stronger.

6.18. Towards the Royal Docks, the main centre of activity is around the ExCeL estate. There are currently no passenger piers on the northern bank opposite the Greenwich Peninsula, although a small passenger pier once operated close to the former western entrance to the Victoria Dock. It is therefore likely that a new pier could be located here, which from a ferry perspective would be located conveniently opposite the existing North Greenwich pier.

6.19. From a passenger perspective, however, the northern bank of the Thames in this area is an unattractive destination, with industrial uses along the whole waterfront. Passengers arriving at a pier in this area would have a long walk to the centres of activity (either the ExCeL area, or a DLR station), and this walk would be of poor quality. It would not be an attractive facility and is not likely to attract passengers.

Figure 6.2 – potential cross-river passenger ferry routes



6.20. Figure 6.2 above highlights the two principal options described above, in red and blue. The yellow route indicates a potential hybrid option, utilising the existing pier on the southern side but a new Canary Wharf pier on the northern bank. While this addresses the problems with the pier location on the southern bank, it would also reduce the service frequency due to the longer route, and may therefore not improve the attractiveness of this option compares to the red route.

6.21. The table below summarises how the main passenger ferry options measure against the objectives.

Objectives	Measure	New Canary Wharf ferry	New Royal Docks ferry
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	NEUTRAL – it provides a new option, but one which is not likely to meet a passenger demand due to overall journey time and quality	NEUTRAL – it provides a new option, but one which is not likely to meet a passenger demand due to overall journey time and quality
To improve access to new rail links being provided in the area	Links to new rail services	FAIL	FAIL
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS	PASS
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	PASS	PASS
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	FAIL	FAIL
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	NEUTRAL	NEUTRAL
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	FAIL	FAIL

6.22. At present, the assessment suggests that while new passenger ferries would enjoy general support, they would not provide an attractive new transport option due to the poor walking routes. They are likely to require both a capital and operating subsidy by TfL.

6.23. However, in the longer term – and in particular when development on the Greenwich Peninsula has reached the western part of the peninsula and Wood Wharf has provided a good new link to Canary Wharf – this could well be a useful link.

6.24. **It is recommended that cross-river ferry options are not pursued as part of this programme**, as these would not address the problems and provide an attractive new river crossing. However, in the longer term, when further development has taken place on both banks of the Thames, there may be a case for re-investigating the potential for a new cross-river facility to provide for Greenwich Peninsula to Canary Wharf local journeys, to relieve the Jubilee line by taking local cross-river trips, and providing a quick route to Canary Wharf for cyclists.

Option: New foot / cycle bridges

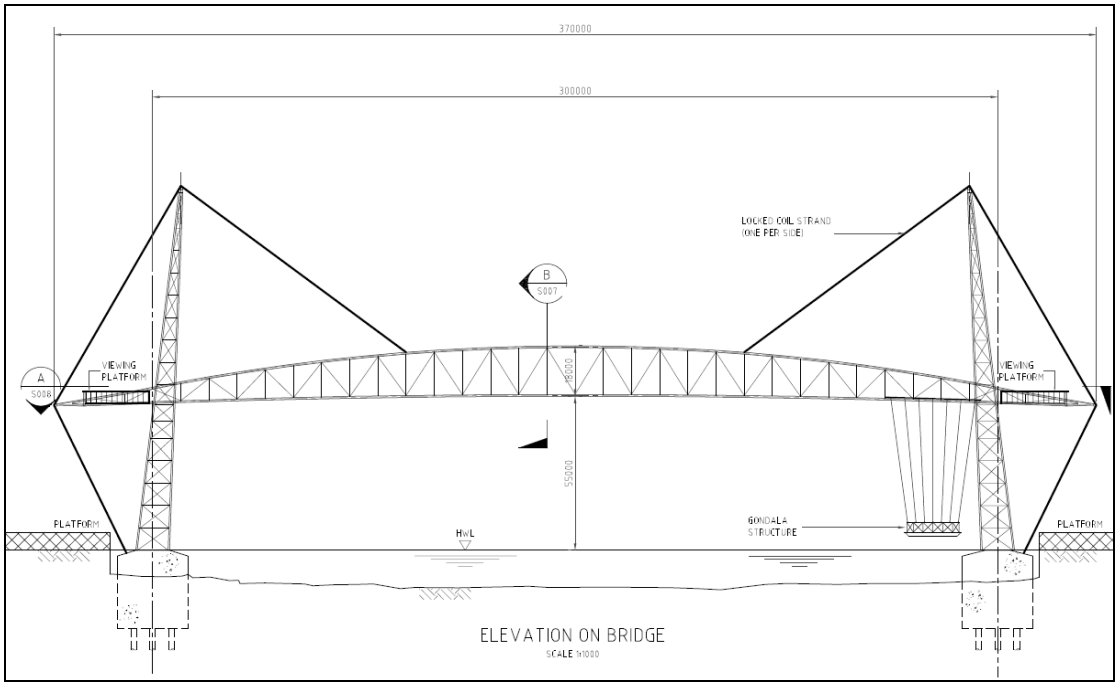
6.25. A new foot / cycle bridge could in theory be built, which would be strongly supported by the local boroughs as a means of better connecting the two sides of the Thames and encouraging walking and cycling.

6.26. Such a bridge could be beneficial in reducing demand on the Jubilee line on one-stop journeys into Canary Wharf and would be an iconic scheme, but it would be a high cost option and there are difficult navigational issues to address.

6.27. At this point of the river a very long span would be required to allow for turning ships, and would need to be at least 50 metres high. A lifting bridge at a sharp bend in the river would be problematic and opposed by the Port of London Authority, with regular closures to allowing shipping to pass, and addressing this issue would require either a fixed high bridge, which would be limited in capacity by lift access, or a transporter type bridge, with a low level gondola carried across the Thames.

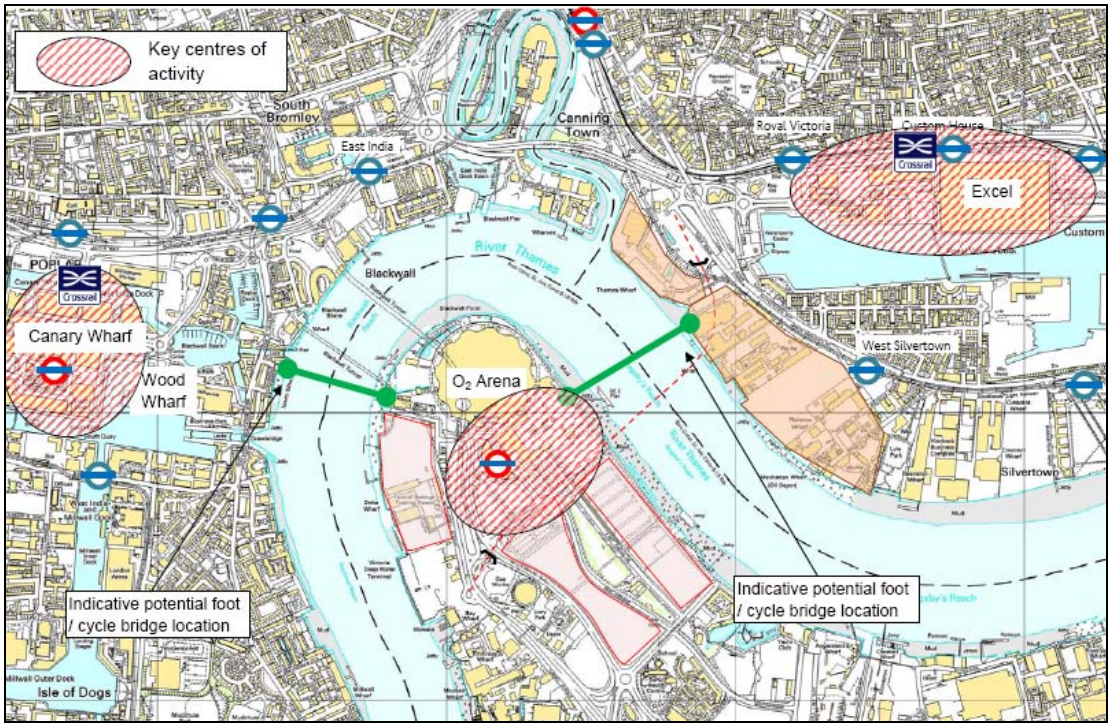
6.28. The transporter concept is illustrated below; a non-transporter bridge would be of the same principles but without the carried gondola, and all users diverted by lifts to the high level walkway.

Figure 6.3 – illustrative pedestrian / cycle transporter bridge



6.29. A bridge would need to connect the centre of activity at North Greenwich to a centre of activity on the northern side of the Thames, such as Canary Wharf or the ExCeL area.

Figure 6.4 – foot / cycle bridge options



6.30. The Figure above illustrates the potential locations of bridges to link to either the Isle of Dogs, or the Royal Docks. In both cases, issues related to the length and quality of the onward walking routes are similar to the passenger ferry options; with the route to Canary Wharf, development of this part of the Greenwich Peninsula and Wood Wharf on the northern side would be required to provide an attractive walking route. On the Royal Docks side, there is an area of industrial uses which separate the Thames from the centres of activity further inland.

6.31. In addition, there are issues about property and visual intrusion; while a floating pier close to the former entrance to the West India Docks would be at a low level and relatively unobtrusive for the adjoining residents, a bridge would entail a large and high structure in front of existing residences, which may cause more of a planning concern.

6.32. A bridge would have a high level of utility for pedestrians and cyclists, some types of bridge more than others; some delays would be encountered either waiting for lifts, or waiting for the gondola in the case of the transporter option. In particular, while feasible to charge pedestrians and cyclists for use of a bridge, it is likely to be difficult in practice to do so; it is not current practice at, for example, the Greenwich foot tunnel, nor at other modern bridges such as the Millennium Bridge. This, in terms of benefit to pedestrians and cyclists, is clearly a positive, and would therefore be more likely to attract users from the alternatives such as the Jubilee line.

6.33. However, a large bridge such as this which is accommodating shipping – by either having a lifting section, by utilising lifts, or operating as a transporter bridge – will have ongoing operating costs to cover in addition to the costs of

construction. As such it is likely to require ongoing operating, as well as capital, subsidy.

6.34. In 2009 Hyder estimated the likely cost of foot/cycle bridge options. A transporter bridge was the cheapest at around £60M construction cost (current prices excluding optimism bias/contingency, project development, land, ship impact protection), a fixed level bridge accessed by lifts or escalators around £62M and £80M respectively, and a low-level lifting bridge around £80M. Project development and land rights costs would take the cost range to around £70M-£90M, and there would need to be a high level of risk at this stage given the uncertainties around design concepts.

6.35. The table below assesses foot/cycle bridge options against the objectives. For this purpose, the assumed scheme is a high-level bridge served by lifts.

Objectives	**Measure**	**New Canary Wharf bridge**	**New Royal Docks bridge**
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	NEUTRAL – it provides a new option, but one which is not likely to meet a passenger demand due to overall journey time and quality of walking routes	NEUTRAL – it provides a new option, but one which is not likely to meet a passenger demand due to overall journey time and quality of walking routes
To improve access to new rail links being provided in the area	Links to new rail services	FAIL	FAIL
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS	PASS
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	PASS	PASS
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	PASS	NEUTRAL – attractive facility but deposits users in industrial area
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	PASS – better link between North Greenwich and Canary Wharf likely to encourage investment	NEUTRAL

Objectives	Measure	New Canary Wharf bridge	New Royal Docks bridge
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	FAIL	FAIL

6.36. At present, the assessment suggests that a new foot / cycle bridge would provide a useful new crossing for some users, and would enjoy a high level of support. However, the walking routes on both sides of the Thames would need substantial improvement associated with developments for the environment to be of a high quality, and journey times – on foot though not by cycle – would be uncompetitive with the Jubilee line.

6.37. A bridge will require a very significant capital investment, and there would be an ongoing maintenance and operating cost associated with a high level or transporter bridge. There is little opportunity to recover these costs from users.

6.38. There would be significant planning obstacles in terms of location major bridge infrastructure close to residents on the Isle of Dogs route, and challenging constraints to meet PLA requirements in either case.

6.39. As a result, **a foot/cycle bridge is not recommended for further work**.

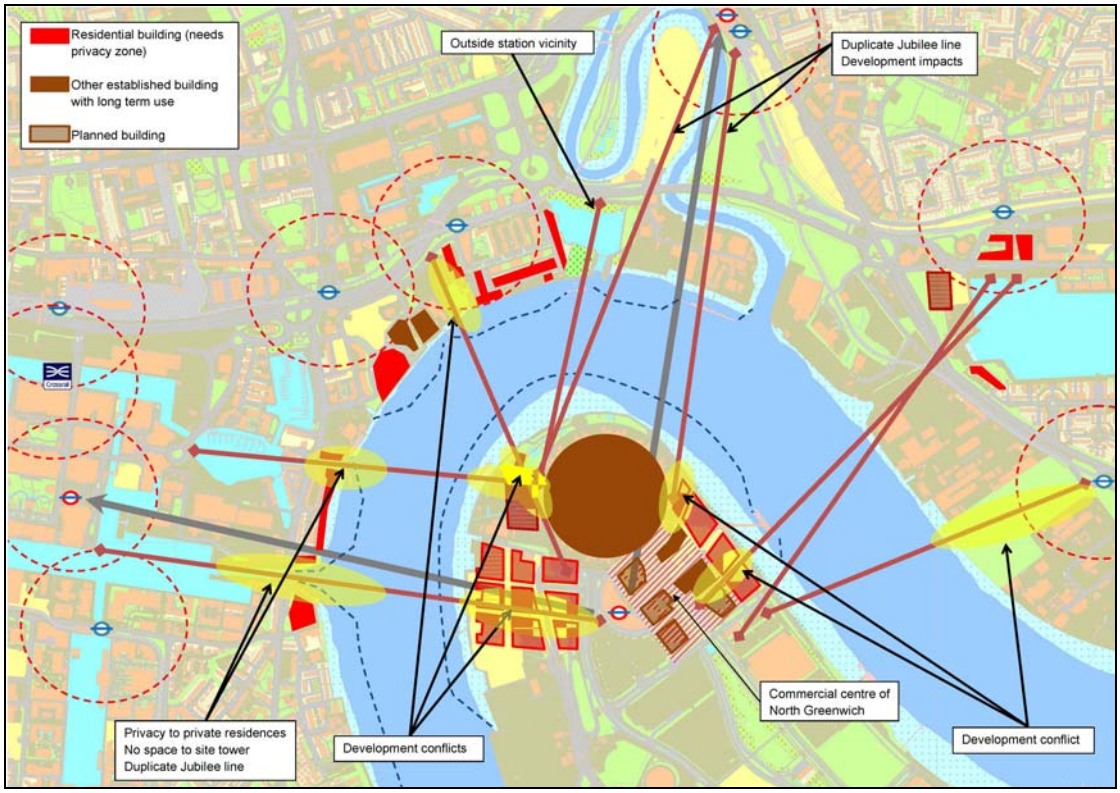
Option: New cable car

6.40. A cable car system could potentially overcome some of the disadvantages of a foot / cycle bridge while still providing a convenient link for those on foot or travelling by cycle. It could traverse the Thames without the need for a long and heavy structure such as a bridge deck, allowing cost savings; it could link the key attractors more directly without the need for pedestrians to follow a long walk through industrial areas; it is an attractive proposition to seek commercial sponsorship and raise advertising revenue; and it would be possible to charge passengers for its use, thus making a contribution to maintenance and operating costs.

6.41. A cable car system could operate a large number of small gondolas with a capacity of over 2,000 passengers per hour per direction, with little or no waiting in normal operation. A crossing would take around 5-6 minutes.

6.42. Several route options from North Greenwich to the northern bank were considered; each route option was considered for its ability to serve a key attractor and/or a station, and for its ability to fit in with the considerable physical constraints. These are shown in the Figure below.

Figure 6.5 – Potential cable car alignments and constraints



6.43. Constraints to be taken into account include:

- need to keep clear of navigational channels including accesses to docks (e.g. West India Dock);
- need to avoid impacting upon planned development sites;
- oversailing of buildings is very difficult, requiring land rights to be acquired (at a cost) for both oversailing rights and for rights of access to

the property 24/7 for last resort emergency escape down to the property roof or private land/gardens;
- in addition fire protection requirements on any buildings close to the line are onerous, as a fire in a building below the system would have potentially serious consequences for passengers passing above;
- the planning obstacles of passing close (even if not over) existing buildings are difficult; it would be necessary to have a privacy zone to residential properties;
- the capacity of a system accessed by lifts will be significantly compromised compared to a lower station building, as there will be issues related both to lift capacity and requirements to safeguard against crowding at platform level.

6.44. A review of the route options against the physical constraints highlighted that a route linking North Greenwich to Royal Victoria (for the DLR and ExCeL) was feasible without significant impacts on existing residents or mature development plans. It would also bring residents of the Greenwich Peninsula to around five minutes' walk from Crossrail at Custom House from 2018.

6.45. Routes to Canary Wharf all conflicted with existing residential development on the northern bank of the Thames, or planned development on the southern side by GPRL or AEG. Routes to East India conflicted with development on the southern side or were remote from the commercial centre, and there were land and privacy issues with the site within a close proximity of the DLR.

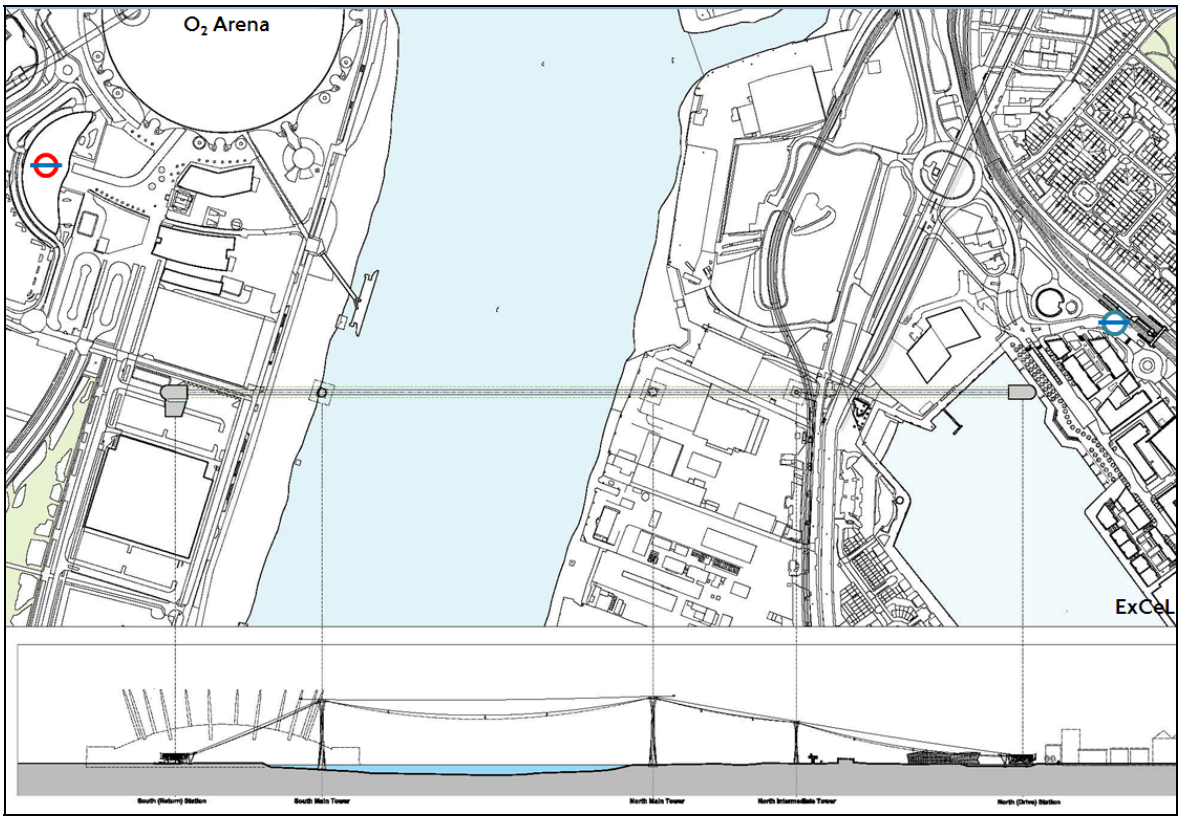
6.46. A route to the ExCeL area also has advantages over other directions, such as:

- **Connectivity**. Routes to the Royal Docks add a new link rather than duplicate the Jubilee line.
- **Regeneration potential**. The Royal Docks has significant development potential which improved connectivity and new visitors will help to foster. Cable car unlikely to have an impact on Canary Wharf development
- **Olympic impacts**. If built by 2012, linking O2 and ExCeL adds to the Olympic offer at both venues, and improves transport resilience during the games
- **Tourism potential**. Linking the O2 with other leisure generators e.g. ExCeL, Siemens, likely to add to attractiveness of all venues as part of larger visitor centre

6.47. Given all the above, if a cable car is to be provided, the route should cross the Thames towards the ExCeL area, to provide a new link to both the growing leisure offer in the Royal Docks and to provide a new link from North Greenwich to the DLR and, from 2018, to Crossrail from Custom House.

6.48. After much discussion with local developer and landowners about the feasibility of this corridor, a route has been identified which avoids all existing residential properties; where the scheme interfaces with planned (but unbuilt) development on the Greenwich Peninsula, TfL has agreed that changes to the masterplan to enable the cable car are feasible. The route is shown in Figure 6.6 below.

Figure 6.6 – The London Cable Car Alignment and long-section



6.49. This route would provide a new travel option for local people; while demand for travel between the Royal Docks and the Greenwich Peninsula is lower than to, for example, Canary Wharf, it provides a direct link without interchange, or without waiting for a train; current journey times are highly variable depending on wait times for each of the two trains required. In addition, the cable car station locations are close to the centres of activity, with a short journey from street to platform.

6.50. Cyclists tend not to use public transport as part of a regular journey, except for longer distance trip, with free travel one of the benefits of cycling. However, from the Greenwich Peninsula, there are no bridges or tunnels available to cyclists, and cycles may not be carried on the Jubilee line (as it is in deep tunnel in this area).

6.51. As a result, although cycle routes on the peninsula itself are good, including National Cycle Network's Thames Path, cycle journeys can be unattractive, especially to nearby locations which are on the other side of the Thames. The cable car offers cyclists living on the peninsula a route to the northern bank of the Thames for onward travel, with a significant time saving over the alternative routes such as via the Greenwich or Woolwich foot tunnels. This time saving is significant and likely to attract cyclists, provided the fare is not too high; season tickets aimed at local regular users could provide a discount over the cash fare.

6.52. With around 25,000 residents expected to be living on the peninsula within the next few years, there is a very significant potential market for cycling if it is

possible to cross the Thames, but who will otherwise not be likely to cycle due to the barrier of the river.

6.53. By effectively overcoming the double barrier of the river and the Silvertown Riverfront industrial zone, the scheme integrates the two Opportunity Areas and supports London Plan strategic policy direction. In particular it supports:

- Greenwich Peninsula as an internationally significant leisure attraction and major contributor to meeting London's need for additional housing; and
- The Royal Docks in maximising the benefits of Crossrail, and capitalising on the success of ExCeL and the potential for further visitor / business related growth.

6.54. The cable car could provide a direct public transport link between North Greenwich and the Royal Docks. These are two of the east sub-region's 14 Opportunity Areas and have the following planned employment and new housing capacities:

- 6000 jobs and 11,000 new homes in the Royal Docks by 2026, and
- 7000 jobs and 13,500 new homes on the Greenwich Peninsula by 2026

6.55. The scheme is expected to have various impacts on regeneration, including increasing land values, supporting business and inward investment, and promoting tourism, by making it easier for the areas of North Greenwich and the Royal Docks operate as a single commercial, leisure and residential location.

6.56. A cable car would conflict with construction of a road bridge at this location, but a bridge is opposed by the local authority and has a very significant traffic impact due to the requirement to open for shipping. This cable car route is however consistent with a road tunnel, and designed to work alongside it.

6.57. A cable car scheme is estimated to cost around £45M to construct (current prices) with around £10M for project development, land, etc.; this is around half the likely cost of a footbridge. Unlike a footbridge, passenger fares would contribute to operating costs.

Assessment

6.58. The table below assesses a cable car option against the objectives.

Objectives	**Measure**	**New North Greenwich - Royal Docks cable car**
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	PASS
To improve access to new rail links being provided in the area	Links to new rail services	PASS – links North Greenwich to DLR and Crossrail
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	PASS
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	PASS
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	PASS
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	PASS – positive business case and potential for revenues to cover operating costs

6.59. A cable car meets all the programme objectives for improving pedestrian / cycle options from North Greenwich and is likely to have considerable secondary regeneration benefits. It enjoys strong support, and there is interest in third party funding in the form of sponsorship and advertising, as well as fare revenue to contribute to maintenance and operating costs.

6.60. As a result, **a cable car to the Royal Docks is recommended for further work**.

Option: Amphibian bus service

6.61. An alternative to a new passenger ferry could be an amphibian bus service. This would be a highly innovative scheme, as no such services are known to currently exist, although a manufacturer in the Netherlands did operate a trial with Stagecoach in 2009 to assess whether it could provide a replacement for a ferry service on the River Clyde in Scotland.

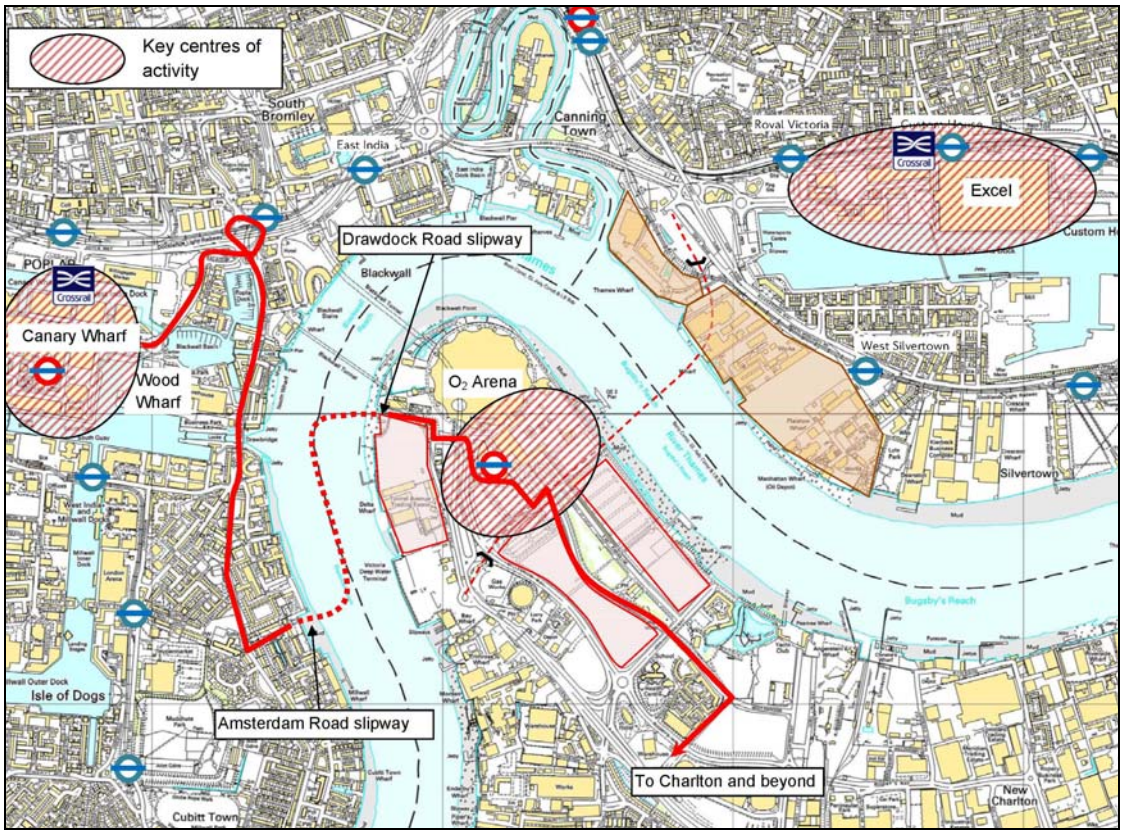
6.62. This option requires access to slipways on both sides of the Thames; given the development and land uses in the areas along the river frontage, it is likely that existing slipways would have to be used.

6.63. There is a slipway on the western side of the Greenwich Peninsula, and another on the eastern side of the Isle of Dogs; however, the latter is not well located to provide a service to Canary Wharf, and its use is likely to be opposed by the adjoining residents.

Figure 5.9 – Amsterdam Road slipway, Isle of Dogs *(source: bing.com)*

6.64. Any such service would inevitably be slow, given the need to change the mode of operation from land to river at the slipways; with slow speeds over the water and circuitous routing on street, the journey times would be very unattractive compared with the Jubilee line, even taking into account the potential for the service to start south of North Greenwich and provide a through journey eliminating the interchange. Figure 5.10 below illustrates the circuitous route which would be required.

Figure 5.10 – potential amphibian bus route



6.65. The capacity would be limited, and with high floors to accommodate the dual-mode of operation, bus stop infrastructure along the route would need to be modified to accommodate the specialist vehicles.

6.66. The service would be of a low capacity, and would not provide additional resilience. It would be difficult to maintain a regular service, and would require specially trained staff capable of navigating on the Thames, with a resultant high operating cost compared to regular bus services.

6.67. The Port of London Authority is likely to be concerned with the impact on shipping and safe navigation, maintenance of the slipways, and impact on the moorings at the Amsterdam Road slipway.

Assessment

6.68. The table below assesses an amphibian bus service option against the objectives.

Objectives	**Measure**	**North Greenwich – Canary Wharf amphibian bus**
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	FAIL – slow journey times, low capacity
To improve access to new rail links being provided in the area	Links to new rail services	FAIL
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	FAIL
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	FAIL
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	FAIL
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	FAIL – likely low demand, high operating costs, no wider social benefits

6.69. In inner London there are significant obstacles to operating an amphibious vehicle in service on a busy river, there are few benefits given the comparative journey times, and the assessment suggests that such a service does not meet the programme's objectives.

6.70. As a result, **an amphibious bus service is not recommended for further work**.

Summary of option assessment

6.71. The table below summarises the performance of the alternatives outlined within this chapter against the objectives.

Objectives	Measure	Do Nothing	New Canary Wharf bridge	New Royal Docks bridge	New North Greenwich - Royal Docks cable car	North Greenwich – Canary Wharf amphibian bus
To support the provision of public transport services in the London Thames Gateway	Providing new transport options for public transport passengers from North Greenwich	FAIL	NEUTRAL	NEUTRAL	PASS	FAIL
To improve access to new rail links being provided in the area	Links to new rail services	FAIL	FAIL	FAIL	PASS	FAIL
To integrate with local and strategic land use policies	Conformity with relevant policies and development plans	PASS	PASS	PASS	PASS	PASS
To ensure that any proposals are acceptable in principle to key stakeholders, including affected boroughs	Degree of support for proposals	NEUTRAL	PASS	PASS	PASS	FAIL
To provide attractive new walking and cycling links	Quality of environment, and links to strategic walking and cycling routes	FAIL	PASS	NEUTRAL	PASS	FAIL
To support the needs of existing businesses in the area and to encourage new business investment	Impact of proposal on local businesses	NEUTRAL	PASS	NEUTRAL	PASS	FAIL
To achieve value for money for TfL and the wider GLA	Assessment of financial impact on TfL/GLA and Business Case	PASS	FAIL	FAIL	PASS	FAIL

6.72. The challenge of local pedestrian / cycle crossings in the area is most acute in the North Greenwich area, and a number of options have been considered for addressing the need for better connectivity.

6.73. The cable car scheme is shown above to be best able to meet the programme objectives of the alternatives considered, and the next chapter reviews the business case for the scheme.

7. BUSINESS CASE

7.1. A Business case assessment for the cable car scheme has been undertaken, and is summarised below.

7.2. It is important to note that at the time of preparation of this update, TfL is in the process of discussing costs with two bidding consortia, and the final cost is therefore not known. A conservative assessment of the costs has therefore been used in this appraisal, as well as the application of risk to the costs. Therefore the numbers within this appraisal may not be consistent with the final capital costs, but are likely to be higher than the actual cost of construction.

Capital Costs

7.3. An OJEU notice and Prequalification Questionnaire were published in late 2010 and two bidding consortia have applied to tender for the design and construction of the cable car. Tenders from bidders have now been returned. At the time of this appraisal it is not known which of the bids (if any) will be accepted, nor which potential options or opportunities for cost savings will be accepted. In the interests of being conservative, a cost at the high end of the range of bids and options has been used, together with a further allowance of 15% for risk. Therefore the numbers within this appraisal may not be consistent with the final capital costs, but are likely to be higher than the actual cost of construction.

7.4. Based on the above, for this appraisal it has been estimated that the capital cost of the scheme will be £55.6 million (in 2011 prices). A further allowance has been made for design and construction risk of 15%, taking the costs within this appraisal to £62.6m. A breakdown of these costs is provided in Table 7.1 below:

Table 7.1 - Capital cost breakdown

Construction item	**2011 estimate (£M)**
Capital cost estimate	46.4
Land cost	2.7
Development	2.9
Project delivery	3.6
Sub-total	**55.6**
Risk and Contingency @ 15%	**7.0**
Total	**62.6**

7.5. TfL is engaged in discussions with the private sector around the opportunities for funding. These have yet to be concluded although preliminary discussions are very positive.

7.6. Nevertheless, with this not secured at the time of this appraisal, a conservative assumption has been made that TfL would be responsible for the full capital costs.

Demand forecasts

7.7. Demand assumptions draw on the analysis of the three main potential groups of users:

- public transport users: including people living and working in London who would use the cable car as part of the public transport network for a journey to/from work or in their leisure time;
- linked visitor users: including people already visiting one of the attractions in the area (such as the O2 Arena and the ExCeL centre), who would use the cable car as part of their day or evening out; and
- attracted tourists: including London residents and visitors to London who would visit for the sole purpose of riding on the cable car.

7.8. While the final fare structure will be agreed by the Mayor in due course, the following fare assumptions have been used for the purpose of assessing the business case:

- Adult Oyster PAYG single journey – [redacted];
- Adult cash single journey – [redacted].

7.9. Various options exist for more detailed consideration including the levels of discount for children, Freedom Pass holders, and Travelcard holders, and the availability of cable car season tickets for regular passengers.

7.10. Depending on the final options for fare and ticketing, passenger numbers (as shown in the table below) are expected to be up to two million passenger journeys in the first nine months (June 2012 – March 2013) increasing to around 2.6 million journeys per annum by 2021 on the back of growth in public transport and link visitor market segments. This equates to around 5,500 passengers a day, which in local transport terms is equivalent to the number of passengers using the DLR to/from Beckton.

Table 7.2 - Passenger demand

Demand (000s)	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**20/21**
Public transport users	467	678	739	807	848	937	986	1,038
Linked visitor users	1,512	1,221	1,260	1,304	1,330	1,387	1,418	1,451
Attracted tourists	122	133	133	133	133	133	133	133
Total demand	**2,101**	**2,032**	**2,132**	**2,243**	**2,310**	**2,457**	**2,537**	**2,622**

(Note: Demand figures for 2012/13 are for nine months of operation only)

7.11. These demand figures are higher than previous estimates and reflect additional information on the size and nature of the potential market.

7.12. Given the unique nature of the scheme, actual demand is difficult to forecast accurately and could vary quite significantly as a result of various factors, including the level of fares and ticketing arrangements in place, regeneration effects and tourism levels in London. However, as a point of comparison, these demand forecasts have been compared to passenger use on other urban cable systems – the passenger demand would appear to fall in between the systems found in New York and Singapore, which carry 2m and 2.5m passengers respectively.

7.13. If complete by June 2012, the Olympic Games would be expected to generate an initial spike in demand due to the proximity to an Olympic venue at each end of the route.

Revenue forecasts

7.14. Passenger fare revenues have been estimated at around [redacted] in year 1, rising to [redacted] per annum at year 5. (This is somewhat lower than the headline fare multiplied by passenger trips due to discounts assumed for children, Freedom Pass holders, Travelcard holders, etc.)

7.15. The potential for the cable car to generate income through sponsorship is substantial. Research undertaken by BDS indicated that a figure in the order of [redacted] per annum could be collected through sponsorship, and [redacted] could be expected from secondary income, such as retail concessions.

7.16. This figure is based on earlier estimates of 750,000 cable car visitors per year spending around 50p each and is therefore a conservative estimate. This large increase in forecast demand compared to the BDS assumption is likely to increase the value of the ancillary concessions.

Operating & Lifecycle Costs

7.17. The Annual operating costs are expected to be around [redacted] per annum and will include staffing, operating costs (including power), ticketing, maintenance and insurance.

7.18. In addition, lifecycle costs, primarily replacement of mechanical and electrical components, will be around £6 million every 10 years.

Non-financial benefits

7.19. The cable car offers the following transport benefits:

Connectivity

7.20. The cable car will improve integration of the London walking network on the north and south sides of the river Thames. Journey times between North Greenwich and the Royal Docks will be improved, especially for cyclists, who cannot use the Jubilee line

7.21. A bespoke spreadsheet model was employed to forecast future demand, building on a model that was already developed for the appraisal of several river crossing options around the Isle of Dogs. An LTS based model has been assembled to assess demand. This uses observed data at Woolwich and Greenwich foot tunnels, as well as the Woolwich ferry. The model forecasts the relative changes in mode share for walking and cycling as a result of changes in generalised journey time (i.e. adding the cable car).

7.22. The 2001 national census travel-to-work data for the AM peak period was factored up to the base year (2006) using population and employment growth from LTS to create OD base matrices. Data from the Canary Wharf Travel Survey was used to estimate trips to and from Canary Wharf as the nature and scale of these trips changed considerably during this period. Future OD matrices were calculated using forecast population and employment growth from LTS B5.4 for 2016 and 2026.

7.23. The TfL Journey Planner was used to estimate base walk and cycle times, which were combined with modal parameters to determine generalised walk and cycle journey times. LTS was used to estimate base PT generalised journey times.

7.24. Base demand was calibrated using observed data for the Greenwich Foot tunnel, Woolwich Foot tunnel and Woolwich Ferry. Demand for the proposed cable car was then calculated using the model with new journey times afforded by the new river crossing. An annualisation factor was then applied to the peak hours demand to obtain annual demand.

Walking benefits

7.25. Those using the cable car as part of a walking trip will save, on average, 3 generalised[7] minutes per journey. 307,000 such journeys per year are expected on the cable car. This equates to about 15,350 hours per year saved. The Value of Time for walkers (according to the Journey Time Calculator) is £15.02 per hour. Overall benefits amount to £230,600 per year. The derivation of this figure is displayed below, in Table 7.3.

[7] 'Generalised' time is used in transport modelling to weight time according to conditions and cost; for example, 1 minute spent travelling is worth 1 minute generalised time, but 1 minute waiting for a train or bus equates to 1.5 minutes generalised time, as this is weighted to reflect passengers' willingness to wait or interchange.

Table 7.3 - Derivation of pedestrian benefits (first full year)

Average no. of pedestrian trips on cable car per day	930
a = No. of pedestrian trips on cable car p.a.	307,000
b = Average generalised time saving per trip (min)	6
c = Equivalent additional time (min) per trip based on average fare	3
d = b – c = Net equivalent time (min) saving per trip	3
e = Value of time per pedestrian (p/min)	25.04
f = a x d x e / 100 = Annual benefits (£) for pedestrians	230,600

Cycling benefits

7.26. There will be large journey time reductions for cyclists through the provision of a new river crossing approximately mid-way between the Greenwich and Woolwich Foot Tunnels. For cyclists, the average time saving is substantially higher, at 22 (generalised) minutes per journey. This is due mainly to the fact that cyclists going to/from the Greenwich Peninsula do not have the level of options available to them as walkers do. An example of such a journey would be one from Greenwich Peninsula to Canary Wharf. Currently, the cyclist would have to use the Greenwich foot tunnel – the cable car offers a journey 7 minutes quicker for the 70 or so cycle trips forecast. Another example of journey time saving is for those 30 or so cyclists heading from inner north east London to Greenwich Peninsula, who each save around 35 minutes (rather than using the inconvenient Greenwich or Woolwich foot tunnels they can use the cable car).

7.27. Cyclists are included in ‘Public Transport users’ in Table 3. The average fare for a regular cyclist is estimated to cost more than the pedestrian fare, at due to fact that fewer cyclists are likely to be travel pass holders compared with those making onward public transport journeys.

7.28. There are forecast to be 222,000 cycle journeys using the cable car per year, or around 670 per day, which equates to a total of about 81,400 hours per year saved. The Value of Time for cyclists (according to the Journey Time Calculator) is £15.02 per hour. Overall benefits for these users thus amount to £1.23M per year. The derivation of this figure is displayed below, in Table 7.4.

Table 7.4 - Derivation of cycling benefits (first full year)

Average no. of cycle trips on cable car per day	670
a = No. of cycle trips on cable car p.a.	222,000
b = Average generalised time saving per trip (min)	28.2
c = Equivalent additional time (min) per trip based on average fare (higher than other passengers – less likely to hold travel passes)	6.2
d = b – c = Net equivalent time (min) saving per trip	22
e = Value of time per cyclist (p/min)	25.04
f = a x d x e / 100 = Annual benefits (£) for cyclists	1,225,000

7.29. In addition to these users, there are forecast to be a further 1.5 million annual trips in year 5 by other users. These users do not gain journey time benefits per se, because they will be tourists / leisure users, who are not seeking to benefit from quicker journeys. These passengers will provide revenues and are also expected to make use of the retail / souvenir outlets on offer, adding to the financial case, but no journey time benefits have been claimed for these passengers in this business case.

Resilience

7.30. Although the cable car is not forecast to be operating at capacity during normal operating conditions, it does provide for a certain amount of network resilience and introduces an additional choice for people travelling to the Greenwich Peninsula. During times of disruption on the Jubilee line, the cable car provides an alternative route, albeit, with a maximum capacity of 2,500 passengers per hour (at full speed). This will help visitors to the O2 get into central London after an event, with the northern cable car station only 150 metres from Royal Victoria DLR station.

7.31. The annual resilience benefits have been calculated to be worth around £430,000 per annum based on the following assumptions:

Crowding benefits

7.32. For journeys from the Greenwich Peninsula to the Royal Docks, the cable car offers competitive journey times with the Jubilee line. The cable car will lead to slightly reduced crowding on the busy Jubilee line link between North Greenwich and Canning Town, at Canning Town station and on the DLR between Canning Town and Royal Victoria. The cable car allows additional

public transport capacity for 2,500 passengers per hour per direction for the Greenwich Peninsula. No financial allowance has been made for this benefit.

Wider Economic Benefits

7.33. The LDA has strongly supported the cable far for its potential to make a substantial contribution to development in the Royal Docks and bringing wider economic benefits to the area. By providing a new crossing it is anticipated this will enhance the effects of the regeneration spending on both sides of the river including Europe's busiest entertainment venue and London's busiest convention centre. Without a direct river crossing at this point it is unlikely that the full benefits from the current and future regeneration spending in both these areas would be realised.

7.34. When evaluating the economic value of the cable car, there is a need to recognise that landmark projects such as this can drive value, growth and economic development in ways that are simply not captured by conventional appraisals. It therefore has to be considered within the wider context of a plan for the Royal Docks and beyond that, the economic strategy and developing brand for East London.

7.35. By effectively overcoming the double barrier of the river and the Silvertown Riverfront industrial zone, the scheme integrates two Opportunity Areas and supports London Plan strategic policy direction. In particular it supports:

(i) Greenwich Peninsula as an internationally significant leisure attraction and major contributor to meeting London's need for additional housing; and

(ii) The Royal Docks in maximising the benefits of Crossrail, and capitalising on the success of ExCeL and the potential for further visitor / business related growth.

7.36. The cable car also provides a travel alternative which helps the Opportunity Areas maximise their strategic roles in meeting London Plan and MTS goals and challenges.

7.37. The cable car will provide a direct public transport link between North Greenwich and the Royal Docks. These are two of the east sub-region's 14 Opportunity Areas and have the following planned employment and new housing capacities:

- 6,000 jobs and 11,000 new homes in the Royal Docks by 2026, and
- 7,000 jobs and 13,500 new homes on the Greenwich Peninsula by 2026

7.38. The scheme is expected to have various impacts on regeneration. These can broadly be categorised as follows:

- Increases in land values
- Support business and inward investment

- Promote visitors/tourism

Increases in land values

7.39. The Greenwich Peninsula and Royal Docks are two of London's largest regeneration areas (the latter now an Enterprise Zone), identified in the London Plan as major growth areas for residential, employment and leisure based activities. Over the next 20 years the London Plan envisages these two Opportunity Areas generating an additional 24,500 new homes (minimum) and 13,000 new jobs. The impact of the cable car will be to make the area more attractive for potential development by providing a direct link between the two areas.

7.40. This will lead to some development activity coming forward earlier than if the cable car did not happen, unlocking the wider economic benefits of this activity for the surrounding area. It is expected that the impact will be most positive for developments at the northern end of the Greenwich Peninsula and the western end of the Royal Docks. In these locations the majority of the land remains within the ownership of the public sector (the HCA at Greenwich Peninsula and LDA for the Royal Docks) although private sector development partners have been secured in both cases. This means that any uplift in land values as a result of the cable car will benefit those responsible for owning the land (the LDA, HCA and their successors within the Mayor's organisation) and private sector partners already on board.

7.41. The Greenwich Peninsula represents a £5bn regeneration opportunity with the HCA as freeholder of the land and the LDA's available land holdings in the Royal Docks are valued at in excess of £75m. Whilst not directly comparable, research into the effects of the Jubilee line identified an uplift in land values along the route of c£13 billion as a result of the new infrastructure. There are numerous other examples highlighting the link between transport investment and land value. Of those houses served by the Croydon Tramlink network, a study has shown that property values have increased by 4% above those wards that were not[8].

7.42. As an example of how improved access can lead to economic enhancement, it is useful to look at the case study of Woolwich Arsenal DLR extension. Studies undertaken before and after the extension opened suggest that the improved access to employment and services has led to higher household incomes in Woolwich town centre. In addition to this, more businesses have opened in Woolwich, with less derelict units on display.

Support business and inward investment

7.43. The cable car will connect the O2 and ExCeL districts, forming a direct link between an international entertainment venue and an international conference and exhibition centre. Between them, the O2 and ExCeL attract over 7 million visitors a year. This, combined with the Siemens Urban Sustainability Centre now under construction adjacent to the northern cable car station, all

[8] http://www.rics.org/site/download_feed.aspx?fileID=2916&fileExtension=PDF

connected by a continuous, non-stop, five minute mass transit link, has the capacity to create a single destination, each element better able to economically complement the other. This is likely to make the Royal Docks/Greenwich Peninsula a more attractive destination for further investment of this kind thus supporting an increase in employment opportunities for local people, for example through encouraging the large development opportunity at Silvertown Quays, previously proposed as the home of a major visitor attraction.

7.44. Areas close to the cable car on both sides of the river have high levels of deprivation and low economic participation. As well as providing better links to jobs, the cable car will provide some direct employment opportunities and lead to the creation of indirect employment particularly through an uplift in visitors and tourists to the surrounding area.

7.45. The area already attracts visitors to locations such as the O2 and ExCeL and has more than 1,000 hotel rooms. The cable car will help retain visitors already in the area and attract new visitors in its own right. This will support existing businesses in the area and lead to the creation of new business opportunities which will have employment opportunities for local people. TfL is supporting local labour and training initiatives in both Newham and Greenwich.

Promote visitors/tourism

7.46. The cable car is expected to have a significant tourism impact including the direct income from visitor spend in both areas, increasing London's tourism offer and the multiplier effects that this may have on the London economy.

7.47. The cable car will not only provide transportation benefits, it will be a visitor attraction in its own right. There are other examples of schemes in London which have this kind of effect including the Millennium footbridge and to a certain extent the Docklands Light Railway; however, the potential impact of the cable car is much greater. Examples from overseas include the San Francisco cable cars, Staten Island ferry and the Hong Kong Peak tram. Tourist cable car systems in Singapore and Barcelona both generate upwards of 1 million visitors per year.

7.48. The design of the cable car structure and the views/experience it offers means that it has the potential to become a major attraction in London. This will have two economic impacts:

- Visitors/tourists already in the area (for example at the O2 and Docklands) will stay longer and potentially spend more money in the local area; and
- New visitors/tourists will be attracted to the area who will in turn spend money and potentially visit other attractions in the area such as Greenwich/Docklands.

7.49. The range of potential visitors/tourists to the system spans across London's tourism/visitor market but will include London residents having a "day out". The impact of these visitors using the cable car has not been quantified in the

business case but is expected to have considerable economic benefits in addition to the other quantified benefits.

7.50. The London Eye is an important positive lesson and comparison to the intended cable car project. Although initially it was believed to be only a temporary attraction in association with the Millennium celebrations, it is now the UK's most popular paid tourist attraction with over 3.5 million annual visitors. Indeed, since 1999, the scheme's popularity has not wavered – it has attracted a fairly steady 3.5m passengers per year. The Millennium Bridge has contributed significantly to the on-going regeneration of the South Bank by enabling improved pedestrian connections to the city of London and a direct connection to St.Paul's as part of the recognised tourist destination route.

Outcome of quantified analysis

7.51. Table 7.5 below summarises the economic analysis undertaken.

Table 7.5 - Summary of quantified analysis

Item of analysis	**Undiscounted (£m)**		**Present value over 30 years £m**
COSTS Capital costs (including risk & contingency)	-62.6		-60.0
Operating costs p.a. in 2026	[redacted]	Pa	[redacted]
Lifecycle costs (every ten years)	-6.0		-8.8
Fare revenue	[redacted]	Pa	[redacted]
Sponsorship (primary & secondary)		pa	
NET FINANCIAL EFFECT			**-20.02**
SOCIAL BENEFITS Walking - journey time savings	0.2	pa	7.1
Cycling - journey time savings	1.2	pa	37.7
Resilience benefits	0.4	pa	9.5
NON-MONETISED BENEFITS Regeneration benefits			
Crowding benefits			
TOTAL SOCIAL BENEFITS			**54.3**
BENEFIT:COST RATIO			**2.7**

7.52. The central case cable car scheme has a BCR of **2.7:1**.

7.53. This business case does not capture all the financial benefits of the scheme, in particular the substantial impact of the scheme on wider economic outcomes around the Royal Docks and Greenwich Peninsula.

8. CONCLUSIONS

8.1. This report has reviewed the need for improved cross-river connectivity in east London, and found that:

- The strategic plans for London envisage a high level of new development in east London, including areas close to the River Thames in Tower Hamlets, Greenwich and Newham;
- Investment in rail links has provided many new opportunities to access regeneration areas in the east London, but the Greenwich Peninsula in particular is forecast to host significant development but is dependent on a single rail station and line;
- A new link to the Royal Docks would provide much greater resilience to the Greenwich Peninsula, encouraging investment to bring new jobs and homes to the area, and would link two areas of potential complementary growth.

8.2. A range of potential options has been considered to address the need for improved crossings, and a cable car has the potential to provide a new crossing from the Greenwich Peninsula, which meets the geographic constraints at a much lower cost than a footbridge, and would deliver pedestrians and cyclists to the area around Royal Victoria, which provides opportunities for complementary development linking the leisure hubs of the O2 Arena and ExCeL.

8.3. Furthermore, a cable car would be an innovative scheme offering a spectacular view of London's Docklands, and is likely to provide a point of interest for those already visiting the O2 Arena and ExCeL, making these more attractive destinations for events. In addition, it is likely to attract some new visitors to the area, who would be likely to visit other local attractions; this would create new secondary jobs in the local area.

8.4. The cost of the cable car is significantly less than a footbridge, and its ability to attract users who are visiting the O2 Arena or ExCeL, or especially to visit the cable car, allows revenues from these visitors to contribute to scheme costs. It is also likely to attract secondary revenue from sponsorship opportunities, due to its innovative nature and high profile location on the Rover Thames.

8.5. If opened prior to the 2012 Olympic Games, it would also be of major benefit in handling the crowds visiting the O2 Arena and ExCeL for events.

8.6. The central case has a Benefit : Cost Ratio of 2.7:1, delivering transport benefits (captured within this business case) and wider economic benefits (which are not captured within this ratio).

8.7. Given the uncertainties around demand and impacts, the scheme impacts should be monitored, and the operations and fare structures kept under review, to ensure that the right balance is maintained between delivering local benefits and providing overall value for money for TfL.