

# Transport for London

## The Garden Bridge

### Strategic Outline Business Case

May 2014



# Transport for London

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## 1. Introduction

### 1.1 *Description*

- 1.1.1 Transport for London (TfL) is the strategic transport authority for Greater London, and is responsible for helping the Mayor of London to deliver the Mayor's Transport Strategy. This strategy includes the promotion of walking in central London and improving cross-river links.
- 1.1.2 At the request of the Mayor of London and Chancellor of the Exchequer, TfL in association with the Department for Transport has assessed the case for a Garden Bridge, promoted by the Garden Bridge Trust, alongside other options for improving pedestrian connections in this area.
- 1.1.3 A new charity, the Garden Bridge Trust, has been established to oversee the procurement, delivery and future operation of the bridge.
- 1.1.4 This document describes the business case for investment in the Garden Bridge (which would be alongside other third party donors) or alternative options.

### 1.2 *Five case model*

- 1.2.1 This document has been prepared using the agreed standards and format for business cases, as set out in The Green Book. The business case has been prepared on behalf of the Garden Bridge Trust by TfL with input from the Department for Transport, Department of Culture, Media and Sport, and HM Treasury, on behalf of the Mayor of London and the government.
- 1.2.2 The approved format is the five case model, which comprises the following key components:
  - The **strategic case** – this sets out the strategic context and the case for change, together with the supporting investment objectives for the scheme
  - The **economic case** – this demonstrates that the organisation has selected the choice for investment which best meets the existing and future needs of the service and optimises value for money
  - The **commercial case** – this outlines the content and structure of the proposed deal
  - The **financial case** – this confirms the funding arrangements and affordability and explains any impact on the balance sheet of the organisation
  - The **management case** – this demonstrates that the scheme is achievable and can be delivered successfully to cost, time and quality



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## 2 The Strategic Case

### Part A: The strategic context

2.1.1 There is strong support for the concept of a Garden Bridge in central London in national, regional and local policy. This chapter sets out the relevant documents and policies that apply to the Garden Bridge.

2.1.2 The following policies and plans are considered:

- Department for Culture, Media and Sport policies
- Department for Transport policies
- London Plan
- Mayor's Transport Strategy
- London's Great Outdoors
- TfL Business Plan
- Vision 2020: The Greatest City on Earth
- TfL Health Action Plan
- Lambeth Core Strategy
- Westminster City Plan
- Waterloo Opportunity Area

### **2.1 National policy context**

#### Department for Culture, Media and Sport (DCMS)

2.1.3 DCMS works to ensure that Britain is the world's most creative and exciting place to live, visit and do business. The department protects and promotes Britain's cultural and artistic heritage, and helps businesses and communities to grow by investing in innovation and highlighting Britain as a fantastic place to visit. There are a number of DCMS policies which are directly relevant to the Garden Bridge project.

2.1.4 **Helping the UK tourism industry to grow.** Tourism is one of the UK's biggest industries. It generates about £115 billion for the economy each year and supports over 2.6 million jobs (2010 figures)<sup>1</sup>. DCMS want to help tourism grow even further by funding campaigns and other promotional work that will inspire more people to visit and explore more parts of Britain. The department supports organisations such as VisitEngland and VisitBritain, and the GREATBritain campaign, and promotes the UK tourism industry at international events and forums.

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<sup>1</sup> <https://www.gov.uk/government/policies/helping-the-uk-tourism-industry-to-grow>

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- 2.1.5 The Garden Bridge will become a key and iconic tourist attraction right in the heart of the capital city, which is the window to the UK for the majority of the international tourism market. The Garden Bridge will improve the UK's tourism offer, as the High Line has done in New York, which attracted 4.4 million visitors in 2012 and has been responsible for \$2bn in private investment since 2006. The Garden Bridge would contribute to the DCMS policy of helping the UK tourism industry to grow.
- 2.1.6 **Supporting vibrant and sustainable arts and culture.** Britain is a world leader in culture and the arts. Innovative, challenging and exciting arts and culture improve people's lives, benefit the economy and attract tourists from around the world. Arts and culture strengthen communities, bringing people together and removing social barriers. Involving young people in the arts increases their academic performance, encourages creativity and supports talent early on<sup>2</sup>.
- 2.1.7 The Garden Bridge will be an iconic example of innovative British design and architecture. It will inspire people and bring people together. It will encourage young people who may want to be involved in the creative sectors and it will further Britain's position as a world leader in culture and the arts.
- 2.1.8 **Maintaining world-leading national museums and galleries, and supporting the museum sector.** Three of the world's top five most visited museums are based in England, and nearly 40 million people visit the national museums and galleries each year. England also has a huge network of specialise and regional museums, run by charities, local authorities and educational establishments<sup>3</sup>.
- 2.1.9 Although it would not be classed as a museum the Garden Bridge would create an unusual and educational environment, showcasing a range of plant life and also providing a unique, pedestrian only bridge across the river where people can enjoy views of the city.

## Department for Transport (DfT)

- 2.1.10 DfT works with agencies and partners to support the transport network that helps the UK's business and gets people and goods travelling around the country. The department plans and invests in transport infrastructure to keep the UK on the move. There are a number of DfT policies which are directly relevant to the Garden Bridge project.
- 2.1.11 **Reducing greenhouse gases and other emissions from transport.** Transport is a major source of greenhouse gases. Around a quarter of domestic carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions in the UK come from transport. Transport is also a source of emissions which make air quality worse. Reducing greenhouse gases from transport will help meet the long term goal of reducing the UK's greenhouse gas emission by at least 80% compared to 1990 levels by 2050<sup>4</sup>.

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<sup>2</sup> <https://www.gov.uk/government/policies/supporting-vibrant-and-sustainable-arts-and-culture>

<sup>3</sup> <https://www.gov.uk/government/policies/maintaining-world-leading-national-museums-and-galleries-and-supporting-the-museum-sector>

<sup>4</sup> <https://www.gov.uk/government/policies/reducing-greenhouse-gases-and-other-emissions-from-transport>

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- 2.1.12 As part of this policy objective the department published 'Walking and cycling: an action plan' in 2004<sup>5</sup>. The action plan sets out measures to increase levels of active travel by creating places to walk and cycle, and influencing travel behaviour through training, education, marketing and promotion. The plan recognises that walking creates health benefits, as well as benefits to transport networks, the local economy, and increased social interaction.
- 2.1.13 The Garden Bridge will provide a new pedestrian link across the river in the heart of central London, which improves the connectivity of the pedestrian network and reduces severance. This will encourage walking by providing more convenient and shorter routes. It will also provide a high quality pedestrian only route across the river, providing a more pleasant and safer pedestrian environment. This will encourage walking by improving the pedestrian environment which will make walking a more attractive option.
- 2.1.14 **Making transport more accessible to all.** Transport should be easy for everyone to use. Making sure that access to all transport modes is hassle free for all will reduce the number of car journeys and therefore help to reduce carbon emissions<sup>6</sup>.
- 2.1.15 Access between the Thames Path and both Waterloo and Blackfriars Bridges is poor and involves a series of stairways. This limits the possibilities for all visitors to use the bridges. The Garden Bridge will provide a new step free pedestrian route across the river Thames. This will encourage and enable all visitors to make best use of the bridge and the Thames Path.

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<sup>5</sup>

<http://tna.europarchive.org/20081203161117/http://www.dft.gov.uk/pgr/sustainable/walking/actionplan/ingandcyclingdocumentinp5802.pdf>

<sup>6</sup> <https://www.gov.uk/government/policies/making-transport-more-accessible-to-all>

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## 2.2 Regional policy context

### London Plan (2011)

2.2.1 The London Plan, published in 2011, is the statutory spatial plan for London which sets out the strategic vision for Greater London up to 2031<sup>7</sup>. The document considers the strategic issues related to the scale of growth London will need to accommodate over the next two decades. The London Plan is based on two core objectives:

*London must **retain and build upon its world city status** as one of the three business centres of global reach. It must be **somewhere people and businesses want to locate, with places and spaces to meet their needs**. This economic dynamism is vital to ensuring the prosperity Londoners (and the rest of the United Kingdom) need, to maintaining the **world-beating innovations** increasingly needed to address global challenges, and to secure the **highest quality development and urban environments**.*

*London must also be **among the best cities in the world to live**, whatever your age or background... The local and distinctive have to be treasured... Our **unique resources of green and open spaces** must be defended and improved, and we must realise the **opportunities presented by the Thames and other waterways**... Fundamentally, we must **pay attention to quality** as well as quantity, and protect the things that make London London.*

2.2.2 The Mayor's vision for the sustainable development of London is that London should 'excel among global cities - expanding opportunities for all its people and enterprises, achieving the highest environmental standards and quality of life and leading the world in its approach to tackling the urban challenges of the 21st century, particularly that of climate change'.

2.2.3 This vision is supported by six detailed objectives for London:

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

2.2.4 The plan makes a specific reference to walking and improving the pedestrian environment: 'the Mayor is also committed to a substantial increase in walking in London. To this end, the quality and safety of London's pedestrian environment should be improved to make the experience of walking more pleasant and an increasingly viable alternative to the private car. By providing safe and attractive routes that are easy to navigate, such as the seven strategic walking routes, people will be

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<sup>7</sup> <http://www.london.gov.uk/sites/default/files/The%20London%20Plan%202011%201.pdf>

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encouraged to walk more, which will have safety, economic and health benefits for them and also help tackle climate change’.

2.2.5 The following table shows the key London Plan policies that relate to the development of the Garden Bridge.

Table 1 London Plan policies

Policy no.	Policy description	Contribution of the Garden Bridge
2.1 B	The Mayor will continue to seek appropriate resources and investment from Government and elsewhere to ensure London excels among world cities and as the major gateway to Europe and the UK.	The Garden Bridge will be a prominent and high profile landmark that will showcase London as a leading global city for place-making and quality of life and the thought leading capital of the world and a focus for creative industries.
2.10 A	<p>The Mayor will, and boroughs and other relevant strategic partners should:</p> <p>a) enhance and promote the unique international, national and Londonwide roles of the Central Activities Zone (CAZ), supporting the distinct offer of the Zone based on a rich mix of local as well as strategic uses and forming the globally iconic core of one of the world’s most attractive and competitive business locations</p> <p>d) sustain and enhance the distinctive environment and heritage of the CAZ, recognising both its strategic components such as the River Thames, the Royal Parks, World Heritage Sites, designated views and more local features including the public realm and historic heritage, smaller open spaces and distinctive buildings, through high quality design and urban management</p> <p>g) sustain and manage the attractions of CAZ as the world’s leading visitor destination</p> <p>l) improve infrastructure for public transport, walking and cycling, and optimise development and regeneration benefits they can support</p>	<p>The Garden Bridge will be a high profile landmark which contributing towards sustaining Iconic London along the River Thames through the creation of new open space and distinctive architecture.</p> <p>The Garden Bridge will improve access to the North and South Bank’s and the heritage and businesses which lie within these areas.</p> <p>The construction of a unique and iconic structure will support the CAZ as a world class visitor destination, as well as support and enhance the cultural importance of the South Bank.</p> <p>The Garden Bridge will improve the quality of walking infrastructure within central London and improve access between the South Bank and the London Underground network.</p>

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	(particularly arising from Crossrail).	
2.11 A	<p>The Mayor will, and boroughs and other relevant agencies should:</p> <p>f) extend the offer and enhance the environment of strategic cultural areas along the South Bank, around the Kensington Museum complex and at the Barbican</p>	<p>The Garden Bridge will extend the offer of the South Bank through creating a new tourist destination and new walking link between the North and South Bank's.</p> <p>The Garden Bridge will enhance the environment of the South Bank through creating a new piece of green infrastructure for London.</p>
2.18 A	<p>The Mayor will work with all relevant strategic partners to protect, promote, expand and manage the extent and quality of, and access to, London's network of green infrastructure. This multifunctional network will secure benefits including, but not limited to: biodiversity; natural and historic landscapes; culture; building a sense of place; the economy; sport; recreation; local food production; mitigating and adapting to climate change; water management; and the social benefits that promote individual and community health and well-being.</p>	<p>The Garden Bridge will expand the quality of green infrastructure within London, with its location and accessibility promoting access to all users.</p> <p>The Garden Bridge will enhance the historic landscape of central London and complement the natural landscape of the River Thames, building a new sense of place within this area.</p> <p>The green infrastructure created by the Garden Bridge will contribute towards the mitigation of climate change through its planting scheme and features such as rainwater collection areas.</p>
3.2	<p>The Mayor will promote London as a healthy place for all – from homes to neighbourhoods and across the city as a whole – by:</p> <p>a) coordinating investment in physical improvements in areas of London that are deprived, physically run-down, and not conducive to good health</p> <p>b) coordinating planning and action on the environment, climate change and public health to maximise benefits and engage a wider range of partners in action</p> <p>c) promoting a strong and diverse economy providing opportunities for all.</p>	<p>The Garden Bridge couples the creation of new green infrastructure, with an increase in the quantity and quality of walking infrastructure within central London, maximising benefits for public health and climate change.</p> <p>The Garden Bridge supports the CAZ as a world class visitor destination and will promote a strong and diverse economy in London through creating new jobs and supporting existing jobs as a result of the regeneration benefits of the project.</p>

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3.6 A	<p>The Mayor and appropriate organisations should ensure that all children and young people have safe access to good quality, well-designed, secure and stimulating play and informal recreation provision, incorporating trees and greenery wherever possible.</p>	<p>The Garden Bridge will create a new piece of green space within central London, enabling children and young people to play.</p> <p>The Garden Bridge will incorporate trees and greenery through the creation of a vegetated corridor across the bridge.</p>
4.5 A	<p>The Mayor will, and boroughs and relevant stakeholders should:</p> <p>a) support London’s visitor economy and stimulate its growth, taking into account the needs of business as well as leisure visitors and seeking to improve the range and quality of provision especially in outer London</p>	<p>The Garden Bridge will improve the local area and aid in the regeneration of the Northbank BID and the Waterloo and Bankside Opportunity Areas.</p> <p>The Garden Bridge will also improve connectivity and reduce severance, improve the pedestrian environment, provide new park space and create a new cultural icon.</p>
4.6 A	<p>The Mayor will, and boroughs and other stakeholders should, support the continued success of London’s diverse range of arts, cultural, professional sporting and entertainment enterprises and the cultural, social and economic benefits that they offer to its residents, workers and visitors.</p>	<p>The Garden Bridge will become a cultural icon given its location in central London, neighbouring the South Bank, and will contribute to the enhancement of the South Bank’s profile as a strategic cultural area.</p>
5.10 A, B	<p>The Mayor will promote and support urban greening, such as new planting in the public realm (including streets, squares and plazas) and multifunctional green infrastructure, to contribute to the adaptation to, and reduction of, the effects of climate change.</p> <p>The Mayor seeks to increase the amount of surface area greened in the Central Activities Zone by at least five per cent by 2030, and a further five per cent by 2050.</p>	<p>The Garden Bridge will directly promote urban greening through the creation of new green infrastructure comprising of trees and other vegetation within the CAZ.</p> <p>The Garden Bridge will contribute towards the Mayor’s aspiration to increase the amount of greened surface area in the CAZ.</p>

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6.1 A	<p>The Mayor will work with all relevant partners to encourage the closer integration of transport and development through the schemes and proposals shown in Table 6.1 (which includes: New walk/cycle Thames crossings including schemes in central London) and by:</p> <p>b) seeking to improve the capacity and accessibility of public transport, walking and cycling, particularly in areas of greatest demand – boroughs should use the standards set out in Table 6.3 in the Parking Addendum to set minimum cycle parking standards in DPDs</p> <p>g) supporting measures that encourage shifts to more sustainable modes and appropriate demand management</p> <p>i) promoting walking by ensuring an improved urban realm</p>	<p>The Garden Bridge will create a new Thames pedestrian crossing which will assist increase capacity on existing cross river links.</p> <p>The Garden Bridge will improve the quality of cross river pedestrian links through creating a pedestrian only bridge which prioritises this user group in comparison to other central London bridges.</p> <p>The Garden Bridge will fill the existing missing pedestrian link between Waterloo and Blackfriars Bridges as well as contribute to resolving the issue of onward passenger distribution from Waterloo station, through encouraging mode shift for those travelling between Waterloo station and the West End.</p> <p>The Garden Bridge will also enhance the public transport accessibility of the South Bank to Temple Station through significantly reducing walking distances.</p> <p>Whilst cycling will not be permitted on the Garden Bridge, signage will be integrated at entry / exit points to promote cycling as a means of access to the bridge.</p>
6.10 A	<p>The Mayor will work with all relevant partners to bring about a significant increase in walking in London, by emphasising the quality of the pedestrian and street environment, including the use of shared space principles – promoting simplified streetscape, decluttering and access for all.</p>	<p>The Garden Bridge will create a segregated high quality pedestrian link between the North and South Bank's, promoting an increase in walking trips in London.</p> <p>The Garden Bridge will be made accessible for all through the provision of two 17 person lifts at each landing of the bridge, with access ramps also provided.</p>
7.5 A	<p>London's public spaces should be secure, accessible, inclusive, connected, easy to understand and maintain, relate to local context, and</p>	<p>The Garden Bridge will be connected to the strategic walking network given its connection with the South Bank and the Thames Path. Its location across</p>



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	incorporate the highest quality design, landscaping, planting, street furniture and surfaces.	<p>the river linking north to south will aide intuitive wayfinding and will be supported with low level signage.</p> <p>The Garden Bridge will be made accessible to all through the provision of ramps and lifts, with 4m wide pedestrian paths provided.</p> <p>The planting regime upon the Garden Bridge will contribute to the creation of a unique sense of place.</p>
7.6 A	Architecture should make a positive contribution to a coherent public realm, streetscape and wider cityscape. It should incorporate the highest quality materials and design appropriate to its context.	<p>The iconic design of the Garden Bridge will contribute to central London's cityscape. The orientation of the bridge will be aligned with points on either bank of the Thames, to ensure the structure is integrated with the surrounding cityscape. The bridge will be designed to maximise the integrity of horticulture planted upon it.</p> <p>The Garden Bridge will create a new coherent public realm between the North and South Bank's.</p>
7.29 A	The River Thames is a strategically important and iconic feature of London. This role should be protected and promoted.	The Garden Bridge will be an iconic landmark which promotes the River Thames as a visitor destination. The Garden Bridge will also contribute to the variety of attractions along the North and South Bank's.

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## Mayor's Transport Strategy (2010)

2.2.6 The MTS<sup>8</sup> sets out the Mayor's transport vision which 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 21<sup>st</sup> century'. The following six goals set out how this overarching vision should be implemented:

- Support economic development and population growth
- Enhance the quality of life for all Londoners
- Improve the safety and security of all Londoners
- Improve transport opportunities for all Londoners
- Reduce transport's contribution to climate change, and improve its resilience
- Support delivery of the London 2012 Olympic Games and its legacy.

2.2.7 Building on this strategic outline, the MTS sets out specific policies and proposals related to transport in London. The key policies which relate to the development of the Garden Bridge are shown in the following table.

Table 2 Mayor's Transport Strategy policies

Policy no.	Policy description	Contribution of the Garden Bridge
3	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve public transport accessibility and conditions for cycling and walking in areas of lower PTAL, where there is an identified need for improving accessibility; and to improve access to economic and social opportunities and services for all Londoners.	<p>The Garden Bridge will enhance cross river pedestrian links within central London, with the bridge integrated with local walking and cycling networks.</p> <p>The Garden Bridge will enhance the connectivity of the South Bank with Temple Station and the London Underground network by reducing existing walking distances.</p> <p>In addition, the Garden Bridge will contribute to addressing the existing issue of onward passenger distribution from Waterloo station to the West End.</p>

<sup>8</sup> <http://www.london.gov.uk/priorities/transport/publications/mayors-transport-strategy>

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5	<p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to ensure efficient and effective access for people and goods within central London through providing improved central London connectivity and appropriate capacity. This will include improving access to major public transport interchanges for pedestrians, cyclists and by public transport.</p>	<p>The Garden Bridge will increase cross river pedestrian capacity, and create a more pedestrian direct link between the North Bank and Waterloo Station.</p> <p>The bridge will also increase the connectivity between the South Bank and the London Underground network at Temple.</p>
11	<p>The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to reduce the need to travel, encourage the use of more sustainable, less congesting modes of transport (public transport, cycling, walking and the Blue Ribbon Network), set appropriate parking standards, and through investment in infrastructure, service improvements, promotion of smarter travel initiatives and further demand management measures as appropriate, aim to increase public transport, walking and cycling mode share.</p>	<p>The Garden Bridge as a new pedestrian only cross river link will encourage and promote an increase in walking activity within central London, through filling an existing pedestrian missing link across the river, enhancing pedestrian connections with the London Underground network and creating a new open space for the enjoyment of people.</p>

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14	The Mayor, through TfL, and working with the DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will seek to improve transport's contribution to the built and natural environment.	<p>The Garden Bridge will enhance transport's contribution to the built environment by increasing cross river connectivity / capacity in central London.</p> <p>The Garden Bridge will also contribute to the improvement of the built environment, given the anticipated regeneration benefits of the project within the North Bank BID and Waterloo Opportunity Area.</p> <p>The Garden Bridge will enhance the natural environment through contributing to the unique landscape of the River Thames within central London, as well as provide benefits in respect of increased green space.</p>
17	The Mayor, through TfL, and working with the DfT and other government agencies, the London boroughs, health authorities and other stakeholders, will promote healthy travel options such as walking and cycling.	<p>The Garden Bridge will promote walking within central London through the creation of pedestrian only bridge which increases cross river connectivity and is integrated with strategic walking routes.</p> <p>Although cycling will not be permitted on the Garden Bridge, users will be encouraged to access the bridge by cycling, through integrating the bridge with local cycle routes and providing cycle parking in close proximity to the north landing.</p>
23	The Mayor, through TfL, and working with the LDA, DfT, Network Rail, train operating companies, London boroughs and other stakeholders, will support regeneration of Opportunity Areas and Areas for Intensification as described in the London Plan.	The Garden Bridge will assist maximise Waterloo Opportunity's Area's development potential through increasing the quality of local transport links and improve the existing public realm provision and route options.

2.2.8 To take forward these policy statements as they apply to the Garden Bridge, the MTS includes two specific proposals, which are key to the Garden Bridge. These are shown in the following table.

# Transport for London

Table 3 Mayor's Transport Strategy proposals

Proposal no.	Proposal	Contribution of the Garden Bridge
59	The Mayor, through TfL, and working with the London boroughs, employers, schools, community groups, other organisations and individuals, will bring about a step change in the walking experience in London to make walking count	The Garden Bridge will contribute to a step change in the walking experience in central London through creating a new link which prioritises pedestrian movement and enjoyment.
60	<p>The Mayor, through TfL, and working with the London boroughs and other stakeholders, will improve the walking experience by enhancing the urban realm and taking focused action to ensure safe, comfortable and attractive walking conditions, including:</p> <p>a) Development of the 'key walking route' approach, to encourage walking and improve corridors between local destinations where people want to travel, encapsulating squares and open spaces where appropriate (for example, London parks).</p>	The Garden Bridge will improve the walking experience by creating a unique pedestrian crossing, which improves connectivity between North and South Bank's and provides a new area of open space within central London, creating attractive walking conditions.

# Transport for London

## London's Great Outdoors (2009)

2.2.9 London's Great Outdoors<sup>9</sup> recognises that investment in public space enhances the look and feel of the city, making it a more healthy and pleasant place for residents and visitors and an environment in which businesses can thrive. It contributes to maintaining and improving London's image as the world's most green and liveable big city and highlights London's offer as a city that can sustain economic growth.

## TfL Business Plan (2012)

2.2.10 TfL's current Business Plan also makes a case for investment in innovative schemes which improve the walking experience and encourage more people to walk around the Capital:

*Walking is a free, easy and reliable method of travel. It offers positive health benefits and is enjoyed by many Londoners. Good pedestrian access is important to the economic vitality of the Capital, with research suggesting that people who walk spend significantly more in town centres than those travelling on any other mode.*

## Vision 2020: 'The Greatest City on Earth' (2013)

2.2.11 In 2013, the Mayor published a document called The Greatest City on Earth<sup>10</sup> which outlines a series of ambitions and opportunities for London to work towards from now until the year 2020. This document supports the Garden Bridge:

*Create new London attractions, such as our own Highline, Floating Village and a Garden Bridge.*

## Health Action Plan (2014)

2.2.12 TfL's Health Action Plan<sup>11</sup> makes the link between good transport provision, active travel and health. It makes the case for investment in streets that are greener, safer and more inviting to pedestrians, cyclists and public transport users. The plan states that 'promoting greater physical activity is a public health priority in London because it helps to prevent diseases such as type 2 diabetes, obesity, heart disease and some cancers'. Creating streets that are inviting to walk in improves air quality, reduces noise, and makes roads even safer.

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<sup>9</sup> <http://www.london.gov.uk/sites/default/files/Manifesto%20for%20Public%20Space.pdf>

<sup>10</sup> [http://www.london.gov.uk/sites/default/files/2020\\_vision\\_web.pdf](http://www.london.gov.uk/sites/default/files/2020_vision_web.pdf)

<sup>11</sup> <http://www.tfl.gov.uk/cdn/static/cms/documents/improving-the-health-of-londoners-transport-action-plan.pdf>

# Transport for London

## 2.3 Local policy context

### London Borough of Lambeth

2.3.1 The Lambeth Core Strategy<sup>12</sup> was adopted in 2011. It includes the following statements which relate to development of the South Bank and Waterloo areas, which would be further enhanced and benefit from the Garden Bridge project:

*Maintain and develop Lambeth's strength in arts and culture and the role of the South Bank as one of London's leading international cultural and tourist destinations reflecting its status as part of the South Bank/Bankside Strategic Cultural Area.*

*Promoting expansion of arts and cultural activities throughout Waterloo and enhancing the South Bank (Riverside) in its role as an international cultural and leisure centre and a London tourist destination through supporting the development of arts and cultural facilities, associated and supporting uses as well as improvements to the public realm and visitor related facilities.*

2.3.2 The Strategy also supports:

- Promoting walking through improvements to the public realm
- Promoting use of the River Thames
- Protecting and maintaining existing open spaces and their function, and increasing the quantity of open space

### Waterloo Opportunity Area

2.3.3 The Waterloo Opportunity Area covers some 78 hectares and the London Plan (2011) notes that the area has a development potential for up to 15,000 additional jobs and 1,900 additional homes.

2.3.4 The following description is taken from the London Plan:

*The Area provides opportunities for intensification of commercial, residential and cultural facilities associated with a major transport hub, a major office location and a Strategic Cultural Area (see Policy 4.6). There is potential to enhance the South Bank and extend the cultural and entertainment offer as a major London visitor destination which can also be enjoyed by local residents and employees. This should be carefully managed to take account of local residential and other needs. In the short to medium term, reuse of the former International Station will provide significant new facilities and increased capacity for the station and the area, as well as expansion of rail services. In the long term, the station presents a major development opportunity.*

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<sup>12</sup> <http://www.lambeth.gov.uk/NR/rdonlyres/C04824A3-E7DE-4FC9-B04D-FCD97557BB9D/0/CoreStrategyAdoptionVersionJanuary20116December100311.pdf>

# Transport for London

## Westminster City Council

2.3.5 Westminster's City Plan<sup>13</sup> was adopted in 2013. It includes the following strategic objectives which relate to the Garden Bridge project:

- (1) To accommodate sustainable growth and change that will contribute to enhancing London's role as a sustainable world class city, including its international business, retail, cultural and entertainment functions within the Central Activities Zone; whilst maintaining its unique and historic character, mix, functions, and townscapes
- (3) To maintain and enhance the quality of life, health and well-being of Westminster's residential communities
- (6) To accommodate the safe and efficient movement of growing numbers of people entering and moving around Westminster by facilitating major improvements to the public transport system, improving the public realm and pedestrian environment, managing vehicular traffic, and making walking and cycling safer and more enjoyable
- (7) To protect and enhance Westminster's open spaces, civic spaces and Blue Ribbon Network, and Westminster's biodiversity; including protecting the unique character and openness of the Royal Parks and other open spaces; and to manage these spaces to ensure areas of relative tranquillity in a city with a daytime population increased every day by over one million workers and visitors.

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<sup>13</sup>

[http://transact.westminster.gov.uk/docstores/publications\\_store/Westminster's%20City%20Plan%20Adopted%20November%202013%20FINAL%20VERSION.pdf](http://transact.westminster.gov.uk/docstores/publications_store/Westminster's%20City%20Plan%20Adopted%20November%202013%20FINAL%20VERSION.pdf)



# Transport for London

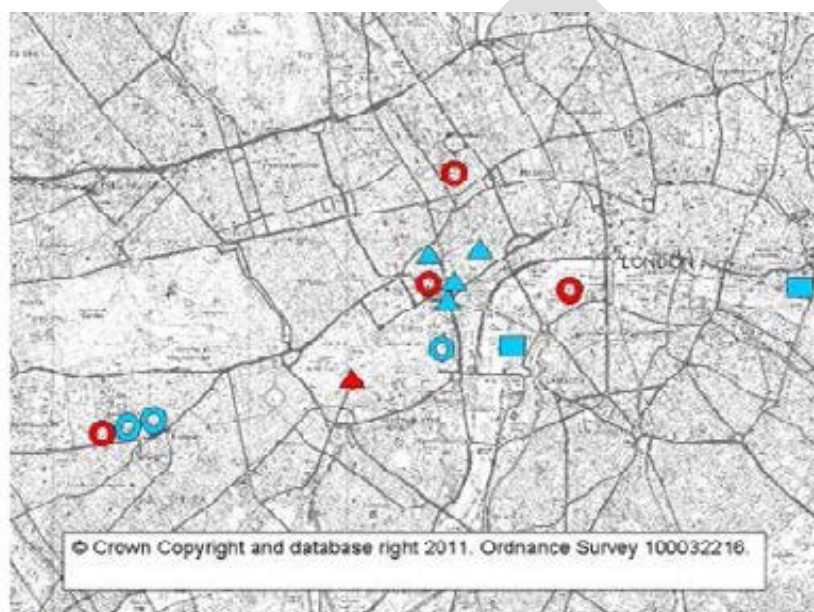
## *Part B: The case for change (problems and opportunities)*

### **2.4 Opportunity: Supporting growth in the London economy by encouraging and protecting tourism revenues**

2.4.1 Tourism in London is a key sector and supports 226,000 jobs or around 5% of all employment in the capital and accounts for £6.6 billion 'tourism direct GVA' of £34.3 billion nationally<sup>14</sup>. London is one of the most visited cities in the world with nearly 15 million international visitors annually. The top 13 national attractions are in London.







Figure 1 Location of key tourist sites in London

(Source: ALVA London Visitor Survey, GLA Economics)



Source: ALVA, London Visitor Survey, GLA Economics

**Key to above map**

	Attraction estimated to have more than 4 million visits	Attraction estimated to have between 2 and 4 million visits
Free admission attraction		
Paid admission attraction		
External site attraction		

<sup>14</sup> GLA Tourism in London (May 2012)

## Transport for London

- 2.4.2 Traditionally, while the US accounts for the largest single share of international visitors to London but the proportion has been in decline since 2007. While London is attractive to visitors from the Eurozone countries (49% of visitors) their comparative spend is lower (accounting for only 33% of expenditure). For London to increase its tourism revenues its future markets will have to be more focused upon the emerging economies but, at present, actual visitor numbers from these countries remain relatively small. As a result there is a continual need to enhance London's tourism offer to retain visitors and their expenditure from established mature markets as well as attract tourists from emerging markets.
- 2.4.3 There are benefits to the UK in terms of global marketing of the UK as a destination to visit and enhancing the perception amongst international investors and visitors.
- 2.4.4 There is an economic value to the creation of new central London "destination" for attracting visitors through the increase in activity and footfall. This will lead to a development of complementary activities and uses that will generate jobs in the local economy on both sides of the river.
- 2.4.5 There will be positive impacts on additional tourism numbers (specifically to better connected attractions) and tourism spend in the local area as well as increases in total UK tourism as London acts as a gateway.

# Transport for London

## 2.5 Problem: Quality of the pedestrian environment on existing bridges in central London

- 2.5.1 TfL is committed to increasing the number of walking trips in London by a million trips per day by 2031, and as part of that is keen to enhance the walking environment, particularly in central London where there is potential to attract new walking trips which are currently being made by other means, often on the busy public transport networks.
- 2.5.2 The views from London's bridges can be spectacular, with the views from Waterloo Bridge among London's iconic views. However the actual pedestrian environment on Waterloo Bridge can be poor.
- 2.5.3 The bridge carries high volumes of traffic and is configured as a dual carriageway. The pedestrian footways on either side of the bridge are utilitarian, and the pedestrian space can feel dominated by the passing traffic. The opportunities for crossing the road are extremely limited, and at weekends the environment is dominated by parked cars.

Figure 2 Waterloo Bridge pedestrian environment



- 2.5.4 Local business groups have in the past sought to reduce the volumes of traffic on the bridge and increase footway widths. For example, South Bank Employers Group's Urban Design Strategy, 2000, said of Waterloo Bridge:

*Pedestrians are exposed to poor weather conditions on this increasingly popular bridge.*

*The superb views from this bridge are rarely enjoyed since pedestrians are not encouraged to pause, even in summer.*

*Busy traffic also discourages pedestrians.*

- 2.5.5 Pedestrian counts on the existing bridges are shown in the Figure below.

# Transport for London

Figure 3 Pedestrian counts on central London bridges

(Source: TfL survey data)



- 2.5.6 The most heavily used bridges in central London are those that connect a mainline station with a major centre of employment – particularly London Bridge, which connects the mainline station of the same name with the City, and Hungerford bridge, which connects Waterloo to the West End.
- 2.5.7 Nevertheless it is striking that there are around 22,800 on Millennium Bridge compared to 12,200 on the nearby Blackfriars Bridge, despite the latter being better placed to serve pedestrians arriving from rail modes and continuing on foot. This suggests a strong preference for this pedestrian crossing over the road bridge.
- 2.5.8 There are many factors that contribute to this preference for bridges that provide a pedestrian only crossing environment. These include:
- Pedestrian bridges are not used by traffic so they feel quieter, safer, and more welcoming to pedestrians
  - Pedestrian bridges are designed to create good public realm which creates a pleasant walking environment and attracts people to use them
  - The pace of movement on a pedestrian only bridge is slower (walking speed) which encourages more people to walk and to pause to take photographs and enjoy the city views

# Transport for London

## 2.6 Problem: Poor access onto Waterloo and Blackfriars bridges from the Thames Path

- 2.6.1 The section of the Thames Path along the South Bank now carries millions of pedestrians each year, but did not exist when the road bridges were first built. As such, the accesses onto the bridges for pedestrians on the Thames Path are relatively poor, with limited step-free options.
- 2.6.2 Access to Waterloo Bridge from Victoria Embankment is also poor, with a large number of steps passing around blind bends to access the roadway from Embankment level.

Figure 4 Access to Waterloo Bridge from Victoria Embankment (north bank)



Figure 5 Waterloo Bridge stairs (south bank)

(Source: Flickr, harmonyhalo)

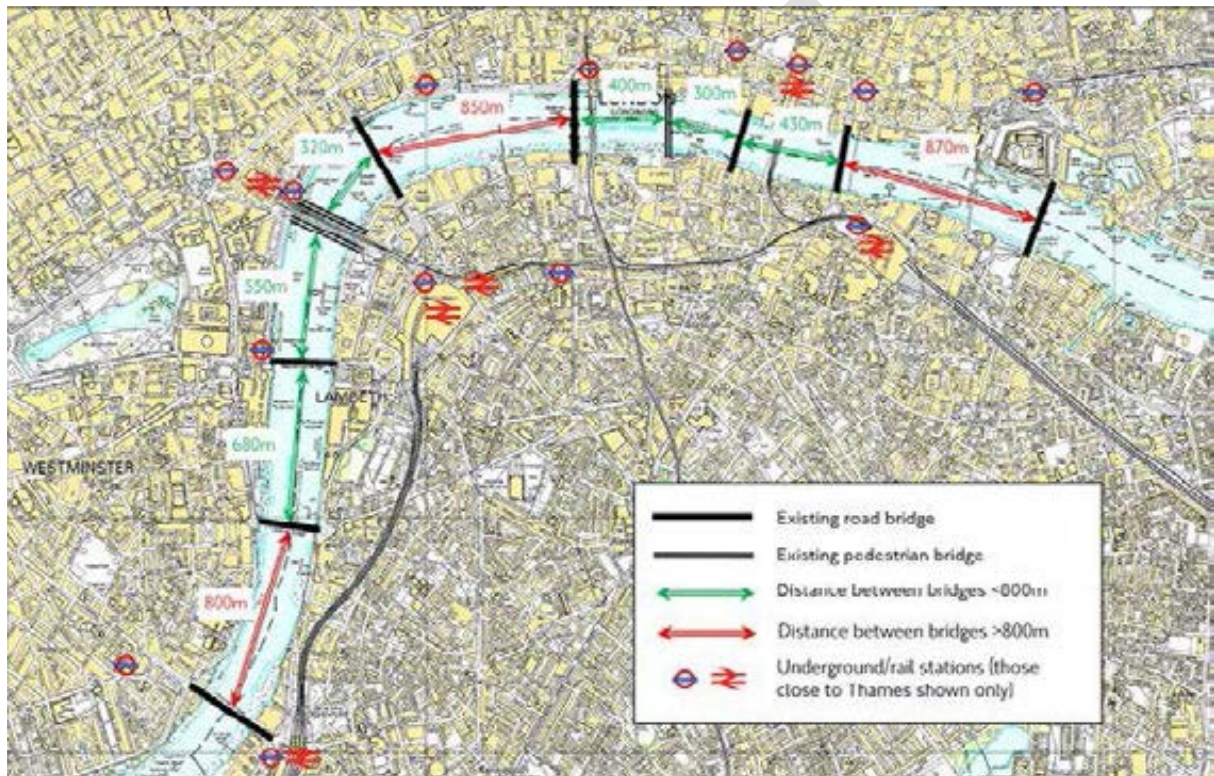


# Transport for London

## 2.7 Problem: Missing link between Waterloo and Blackfriars bridges for pedestrians

2.7.1 As well as ambience, journey length is an important factor in encouraging people to make more journeys on foot, and a dense, permeable, connected walking network encourages more walking trips. Central London's bridges are already generally more widely spaced apart than in many similar cities, due in part to the cost of spanning such distances (for example, the Seine in Paris is much narrower, and has fewer shipping constraints).

Figure 6 Bridge spacing in central London



2.7.2 There are three sections of the Thames with spacing between bridges of 800m or over; between Vauxhall and Lambeth bridges, between Waterloo and Blackfriars bridges, and between London and Tower bridges.

2.7.3 The first of these is in an area of relatively low pedestrian demand and footfall; Vauxhall bridge aligns with tube and rail stations on both sides so is well located to cater for local pedestrian movements.

2.7.4 The second, between Waterloo and Blackfriars bridges, is at the heart of central London, and within an area in which a large amount of growth and new development is taking place in the coming years. The closest Underground station, Temple, is not well linked to the southern bank.

2.7.5 Providing a new bridge between Waterloo and Blackfriars bridges to reduce the spacing to a level more typical of central London would reduce the barrier effect of the Thames on local walking journeys, and would be likely to both save time for those making existing trips via adjacent bridges, and stimulate new walking trips.

## Transport for London

- 2.7.6 The final section with a long spacing is between London and Tower bridges. This part of the Thames is still used by large vessels, notably HMS Belfast, which is moored in the centre of the section, and cruise ships which moor alongside. Maintaining navigability of the river is important and therefore it is not possible to bridge this gap without an extensive structure spanning high above the navigational channel.

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# Transport for London

## 2.8 Problem: Underground access to the South Bank area

- 2.8.1 Temple Underground station is the closest station to parts of the busy South Bank, including the area around ITV and IBM, and the station is one of the quieter stations in zone 1, and significantly less crowded than nearby Embankment and Waterloo.
- 2.8.2 It lies just 350 metres from the opposite bank, where there are a number of large destinations including the National Theatre, ITV studios, IBM, Gabriel's Wharf and the Oxo Tower.
- 2.8.3 However, the lack of a bridge in this vicinity means that the walking route from Temple is indirect and not very commodious; indeed, Embankment and Blackfriars stations are slightly closer on foot than Temple itself.

Figure 7 Walking route from Temple to the South Bank



- 2.8.4 As such the provision of a new footbridge to link Temple with the South Bank would make under-used Temple station a very viable new access route to the bustling South Bank area.
- 2.8.5 Benefits if this link would include:
  - faster journey times;
  - better use of spare capacity at Temple, in place of busy Waterloo and Embankment;
  - better resilience by increasing the number of transport options for the area.



# Transport for London

## 2.9 Problem: Onward distribution of passengers from Waterloo station

2.9.1 TfL's Central London Rail Termini study (2011)<sup>15</sup> notes that:

*"Catering for the efficient dispersal of the large volumes of rail passengers alighting at central London's rail termini is of importance to the functioning of London's economy. With the number of rail passengers travelling into central London projected to rise over the next 20 years, the need for efficient onward dispersal will become even greater."*

2.9.2 In each morning peak period, some 85,500 passengers arrive at Waterloo station from mainline trains, and the local transport network has to cater for the onward journeys from the station to people's final destination. 45,000 of these passengers arrive in the peak hour (0800-0900).

2.9.3 Analysis for TfL's study considered the number of onward trips from the termini which are potentially walkable, which are under 2 km in length but currently made by mechanised modes (mainly Underground and bus), and found:

*In total, 123,000 journeys were identified that could potentially be walked but are not walked at present. This amounts to 12 per cent of onward journeys by all modes and 19 per cent of journeys by mechanised modes. There is greatest potential for increased walk travel at Waterloo (37,600 potentially walkable journeys), London Bridge (16,600) and Victoria (15,300).*

2.9.4 Currently, approximately 55% continue their journey from Waterloo by Underground, 11% by bus, and 21% on foot, with others continuing by cycle, taxi or other means (including other rail services, e.g. from Waterloo East).

2.9.5 Both the Underground and bus services from Waterloo are under pressure in the peaks, and it is forecast that peak period passenger arrivals will increase significantly as London's population grows from eight to ten million by 2031. These additional passengers will be trying to board onward transport services that are themselves likely to be carrying greatly increased numbers of passengers.

2.9.6 As a result of the existing pressure and forecast increases in pressure in the future, it is essential that an increasing proportion of those arriving at Waterloo continue their journey on foot.

2.9.7 The figure below illustrates the modes of onward travel from Waterloo to other parts of central London, based on a major 2010 survey of rail commuters.

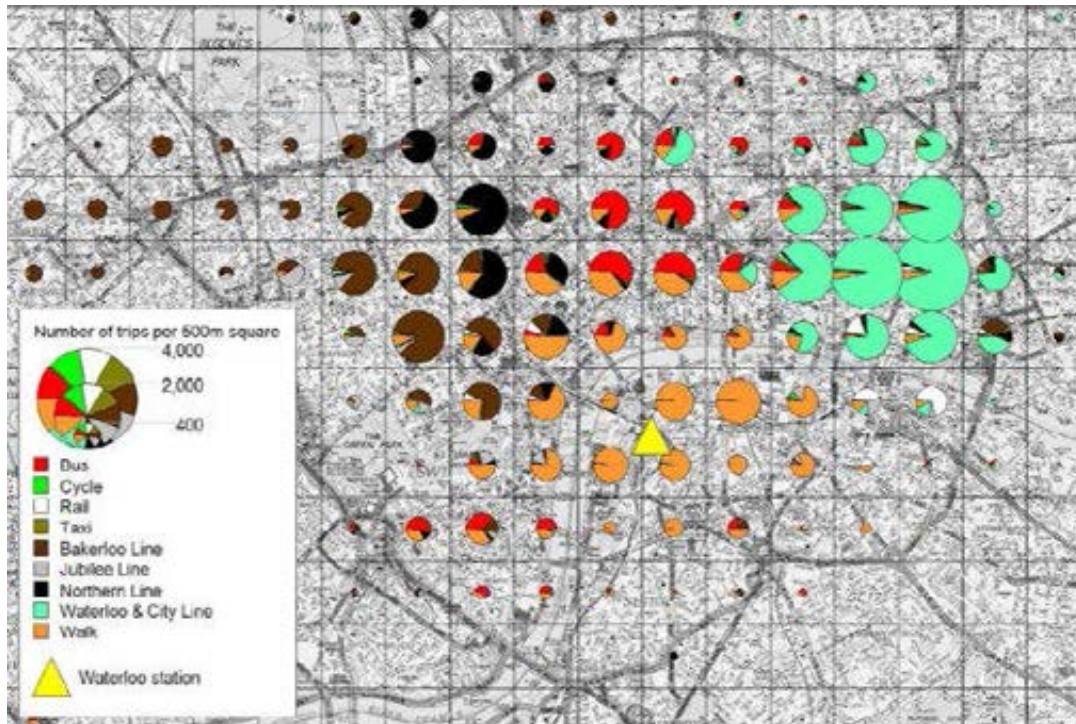
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<sup>15</sup> <http://www.tfl.gov.uk/cdn/static/cms/documents/central-london-rail-termini-report.pdf>

# Transport for London

Figure 8 National rail arrivals at Waterloo station, onward modes by final trip destination, AM peak

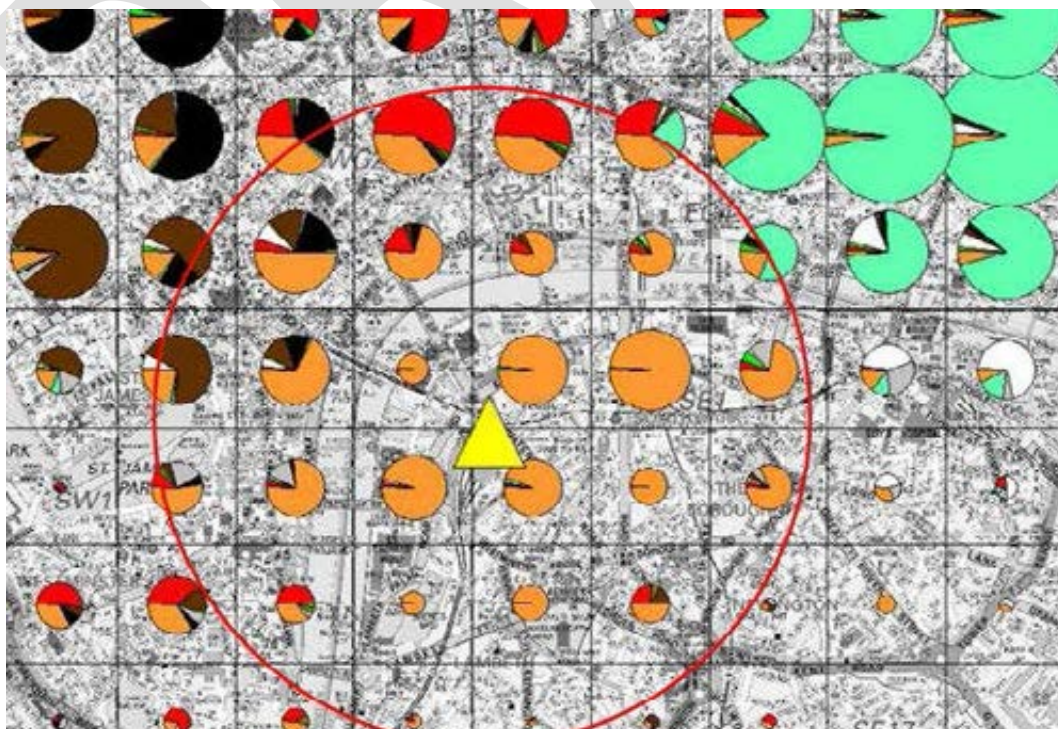
(Source: TfL Central London Rail Termini study)



2.9.8 The figure below focuses on the area within around 1.5 km, which is a comfortable walking distance for most people.

Figure 9 National rail arrivals at Waterloo station, onward modes by final trip destination, AM peak, within 1.5km of Waterloo station

(Source: TfL Central London Rail Termini study)

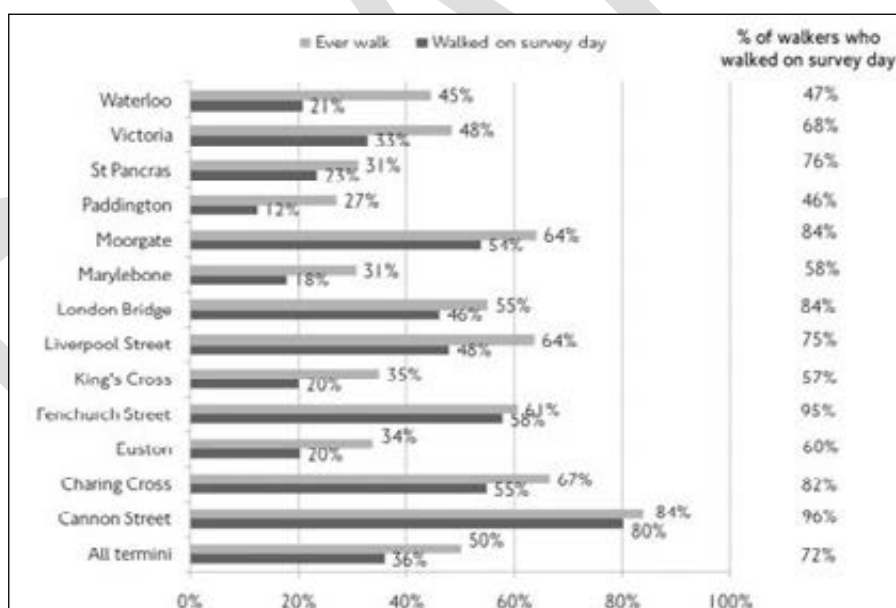


# Transport for London

- 2.9.9 Within a 1.5 km radius, the proportion of walking trips varies greatly.
- 2.9.10 There are some very strong patterns of Underground usage where this provides a direct connection, most notably to the City (Waterloo & City line), and West End (Bakerloo or Northern lines).
- 2.9.11 There is also a relatively high proportion of walking trips where no direct Underground connection exists.
- 2.9.12 Staying on the same side of the Thames, the proportion of walking trips to Borough is high, at around three quarters. In contrast, of those with a destination around Lincoln's Inn and Fleet Street, a similar distance away, only a third of people walk from Waterloo.
- 2.9.13 It is notable that over a quarter of the commuters with a destination just to the north of Waterloo Bridge don't walk, even though it is a walk of just a few hundred metres and additional fares are payable on the Underground or buses.
- 2.9.14 As well as being asked to describe the trip they were making at the time of the survey, respondents were also asked whether they ever walk for their onward journey between the central London terminus and their final destination (see Figure below).

Figure 10 Waterloo station: percentage of walkers who walked on the survey day

(Source: TfL Central London Rail Termini study)



- 2.9.15 The greatest disparity was found at Waterloo, where almost half the arrivals claim to walk some of the time but only 21% did on the day they were surveyed. This may suggest that the distance is deemed to be walkable but that the environment is not conducive to walking
- 2.9.16 There is clearly an opportunity to encourage some of these journeys to switch to walking to take some pressure of the bus and Underground services.

# Transport for London

## 2.10 Problem: Supporting economic activity and development on the north bank

- 2.10.1 While the thriving Covent Garden district extends to the north west side of the Aldwych and Somerset House attracts increasing numbers of visitors, footfall declines sharply east of Waterloo Bridge compared with adjacent parts of Covent Garden/Strand, and areas close to Temple are very quiet at weekends.
- 2.10.2 There are major ambitions however for the renewal of this area, and in 2013 the Northbank BID was established to co-ordinate efforts amongst major local businesses to improve the area between Trafalgar Square and Westminster's boundary with the City.

Figure 11 Map showing extent of Northbank BID



- 2.10.3 The Northbank BID reports that there is in excess of £1 billion being privately invested in the area as landowners seek to intensify uses in the area, including expansion of the two major Universities (King's College London and the London School of Economics), and Somerset House.
- 2.10.4 Tapping into the footfall on the southern side of the river, particularly if Northbank becomes a stopping off point between the South Bank and Covent Garden, would increase the value of these investments, enabling these developments to come forward at a faster pace, with more intensive uses.
- 2.10.5 As well as the challenge of improving footfall in the Northbank BID area, there is a need to improve the permeability and connectivity (both physical and mental) between areas surrounding the Temple and South Bank Area that have been identified for growth in the London Plan. Within 500m the 78ha Waterloo Opportunity Area has the potential to accommodate 15,000 additional jobs and 1,900 homes.

## Transport for London

- 2.10.6 Within 1,000m south and eastwards is located the London Bridge, Bankside and Borough Opportunity Area (which has the capacity to support 25,000 additional jobs and 1,900 homes) and the edges of Elephant & Castle which is undergoing significant redevelopment.
- 2.10.7 Going 1,000m northwards there is a need to improve pedestrian and commuter connectivity to Holborn (a 13ha Area of Intensification with capacity for 2,000 additional jobs and 200 homes).
- 2.10.8 Slightly further distant, is the 19ha Tottenham Court Road Opportunity Area (with capacity for 5,000 jobs and 420 homes) and the Farringdon and Smithfield Area of Intensification (which could support 2,500 jobs and 850 homes). Within these London Plan designated areas there is potential to deliver 49,500 jobs and 5,270 homes for over 12,000 new residents.

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# Transport for London

## **2.11 Opportunity: maximising Waterloo Opportunity Area's development potential**

2.11.1 While the Waterloo area has a wide range and high concentration of transport options and nationally significant cultural attractions, significant improvements are required to the local infrastructure and the environment to benefit current and future businesses and their workforce, visitors and local residents. There is a significant opportunity for the ongoing development of Waterloo to extend the high value CAZ southwards

2.11.2 The extent of potential future growth is such that Lambeth Council and partners want to ensure that a comprehensive and holistic approach to infrastructure development is undertaken for the whole area and its key components, so the benefits of new development and growth are maximised for all stakeholders. The London Plan (2012) estimated that the 78 hectare area has the potential to accommodate up to 15,000 additional jobs and up to 1,900 new homes by 2031 (assuming typical London development densities).

2.11.3 While the full scale redevelopment of Waterloo station over the next 15 to 20 years could result in perhaps 20,000 to 30,000 new jobs in the area, the redevelopment is a particularly challenging project. However, as this equates to a potential 20% increase in total employment across the borough, there is a need to carefully manage the impacts of this growth and to ensure that the benefits accrue, as far as possible, across the whole borough. Therefore the area needs to:

- Maximise development potential: Maximising the area's potential for developing a full and balanced range of Central London and town centre activities (office, retail, leisure and entertainment, education)
- Secure Accessible Jobs: Increase in sustainable jobs in line with London Plan with clear routes for Lambeth residents to access these new employment opportunities
- Encourage office development: Support appropriate scale and form of densification of office employment around and above Waterloo station.
- Improve transport hub function: Improve transport capacity and interchange quality of Waterloo Station especially permeability
- Increase public realm provision and route options: Achieve improvements in the quality, extent and management of public realm, permeability and linkages throughout the area.

# Transport for London

## 2.12 Opportunity: Provide new park space in central London

- 2.12.1 London is well known for its parks and gardens. This includes a wide range of facilities from local recreational grounds and small pockets of greenery in the city, to huge royal parks such as Richmond and the UNESCO world heritage site of Kew Gardens.
- 2.12.2 The current provision of parks and open space around Waterloo and Blackfriars Bridges is shown in the map below.

Figure 12 Map showing open space and retail frontage in central London



- 2.12.3 Access to parks and open space is important for people who live and work in central London as well as attracting visitors. It improves the quality of the environment and provides space for people to spend time outside.
- 2.12.4 London is a growing city and the number of jobs in the central employment districts is going to increase. This will be accommodated through an increase in the total amount of office space, but also through more intensive use of that space. According to data from the British Council for Offices (BCO), the average office tenant now uses around 11 square metres per worker, which is 35% less than in 1997. A new building in Ludgate Hill, in London's financial district, will allocate just eight square metres to each employee.
- 2.12.5 There are very few opportunities to increase the amount of park and open space available in this area of London. As employment densities increase, the amount of open space per employee will decrease. In creating a new bridge across the Thames, there is a great opportunity to create a new park and a new kind of space, at the same time. This will improve the access to open space for local employees and improve the overall offer of parks and gardens in London.

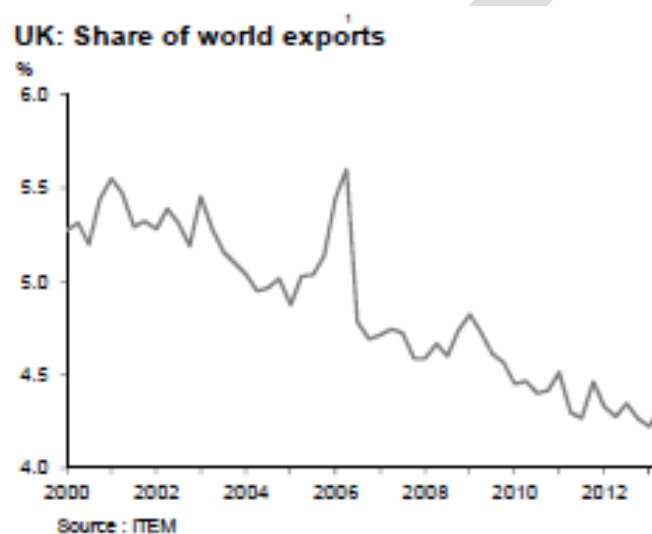
## Transport for London

### 2.13 Opportunity: Showcasing UK expertise and innovation in engineering, design and landscape

2.13.1 The UK's export performance since 2008 has been poor, especially given the sterling's sharp fall in 2008–09. With its productivity growth and wage costs lagging behind competitors such as the US and Germany, the UK managed only 17% growth in export volumes in the four years since Q2 2009<sup>16</sup>. By comparison Germany's exports grew by 34% over the same period. To date, the UK's progress in penetrating fast-growing emerging markets has also been comparatively slow.

Figure 13 UK share of world exports

(Source: ITEM)



- 2.13.2 Promoting the UK's commercial interests around the world is at the centre of the Government's foreign and economic policies under one strong national brand<sup>17</sup>. To yield long-term benefits for the UK economy, promotional activity needs to improve perceptions both at home and overseas and show Britain's diverse strengths around the world.
- 2.13.3 Emerging and high growth markets need to expand their infrastructure rapidly to ensure they can sustain economic growth. The construction, environment and water, and transport sectors are vital to any modernising economy and offer enormous opportunities to UK companies.
- 2.13.4 Representing an annual output of £107 billion, the UK construction industry comprises more than 300,000 companies. UK companies, with their high-end consulting, design and engineering capabilities stretching across many disciplines, have shown themselves strongly placed to address these trends and compete on a global scale. As part of their established activities UKTI will be able to showcase the activities of the firms delivering the unique Garden Bridge which will also form a new part of the national brand.

<sup>16</sup> EY ITEM Special Report on Exports (Dec 2013)

<sup>17</sup> UKTI – Britain Open for Business (June 2011)



## Transport for London

- 2.13.5 The very high quality design and concept will give a unique and iconic structure that will become recognised worldwide supporting the UK and London's profile internationally as a centre for the creative industries and the "thought leading" capital of the world.
- 2.13.6 The development of the bridge (led by three UK firms) will showcase expertise in design, engineering and landscape – supporting the growth and expansion of the UK creative industry sector.

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# Transport for London

## 2.14 Opportunity: Supporting the UK's internationally renowned creative sector

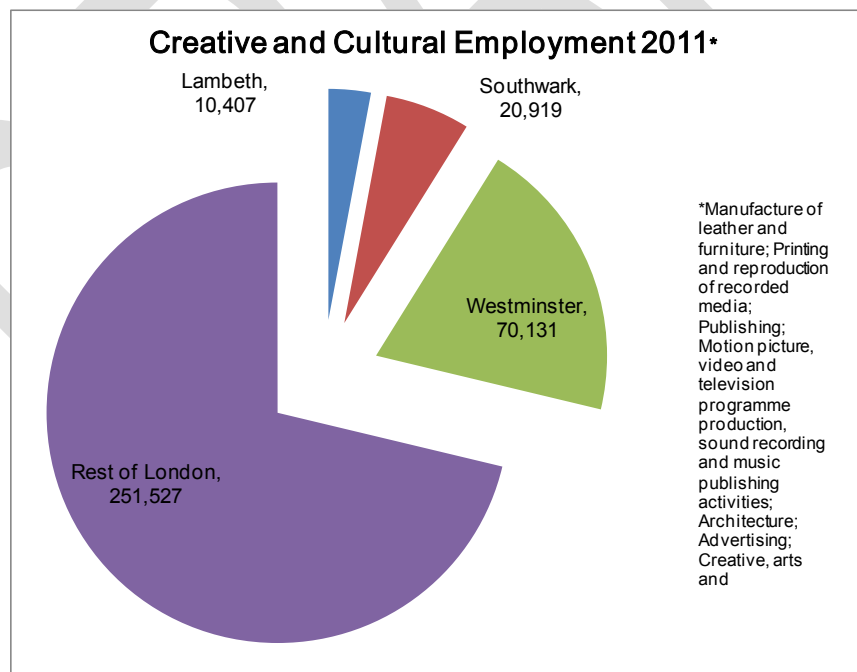
2.14.1 The bridge will enhance the connections between two international clusters of cultural and creative activities (Covent Garden and the South Bank). This includes key destinations such as:

- Royal Festival hall
- National Theatre
- South Bank Centre
- Somerset House
- Kings College.

2.14.2 The bridge will improve interaction between the various uses on both sides of the river supporting the development and intensification of these uses through the creation of a larger critical mass. In effect, there will be agglomeration benefits associated with the bridge that will accrue largely to the creative industries sector.

2.14.3 North and south of the river in Central London there is a major cluster of more than 100,000 creative and cultural jobs, accounting for nearly one third of the entire sector in London.

Figure 14 Creative and cultural employment in Lambeth, Southwark and Westminster



# Transport for London

## 2.15 Objectives

2.15.1 There are a wide range of complementary objectives for the project. The seven core objectives of the project are:

- To **improve pedestrian connectivity** across the Thames in central London to reduce severance and contribute towards an increase in north-south movements across the river by foot
- To contribute towards **improving the quality of the pedestrian environment** and public realm in central London that will support an increase in walking across central London as a whole and help contribute towards MTS targets
- to **improve transport connectivity**, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple
- to **support the economic development** of areas adjoining the bridge on both sides of the river and to help bring forward development
- to **support central London's visitor and tourist economy**
- to create a **new public open space and garden** in central London
- to be **affordable**

2.15.2 The following table sets out how the objectives relate to the problems and opportunities that were identified and discussed in the previous section.

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Table 4 Project objectives mapped against identified problems and opportunities

Objectives / Problems and Opportunities	Improve pedestrian connectivity	Improve the pedestrian environment and urban realm	improve transport connectivity	Support economic development	Support central London's visitor and tourist economy	A new public open space and garden	To be affordable
Supporting growth in the London economy by encouraging and protecting tourism revenues				✓	✓	✓	
Poor pedestrian environment on existing bridges in central London	✓	✓		✓	✓		
Poor access onto Waterloo and Blackfriars bridges from the Thames Path	✓	✓			✓		
Missing link between Temple station and the south bank	✓		✓	✓			
Onward distribution of passengers from Waterloo station	✓	✓	✓	✓			
Urban park provision		✓		✓		✓	
Lack of economic activity around Temple station and in Northbank BID	✓		✓	✓			
Maximise Waterloo Opportunity Area's development potential	✓			✓			
Showcasing UK expertise and innovation in engineering, design and landscape				✓	✓		
Supporting the UK's internationally renowned creative sector	✓		✓	✓			

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## 2.16 Options

2.16.1 A number of options have been considered, taking into account the specific investment objectives as well as the wider public policy objectives outlined above. The options are listed below:

- **1. Do nothing:** No change to existing arrangements
- **2. Enhance/modify existing bridges in central London:** Invest in improvements to the ambience of existing central London bridges, including planting if possible
- **3. New bridge elsewhere in central London:** Build a new pedestrian bridge in another part of central London
- **4. New bridge between Temple and South Bank (no garden):** Build a new simple footbridge between Temple and the South Bank
- **5. New Garden bridge between Temple and South Bank:** Build a new bridge with a garden between Temple and the South Bank

2.16.2 The following sections describe the options above and consider them against the project objectives.

# Transport for London

## Option 1 – Do nothing

2.16.3 The do nothing option involves no changes to the existing bridges and no new bridges across the Thames in central London. The table below summarises how this option performs against the project objectives.

**Table 5 Performance of Option 1 against objectives**

Objective	Comments	Assessment
To improve pedestrian connectivity across the Thames in central London	Under a Do Nothing option, there would be no new pedestrian link across the river and no reduction in severance	Neutral -
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	Under a Do Nothing option, the quality of the pedestrian environment would not improve	Neutral -
To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	No improvement in accessibility of the South Bank or improved links to Temple	Neutral -
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	No regeneration or enhancement to the local area – as there would be no improvement to connectivity, no changes to the pedestrian environment, and no new open space or park provision.	Neutral -
To support central London's visitor and tourist economy	Does not encourage tourism – as there would be no new park or cultural icon to improve the offer of visitor attractions in central London	Neutral -
To create a new public open space and garden in central London	No new park space – no new park space or open space would be created	Neutral -
To be affordable	No expenditure (or revenue) from this option	Neutral -

# Transport for London

## Option 2 – Enhance/modify existing bridges in central London

- 2.16.4 This option seeks to meet the project objectives by enhancing or modifying one or more existing central London bridge(s).
- 2.16.5 The idea most likely to meet the project objectives is to use Waterloo, which lies in the heart of central London between the West End and South Bank, but which offers a relatively poor environment for pedestrians.
- 2.16.6 A concept has been considered whereby one of Waterloo Bridge's two vehicular carriageways is pedestrianised, and the space used to create a new public space for pedestrians. Given the importance of Waterloo Bridge to the road network including many bus routes (it is a part of the Strategic Road Network and carries 17 daytime bus routes), it is not considered feasible to fully close the bridge to traffic. This scenario would, however, mean that buses would no longer enjoy protection from traffic congestion afforded by the current bus lanes.
- 2.16.7 Accessibility would be improved by providing lift access from embankment level to the bridge on both sides of the river. There would be no fundamental change to the structure of Waterloo Bridge as this project would occupy the space currently utilised by one carriageway of the existing road on top of the existing structure.
- 2.16.8 For the purpose of this concept, no work has been undertaken to consider how the northern end would work, in terms of the presence of the Strand Underpass in the centre of the carriageway. This would need to be addressed should this concept be taken forward; it may be that to provide a satisfactory solution it would be necessary to close the underpass, but this is excluded from this concept assessment.

Figure 15 Location of Waterloo Bridge



## Transport for London

- 2.16.9 Planting would be accommodated in pots or raised beds placed on top of the existing bridge structure. This limits the size of plants that could be used, and would require regular watering as there would be no irrigation or rain water capture. Structurally, the bridges are not designed to carry large amounts of soil, and so the planting would be limited in scope, potentially limited to planting in pots. This may improve the ambience, but the level of intervention would be limited and therefore so would be the benefits compared with a purpose-built garden. In addition there would be heritage implications, with the bridges not being designed for that purpose.
- 2.16.10 There are alternative ways of implementing the scheme depending on the design concept. Permanent schemes in high quality materials can be expensive, but are likely to be needed to meet the high expectations there would be at a site such as this (Waterloo Bridge is Grade II\* listed).
- 2.16.11 At the lower cost end of the spectrum, New York City has trialled extensive reallocations of roadspace in parts of the city, initially using low-cost solutions, as illustrated below, to allow the schemes to be implemented in permanent materials should they prove successful.

Figure 16 New York's lower cost experimental pedestrianisation



- 2.16.12 Option 2 would have a negative impact on the road network with a reduction in the amount of space available for traffic. In facilitating the creation of new open space, existing road space allocated to buses and cycles would be removed, with the project therefore having the greatest impact on public transport and other sustainable modes of transport.
- 2.16.13 The table below summarises how this option performs against the project objectives.



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Table 6 Performance of Option 2 against objectives

Objective	Comments	Assessment
To improve pedestrian connectivity across the Thames in central London	As this option would not involve a new crossing, there would be no new pedestrian link across the river and no reduction in severance.	Neutral -
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	Improvement to the pedestrian environment limited by proximity to traffic lanes. The environment would be noisy and could still feel traffic dominated.  However, the provision of a garden would contribute towards an improved pedestrian environment, with an increase in walking trips associated with this improvement.	Slight positive ✓
To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	Option would have a limited impact in improving connectivity between South Bank and Temple Underground Station, as walking distances between the South Bank and the LU network would remain unchanged.	Neutral -
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	This option would provide limited benefits in generating additional footfall in the Strand / Aldwych area during quieter periods.	Slight positive ✓
To support central London's visitor and tourist economy	This option would not encourage tourism as there would be no new cultural icon to improve the offer of visitor attractions in central London	Neutral -
To create a new public open space and garden in central London	This option would increase the amount of open space in central London, however the retention of vehicular traffic is likely to undermine benefits associated with this option.	Slight positive ✓
To be affordable	This option would require capital funding and would remain an ongoing public liability	Slight negative x

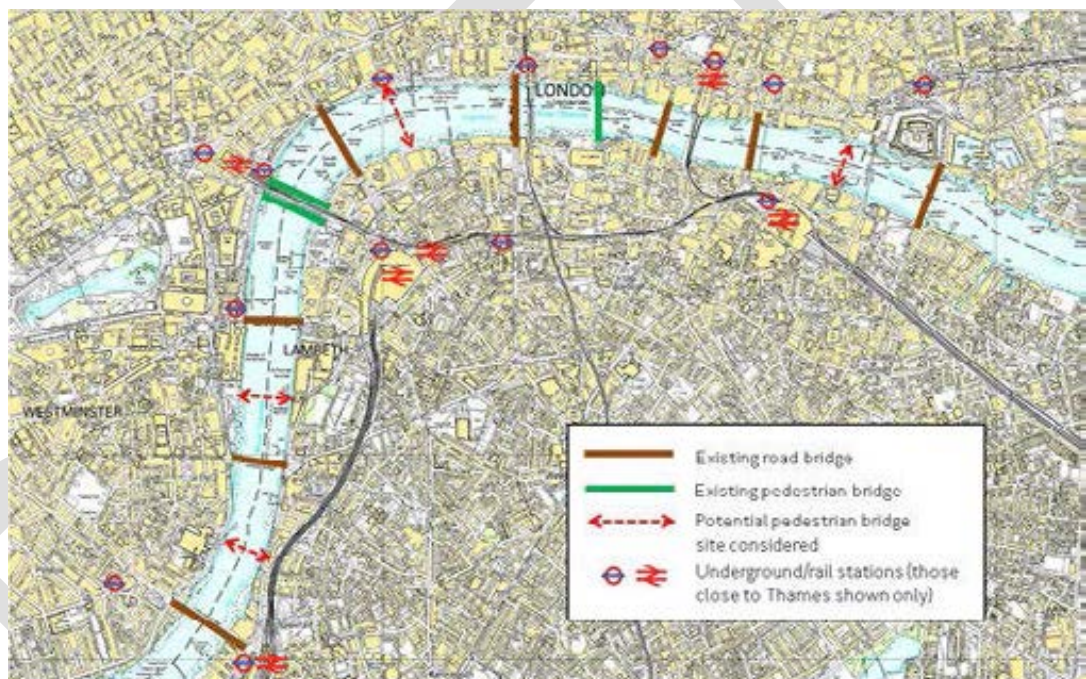
# Transport for London

## Option 3 – New bridge elsewhere in central London

2.16.14 This option would involve creating a new bridge in central London, with the following locations considered (from east to west):

- Between London Bridge and Tower Bridge
- Between Blackfriars Bridge and Waterloo Bridge (see *Option 4*)
- Between Westminster Bridge and Lambeth Bridge
- Between Lambeth Bridge and Vauxhall Bridge

Figure 17 Location of bridge options



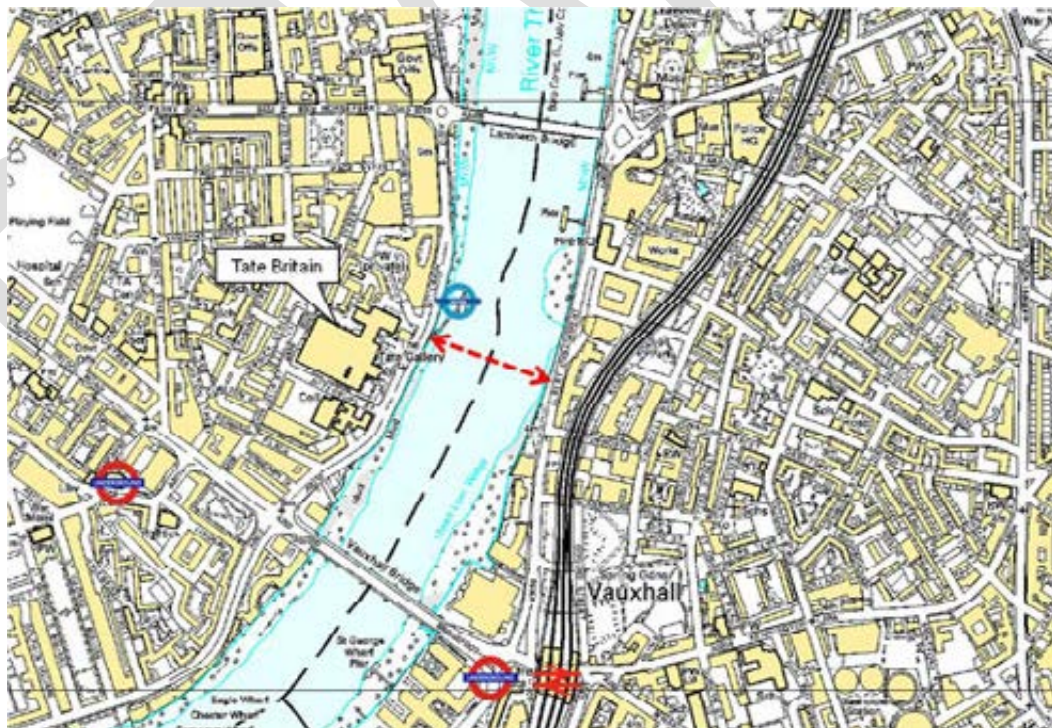
2.16.15 A new bridge between London Bridge and Tower Bridge would provide a pedestrian connection between two bridges heavily used by pedestrians, connecting the City of London and tourist attractions on the North Bank such as the Tower of London with the South Bank. A bridge in this location would have benefits for severance, given the spacing of 830m between bridges.

2.16.16 However, this option would be located downstream of London Bridge (the first low clearance bridge on the River Thames) and as such would need to allow for a high air draft. It would also conflict with obstructions along the river such as HMS Belfast and the Pool of London ship berth alongside it. This option has therefore been discounted.

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- 2.16.17 A new bridge between Westminster Bridge and Lambeth Bridge would provide additional pedestrian capacity and connectivity, and could in theory ease congestion on Westminster Bridge. However, the bridge would not be located on any main pedestrian desire lines, with the crowding on Westminster Bridge largely the result of high tourist demand between Westminster and the County Hall part of the South Bank. In addition, the opportunities for landing a bridge are very limited, and a landing would most likely need to be sited in Victoria Tower Gardens, adjacent to the Palace of Westminster. This very sensitive location would be likely to present significant challenges in securing planning consent for the structure and required access. This option has therefore been discounted.
- 2.16.18 The most promising location for a new bridge in central London, other than at Temple (see next option), linking the North Bank and South Bank is between Lambeth and Vauxhall Bridge. The spacing between adjacent bridges is around 820m at mid-river (similar to the spacing between Waterloo and Blackfriars bridges). The riverbank is not as constrained as the other options above, so construction of a footbridge is likely to be feasible, and the presence of the Tate Britain and Milbank Millennium Pier on the North Bank, and emerging commercial development on the South Bank in this location, suggest there is merit in considering this as a plausible option.
- 2.16.19 The location is shown in the Figure below.

Figure 18 Location of potential bridge between Lambeth and Westminster bridges



# Transport for London

Table 7 Performance of Option 3 against objectives

Objective	Comments	Assessment
To improve pedestrian connectivity across the Thames in central London	A new bridge would improve local connectivity and create a new crossing for central London.	Strong positive ✓✓✓
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	This option would improve the quality of the pedestrian environment in central London, and support an increase in walking through providing a pedestrian link between emerging areas of development and transport services from Milbank Pier.	Strong positive ✓✓✓
To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	Building a new crossing between Lambeth bridge and Vauxhall bridge would not improve links around the South Bank area or link to Temple	Neutral -
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	A new bridge at this location would improve the economic development potential of the area	Slight positive ✓
To support central London's visitor and tourist economy	A new bridge in this location would be unlikely to affect central London's visitor economy, given the presence of surrounding attractions and that such an option would not represent a cultural icon.	Neutral -
To create a new public open space and garden in central London	No new park space – no new park space or open space would be created	Neutral -
To be affordable	This option would require capital funding and would remain an ongoing public liability	Moderate negative xx

# Transport for London

## Option 4 – New bridge between Temple and South Bank (no garden)

- 2.16.20 This option would involve creating a conventional footbridge across the River Thames from the North Bank, adjacent to the Temple Underground Station, to the South Bank, near to the National Theatre, Gabriel’s Wharf and the Bernie Spain Gardens.
- 2.16.21 This would provide a solution to the functional needs of moving people through the area, but would not include a garden.

Figure 19 Location of potential bridge between Blackfriars and Waterloo bridges



- 2.16.22 The table below summarises how this option performs against the project objectives.

Table 8 Performance of Option 4 against objectives

Objective	Comments	Assessment
To improve pedestrian connectivity across the Thames in central London	A new bridge would improve local connectivity, and provide a new crossing for central London.	Strong positive ✓✓✓
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	Building a new crossing would contribute to the improved walking environment of central London	Strong positive ✓✓✓

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To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	Building a new crossing in this location would improve links around the South Bank area or link to Temple	Strong positive ✓✓✓
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	A new bridge at this location would improve the economic development potential of the area.	Slight positive ✓
To support central London's visitor and tourist economy	A new bridge at this location would have some benefits in supporting the central London visitor and tourist economy. However, these benefits would be limited given it is unlikely that this option would represent a cultural icon.  A conventional bridge would fail to demonstrate any special capability in UK design in addressing unique challenges like the combination of landscaping with bridge building.	Slight positive ✓
To create a new public open space and garden in central London	No new park space – no new park space or open space would be created	Neutral -
To be affordable	This option would require capital funding and would remain an ongoing public liability	Moderate negative xx

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## Option 5 – New Garden bridge between Temple and South Bank

- 2.16.23 This option would involve creating a new Garden Bridge between Temple on the north bank and the ITV building on the South Bank. This would be on the same alignment as the previous option but would be designed to incorporate a new public space on the bridge deck rather than just a functional footbridge.
- 2.16.24 The new bridge would be for pedestrians only and would be a 'garden bridge' with areas for planting designed into the structure of the bridge; relatively large plants and trees could be accommodated, rather than pots placed on a solid deck.
- 2.16.25 A bridge in this location would stand apart from the existing bridges and there is therefore greater freedom to create a unique design and to use innovative materials here.

Figure 20 Artist's impression of the Garden Bridge concept



- 2.16.26 The table below summarises how this option performs against the project objectives.

# Transport for London

Table 9 Performance of Option 5 against objectives

Objective	Comments	Assessment
To improve pedestrian connectivity across the Thames in central London	A new bridge would improve local connectivity, and provide a new crossing for central London.	Strong positive ✓✓✓
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	This option would improve the quality of the public realm and provide additional capacity to accommodate increasing numbers of cross river walking trips.	Strong positive ✓✓✓
To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	Building a new crossing in this location would improve links around the South Bank area or link to Temple	Strong positive ✓✓✓
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	A new cultural icon in this location would improve the economic development potential of the area.	Strong positive ✓✓✓
To support central London's visitor and tourist economy	This option would have significant benefits for central London's visitor and tourist economy, given the creation of a new cultural icon.	Strong positive ✓✓✓
To create a new public open space and garden in central London	This option would create a new public space in central London, segregated from vehicular movements on neighbouring bridges, maximising enjoyment for pedestrians.	Strong positive ✓✓✓
To be affordable	This option would require new capital funding, but would only go ahead in conjunction with third party funding, and ongoing costs would be for a third party rather than public sector	Slight negative x



# Transport for London

## Summary of the options considered

2.16.27 The table below summarises how each of the six options considered compare against the project objectives.

**Table 9 Performance of each Option against objectives**

Objective	Option 1	Option 2	Option 3	Option 4	Option 5
To improve pedestrian connectivity across the Thames in central London	Neutral -	Neutral -	Strong positive ✓✓✓	Strong positive ✓✓✓	Strong positive ✓✓✓
To contribute towards improving the quality of the pedestrian environment and public realm in central London that will support an increase in walking	Neutral -	Slight positive ✓	Strong positive ✓✓✓	Strong positive ✓✓✓	Strong positive ✓✓✓
To improve transport connectivity, efficiency and resilience for the South Bank area by providing better links to the Underground network at Temple	Neutral -	Neutral -	Neutral -	Strong positive ✓✓✓	Strong positive ✓✓✓
To support the economic development of areas adjoining the bridge on both sides of the river and to help bring forward development	Neutral -	Slight positive ✓	Slight positive ✓	Slight positive ✓	Strong positive ✓✓✓
To support central London's visitor and tourist economy	Neutral -	Neutral -	Neutral -	Slight positive ✓	Strong positive ✓✓✓
To create a new public open space and garden in central London	Neutral -	Slight positive ✓	Neutral -	Neutral -	Strong positive ✓✓✓
To be affordable	Neutral -	Slight negative x	Moderate negative xx	Moderate negative xx	Slight negative x

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2.16.28 The conclusions for each option are given below:

***1. Do nothing: No change to existing arrangements***

2.16.29 The Do Nothing option is not recommended, as it does not meet any of the project objectives.

***2. Enhance/modify existing bridges in central London: Invest in improvements to the ambience of existing central London bridges, including planting if possible***

2.16.30 The ability of existing bridges to be upgraded to a suitable standard to meet this project's objectives is limited, given the lack of new connectivity, and the impact on existing bridge users.

2.16.31 It is therefore not recommended as an option to fulfil this project's objectives, although enhancements to the ambience of existing bridges could be explored in addition to this project where benefits may arise.

***3. New bridge elsewhere in central London: Build a new pedestrian bridge in another part of central London***

2.16.32 This option is not recommended, as the Temple area is the longest space between bridges in the centre of London and aligns with an Underground station, and an option which provides a new crossing at this point, would therefore deliver the greatest connectivity benefits.

***4. New bridge between Temple and South Bank (no garden): Build a new simple footbridge between Temple and the South Bank***

2.16.33 This option is not recommended, because although it meets the connectivity objectives well, it is not likely to attract new visitors to the area in any significant numbers, and would not create any new open space.

***5. New Garden bridge between Temple and South Bank: Build a new bridge with a garden between Temple and the South Bank***

2.16.34 This option meets all of the project objectives well except that it requires some capital investment (alongside third party contributions).

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## 3 The Economic Case

### 3.1 *Introduction*

3.1.1 This section reviews the likely impacts of the options, outlining where possible the quantified or qualitative impacts and costs.

### 3.2 *Assessment of benefits*

3.2.1 A wide range of potential impacts to London and the UK economy have been considered:

- Journey time (walk time saving)
- Journey Quality (ambience)
- Severance
- Crowding
- Road safety
- Pedestrian exposure to emissions
- Health impacts (physical activity)
- Business and property impacts
- Showcasing Britain
- Tourism

3.2.2 The impacts of each option have been considered and this is described in the following sections.

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## 3.3 *Journey time (walk time savings)*

3.3.1 Options where connectivity is enhanced are likely to lead to walk journey time savings by reducing how far people will need to walk in order to reach their destination. These savings are a core transport benefit. It should be noted that this estimate of travel time savings looks only at trips that already take place. It does not consider any new trips generated by the introduction of a new crossing. This is because it is assumed that many of the new trips would be leisure trips where users may not value a reduction in journey time. In fact, in some cases they may wish to take longer in order to enjoy a new facility if the ambience is sufficiently high.

### *Option 1. Do nothing: No change to existing arrangements*

3.3.2 Under the Do Nothing option, there would be no change to walking times.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.3.3 Reallocating one of the carriageways of Waterloo Bridge for pedestrians would bring benefits to pedestrians (described later in this section) but journey times would not be improved.

3.3.4 In addition, the loss of bus lanes on Waterloo Bridge could have a severe impact on bus passengers' journey times, and associated knock-on impacts on service reliability affecting passengers over a wide area.

3.3.5 As such, this could be a significant negative effect for bus passengers, but a quantification of these impacts has not been undertaken.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.3.6 Journey time benefits for Option 3 have not been calculated in detail, although the following section outlines that the walking time benefits for Options 4 and 5 have been estimated at around £180,000 per annum.

3.3.7 Option 3 is located in an area of much lower footfall than Options 4 and 5, and would not provide shorter journeys for many users. Therefore the assessment assumes that this option would provide just half of the journey time benefits, equivalent to around £90,000 per annum.

### *Option 4. New bridge between Temple and South Bank (no garden)*

3.3.8 The construction of a new bridge between Temple and the South Bank would reduce the journey times of pedestrians with an origin or destination close to the

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new bridge location. In particular, it would provide a section of the South Bank with direct access to Temple Underground station.

- 3.3.9 The forecast annualised total travel time saving is 27,000 hours which translates to an annual benefit of around £180,000, which is assessed as a **Slight positive**. See Appendix A for more details of the calculation.

## *Option 5. New Garden bridge between Temple and South Bank*

- 3.3.10 This option would offer the same utility as Option 4, and an annual benefit of around £180,000, which is assessed as a **Slight positive**. See Appendix A for more details of the calculation.

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## 3.4 Journey quality (ambience)

3.4.1 Journey quality is an important consideration in scheme appraisal for walkers and includes environmental conditions on a route. Evidence for quantification is limited, so only a qualitative assessment has been made.

### *Option 1. Do nothing: No change to existing arrangements*

3.4.2 Under the Do Nothing option, there would be no change to journey ambience. As such, the assessment of impact is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.4.3 Creating a new pedestrian space on Waterloo Bridge would greatly improve the journey quality for pedestrians using the bridge, although traffic would still be alongside the pedestrian route.

Figure 21 – Waterloo Bridge and pedestrianisation



3.4.4 As such, the assessment of severance benefit is **Slight benefit**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.4.5 This option would provide pedestrians with a new bridge away from the current road bridges either side. However, the number of pedestrians benefitting is low.

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Figure 22 – Lambeth Bridge and pedestrian bridge (Millennium)



3.4.6 As such, the assessment of severance benefit is **Slight benefit**.

## *Option 4. New bridge between Temple and South Bank (no garden)*

3.4.7 Option 4 would provide pedestrians with a new bridge away from the current road bridges either side, and the number of pedestrians benefitting would be much higher than at the location of Option 3.

Figure 23 – Waterloo Bridge and pedestrian bridge (Millennium)



3.4.8 The assessment of severance benefit is **Moderate benefit**.

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## *Option 5. New Garden bridge between Temple and South Bank*

- 3.4.9 Option 5 would provide pedestrians with the same benefits as Option 4, but with the additional factor that as well as taking pedestrians away from vehicular traffic, the bridge deck would be a very high quality environment in its own right.

Figure 24 – Waterloo Bridge and garden bridge concept



- 3.4.10 The assessment of severance benefit is **Large benefit**.



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## 3.5 Severance

3.5.1 Severance is the effect of a barrier, whether a natural feature such as a river or mountain range, or a man-made barrier such as a railway or main road, on people's journeys, which can lead to increased trip distances and times.

3.5.2 The River Thames naturally leads to severance in some sections where crossings are limited, particularly downriver where there are far fewer crossings compared with central London. However, a severance effect is still present in spaces between crossings, particularly for those on foot. A new bridge could reduce this severance effect, if it is located where the distance between bridges is relatively longer, and where there are key pedestrian origins or destinations close to the river but not adjacent to a bridge.

3.5.3 Methodology as suggested in webTAG unit 18 (Department for Transport appraisal guidelines) was used to assess the likely scale of severance currently present and the impact that each option would have on this. This involves first assessing the level of severance in the Do Minimum and with scheme case, then assessing the likely number of people impacted.

3.5.4 According to webTAG, Severance may be classified according to the following four broad levels.

**None** - Little or no hindrance to pedestrian movement.

**Slight** - All people wishing to make pedestrian movements will be able to do so, but there will probably be some hindrance to movement.

**Moderate** - Pedestrian journeys will be longer or less attractive; some people are likely to be dissuaded from making some journeys on foot.

**Severe** - People are likely to be deterred from making pedestrian journeys to an extent sufficient to induce a reorganisation of their activities. In some cases, this could lead to a change in the location of centres of activity or to a permanent loss of access to certain facilities for a particular community. Those who do make journeys on foot will experience considerable hindrance.

Table 10 WebTAG A4-I scoring criteria

Without-scheme Severance Scoring	With-scheme Severance Scoring			
	None	Slight	Moderate	Large
None	None	Slight negative	Moderate negative	Large negative
Slight	Slight positive	None	Slight negative	Moderate negative
Moderate	Moderate positive	Slight positive	None	Slight negative
Large	Large positive	Moderate positive	Slight positive	None

<sup>18</sup> WebTAG Unit A4-I, DfT, January 2014

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## *Option 1. Do nothing: No change to existing arrangements*

- 3.5.5 Under the Do Nothing option, there would be no change to levels of severance. As such, the assessment of severance benefit is **None**.

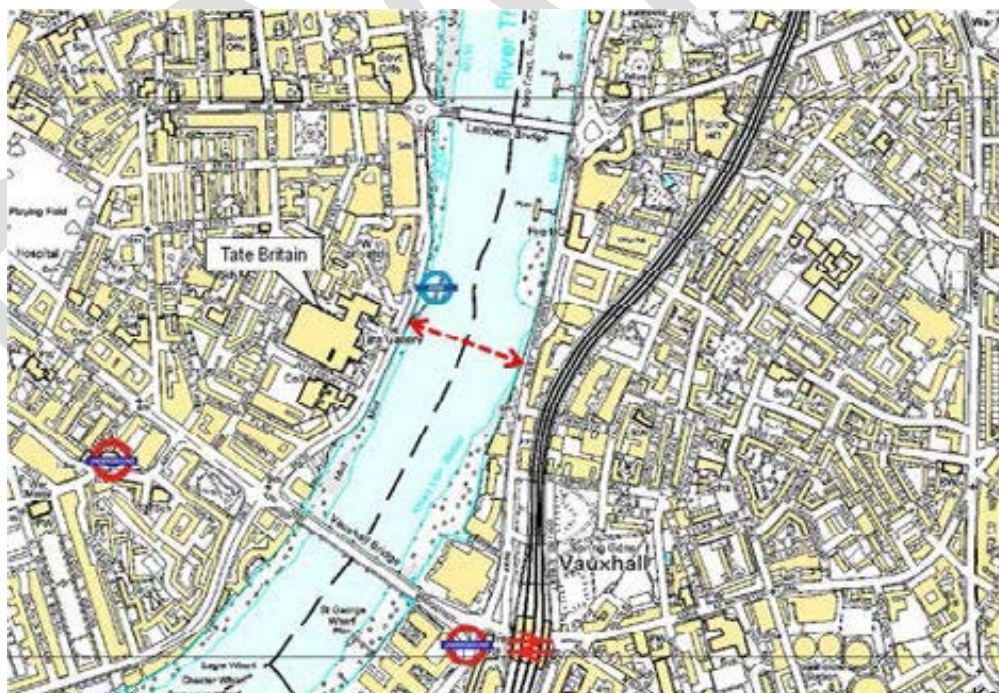
## *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

- 3.5.6 Reallocating one of the carriageways of Waterloo Bridge for pedestrians would bring benefits to pedestrians (described later in this section) but severance would not be improved. As such, the assessment of severance benefit is **None**.

## *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

- 3.5.7 This option would reduce the severance between each bank of the river in this location. The Figure below illustrates the main potential beneficiaries of this reduction in severance.

Figure 25 – severance effects, Option 3



- 3.5.8 A new bridge would be close to Tate Britain, an important cultural site, but would not improve its links to the wider transport network, as it would still be closest to Pimlico Underground station, and no closer to the national rail stations on the southern side. It would improve connections between the area on the southern bank and the river pier, but this is unlikely to offer a significant transport benefit as the pier principally serves visitors to Tate Britain.

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- 3.5.9 Based upon the above, the assessment of the level of severance in the Do Minimum scenario is **Slight**, and with Option 3 is considered to remain **Slight**. As such, the assessment of severance benefit is **None**.

### *Option 4. New bridge between Temple and South Bank (no garden)*

- 3.5.10 Option 4 would reduce the severance between each bank of the river in this location. The Figure below illustrates the main potential beneficiaries of this reduction in severance.

Figure 26 – severance effects, Option 4 (and Option 5)



- 3.5.11 A new bridge would link directly to Temple Underground station, which would provide improved access to the Underground from areas of high pedestrian activity on the South Bank including the Oxo Building, Gabriel's Wharf, the ITV studios (audiences of up to 1,000), and the Queens Walk itself.
- 3.5.12 It would also improve links to the busy Queens Walk area from destinations on the northern side, including Somerset House, King's College, the Royal Courts of Justice, and the Inner and Middle Temples.
- 3.5.13 Based upon the above, the assessment of the level of severance in the Do Minimum scenario is **Slight**, and with Option 3 is considered to improve to **None**. As such, the assessment of severance benefit is **Slight positive**.

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## *Option 5. New Garden bridge between Temple and South Bank*

- 3.5.14 This option would offer the same benefit as Option 4 , with a level of severance in the Do Minimum scenario of **Slight**, and with Option 4 improving to **None**. As such, the assessment of severance benefit is **Slight positive**.

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## 3.6 Crowding

3.6.1 London's transport networks are under increasing pressure as the number of jobs, residents and visitors increases. Projects which reduce crowding – through providing new links, increasing capacity or making more efficient use of the existing transport networks – will help to reduce levels of crowding which will otherwise increase over time.

### *Option 1. Do nothing: No change to existing arrangements*

3.6.2 Under the Do Nothing option, there would be no change to levels of crowding on the transport networks (relative to the background growth, which will gradually increase crowding where other measures are not implemented. As such, the assessment of crowding benefit is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.6.3 Reallocating one of the carriageways of Waterloo Bridge for pedestrians would increase the space available for pedestrians on the bridge, but the bridge itself is not currently crowded, and the option is unlikely to have a significant effect on the patterns of travel on the public transport networks.

3.6.4 As such, the assessment of crowding benefit is **None**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.6.5 Building a new bridge in this location is unlikely to have a significant effect on the patterns of travel on the public transport networks, and crowding is not a problem on the walking routes in this area or adjacent bridges.

3.6.6 As such, the assessment of crowding benefit is **None**.

### *Option 4. New bridge between Temple and South Bank (no garden)*

3.6.7 Option 4 would provide improved access to Temple Underground station from areas of high pedestrian activity on the South Bank including the Oxo Building, Gabriel's Wharf, the ITV studios (audiences of up to 1,000), and the Queens Walk itself.

3.6.8 This is likely to result in some peak period trips currently using Waterloo, Embankment or Blackfriars stations to switch to Temple. Temple station has more spare capacity than Waterloo or Embankment stations, which in the weekday peak are crowded stations, and therefore the assessment of crowding benefit is **Slight positive**.

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## *Option 5. New Garden bridge between Temple and South Bank*

- 3.6.9 This option would offer the same crowding benefit as Option 4 , and as such the assessment of severance benefit is **Slight positive**.

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## 3.7 Road safety

3.7.1 Improving the safety of all road users, and particularly vulnerable road users, is a key objective at all levels of government. While road schemes are outside the scope of this project, there is the potential to improve the safety of pedestrians by providing an alternative walking route which allows pedestrians to by-pass busy parts of central London's road network.

### *Option 1. Do nothing: No change to existing arrangements*

3.7.2 Under the Do Nothing option, there would be no change to pedestrian routes or their exposure to traffic. As such, the assessment of road safety impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.7.3 Reallocating one of the carriageways of Waterloo Bridge for pedestrians would greatly increase the space available for pedestrians on the bridge, and reduce the likelihood of pedestrian/vehicle conflict on the bridge. However, the scope for pedestrian / vehicle conflict on the bridge itself is low, with the likely conflict points being the junctions at either end, which pedestrians would still need to negotiate.

3.7.4 In addition, the removal of the bus lanes reduces the level of protection available to cyclists on the remaining carriageway, which would also be without a cycle lane in one direction if the existing kerbs are retained (each carriageway is only around 8.3 m wide, insufficient for cycle lanes in both directions with two-way traffic). For the purpose of this assessment it is assumed that in one direction a segregated cycle track would be provided within the pedestrianised area to allow cycle provision to be maintained under the single carriageway layout.

3.7.5 Overall, the assessment of road safety impacts is **None**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.7.6 Building a new bridge in this location would provide pedestrians with a dedicated route across the River Thames away from vehicular traffic. However, the points of conflict between pedestrians and vehicles are at the junctions at either end of the bridges rather than over the river itself, and pedestrians would not avoid these junctions by the provision of a new bridge between them.

3.7.7 As such, the assessment of road safety impacts is **None**.

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## *Option 4. New bridge between Temple and South Bank (no garden)*

3.7.8 As well as providing a new crossing over the Thames itself (as in Option 3), a bridge here has the added benefit of allowing its users to avoid busy roads at each end. On the southern side, it links to the pedestrian Queen's Walk, and on the northern side it passes over the busy Victoria Embankment and allows pedestrians to either access the Underground without crossing any roads, or to continue north by much quieter roads than those linking to the road bridges either side. This would reduce pedestrians' conflicts with vehicular traffic.

3.7.9 Therefore the assessment of road safety impacts is **Slight positive**.

## *Option 5. New Garden bridge between Temple and South Bank*

3.7.10 This option would offer the same road safety impacts as Option 4 , and as such the assessment of severance benefit is **Slight positive**.

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## 3.8 *Air quality: pedestrian exposure to pollution*

3.8.1 Where practical, pedestrians will generally prefer to use walking routes where air pollution is lower, to avoid discomfort and minimise impacts on personal health. Concentrations of air pollutants like Nitrogen Dioxide (NO<sub>2</sub>) are highest in the centre of busy roads with concentrations dropping off significantly as you move onto the pavement and into background locations.

3.8.2 It is therefore possible to deliver a benefit by reducing pedestrian exposure to air pollution. This would be achieved by moving pedestrians away from higher traffic roads with higher levels of exposure to quieter roads or pedestrian access only roads.

### *Option 1. Do nothing: No change to existing arrangements*

3.8.3 Under the Do Nothing option, there would be no change to pedestrian routes or their exposure to air pollutants. As such, the assessment of air quality impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.8.4 Reallocating one of the carriageways of Waterloo Bridge for pedestrians would result in some small reductions in exposure to air pollution, by providing an attractive pedestrian route several metres further from the vehicular traffic on the bridge. However this effect is limited as the air on the bridge is likely to be the least harmful part of the journey due to the exposed nature of the Thames bridges, and the approach routes to and from the bridge would be the same as under a Do Nothing scenario.

3.8.5 The small gains in moving pedestrians further from the traffic on the bridge could be offset by pedestrians spending longer on the bridge, adjacent to what would still be a busy road, due to the presence of seating and plants.

3.8.6 Overall, the assessment of air quality impacts is **None**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.8.7 Building a new bridge in this location would provide pedestrians with a dedicated route across the River Thames away from vehicular traffic. However, as with the option above, the journey link across the Thames is likely to be point at which pedestrians have the lowest exposure to air pollution, while the routes on and off the bridge would remain alongside the busy roads on each embankment.

3.8.8 the points of conflict between pedestrians and vehicles are at the junctions at either end of the bridges rather than over the river itself, and pedestrians would not avoid these junctions by the provision of a new bridge between them.

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3.8.9 As such, the assessment of air quality impacts is **None**.

## *Option 4. New bridge between Temple and South Bank (no garden)*

3.8.10 This option would have a more significant impact than the preceding options, because as well as providing a new traffic-free route over the Thames, it would open up to pedestrians new walking routes on either side which are also away from busy traffic routes, thus reducing exposures over much more of the pedestrian's journey.

3.8.11 On the southern side, it links to the pedestrian Queen's Walk, and on the northern side it passes over the busy Victoria Embankment and allows pedestrians to either access the Underground without crossing any roads, or to continue north by much quieter roads than those linking to the road bridges either side.

3.8.12 To understand this effect in more detail, the average NO<sub>2</sub> concentrations on four local walking journeys with and without a new bridge at Temple were compared.

3.8.13 The selected journeys were:

- The National Theatre to Sir John Soane Museum (Lincoln's Inn)
- Somerset House to Borough Market
- Somerset House to the Tate Modern
- Waterloo to Temple

3.8.14 The routes between these points with and without a new bridge are shown in the Figures below. Routes using the new bridge are shown in green and those without a new bridge are shown in blue.

3.8.15 Using modelled concentrations of the NO<sub>2</sub> annual mean for 2010 from the London Atmospheric Emissions Inventory 2010 (LAEI) the average NO<sub>2</sub> concentration for each journey and route was compared. This was done by averaging the concentration at every metre along the defined routes using Vertical Mapper (an add-on to Mapinfo).

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Figure 27 NO<sub>2</sub> annual mean: National Theatre to Sir John Soane museum

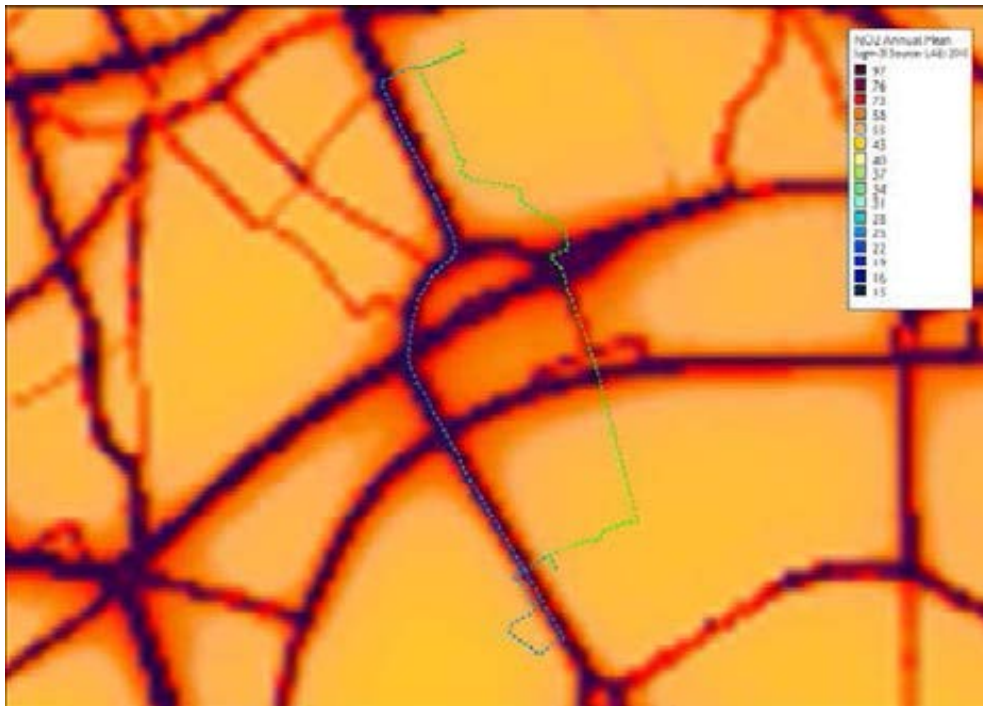
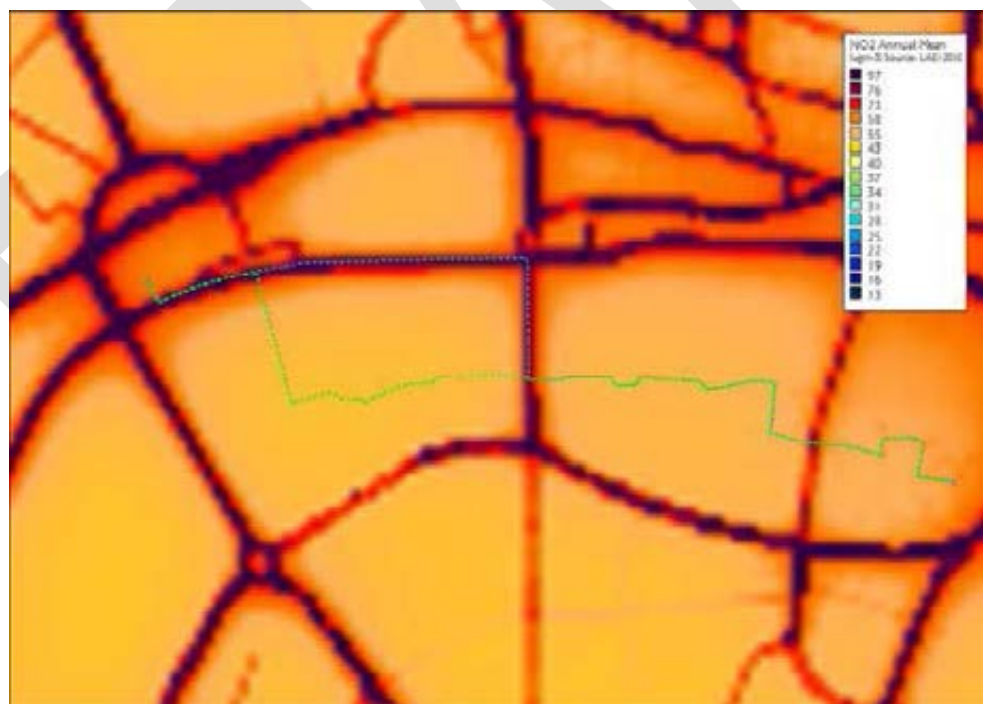


Figure 28 NO<sub>2</sub> annual mean: Somerset House to Borough Market



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Figure 29 NO<sub>2</sub> annual mean: Somerset House to Tate Modern

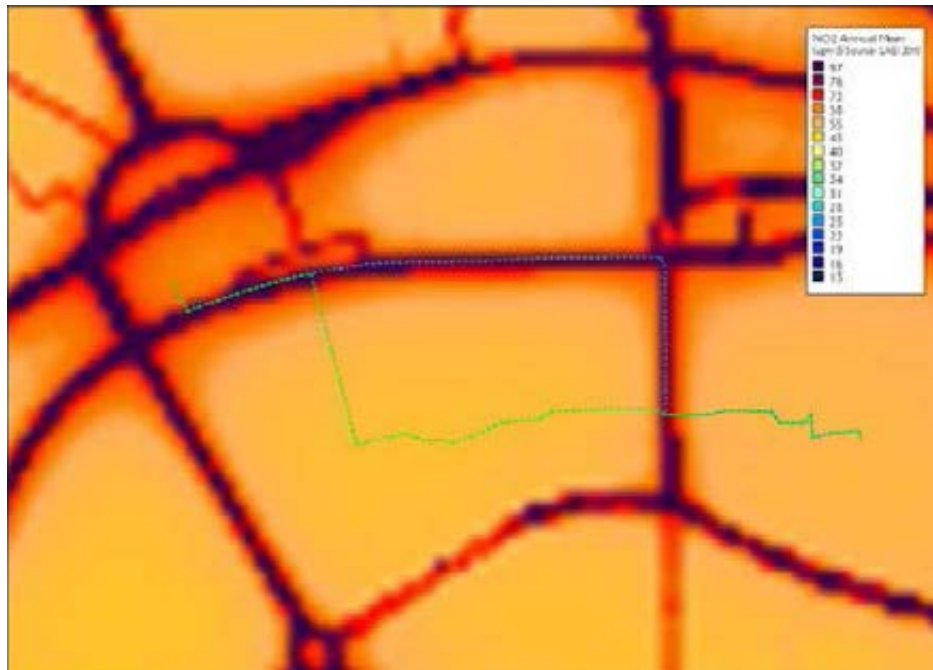
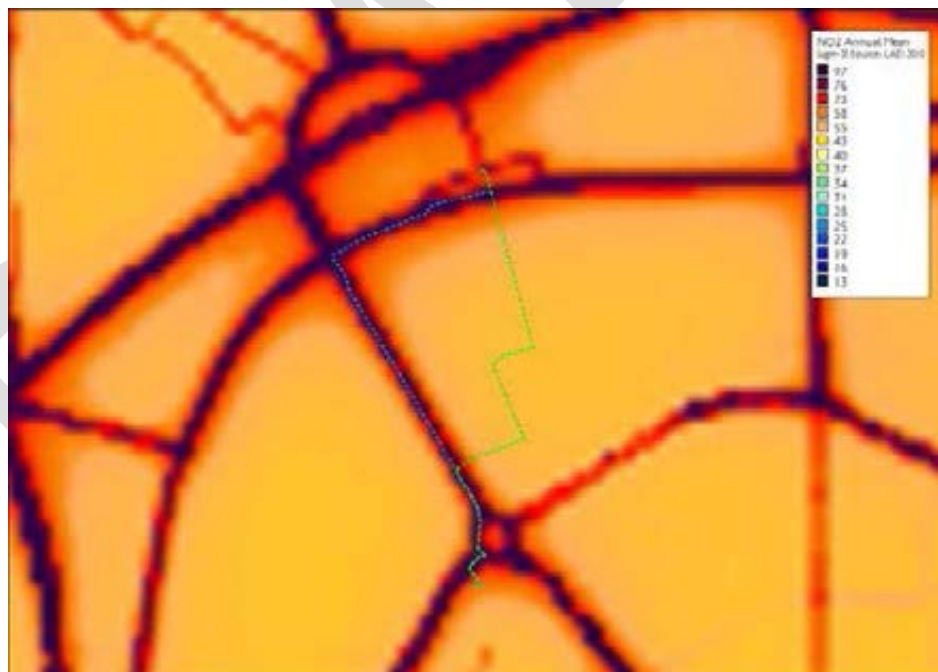


Figure 30 NO<sub>2</sub> annual mean: Waterloo to Temple



- 3.8.16 The LAEI 2010 is a database with information on emissions from all sources of air pollutants in the Greater London area. The emissions data is modelled using observed activity data of the various emission sources (such as traffic flows and speeds and gas usage). These pollutant emissions are then run through a model to calculate the average concentrations of those pollutants in the air in a given year. For the 'base year' (in this case 2010) meteorological data for 2010 is applied to the emissions along with information on building height and other determinants of

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concentrations. The modelled concentrations are then calibrated with monitored air quality data and where there is a difference a correction factor is applied. Future year emissions are estimated and run through the model using the base year meteorological data and applying the relevant correction factors.

- 3.8.17 The results of the evaluation show that, on average, routes involving a new bridge have 20% to 30% lower NO<sub>2</sub> concentrations. These changes in concentration by route are shown in the Table below.

Table 11 Percentage change in average NO<sub>2</sub> concentrations for selected journeys

Route	% change in average concentrations
Waterloo to Temple	-30%
Somerset House to Borough Market	-19%
Somerset House to Tate Modern	-26%
National Theatre to Sir John Soane Museum	-19%

- 3.8.18 Therefore the assessment of air quality impacts for Option 4 is **Slight positive**.

### *Option 5. New Garden bridge between Temple and South Bank*

- 3.8.19 This option would offer the same air quality impacts as Option 4, and as such the assessment of air quality impacts for Option 5 is **Slight positive**.

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## 3.9 *Physical activity*

3.9.1 Options which increase people's propensity to walk (or cycle) regularly bring about a health benefit to those users. While a new bridge will shorten some walking journeys, in some cases that effect is likely to be more than offset by making more journeys walkable which are currently undertaken by other modes of transport, such as encouraging a switch from short bus journeys to walking.

3.9.2 Analysis of the options where there is likely to be such a benefit has been carried out. The analysis is based on the World Health Organization (WHO) Health Economic Assessment Tools (HEAT) for walking and cycling using a set of assumptions about regular walking trips generated by the bridge. This is the method recommended by the Department for Transport (DfT) for assessing health benefits of walking and cycling initiatives.

### *Option 1. Do nothing: No change to existing arrangements*

3.9.3 Under this option, there would be no change to pedestrian behaviour and as such, the assessment of health impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.9.4 This options would not shorten any journeys and is therefore unlikely to result in any significant increases in walking activity.

3.9.5 Therefore, the assessment of health impacts for this option is **None**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.9.6 A new bridge in this location would not provide a shorter walking route for any major movements of people currently undertaken by other means, and therefore it would not provide any significant opportunities for existing journeys to switch to walking.

3.9.7 Therefore the assessment of health impacts is **None**.

### *Option 4. New bridge between Temple and South Bank (no garden)*

3.9.8 A new bridge between Temple and the South Bank would open up the potential for some journeys to switch mode from public transport to walking, because it will improve the walking links between Waterloo station and the Temple area, which is a relatively short journey within most people's walking capability, but which currently has a relatively low walking share for the distance.

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- 3.9.9 The daily number of walk trips included in this assessment is 864 trips from Waterloo diverting to walking once a new bridge has been built; this is based on an assessment of potential modal switch undertaken as part of the feasibility work, using data from origin-destination surveys of bridge users and surveys of Waterloo station users.
- 3.9.10 Based on the World Health Organization (WHO) Health Economic Assessment Tool (HEAT) for walking, a new bridge at this location would prevent between 0.37 and 0.70 deaths per year; the mid-point of this likely range is 0.535. This equates to an annual benefit of £963,000.
- 3.9.11 Therefore the assessment of health impacts is **Slight positive**.

### *Option 5. New Garden bridge between Temple and South Bank*

- 3.9.12 This option would be likely to enjoy higher benefits than Option 4, as the higher ambience is likely to be more effective in encouraging commuters to switch to walking. However there is insufficient data to allow a distinction to be made at this point, and therefore it is assumed that Option 5 would accrue the same benefit as Option 4.
- 3.9.13 The assessment of health impacts is therefore **Slight positive**.

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## 3.10 Business and property impacts

3.10.1 There is considerable evidence that new infrastructure and well designed and well managed parks can have a positive impact on nearby businesses and supporting economic development activity, with a consequent impact on property values and their yields.

3.10.2 CABE Space, for example, found that there can be wide variations in the uplift in property values which can be up to as much as 34%, although properties adjacent to a park 'generally clustered at around a 5% to 7% premium over an identical property in the same market area, but outside of the influence of the park'.

### *Option 1. Do nothing: No change to existing arrangements*

3.10.3 Under this option, there would be no land value changes arising, so the assessment of property impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.10.4 Although this option would improve ambience on the bridge, it would not be likely to have any significant effect on property/land values, as the attracted footfall would be likely to be relatively low, and there are limited opportunities for local businesses to capture value from any visitors who are attracted by the improved ambience on the bridge.

3.10.5 Therefore, the assessment of property impacts for this option is **None**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.10.6 A new bridge at this location would not be likely to draw additional visitors to this part of London, and would therefore be expected to have minimal effect on the local business economy. However, it is likely that there would be some benefits to local residential property prices, particularly on the southern side, due to improved links to the Westminster side of the river.

3.10.7 A note on the likely impacts of a Garden Bridge at this location can be found at Appendix C. A bridge in this location would bring some similar benefits, but at a lower level, and to a smaller local base of development. The assessment assumes that this option would attract 20% of the property price impacts of the Garden Bridge option, equivalent to a one-off gross increase of **£21 million**.

3.10.8 Therefore the assessment of property impacts is **Slight positive**.

3.10.9 However, some of the uplift in values may be as a result of diverting investment from elsewhere; therefore sensitivity tests have been undertaken assuming half the rate of property increase, and no increase in property values.



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## *Option 4. New bridge between Temple and South Bank (no garden)*

- 3.10.10 A new bridge at this location is likely to have a greater impact than the preceding options, as it would have a greater impact on local footfall, and its improved connectivity would occur in a location which has higher development densities and development opportunities.
- 3.10.11 A note on the likely impacts of a Garden Bridge at this location can be found at Appendix C. However, some of the impacts described would apply also to Option 4.
- 3.10.12 The assessment suggests a Large positive outcome for Option 5; based on this, an assessment of **Moderate positive** has been made for Option 4. This assumes that the 5% uplift in property values associated with Option 5 would translate to only a 2% uplift for a more simple footbridge, equivalent to a one-off gross benefit of **£33.6 million**, and that the business turnover benefits would also represent 40% of the value of the Garden Bridge option, which is equivalent to an annual benefit of £6.6 million per annum.
- 3.10.13 However, some of the uplift in values may be as a result of diverting investment or business from elsewhere; therefore sensitivity tests have been undertaken assuming half the rate of property and business impacts, and no property or business impacts.

## *Option 5. New Garden bridge between Temple and South Bank*

- 3.10.14 A Garden Bridge at this location is likely to have a significantly greater impact than the preceding options, as it would not only improve connectivity and footfall in the areas on either side, but would be a major attraction in its own right, providing additional utility to the local area in the shape of its open space, and by attracting tourists would increase the values of local business property.
- 3.10.15 A note on the likely impacts of a Garden Bridge at this location can be found at Appendix C, and these are summarised below.
- 3.10.16 The development impacts arising from the Garden Bridge can be expected to affect land and property within a nearby impact area, schemes that exist in the planning pipeline and other schemes that may come forward in the future. These gross impacts can accrue from a number of sources including:
- Increase in the quantity of new retail, hotel, office and residential units constructed through the direct and wider effects associated with the Garden Bridge.
  - Increase in the speed of development (i.e. planned schemes coming forward faster) and changes in the mix of development (e.g. increased retail and hospitality at street level due to increases in footfall).
  - Improvements in the financial performance of the existing property stock adjacent to the Garden Bridge which would, for example, affect capital values and rents from residential and retail units, the occupancy and yield

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for each hotel room and turnover per square metre for retail and hospitality uses. There could also be a specific premium attached to the views of the Garden Bridge in addition to these effects. While a range of studies show that the positive uplift in property values can be as high as 34% evidence from a number of studies in the literature report increases of around 5%.

- These effects would also increase tax revenues for the Exchequer derived from various sources including revenue from income, business and sales taxes such as VAT and Stamp Duty Land Tax (SDLT).

- 3.10.17 There is significant high density development planned both north and south of the Garden Bridge. For example, recent and planned developments within about 500m of the Garden Bridge on the South Bank will provide 170,000 m<sup>2</sup> of office, commercial and other floorspace, 1,400 residential units and more than 1,000 hotel bedspaces. Together this £1.33 billion programme of investment would accommodate 10,000 jobs and 3,000 new residents. Similarly £351 million of residential development is planned at One Arundel Great Court and 190 Strand closing the northern landing point.
- 3.10.18 If the development value was increased by 5% due to the effects of the Garden Bridge (at the conservative end of the 5-7% cluster of value increases in the literature) this would result in a one-off gross benefit worth **£84.1 million**.
- 3.10.19 With increased footfall in the areas leading to and from the Garden Bridge as well as being known as a high profile destination, the Garden Bridge can be expected to affect the income generated by nearby businesses and the value and yield of existing property. With around 7 million visitors forecast the effects can be expected to be particularly strong on the North Bank due to its low levels of current footfall around Arundel Street.
- 3.10.20 As well as the proximity to a major new tourist attraction and the associated increases in footfall, a large number of businesses will benefit from improved catchment areas by foot, opening up their businesses to new consumers.

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Figure 31 Changes in catchment within 20 minutes of a new bridge – from the south

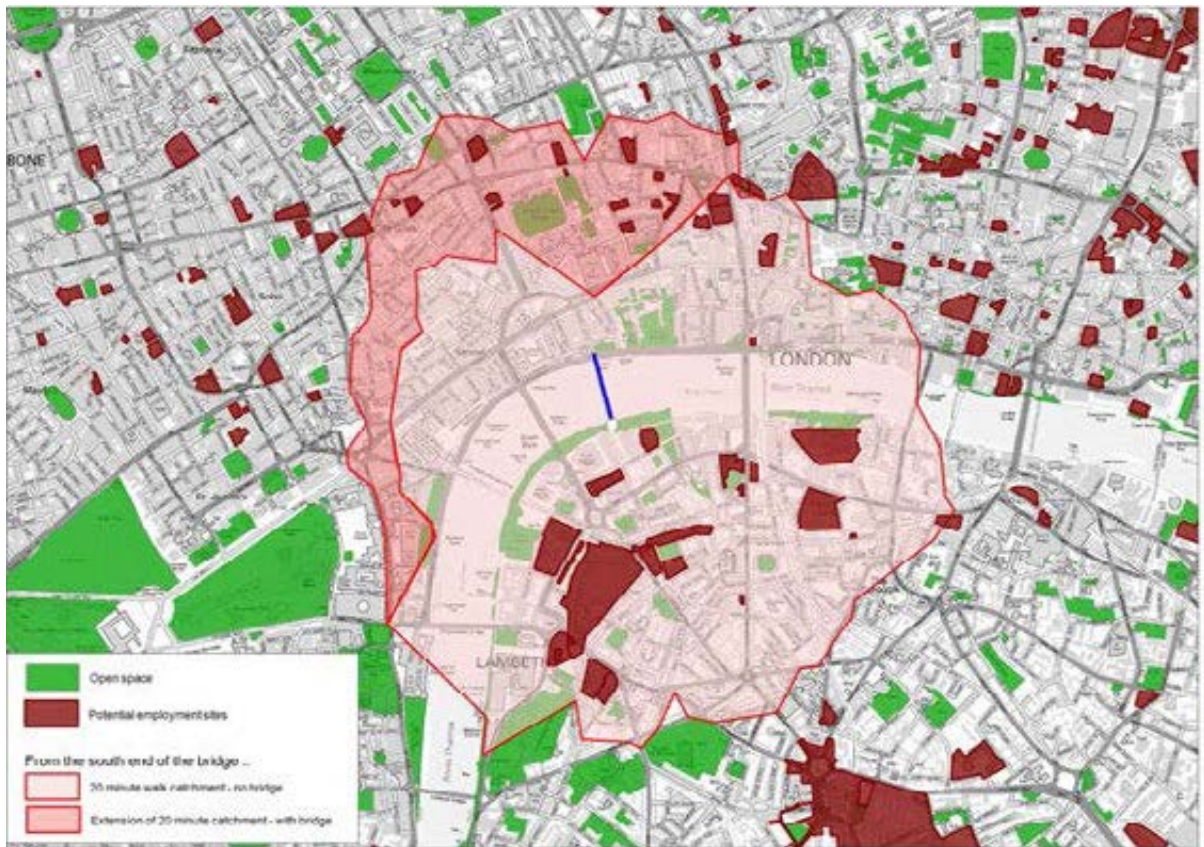
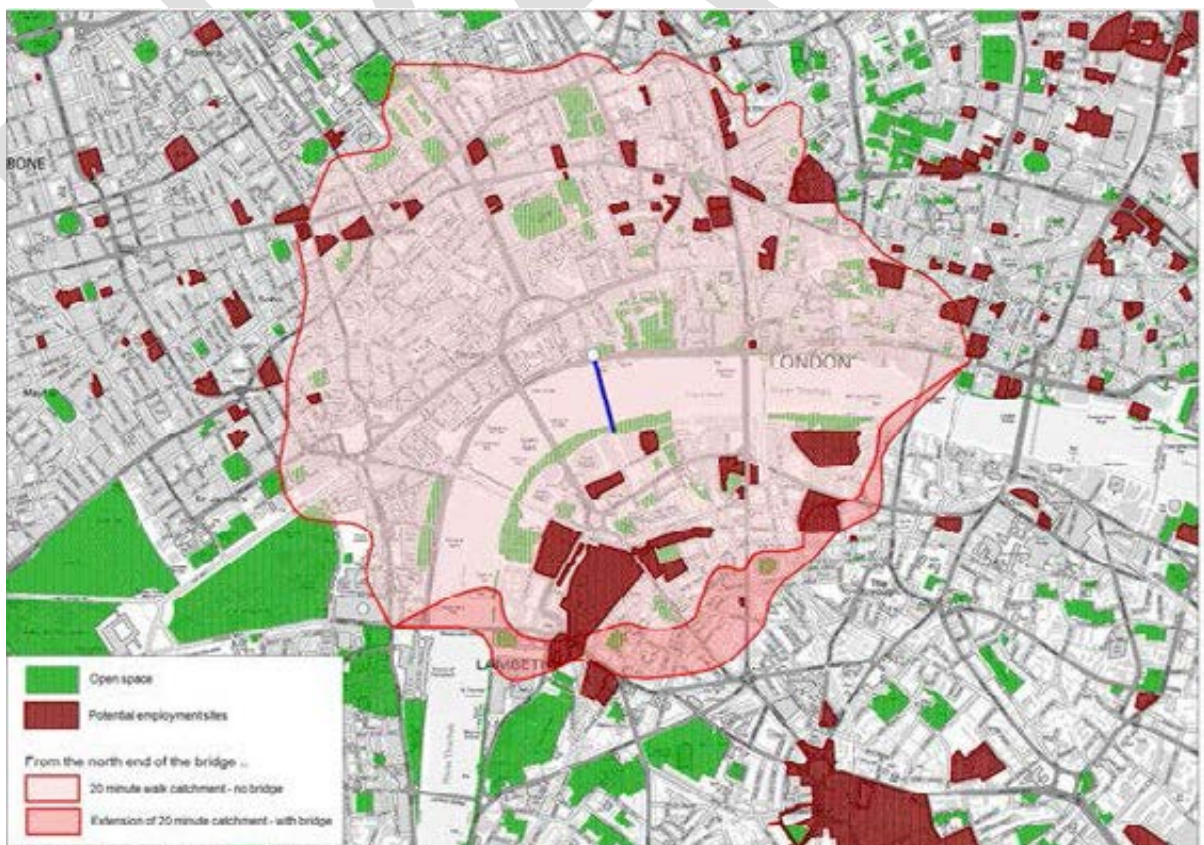


Figure 32 Changes in catchment within 20 minutes of a new bridge – from the north



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- 3.10.21 While a detailed study would be required to assess the aggregate impact initial estimation for four business on the South Bank and two new developments near to the northern landing point have been assessed. The positive impacts of the Garden Bridge are estimated to be **£13.5 million** each year.
- 3.10.22 The assessment of business/property impacts is therefore **Large positive**.
- 3.10.23 However, some of the uplift in values may be as a result of diverting investment or business from elsewhere; therefore sensitivity tests have been undertaken assuming half the rate of property and business impacts, and no property or business impacts.

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## 3.11 Showcasing Britain

- 3.11.1 There are many examples of London icons being used to showcase and promote London and the UK, with the aim and effect of attracting investment from overseas. One example is the redesigned New Bus for London. The photo below shows the iconic new bus being used as part of the 'Britain is GREAT' campaign in the main square in Krakow, Poland.
- 3.11.2 Building a major new structure in the heart of London would be an opportunity to provide not just a functional bridge, but also to showcase Britain's creative industries. This section reviews which options have this potential.

Figure 33 New Bus for London, 'Britain is GREAT', Krakow, Poland

(Source: personal photograph)



### *Option 1. Do nothing: No change to existing arrangements*

- 3.11.3 Under this option, there would be no new opportunities to showcase Britain, so the assessment of these impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

- 3.11.4 Under this option, the creation of a new public space on an existing bridge would be a positive thing for London and may appeal to visitors, but would be small in scale and is not likely to result in any significant change in Britain's image overseas, so the assessment of these impacts is **None**.

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## *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

- 3.11.5 A new bridge between Lambeth and Vauxhall bridges would have a low profile due to the relatively low numbers of visitors in the area, despite its proximity to Tate Britain; therefore the assessment of these impacts is **None**.

## *Option 4. New bridge between Temple and South Bank (no garden)*

- 3.11.6 A new bridge at this location would have a higher profile than the preceding options, given its location at the heart of central London. Although no design has been prepared, there is a clear opportunity to design a special structure that would garner interest and coverage overseas.
- 3.11.7 However, there are many interesting footbridges around the world and therefore the impact has been assessed as **Slight positive**.

## *Option 5. New Garden bridge between Temple and South Bank*

- 3.11.8 A Garden Bridge at this location would have a very high profile due both to its high profile location (as per Option 4), and also the innovative nature of building a bridge with a garden on the deck, which would be unique.
- 3.11.9 The Garden Bridge will have significant promotional and branding benefits for the UK and London which can be expected to accrue in additional tourism revenues (in effect an export) and in additional contracts for the UK's design, construction and professional service industries (some of which would also be exports).
- 3.11.10 In 2010 the GVA output of the UK's construction sector was worth £83 billion<sup>19</sup>, contributing 6.3% of national economic output.
- 3.11.11 The Garden Bridge can be expected to be a global marketing icon for UK design, engineering and construction skills and support export activity. UK construction exports are dominated by high-value services such as engineering consultancy and design, architectural activities, and property management. With exports of construction services amounting to £1.22 billion in 2010<sup>20</sup>, a 0.5% increase in this activity due to the Garden Bridge could be worth **£6.1 million** a year. As the impact will fade over time it is reasonable to allow for this benefit only over 5 years.
- 3.11.12 As a result, the impact has been assessed as **Large positive**.

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<sup>19</sup> ONS National Accounts 2012

<sup>20</sup> United Kingdom Balance of Payments: The Pink Book (Office National Statistics 2011)

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## *Showcasing sensitivity tests*

- 3.11.13 Note while showcasing Britain benefits are an important part of the case, there is uncertainty around the forecasting/quantification of these benefits, and therefore sensitivity tests have been undertaken using low, medium and high scenarios (the former and latter being half and double the benefits above, which are used in the medium case).

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## 3.12 Job Impacts

3.12.1 A new construction project could result in additional operational, construction and associated employment in the impact area and potential more widely across the London and the UK. This section reviews the potential effects of the options.

### *Option 1. Do nothing: No change to existing arrangements*

3.12.2 Under this option, there would be no new job opportunities, so the assessment of these impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.12.3 Under this option, the creation of a new public space on an existing bridge would create some construction and operational jobs.

3.12.4 Initial estimates suggest the following gross job effects:

- Construction employment of around 35 jobs<sup>21</sup> (FTE) will result from part-pedestrianising Waterloo Bridge assuming capital costs of around £20 million.
- Operational employment at the bridge (i.e. gardeners) are estimated to result in 5 jobs (FTE), allowing for a high level of maintenance of the planted areas, although this work could be lower if less intensive planting is provided.

3.12.5 Overall the assessment of these impacts is **Slight positive**.

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.12.6 The construction of a new footbridge bridge would create construction jobs, although there would be little in the way of ongoing operational jobs.

3.12.7 Initial estimates suggest the following gross job effects:

- Construction employment of around 100 jobs<sup>22</sup> (FTE) will result from construction of a new footbridge, assuming capital costs of around £60 million.
- Operational impacts however are negligible, as the bridge would require little ongoing maintenance or operational staff

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<sup>21</sup> Assuming 17 job years result from every £1 million of capital cost and 10 job years is equivalent to one Full Time Equivalent (FTE). Includes indirect and induced effects.

<sup>22</sup> Assuming 17 job years result from every £1 million of capital cost and 10 job years is equivalent to one Full Time Equivalent (FTE). Includes indirect and induced effects.



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3.12.8 Overall the assessment of these impacts is **Moderate positive**, although this is based largely on the construction rather than ongoing operational employment.

## ***Option 4. New bridge between Temple and South Bank (no garden)***

3.12.9 As per Option 3, the construction of a new footbridge bridge would create construction jobs, although there would be little in the way of ongoing operational jobs.

3.12.10 Initial estimates suggest the following gross job effects:

- Construction employment of around 100 jobs<sup>23</sup> (FTE) will result from construction of a new footbridge, assuming capital costs of around £60 million.
- Operational impacts however are negligible, as the bridge would require little ongoing maintenance or operational staff

3.12.11 Overall the assessment of these impacts is **Moderate positive**, although this is based largely on the construction rather than ongoing operational employment.

## ***Option 5. New Garden bridge between Temple and South Bank***

3.12.12 As per Options 3 and 4, the construction of a new garden bridge would create construction jobs, but these would be more numerous given the much greater scale of construction to allow for the creation of the garden on the bridge. In addition there would be more ongoing employment to manage the extensive gardens, and to provide security etc.

3.12.13 Initial estimates suggest the following gross job effects:

- Construction employment of around 250 jobs<sup>24</sup> (FTE) will result from building the Garden Bridge assuming capital costs of around £150 million. Additional construction employment would also be associated any net additional development triggered both north and south of the Thames.
- Operational employment at the Garden Bridge (e.g. gardeners, cleaners and security staff) are estimated to result in 25 jobs (FTE) as well as staff employed at the Garden Bridge Trust. By way of comparison, New York's High Line employs 36 maintenance staff as well as 80 staff at the Friends of the High Line.

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<sup>23</sup> Assuming 17 job years result from every £1 million of capital cost and 10 job years is equivalent to one Full Time Equivalent (FTE). Includes indirect and induced effects.

<sup>24</sup> Assuming 17 job years result from every £1 million of capital cost and 10 job years is equivalent to one Full Time Equivalent (FTE). Includes indirect and induced effects.

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- Increases in planned development, the attraction of new firms, the expansion of existing firms and the more intensive use of existing floor and street space will also trigger additional employment.

3.12.14 As a result, the impact has been assessed as **Large positive**.

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## 3.13 Tourism revenue

- 3.13.1 London is one of the most visited cities in the world with nearly 15 million international visitors annually. Tourism in London is a key sector and supports 226,000 jobs or around 5% of all employment in the capital and accounts for £6.6 billion 'tourism direct GVA' of £34.3 billion nationally<sup>25</sup>.
- 3.13.2 The average holiday visit including a stay in London in 2012 was around 5 nights<sup>26</sup>, with an average spend per night of £125. Further, survey results also show that 64% of all visits to London include seeing a park or garden<sup>2</sup>. Therefore, by adding to the tourist offer and encouraging tourists to stay in London longer, there can be a significant extra spend and increased benefit to the economy from extra tourism related revenue. Additional spend will be generated by spending extra time in London through activities such as shopping or having to stay an additional night in London. Therefore this calculation does not look directly at the additional spend as a result of actually visiting the Garden Bridge (for example one may visit the Garden bridge without spending any money) but of the likely increase in average spend over the whole visit as a result of staying in London for some extra time in order to visit the Garden Bridge.
- 3.13.3 It should be noted that the estimate presented here looks only at the additional revenue that would result from international visitors. It excludes any effect from visitors from other parts of Britain. This is because it would be difficult to estimate how much of the additional revenue is in fact 'additional' and how much is substitution, i.e. revenue that is gained in London but lost elsewhere in Britain. Additional revenue from overseas can always be thought of as a net increase in revenue since any substitution would be from outside Britain.
- 3.13.4 A new bridge on the Thames has the potential to add to London's cultural offer and provide a new attractor for tourists. This section considers which options are more likely to help to grow the UK's tourist economy.

### *Option 1. Do nothing: No change to existing arrangements*

- 3.13.5 Under this option, there would be no change to London's visitor economy, so the assessment of these impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

- 3.13.6 The creation of a new public space on an existing bridge would improve the visitor experience of those who use Waterloo Bridge, but is unlikely to be sufficiently diverting to have any impact on London's visitor economy.
- 3.13.7 As a result, the assessment of these impacts is **None**.

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<sup>25</sup> GLA Tourism in London (May 2012)

<sup>26</sup> Inbound tourism to Britain's nations and regions, VisitBritain, 2013

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## ***Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges***

- 3.13.8 The construction of a new footbridge in this area could provide some small amenity benefits for visitors to the area, such as those visiting Tate Britain, particularly if the bridge is of a sufficiently striking design. However, overall it is unlikely to have any real impact on the size of London's visitor economy.
- 3.13.9 Accordingly, the assessment of these impacts is **None**.

## ***Option 4. New bridge between Temple and South Bank (no garden)***

- 3.13.10 As with Option 3, the construction of a new footbridge in this area could provide some amenity benefits for visitors to the area, particularly if the bridge is of a sufficiently striking design, and the number of visitors benefitting would be much larger in this area than under Option 3. However, a relatively standard footbridge, even if of high quality, is unlikely to have a significant impact on the overall size of London's visitor economy.
- 3.13.11 Accordingly, the assessment of these impacts is **None**.

## ***Option 5. New Garden bridge between Temple and South Bank***

- 3.13.12 As per Options 3 and 4, the construction of a new garden bridge would provide some amenity to existing visitors, especially if it is of a striking design. However, it would additionally create a wholly new visitor attraction in its own right, which could both divert existing visitors resulting in a slightly longer stay in London/the UK, and at the margins has the potential to attract some visitors especially, at least in conjunction with the existing attractions.
- 3.13.13 London is one of the most visited cities in the world with nearly 15 million international visitors annually. The average holiday visit including a stay in London in 2012 was around 5 nights, with an average spend per night of £125.
- 3.13.14 Survey results also show that 64% of all overseas visits to London include seeing a park or garden. If 5% of those overseas visitors who visit a park or garden were assumed to spend an additional hour on average in London with a Garden Bridge in place, the estimated additional tourism revenue generated by the Garden Bridge would be £2.5 million per annum. (For details of the calculation see Appendix D.)
- 3.13.15 As a result, the assessment of these impacts is **Moderate positive**.

## ***Tourism sensitivity tests***

- 3.13.16 Note while tourism benefits are an important part of the case, there is uncertainty around the forecasting/quantification of these benefits, and therefore sensitivity tests have been undertaken using low, medium and high scenarios (the former and latter being half and double the benefits above, which are used in the medium case).

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## 3.14 Costs

3.14.1 This section considers the likely costs of the alternative options.

### *Option 1. Do nothing: No change to existing arrangements*

3.14.2 Under this option, there would be no scheme to construct or operate, so the assessment of these impacts is **None**.

### *Option 2. Enhance/modify existing bridges in central London: part pedestrianise Waterloo Bridge*

3.14.3 An estimate of the capital costs of £20 million has been assumed in this assessment. In practice, the cost could be highly variable, given options around the quality/cost of materials, and the boundaries of the scheme (e.g. would the Strand Underpass be retained in its current form, minimising cost but potentially compromising the scheme?).

3.14.4 Construction (and the operational phase) would result in the reallocation of carriageway to pedestrians, and would most likely take the form of removing the bus lanes. Congestion is relatively common on the bridge so this would have a negative effect on traffic, and in particular on bus services. This has not been quantified due to the high number of variables around the manner of introduction and potential for mitigation measures elsewhere, but the residual effect is assessed to be negative into the long term.

3.14.5 In summary, the likely costs of this option (in current, 2014 prices) is approximately:

- Construction: **c. £20 million (£18m at present value)**
- Construction disruption: **Slight negative (unquantified)**
- Operation: **c. £1 million p.a. (£24m at present value)**
- Operational disruption: **Slight negative (unquantified)**

### *Option 3. New bridge elsewhere in central London: between Lambeth and Vauxhall bridges*

3.14.6 An estimate of the capital costs of £40 million has been assumed in this assessment. This is based on the business case for the proposed foot/cycle bridge between Battersea/Nine Elms and Pimlico. That bridge was costed by Theobald + Gardiner in 2013 at £40 million, and a bridge in this location would be similar.

3.14.7 With optimism bias added at 66%, the cost in the assessment is around £62 million (discounted).

3.14.8 Operational costs are low, subject to some periodic renewal costs; a present value cost of £7.6m has been calculated for operating costs, as per the estimate for the Battersea/Nine Elms footbridge.

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- 3.14.9 There is assumed to be no significant construction disruption.
- 3.14.10 In summary, the likely costs of this option (in current, 2014 prices) is approximately:
- Construction: c. **£40 million (£62m with optimism bias at present value)**
  - Construction disruption: **None**
  - Operation: c. **£0.5 million p.a. (£7.6m at present value)**
  - Operational disruption: **None**

## *Option 4. New bridge between Temple and South Bank (no garden)*

- 3.14.11 An estimate of the capital costs of £50 million has been assumed in this assessment. This is based on the business case for the proposed foot/cycle bridge between Battersea/Nine Elms and Pimlico. That bridge was costed by Theobald + Gardiner in 2013 at £40 million, and a bridge in this location would be similar, except that:
- there is no clear space to land a bridge at ground level, and therefore it is likely that the roof of Temple station would be used; the works to strengthen the roof to accommodate the landing of a bridge have been costed at around £5 million.
  - land would also need to be acquired on both sides of the river to accommodate the bridge accesses. The cost of land has been estimated at around £5 million, based on the negotiations being undertaken by the Garden Bridge Trust.
- 3.14.12 This increases the cost to around £50 million. With optimism bias added at 66%, the cost in the assessment is around £77 million (discounted).
- 3.14.13 Operational costs are low, subject to some periodic renewal costs; a present value cost of £7.6m has been calculated for operating costs, as per the estimate for the Battersea/Nine Elms footbridge.
- 3.14.14 It is assumed that the bridge would land on the roof of Temple station, as per the proposal under Option 5. Initial engineering work suggests that there may be a need to close the station for around 6 months to allow for the reconstruction of the ticket hall roof to support the weight of the stairs and accommodate lifts. The cost of disruption to passengers has been assessed by London Underground as approximately £3.2 million.
- 3.14.15 In summary, the likely costs of this option (in current, 2014 prices) is approximately:
- Construction: c. **£60 million (£77m with optimism bias at present value)**
  - Construction disruption: c. **£3.2 million**
  - Operation: c. **£0.5 million p.a. (£7.6m at present value)**
  - Operational disruption: **None**

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## *Option 5. New Garden bridge between Temple and South Bank*

- 3.14.16 An estimate of the capital costs of £150 million has been assumed in this assessment. This is based on estimates prepared by Arup (more detail on the breakdown and assumptions follows in the Financial case). Operational costs are forecast to be around £2.5 million per annum.
- 3.14.17 The bridge would land on the roof of Temple station. Initial engineering work suggests that there may be a need to close the station for around 6 months to allow for the reconstruction of the ticket hall roof to support the weight of the stairs and accommodate lifts. The cost of disruption to passengers has been assessed by London Underground as approximately £3.2 million.
- 3.14.18 In summary, the likely costs of this option (in current, 2014 prices) is approximately:
- Construction: c. **£150 million (£193m with optimism bias at present value)**
  - Construction disruption: c. **£3.2 million**
  - Operation: c. **£2.5 million p.a. (£57m at present value)**
  - Operational disruption: **None**
- 3.14.19 In addition, an annual cost of £500,000 has been assumed in the calculations for the running costs of the Garden Bridge Trust.
- 3.15 Cost : Benefit ratio (BCR)**
- 3.15.1 It has not been possible to quantify all of the benefits, with some subjects being assessed only qualitatively, but where possible all the costs and benefits have been appraised and a Benefit:Cost Ratio (BCR) produced.
- 3.15.2 The results of the Benefit:Cost ratio calculations are shown in the appraisal summary table on the next page.

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## 3.16 *Appraisal summary table*

3.16.1 The Table below summarises the findings of the above assessments.

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Table 12 Appraisal summary table

Impact / Benefit	Option 1 - Do Nothing	Option 2 - enhance Waterloo Bridge	Option 3 - bridge between Lambeth & Vauxhall bridges	Option 4 - bridge between Temple & South Bank (no garden)	Option 5 - garden bridge between Temple & South Bank
Walking time savings	None	None	Slight positive £90,000 p.a.	Slight positive £180,000 p.a.	Slight positive £180,000 p.a.
Journey quality	None	Slight positive	Slight positive	Moderate positive	Large positive
Severance	None	None	Slight positive	Slight positive	Slight positive
Crowding	None	None	None	Slight positive	Slight positive
Road safety	None	None	None	Slight positive	Slight positive
Pedestrian exposure to emissions	None	None	None	Slight positive 20% to 30% lower NO <sub>2</sub> concentrations on some pedestrian trips	Slight positive 20% to 30% lower NO <sub>2</sub> concentrations on some pedestrian trips
Health impacts (physical activity)	None	None	None	Slight positive £963,000 p.a.	Slight positive £963,000 p.a.
Business impacts	None	None	Slight positive £2.8m p.a.	Moderate positive £5.4m p.a.	Large positive £13.5m p.a.
Residential property values	None	None	Slight positive £21m (one-off value increase)	Moderate positive £33.6m (one-off value increase)	Large positive £84.1m (one-off value increase)
Showcasing Britain	None	None	None	None	Moderate positive £6.1m p.a. for 5 years
Job creation	None	Slight positive Construction – 35 FTE jobs  Operation – 5 FTE jobs	Moderate positive Construction – 100 FTE jobs  None	Moderate positive Construction – 100 FTE jobs  None	Large positive Construction – 250 FTE jobs  Operation – 20 FTE jobs
Tourism	None	None	None	None	Moderate positive £2.5m p.a.
<b>TOTAL BENEFITS (60 yrs PV)</b>	<b>None</b>	<b>-£24m</b>	<b>£11m</b>	<b>£169m</b>	<b>£330m</b>
Construction cost	None	c. £20 million	c. £40 million	c. £50 million	c. £150 million
Construction disruption	None	Slight negative	None	c. £3.2 million	c. £3.2 million
Operating cost	None	c. £1 million p.a.	c. £0.5 million p.a.	c. £0.5 million p.a.	c. £2.5 million p.a.
Operational disruption	None	Slight negative	None	None	None
<b>TOTAL COSTS (60 yrs PV)</b>	<b>None</b>	<b>£18m</b>	<b>£62m</b>	<b>£78m</b>	<b>£57m</b>
NPV	None	- £42m	- £52m	£91m	£273m
BCR (£60m public contribution to GBT)	N/A	-1.3	0.2	2.2	5.8
BCR (if all public sector funding)	N/A	-1.3	0.2	2.2	2.4

Property/business impact sensitivity tests

No property, business impacts	N/A	-1.3	-0.1	0.2	-1.5
Half property, business impacts	N/A	-1.3	0.1	1.2	2.4
Full property, business impacts	N/A	-1.3	0.2	2.2	5.8

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- 3.16.2 Based upon the assessment of the options against the project objectives and assessment of the costs and benefits, it is concluded that there is a good case for public investment in the Garden Bridge.
- 3.16.3 The sensitivity test show that the project is sensitive to the wider impacts in property and businesses; however the BCR remains over 2 : 1 even when those benefits are halved. With those benefits included in full there is a BCR of 5.8 : 1.
- 3.16.4 Should this option be taken forward, the next sections consider the scope, risks constraints, dependencies and stakeholders associated with that option, and then the Financial, Commercial and Management Cases are set out.

## 3.17 Scope

- 3.17.1 The scope of this project is the construction of a new Garden Bridge, including the works necessary to access the bridge at both ends, and any other measures required to ensure its delivery.
- 3.17.2 The scope does not include any other measures that may be proposed, that may complement or enhance the scheme, but which are not necessary for its delivery. These include:
- Provision of step free access from street to platform level at Temple station
  - Wider urban realm improvements in the area, for example any WCC or Northbank BID proposals for pedestrianisation or shared used in the Strand, or converting Aldwych back to two-way operation.

## 3.18 Main risks

- 3.18.1 There are a number of risks involved in the development and promotion of the Garden Bridge concept.
- 3.18.2 The main risks are related to funding, governance and delivery of the project and as such are discussed in detail under the Financial, Commercial and Management Cases.

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## 3.19 Constraints

- 3.19.1 There are a number of constraints which may have a bearing on the development of a new Garden Bridge in central London. The principal issue is the close geographical and programme link between the Garden Bridge project and the Thames Tideway Tunnel.
- 3.19.2 The Thames Tideway Tunnel (TTT) is a major scheme for London and will involve long term construction in the river and changes to the river bed environment. The Garden Bridge has been designed and engineered on the basis that it is constructed and opens before work on the TTT commences. This means the Garden Bridge needs to complete by 2017/18. This is a tight timescale and if it is not met then the two projects may be constructed simultaneously and this may lead to complications and delay in the delivery of both projects.
- 3.19.3 TfL and the Garden Bridge Trust are liaising closely with Thames Water to ensure that the two projects are aligned as far as possible.

## 3.20 Dependencies

- 3.20.1 The development of a new Garden Bridge may be subject to a number of dependencies, which are external influences on the project. These issues would be carefully monitored and managed throughout the lifespan of the scheme, and include the following:
- Thames Tideway Tunnel
  - Cycle Super Highway along Victoria Embankment

## 3.21 Stakeholders

- 3.21.1 The following table outlines the main stakeholder groups who are involved with or would be interested in the project.

Table 13 Stakeholders

Stakeholder	Description	Involvement in the project
Garden Bridge Trust	Charitable trust	Set up to promote, fund, own and operate the Garden Bridge
Transport for London (TfL)	Statutory planning authority for transport	Leading the development of the Garden Bridge in the early stages of the project  Responsible for reviewing the impact on the transport network (including the safe operation of Temple station)

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London Borough of Lambeth (LBL)	Statutory planning authority	Responsible for reviewing the impact on local area and residents Responsible for reviewing the planning application
Westminster City Council (WCC)	Statutory planning authority	Responsible for reviewing the impact on local area and residents Responsible for reviewing the planning application
London Borough of Southwark	Neighbouring planning authority	Interest
City of London	Neighbouring planning authority	Interest
Greater London Authority (GLA)	Statutory planning authority	Interest
Port of London Authority (PLA)	River Thames authority	Responsible for reviewing the impact on the river navigation and marine environment
Environment Agency	Environmental authority	Responsible for reviewing the impact on local environment
Local landowners - Coin Street Community Builders, ITV, IBM, boat moorings, Arundel Street developers	Landowners	Some would be impacted by the project either during construction or after opening

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## 4 The Commercial Case

### 4.1 Introduction

- 4.1.1 This section sets out the commercial and contractual arrangements in relation to the Garden Bridge.
- 4.1.2 There are three key phases in the project – the development phase, the construction phase and the operational phase. Each phase has its own requirements and structure.

### 4.2 Required services and contractual arrangements

#### Development phase

- 4.2.1 The planning and consent activities are being led by TfL, authorised by a Mayoral Direction.
- 4.2.2 TfL have an internal project team and have contracted Arup, with sub contractors Heatherwick Studios and Dan Pearson, to work on the Garden Bridge project. This team has been developing the design to RIBA stage C, and is preparing to submit a planning application to City of Westminster and LB Lambeth in spring 2014.
- 4.2.3 TfL have helped to set up a new charitable trust, The Garden Bridge Trust, who are responsible for securing funds for construction and future maintenance, and for the funding, procurement and delivery of the project.

#### Construction phase

- 4.2.4 The construction phase will be led and managed by the Garden Bridge Trust. It is possible that TfL may provide project management expertise during construction.

#### Operational phase

- 4.2.5 Once the bridge is open it will be owned and operated by the Garden Bridge Trust. They will be responsible for managing and maintaining both the bridge structure and the garden. This could be managed directly by the Trust, or they could secure an agreement with another body to take responsibility for this.

### 4.3 Procurement strategy

- 4.3.1 A draft procurement strategy has been developed for the scheme, but not yet agreed by the Board.
- 4.3.2 The strategy recommends that the Garden Bridge be delivered via a design and build, fixed price construction contract, using an industry standard form. This route has been selected as it would achieve price certainty and certainty of outcome for the Trust.
- 4.3.3 To inform potential Contractor's technical offers, and to increase their confidence in the deliverability of a compliant and constructible design, it has been recommended that a Specimen Design is produced and provided in an un-warranted form to tenderers.

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- 4.3.4 An EU-compliant procurement route following the Competitive Dialogue process is to be adopted to enable the Employer to obtain certainty that the Contractor is capable of developing a compliant design, in particular with reference to those items where high visual quality is of fundamental importance.
- 4.3.5 Leadership of the procurement process will be by the Trust; it is recommended that support to the Trust is provided by technical, procurement and legal specialists. The role of each specialist is reviewed and the deliverable required of them outlined.
- 4.3.6 The strategy identified a key recommendations;
- The procurement process is conducted in a manner compliant with the Competitive Dialogue procedure under the Public Contracts Regulations 2006;
  - The procurement of the Garden Bridge proceeds on the basis of a fixed-price design and build contract;
  - Legal advice is sought as to the applicability of the Regulations;
  - A standard form construction contract is adopted following finalisation of the risk allocation as presented in Appendix A;
  - Subject to approval of the Trust, the standard form contract is amended to reflect the risk allocation presented in Appendix A;
  - A Specimen Design is produced which is provided on an unwarranted basis to prospective Contractors at tender stage;
  - Detailed Definition Drawings are provided in the Employer's Requirements for those items where visual quality is of high importance;
  - Bi-lateral discussions are held with selected Contractors to seek views on the proposed procurement route, contract form and risk allocation;
  - Risk reduction activities are undertaken as outlined in this paper;
  - Legal resource is procured to provide commercial advice and contract drafting support;
  - Insurance advice is procured to determine the most cost-effective means of insuring risk during construction.

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## 5 The Financial Case

### 5.1 Introduction

5.1.1 This section sets out the forecast financial implications of the Garden Bridge.

### 5.2 Scheme cost

5.2.1 The estimated cost for the Garden Bridge is £144 million (2014 prices) or £158m after including inflation. This includes scheme development, planning, construction, VAT and risk allowance of £25m (£2.7m pre-construction activities and £22.3m for construction).

#### Delivery and construction cost estimates

Table 14 Cost estimate

£ millions, 2014 prices	13/14	14/15	15/16	16/17	17/18	18/19	Total
Design and Planning	4.3	0.8	-	-	-	-	5.1
Tender and Contract Award	0.1	3.4	3.9	-	-	-	7.4
Surveys, Investigations, Tests etc	-	0.4	0.5	-	-	-	0.9
Real Estate, Consents, etc	0.2	3.4	3.9	-	-	-	7.5
Main construction contracts	-	-	3.4	20.2	62.3	13.4	99.2
<b>Sub-total</b>	<b>4.6</b>	<b>8.0</b>	<b>11.7</b>	<b>20.2</b>	<b>62.3</b>	<b>13.4</b>	<b>120.1</b>
VAT	0.9	1.6	2.3	4.0	12.5	2.7	24.0
<b>Total</b>	<b>5.5</b>	<b>9.6</b>	<b>14.0</b>	<b>24.2</b>	<b>74.8</b>	<b>16.1</b>	<b>144.1</b>

#### 5.2.2 Project cost summary:

Cost pre-construction (to mid 2015)	£21m
Cost of construction (mid 2015 to mid 2018)	£99m
Total cost (2014 prices, excl. VAT)	£120m
Add: VAT	£24m
Total cost (2014 prices, incl. VAT)	£144m
Add: Inflation	£14m
Total cost (outturn prices)	£158m

#### Trust running cost estimates

5.2.3 In addition to delivery and construction costs, there will be Trust running costs. These will include: Trust set-up costs, staff salaries / payroll burdens, staff expenses, communications, Trust management expenses, accommodation, fundraising materials, fundraising events.

5.2.4 Additional Trust running costs (to mid 2018) are expected to be between £5-7m.

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## Operation and maintenance cost estimates

- 5.2.5 The estimated cost of ongoing operation and maintenance for the Garden Bridge is estimated to be around £2.5m per year from 2018 onwards. Over a 60 year period this equates to £150m (2014 prices). While costs are likely to fluctuate, based on the maintenance regime adopted, a constant figure of £2.5m per annum has been adopted for the purposes of the business case assessment.
- 5.2.6 This includes the cost of bridge maintenance as well as the running costs for the garden. There will also be running costs associated with staffing the bridge – for gardeners and potentially security. The final cost is dependent on the way the bridge is managed and it is a high level estimate at this stage. The initial estimate is based on the following assumptions:
- ‘Soft landscaping’ (est. £1.1m per annum) - A requirement for permanent staffing, including gardeners and supervisory staff undertaking landscape maintenance tasks most days. It could also involve the use of volunteers and incorporate education/training elements. The maintenance regime to cover annual planting and soil treatment requirement, maintenance of plant and equipment, provision of gardening consumables and cyclical landscaping “renewal” and “enhancement”.
  - ‘Hard landscaping (est. £0.25m per annum) - In addition to soft landscaping responsibilities, hard landscaping will require regular maintenance to keep all surfaces clean and serviceable with repairs and replacements undertaken as they become necessary. Also includes street furniture i.e. hand railing, seating, litter bins and signage. Similarly, all of these items will require regular inspection, maintenance including cleaning, and repairs / replacement as required.
  - Operation and management (est. £0.25m per annum) – Includes; Crowd Control – to control the number of people on the bridge at any one time for safety reasons, but also to maintain the desired visitor experience; Security - the perceived risks in terms of violence, crime, vandalism and terrorist threats. As a tourist destination attracting large crowds at peak times, as well as having winding pathways, the Garden Bridge could be seen as a location for all of these activities. Whilst CCTV will help, it is believed that a form of physical security personnel presence will also be desired to act as a deterrent; and Emergency egress and access – the ability to manage clearing and access to the bridge during emergency situations.
  - Bridge maintenance (est. £0.9m per annum) – Includes; Structural inspections – although design should see little actual maintenance required; and Systems inspection and maintenance – lighting, power, lifts, irrigation, security equipment.

## 5.3 Funding

- 5.3.1 The Garden Bridge Trust is responsible for securing the necessary funds for delivery, construction, trust running costs and the ongoing operation and maintenance. A fund raisings strategy is being developed which will seek to secure funds from a combination of public bodies (TfL and HMT/DfT), private trusts and charity funds, private individuals, and private corporations. While the strategy will consider parties



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from across the globe, the focus will be on those based in the UK or with a strong presence in the UK.

- 5.3.2 A fundraising pipeline is being developed which will monitor funding which is committed (possibly subject to conditions), funding which is pledged (but terms of funding are still to be agreed), funding opportunities where discussions are progressing (but no certainty of funding commitment at this stage) and funding targets (where there are organisations or individuals which will be approached).
- 5.3.3 The fundraising target has been set at a level which is c.10-15% higher than the forecast cost of the delivery and construction, given that there may not be certainty over all funding being received, even if committed.
- 5.3.4 Core to the fundraising campaign is the upfront commitment of £60m from DfT (via HMT) and TfL which have each pledged to contribute £30 million each towards the scheme. TfL's contribution will include £5 million of funds already spent leading up to a funding agreement between TfL, DfT and the Trust being agreed (where the approval of this business case is a key condition). Both TfL and DfT contributions will be provided *pari passu* and in stages based on key delivery milestones being met.
- 5.3.5 The profile of funding is also important, in terms of timing and whether there is the potential for any gap funding, lending or underwriting of the project, and a discussion with HMT about how any funding support might be structured would be beneficial and will be sought.
- 5.3.6 The overall funding package for the ongoing maintenance cost will be set out and secured by the Garden Bridge Trust.

## **5.4 Impact on TfL**

- 5.4.1 The financial authority for TfL's contribution has already been secured which means the committed £30m is included in TfL's Business Plan.
- 5.4.2 TfL has committed to support the delivery of the Garden Bridge by leading the process of securing the necessary planning powers; helping to secure third party funding and establish an appropriate structure for delivery and providing its project management expertise to the delivery.
- 5.4.3 However TfL cannot be in a position whereby it could be held liable for any financial loss on any aspect of the project.

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## 6 The Management Case

### 6.1 Introduction

- 6.1.1 This section addresses the achievability of the Garden Bridge project and sets out how it will be managed to ensure successful delivery in accordance with best practice.

### 6.2 Garden Bridge Trust

- 6.2.1 The scheme is being promoted and will be delivered by the Garden Bridge Trust, a new charitable trust which has been set up for this purpose. The Trust will apply for powers to construct the bridge through planning applications to Lambeth and Westminster Councils, with assorted other consents from the appropriate statutory body (such as the PLA, EA, etc).
- 6.2.2 The Trust is also responsible for raising the necessary funding package for the development and construction of the Garden Bridge as well as ongoing operation and maintenance costs. The Trust will own the structure once it is complete.
- 6.2.3 The trust is a company limited by guarantee registered with Companies House (Number 08755461). The Articles of Association define the company as a charity, regulated by The Charity Commission for England and Wales.
- 6.2.4 The objects of the charity are to provide and maintain a garden style footbridge over the River Thames providing relaxation, recreation and leisure-time occupation in the interests of social welfare and with the object to improving the condition of life of the public at large. The objects also include environmental protection, conservation, and improvement and the advance of education, training and public knowledge of arboriculture, horticulture and associate sciences.
- 6.2.5 The trust has members, founder members and directors. A minimum of three directors and a maximum of twelve are allowed under the articles. Directors are expected to be fit and proper persons to manage a charity and article 26 defines unacceptable criteria that affords for the removal of directors. Meetings of directors are held no less than four times per year and all meetings of the trust and/or its members require a quorum of a minimum of two persons or one third of members. In article 33, it is a requirement that a TfL representative is invited to all meetings and that no amendments to the articles are allowed without TfL's advance consent.
- 6.2.6 Article 30 and 31 allow the directors to delegate the day to day management of the trust and any of their powers to managers or committees respectively.

### 6.3 Transport for London's role

- 6.3.1 Transport for London undertook the role of setting up the Trust and has continued providing interim support, both financial and management time, while the Trust establishes itself. In order to progress the scheme, TfL has also take lead, on behalf of the Trust, the preparation of the planning application and some associated land negotiations. Subsequently, many of the main technical and legal advisors are contracted to TfL rather than the Trust.

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6.3.2 It is the intention that TfL's supporting role will reduce over time as Trust becomes more established. Subsequently, existing advisor contracts would be novated across the Trust and any new contact would be let by the Trust rather than TfL. The diagrams below describe both the current arrangements and future arrangements. The transition will take place between June-July-August 2014. Plans are being developed by the Trust on how to facilitate the transition.

Diagram: Interim commercial structure arrangements (to mid-end 2014)

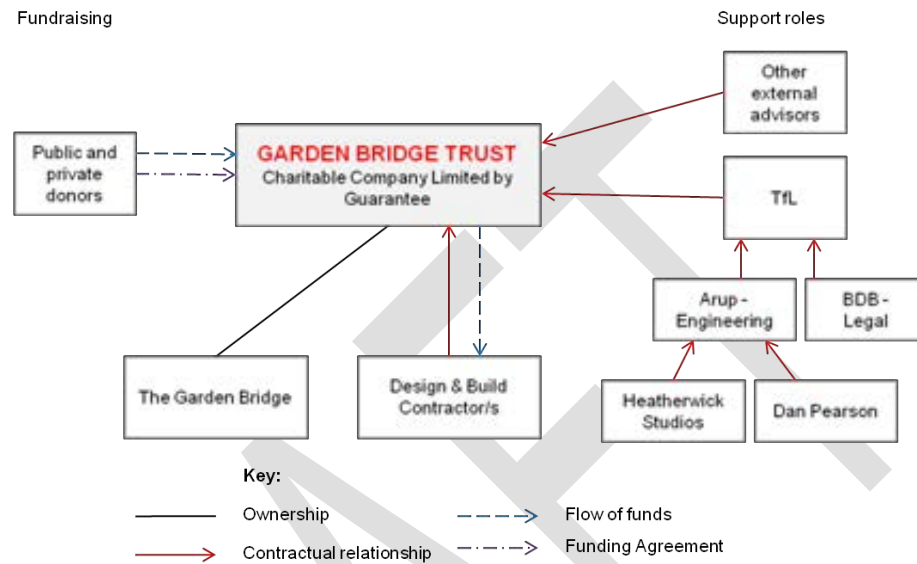
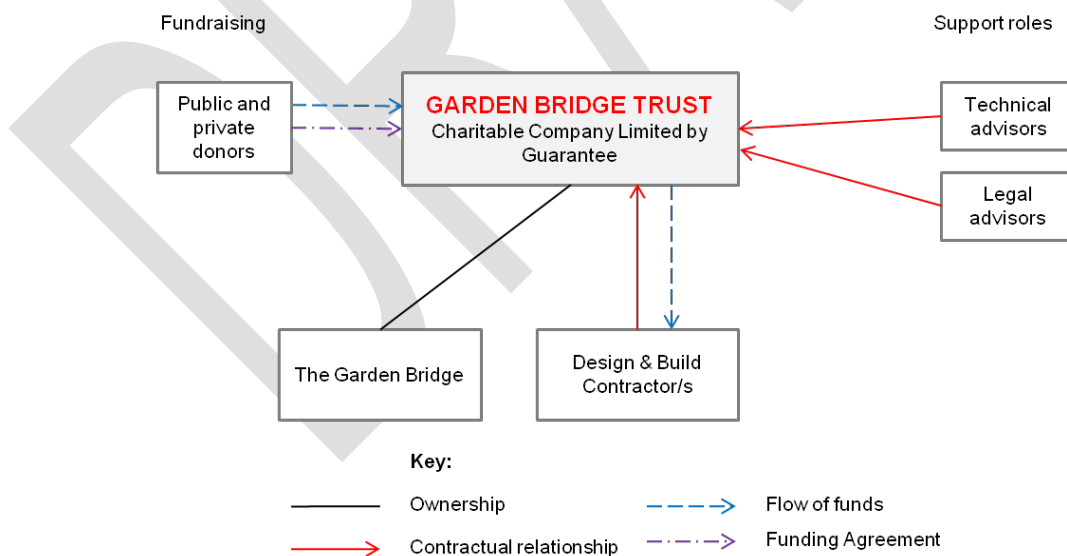


Diagram: Commercial structure arrangements



## 6.4 Trust Directors

6.4.1 Lord Mervyn Davies is the Chairman of the Trust and its founding members include Paul Morrell (formerly the UK government's Chief Construction Advisor). All trustees have been appointed for their relevant experience, skills and time to successfully deliver the project to programme and budget. The Trust is composed of highly

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experienced professionals with experience in construction, finance and law. The current Trustees are listed below.

- **Mervyn Davies, Baron Davies of Abersoch** - Chairman of the Garden Bridge Trust. He was formerly Chief Executive then Chairman of Standard Chartered PLC and Minister of State for Trade, Investment and Small Business; currently Vice Chairman and Partner at Corsair Capital, Non-Executive Chairman of PineBridge, Senior Independent Director at Diageo, Non-Executive Director of Bharti Airtel, Chair of the Advisory Board of Moelis and Co, Chair of the Council of Bangor University and Chairman of Trustees of the Royal Academy of Arts. He is also a Fellow of the Institute of Banking.
- **Paul Morrell OBE** (Deputy Chair and Chair Project Delivery Board) - formerly Partner/Senior Partner/International Chairman of Construction Cost and Project Management Consultants Davis Langdon (1976-2007), Commissioner/Deputy Chair of the Commission for Architecture and the Built Environment (2000-2008), Government Chief Construction Adviser (2009-12). Fellow of the Royal Institution of Chartered Surveyors and of the Institution of Civil Engineers, and Honorary Fellow of the Royal Institute of British Architects
- **John Heaps** - Chairman of Eversheds LLP. Member of the Constitutional Committee, the Risk and Audit Committee and the SPPI Council of the International Bar Association. Fellow of the Chartered Institute of Arbitrators and member of the International Mediation Institute.
- **Joanna Lumley OBE** – originator of the idea for the Garden Bridge; actress and producer; human rights activist for Survival International and the Gurkha Justice Campaign; advocate for a number of charities and animal welfare groups. Fellow of the Royal Geographical Society, honorary doctorates/degrees from the University of Kent, the University of St Andrew's and Queen's University Belfast.
- **Rohan Silva** - formerly Special Adviser Number 10, associated with initiatives re open data, foreign aid, the Big Society, the national Life Science Strategy and (particularly) Tech City. Now an entrepreneur focusing on online education. Read law at Manchester University, followed by period at the Treasury via the Civil Service fast stream, and then working for the Conservatives in Opposition and Government. Currently at venture capital firm Index Ventures
- **Julie Carlyle** – (Chair of Finance and Audit Board) Julie has been with Ernst & Young for 16 years and has been an Audit Partner for 5 of those. Julie is ACA qualified (ICAEW) and has an LLB in European Law and LLM in Competition Law from Glasgow University plus a Masters in the Economic Analysis of Law from Hamburg University. She has played a key role in developing the EY Audit network across EMEIA including Northern Europe, Middle East, India and South Africa. Julie is an active participant and spokesperson for the ICAEW audit insights steering group. She is the London Partner Sponsor for the EY Entrepreneur of the Year programme as well as Non-Executive Director of SME Wholesale Finance Limited.
- **Roland Rudd** (Chair of Communications/Outreach Board) - founder and Partner RLM Finsbury, a global financial communications group. Formerly a journalist at the Financial Times, The Sunday Correspondent and The Times; and former

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policy coordinator for Lord Owen. Visiting Fellow at Oxford University's Centre of Corporate Reputation, honorary fellow at the University's Regent's Park College. Founding Chairman of Business for New Europe and a member of the Centre for European Reform's advisory board. Trustee Royal Opera House and The Education Employers Taskforce, Chairman Tate Corporate Advisory Group, Non-Executive Director the Army Board, member Appeal Board Great Ormond Street Hospital Centre for Rare Disease Research, Patron NSPCC, Founding Chairman of the Legacy 10 charitable giving campaign and is a governor of Wellington College.

- **Lucy Dimes** (Chair Operations Board) – Chief Operation Officer at Equiniti. Formerly Chief Executive UK & Ireland for Alcatel-Lucent and prior to that Managing Director Group & Openreach Operations for BT plc; currently a Non-Executive Director for Berendsen PLC and member of the Audit, Remuneration and Nomination Committees. Lucy is also a Trustee for Safer London and an Ambassador for Lucy Air Ambulance For Children. Lucy has an MBA from London Business School, a First Class Degree in Business and a Chartered Institute of Marketing Diploma. She is an alumna of the Harvard Business School 'Global Women Leaders' programme, a Freeman of the Worshipful Company of Information Technologists and a Fellow of the Institute of Directors. Lucy was awarded the Corporate Leader of the Year at the 2013 FDM Everywoman in Technology Awards and the 'First Woman' Award in Science & Technology at the 2013 CBI Awards.

## 6.5 Responsibilities of the Garden bridge Trust

- 6.5.1 The Garden Bridge Trust recognises its responsibilities both generally and under its articles. To this end, it has established a number of committees to execute and take responsibility for monitoring and reviewing project, financial and other risks and associated controls, corporate governance and financial assurance, communications and operations etc. each committee has a trust director appointed.

### Delivery of the Bridge

- 6.5.2 The Project Delivery Board will oversee and control the delivery of the bridge. GBT will procure the design, delivery and handover into maintenance of the bridge. Due to the unique nature of the project, GBT will act as the client and directly engage a small team of competent professionals to effect governance and provide diligence to the client team. The client team will perform a project management function and coordinate activities in order to manage funding, delivery, expenditure and programme.
- 6.5.3 GBT will competitively procure a Principal Contractor to deliver the construction of the bridge and associated infrastructure. GBT will also engage appropriate resources to manage the execution of the construction contract, through the use of an integrated Professional Services Agreement. GBT client team specifies requirements, monitors progress and controls change, consistently seeking out opportunities to maximise programme efficiency in terms of time and cost. GBT will fund the designer, management agent and the contractor to execute the respective work packages on its behalf.

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## Ongoing operations and maintenance

6.5.4 The Operations Board will oversee and control the handover into operation and maintenance. The operation and maintenance of the bridge, landscaping and associated infrastructure and services will be the responsibility of GBT in perpetuity. The Operations Board will fully articulate the security, cleaning, safety operations and maintenance functions. The initial team have developed an operating and maintenance concept which has been used to develop an initial cost estimate of utilities, operating and maintenance activities and will be refined further over the coming months.

## Fundraising

6.5.5 The Finance and Audit Board will oversee and control the fundraising of the trust. GBT recognise that significant capital is required to be raised before the bridge can be procured. There is also the annual expenditure require for the on-going maintenance and operation of the bridge. Prior to committing to any construction contracts, GBT will secure [85]% of the overall anticipated costs, and has targeted fundraising accordingly.

6.5.6 Noting the pledged commitment of £60m from Government and TfL to the project, GBT has appointed a full-time Director of Development as fundraising manager to address the funding shortfall and a major capital campaign has been commenced.

6.5.7 The campaign has three phases; the private phase, semi-private and public. The private phase is currently targeting major trusts, foundations and individuals who are assessed as potential receptive donors, with corporate support being explored concurrently. It is expected that around 80% of the funding commitment will be generated in this manner. The semi-private phase will commence in early 2015, approaching donors assessed as 'cooler' to the project. A high-profile public fundraising campaign will seek the outstanding funds. This campaign is being supported by high profile media, including the Evening Standard. This campaign is likely to generate in the region of £2 to £5 million through subscriptions, online gifts and merchandise.

6.5.8 As of May 2014, there are commitments totalling[£3m] [and the foreseen operating costs of the trust are committed to be funded through to handover, with funds transferred to cover the period until end March 2015].

6.5.9 The fundraising will involve the Communications Board who will liaise and ensure that the project's profile remains high and that communications are of a high quality.

## 6.6 *Garden Bridge Trust Management Team*

6.6.1 The Trust's initial management team is outlined below.

- **Bee Emmott** - Executive Director; she has been involved with the Garden Bridge since the inception of the idea, establishing and developing the Garden Bridge Trust, having been at Heatherwick Studio for the past four years. She is a graduate of Edinburgh University and Edinburgh College of Art, with an MA in both Fine Art and History of Art. Bee is an experienced creative strategist and has

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been Head of Special Projects at Heatherwick Studio since 2011, with responsibility for nurturing key client relationships and attracting and developing new business.

- **Bernadette O'Sullivan** - Director of Development; she is an experienced professional fundraiser. She has substantial experience of income generation across a range of sectors including the arts, heritage, and medical research. This has involved creating strategies for income growth, revenue income and capital campaigns. She previously held the position of Director of Development with the London Symphony Orchestra for four years, during which time she successfully led a £9 million Endowment Fund Campaign and delivered a legacy marketing campaign which has resulted in new pledges to the value of £10m.
- **Anthony Marley** - Programme Director; he is an experienced and qualified programme executive with more than 20 years' experience of delivering capital infrastructure in regulated, complex environments. He held accountability for the delivery of transport infrastructure for the London 2012 Games. Anthony has an MSc in Project and Programme Management from Northumbria University Business School, is an accredited MSP Advanced Practitioner and a qualified Engineer. He is a member of the Institution of Engineering and Technology and the Association for Project Management.
- **Crispin Rees** – Project Support; he has been seconded to the Trust on a full time basis to provide support to the initial team. He joined Transport for London on its graduate programme. After successfully completing the scheme he worked on transport policy at the London Borough of Camden, road planning for the London 2012 Olympic Games and most recently focused on improving Accessibility. Crispin has an MSc in Transport Planning and Management and a BSc in Geography and Planning.

6.6.2 This team are leading the establishment of the trust as a corporate entity, establishment of the trust as a functioning project client and collating all the information necessary to enable the programme to proceed. The team are also leading the fundraising campaign on behalf of the trust directors.

6.6.3 The team will shortly take an office in Somerset House (with a rent-free period and deeply discounted rate negotiated) to locate the initial managers adjacent the site of the bridge. This is expected to greatly assist with raising funds and awareness.

6.6.4 The trust has [a business plan for the in-life/operation duration]. The trust has established the estimated cost and profiled this into the Stage D cost plan, which determines the cash-flow. [The Funding that will meet the spend requirement has been identified and work is in hand to develop the appropriate funding profile which synchronises with the programme and cost plan.

## 6.7 *Project management arrangements*

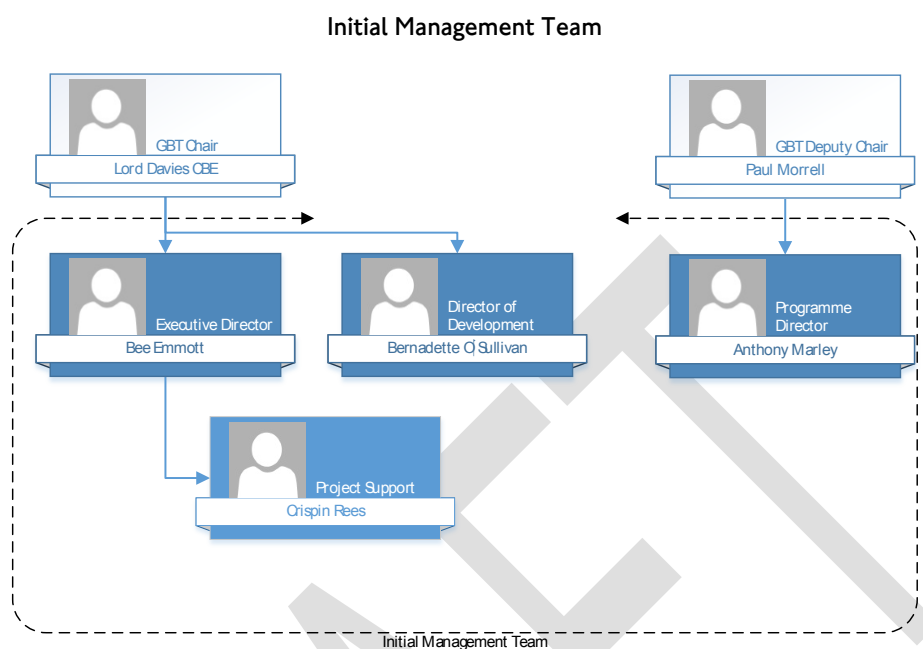
### Project reporting structure

6.7.1 The scheme is being promoted and will be delivered by the Garden Bridge Trust. Transport for London is assisting with the development of the project and working

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with key stakeholders such as the PLA and boroughs. Arup are the lead engineers, Heatherwick Studios is the architect and Dan Pearson is the landscape designer.

6.7.2 The Trust team structure is illustrated in the following diagram:



6.7.3 The latest working version of the organisational chart is attached in Appendix F. Positions to be filled are shown as TBA. A brief description of the necessary roles is provided below, however position titles and job descriptions are subject to further changes, to align with the Trust's vision as shown on the chart in Appendix F. Positions to be filled in the next 6 months are presented in the Appendix

## 6.8 Governance and project Management arrangements

6.8.1 Recognising that the directors of the trust have not committed their time fully to the trust, article 30 allows Directors to delegate any of their powers to a committee consisting at least one director. Under 30 2 2, an executive committee, known as the Project Delivery Board, will be appointed to manage the design furtherance, procurement, construction and handover into maintenance of the garden bridge. Three other committees will be appointed, the Finance and Audit Board, the Communications Board and the Operations Board.

6.8.2 The Terms of Reference for these boards have been drafted and are to be adopted subject Board endorsement.

6.8.3 Governance details are provided in a separate document.



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## Project Delivery Board

6.8.4 The Project Delivery Board will consist the trust deputy chair and director Paul Morrell, trust Executive Director, Bee Emmott and appointed professionals who will be responsible for funding, project management, commercial stewardship, interface management and administration of the trust and project. The Project Board will have the power to incur expenditure, only in accordance with a budget agreed with trust directors, as allowed for by article 30 2 2. The Project Delivery Board will make recommendation to, and receive consent from, the Finance and Audit Board [and trust directors] before contracts are entered into and commitments made with anyone.

## Operations Board

6.8.5 The Operations Board will consider and represent the operation and maintenance issues of the bridge post-handover, liaising closely with the Project Delivery Board.

## Project Delivery Board

6.8.6 The GBT Project Delivery Board will manage a project team to ensure delivery of construction, regular assessment and formal reporting of issues, risks, progress, financial, commercial and technical matters, on a monthly basis to the trust. The GBT project team will ensure that progress meets the planned schedule and engages with delivery partners and stakeholders as required to attend to any action necessary to meet deadlines.

6.8.7 The project team will provide weekly progress reports with key information to the project delivery board. On a monthly basis, an Assurance Report will be produced for the project delivery board. The project delivery board will in turn produce and formally issue quarterly progress reports for the trust to consider.

6.8.8 A proportionate gate assurance process will be established to ensure that the project only progresses when the project delivery board [and stakeholders] are satisfied that the pertinent issues have been considered and reasonable provision made to attend to them. The stage gate reviews will produce certification for each stage and capture the signature of the Gatekeeper, who will only certify, once the relevant stakeholders have accepted the assurance.

6.8.9 Key roles are as follows.

6.8.10 Chair – Paul Morrell (to be confirmed):

- Overall strategic responsibility for benefit realisation, including obtaining funding authorisation and integration of project with other related and broader projects [see Governance diagram, Appendix B]. Chair ensures that the project remains viable and resolves issues outside the control of the project director, including authorising change, commitment and payments within delegated authority, or obtaining authority where request exceeds delegation. The chair collates and issues board agenda and papers, chairs project delivery board meetings to ensure strategic fit within GBT and with adjacent stakeholders.

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## 6.8.11 Programme Director – Anthony Marley:

- Accountable to project delivery board for the strategic leadership of the project and its relationship with adjacent developments, funding, stakeholders and suppliers.
- Responsible for project delivery against objectives related to cost, time, quality and safety. Co-ordinates and manages the Professional Services Supplier and design/technical assurance contracts to ensure that Project Manager is able to focus on Principal Contractor. Liaises with stakeholder and suppliers to maintain a contemporary understanding of the project landscape.
- Subject to delegated authorities, can authorise change, commitment and payments, or obtain authority where request exceeds delegation. Reports regularly, to advise internal stakeholders of progress. Manages issues and risks outside the control of the project manager.
- Ensures that appropriate governance is applied, stage gate reviews are held and that there is adequate consideration of the issues. Is authorised to act as stage gatekeeper and sign each stage gate certificate to allow the project to proceed, once consultees are happy.
- Ensures that regular formal value management and value engineering, Quantified risk assessment, schedule risk assessments, etc. are held and that outcomes are focussed, productive, accurately captured and communicated. Analyses trend information and acts to mitigate issues.

## 6.8.12 Business Manager – Role to be filled

- Management accountant with responsibility for preparing, developing and analysing key financial information to ensure the project board make well-informed decisions to ensure future stability, growth and project viability.
- Responsible for the establishment and maintenance of financial policies and management information systems, as well as a support service to management colleagues. Ensures that cash-flow and investments are managed to maximise benefit to the trust, financial administration of contracts and employees, including payroll, and outgoings are provided for on all aspects of finance. The role combines accounting skills with business management skills. Validates actual and forecast costs against budget, manages accounts payable and verifies applications for payment from suppliers.

## 6.8.13 Business Support – Role to be filled:

- Provision of full administrative support to the board and project team. Facilitation of meetings including minutes and telephone duties. Calendar management, filing / archiving and document control, premises management, day to day office support, maintaining sufficient supplies etc.

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## GBT Project Team

### 6.8.14 Project Manager – Role to be filled:

- Responsible for the day to day management of the relationship with Contractors, key stakeholders and the project delivery against objectives related to cost, time, quality and safety. Oversees the execution of works allocated to suppliers.
- Compiles the management reports periodically, to advise internal stakeholders of progress. Manages changes, issues and risks as highlighted by the respective project managers. Responsible for management of and upward reporting of progress, issues, risk, cost etc., through periodic programme reviews. Has contract management and responsibility for respective delivery partner's scope.

### 6.8.15 Commercial Manager – Role to be filled:

- Responsible for professional commercial advice, service expertise and guidance to enable the Route to achieve compliance with relevant business targets, processes and procedures. To assist in the resolution of commercial issues at Route level and act as the champion within the Contracts and Procurement function when these issues require escalation. The role is accountable for the accuracy of the Period Finance Reports, Change Control Log, KPI's and interim payments & final accounts. Part of the project leadership team with internal and external suppliers focussing on performance and management on behalf of the trust.
- Acts as Project Manager's authorised representative when Project Manager is unavailable.

### 6.8.16 Construction Manager – Role to be filled:

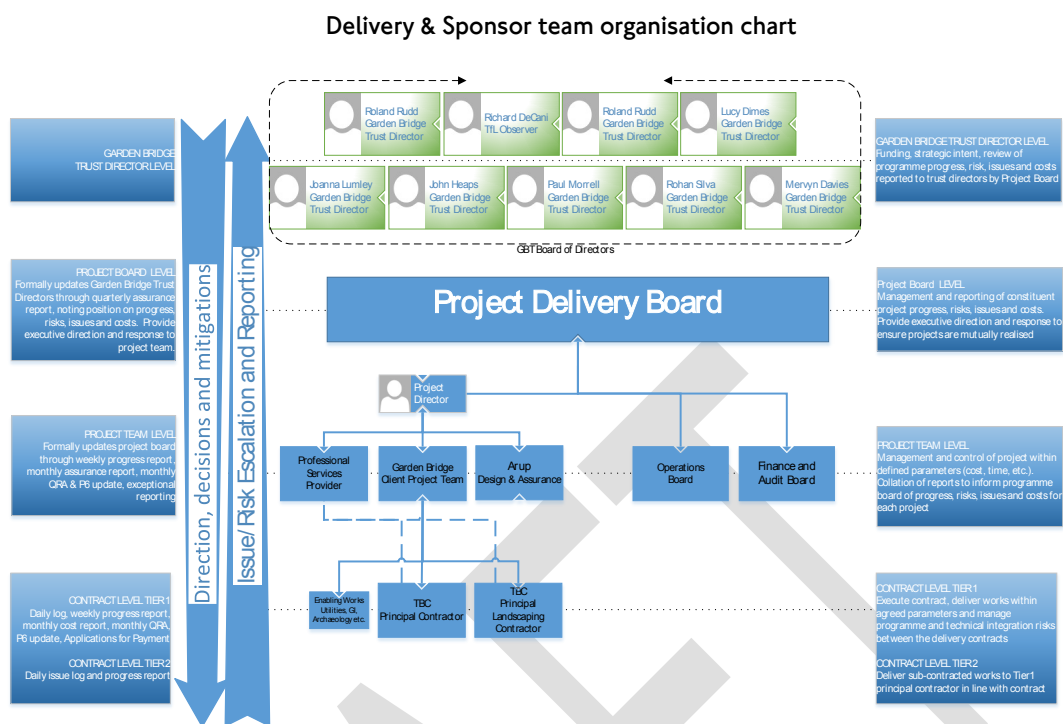
- Responsible to the Project Manager for ensuring effective and efficient support and oversight is provided to the Principal Contractor to enable and ensure efficient and timely realisation of programme and scope. Monitors receipt of goods, and contractor's progress reports for accuracy and ensures that work is planned, resourced and prepared for. Collates daily and weekly reports for the project manager.

### 6.8.17 Stakeholder Manager – Role to be filled;

- Responsible to the Project Director for day to day liaison with all stakeholders. Ensures that the appropriate representatives are kept abreast of the progress and issues.
- Chairs Stakeholder & Communications Working Group to enable regular liaison meetings with representatives of each of the communications teams. In addition ad hoc face to face meetings and email updates maintain a valuable exchange of information.

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6.8.18 The diagram below captures the initial delivery team hierarchy.



## 6.9 Project plan

6.9.1 The Trust has developed a detailed project plan for the development and delivery of the Garden Bridge. Indicative key milestones from this project plan are outlined in the table below.

Table 15 Key milestones

Item	Indicative milestone dates
Public consultation	November – December 2013
Planning application submission	May 2014
Public fundraising campaign to start	May 2014
Preparation of next stage design and tender material	May 2014
Dialogue with construction industry starts	July 2014
Planning consents secured	November 2014
Formal tender issued	March 2015
Land acquired	April 2015
Contract awarded	August 2015
Construction commences	September 2015
Construction complete date	August 2018

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## 6.10 Use of special advisors

6.10.1 Special advisors have been used in a timely and cost-effective manner. The special advisors are listed in the table below.

Table 16 Special advisors

Specialist area	Advisor
Financial	Transport for London (Commercial Finance)
Technical	Transport for London (planning, consents, project management) Arup (civil engineering, maritime engineering, environment, transport, project management) Heatherwick Studios (architecture, design) Dan Pearson (landscape)
Procurement and legal	Transport for London (legal) Bircham Dyson Bell (legal)
Business assurance	n/a
Other	n/a

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## Appendix A – Journey time saving calculations

### Options 4 and 5

A new footbridge between Temple Station and the South Bank will deliver improved connectivity between the north and south banks in this area and reduce pedestrians' journey times. The walk journey time savings that would likely result from construction of these options has been quantified and monetised.

A series of pedestrian surveys were carried out in August and September 2013. This included both counts of pedestrians and surveys of their origins and destinations on Waterloo Bridge and Blackfriars Bridge. This provided an estimate of the where pedestrians were walking from and to as well as their number. Table xx shows the estimated annual bi-directional flows across Waterloo and Blackfriars Bridges.

Table: Estimated annual bridge flows

(Source: Demand Forecasting for Garden Bridge, Arup 2013)

Bridge	Estimated annual pedestrians (Millions)
Waterloo	3.40
Blackfriars	3.43

The Tables below show the distribution for Blackfriars and Waterloo Bridge. These distributions were used with the observed count totals to get a weekday average distribution.

Separately, a network based model was used to calculate journey times between origins and destinations as seen in table xx. The travel times were calculated both with and without the Garden Bridge Option 4 in place. This showed that the maximum saving was likely to be around three minutes for a trip between for example Temple and the London Eye. A minimum of 20 seconds was calculated, which accrued to trips for example, between the Tate Modern and Covent Garden.

The journey time savings were calculated by assuming all existing journeys that would have a lower journey time if using the new crossing would switch route to take advantage of this. These benefits were only calculated for existing weekday trips and so no benefits have been claimed for any new trips that would result from introduction of the new crossing or any weekend trips. In the absence of information on whether users would value a time saving, the weekend has been excluded to give a more conservative estimate.

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Table: Origin-destination matrices for Blackfriars and Waterloo Bridges (weekday all day)

(Source: Demand Forecasting for Garden Bridge, Arup 2013)

## *Blackfriars Bridge*

Origin/Destination		A	B	C	D	E	F	Total
A	London Eye	0%	0%	0%	0%	0%	1%	2%
B	Waterloo/Southwark	0%	0%	0%	1%	12%	19%	32%
C	Tate Modern/Millennium Bridge	0%	0%	0%	1%	7%	11%	19%
D	Westminster/Leicester Square	0%	1%	1%	0%	0%	0%	2%
E	Holborn/Temple/Covent Garden	0%	11%	5%	0%	0%	0%	16%
F	St Paul's/Bank	1%	15%	13%	0%	0%	0%	29%
<b>Total</b>		<b>1%</b>	<b>27%</b>	<b>19%</b>	<b>3%</b>	<b>20%</b>	<b>31%</b>	<b>100%</b>

## *Waterloo Bridge*

Origin/Destination		A	B	C	D	E	F	Total
A	London Eye	0%	0%	0%	0%	2%	0%	2%
B	Waterloo/Southwark	0%	0%	0%	12%	40%	1%	54%
C	Tate Modern/Millennium Bridge	0%	0%	0%	1%	2%	0%	3%
D	Westminster/Leicester Square	2%	7%	2%	0%	0%	0%	10%
E	Holborn/Temple/Covent Garden	4%	24%	1%	0%	0%	0%	29%
F	St Paul's/Bank	0%	2%	0%	0%	0%	0%	3%
<b>Total</b>		<b>6%</b>	<b>33%</b>	<b>3%</b>	<b>14%</b>	<b>43%</b>	<b>1%</b>	<b>100%</b>

The total journey time savings for existing users are estimated at 27,000 hours annually for weekdays only. This is equivalent to around 25 seconds per trip.

## Estimation of Annual Benefits

### Inputs/ Assumptions

- Annual pedestrian estimates are based upon counts at each crossing with values for months where counts are not available infilled based upon flow profiles from other nearby bridges (Millennium Bridge and Hungerford Bridge)
- Value of Time (VoT) taken from WebTAG Table A1.3.1 = £6.81 per hour (assumes pedestrians are not in work time but commuting to work; no allowance has been made for daytime trips in work time, e.g. travelling between local meetings).

### Benefit Calculation

The annualised total travel time saving is 27,000 hours which translates to an annual benefit of £184k.



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## Appendix B – HEAT tool health benefit calculations

### Option 5

#### Estimating health benefits from a new bridge at Temple

##### Summary

Based on the World Health Organization (WHO) Health Economic Assessment Tool (HEAT)<sup>27</sup> for walking, a new bridge at this location would prevent between 0.37 and 0.70 deaths per year; the mid-point of this likely range is 0.535. This equates to an annual benefit of £963,000.

This gives a current value of total benefit of between £12,131,000 and £23,078,000 over thirty years.

##### Methodology and assumptions

Analysis has been carried out to estimate the health benefits of a new bridge at this location. The analysis is based on the World Health Organization (WHO) Health Economic Assessment Tools (HEAT) for walking and cycling using a set of assumptions about regular walking trips generated by the bridge. This is the method recommended by the Department for Transport (DfT) for assessing health benefits of walking and cycling initiatives.

HEAT is designed for assessing the benefits of reduced premature mortality resulting from walking and cycling initiatives. It is designed to assess:

- Impacts at a population (not individual) level
- The benefits of habitual behaviour, not one-off or irregular events
- The benefits to adult populations, assumed to be around 20 to 64 years
- Normal populations where the level of physical activity is not very high

The assumptions made are:

- Only health benefits from walking are assessed because cycling will not be permitted on a new bridge, although bicycles may be wheeled across.
- The daily number of walk trips included in this assessment is 864. This is the number of existing bus trips that the Demand Forecasting Note predicts will divert to walking across the Garden Bridge. Although the Demand Forecasting Note forecasts annual visitors of 6.8 million and around 25,000 per weekday, it cannot be determined what proportion of these trips will be new, regular walk trips. It is assumed in this assessment that 864 people regularly do this walk (daily). For sensitivity testing the tool was run for 432 people doing the walk twice a day, this produced a slightly lower health benefit of £11,539,000 to £20,933,000 (prevents 0.35 – 0.63 deaths per year)
- The amount of walking assessed is from a single point in time (because walking levels pre the new bridge are unknown)
- The distance walked was tested with two sensitivities of 1km and 2km. These two distances were picked because using Google maps a walk trip from Waterloo station

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<sup>27</sup> <http://www.heatwalkingcycling.org/>

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to the south landing of the bridge is around 0.8km, the walk across the bridge is 360m and the onward journey up the Kingsway to Holborn is 0.8km.

- The UK mortality rate is 434.10 deaths per 100,000 persons per year (crude rate, 2010)
- The value of a statistical life is £1.8m. This is from the TfL Business Case Development Value Appendix F. It is a DfT figure factored up to 2013 prices
- The time it will take for the 864 trips to shift to walking from bus use will be one year.
- The time period over which benefits are calculated is 30 years.
- The discount rate to apply to future benefits is 3.5% (first 30 years) and 3.0% (after 30 years)

## Conclusions

Based on the WHO HEAT tool for walking, a new bridge at this location would prevent 0.37 to 0.70 deaths per year, giving a current value of total benefit of between £12,131,000 and £23,078,000 over the thirty years of the appraisal period.

The assumptions made are very conservative, assessing 864 trips out of a forecast daily total of 25,000 (under 5 per cent of daily trips) because these trips are the only ones that are known to be new, regular walk trips. Other trips may be displaced walk trips. Given the iconic nature and central location of the new bridge in London it is highly likely that other, regular walk and cycle trips will be extended to divert via the new bridge. It is also likely that new walk trips will be generated to visit the Bridge regularly by those working and living close to the Garden Bridge. However, lack of appropriate data to estimate these consequences mean that they have not been included in this assessment.

It is recommended that regular surveys are conducted of users of the new bridge to determine levels of new walk trips and origins and destinations and that the HEAT tool is re-run using this data to assess the health benefits of the Bridge and inform future estimates for similar projects. This tool only assesses the health benefits of physical activity from regular walking, there are likely to be other health benefits which have not been included in this analysis.

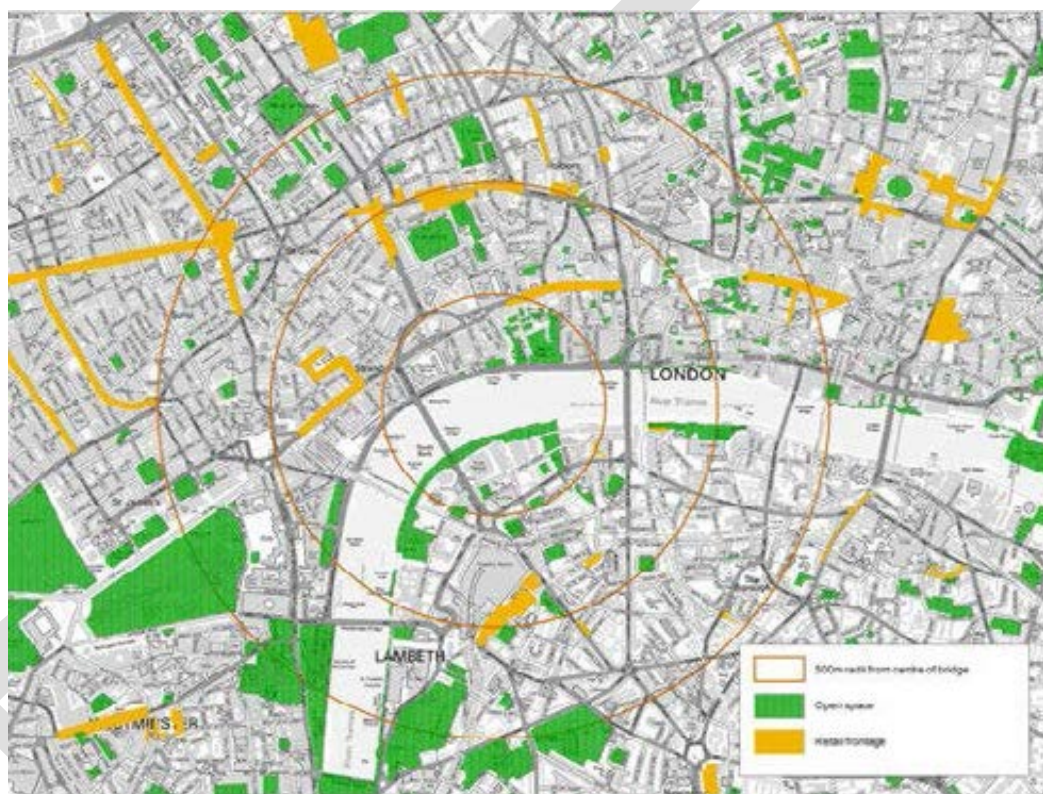
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## Appendix C – business/property benefit calculations

*Note is based on Option 5 (Garden Bridge)*

It has been calculated that more than \$2 billion (£1.2 billion) has been invested in the district surrounding the High Line in New York as a direct result of the High Line's design and construction<sup>28</sup>. However it is also important to note that use of re-zoning, which is possible within the US land use planning system, has been important to achieving this scale of development benefit.

### Garden Bridge Catchment (up to 1,500m)



The development impacts arising from the Garden Bridge can be expected to affect land and property within a nearby impact area, schemes that exist in the planning pipeline and other schemes that may come forward in the future. These gross impacts can accrue from a number of sources including:

- Increase in the quantity of new retail, hotel, office and residential units constructed through the direct and wider effects associated with the Garden Bridge.
- Increase in the speed of development (i.e. planned schemes coming forward faster) and changes in the mix of development (e.g. increased retail and hospitality at street level due to increases in footfall).

<sup>28</sup> TfL research found that the Co-founders of the Friends of the High Line report that their biggest regret was not having a better mechanism to capture a proportion of value uplift as a public benefit.

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- Improvements in the financial performance of the existing property stock adjacent to the Garden Bridge which would, for example, affect capital values and rents from residential and retail units, the occupancy and yield for each hotel room and turnover per square metre for retail and hospitality uses. There could also be a specific premium attached to the views of the Garden Bridge in addition to these effects. While a range of studies show that the positive uplift in property values can be as high as 34% evidence from a number of studies in the literature report increases of around 5%.
- These effects would also increase tax revenues for the Exchequer derived from various sources including revenue from income, business and sales taxes such as VAT and Stamp Duty Land Tax (SDLT). For example, New York's Central Park generated revenues of \$136 million (£82 million) in 2007 from concessions and other commercial uses. This resulted in \$16 million (£9.6 million) of additional income for New York City and the Department of Parks and Recreation through income, sales and business taxes and permits for concessions and events.

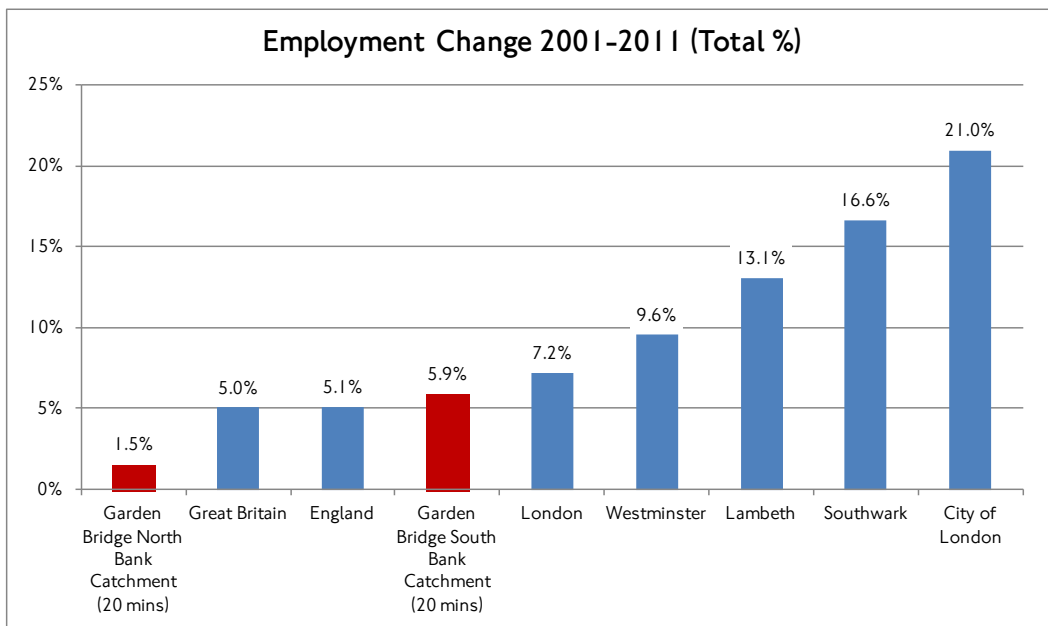
The area surrounding the proposed Garden Bridge site is characterised by commercial activities<sup>29</sup> with more than 513,300 jobs within 1,500m of the Garden Bridge site in 2011 and 38,300 residents. In terms of walk-in catchment in 2011 there were around 390,600 workplace jobs within a 20 minute walk-in catchment on the North Bank and 23,700 residents. In the South Bank catchment there were 229,100 workplace jobs and 21,100 residents.

However, economically the North Bank catchment area has grown very slowly over the last decade. Between 2001 and 2011 the number of jobs within the 20 minute North Bank walk-in catchment grew by just 1.5% (5,900 jobs) or about 0.2% each year. This was less than one third of the national average growth and significantly below the growth levels seen in the surrounding central London boroughs: Westminster (10%), Lambeth (13%), Southwark (17%) and City of London (21%). The South Bank catchment experienced more jobs growth over the last decade (+6% or +12,800 jobs) but this also lagged behind the London average and was less than half the growth rate achieved in Lambeth and Southwark.

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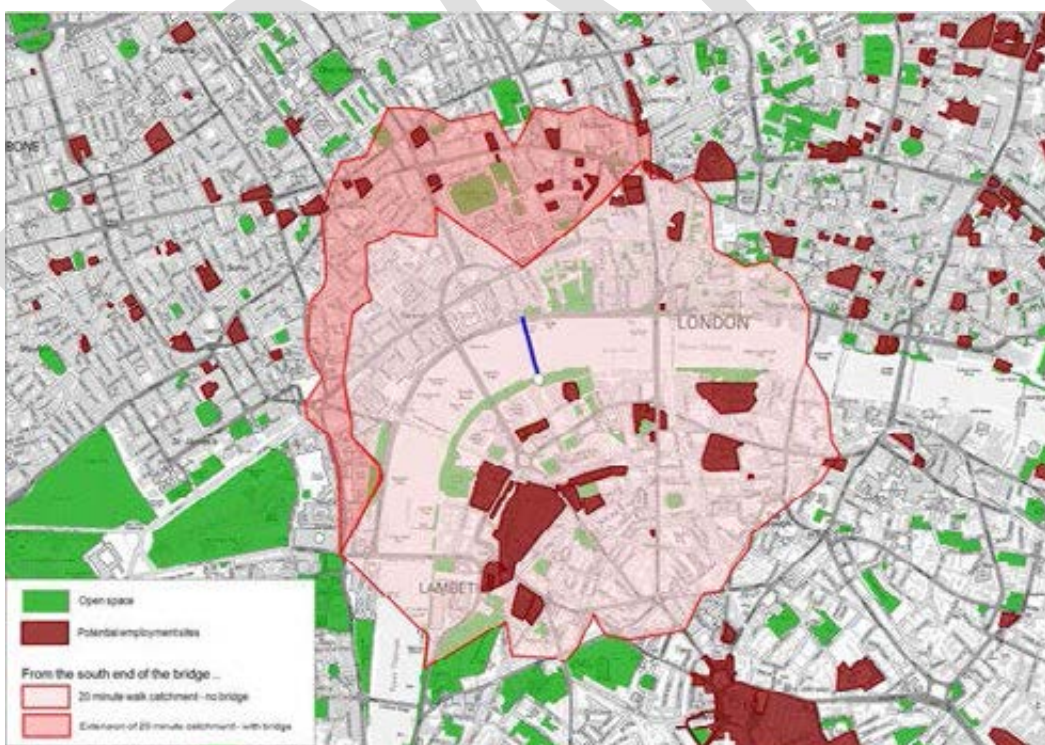
<sup>29</sup> This includes offices, retail, hospitality, a concentration of international cultural attractions and Waterloo Station.

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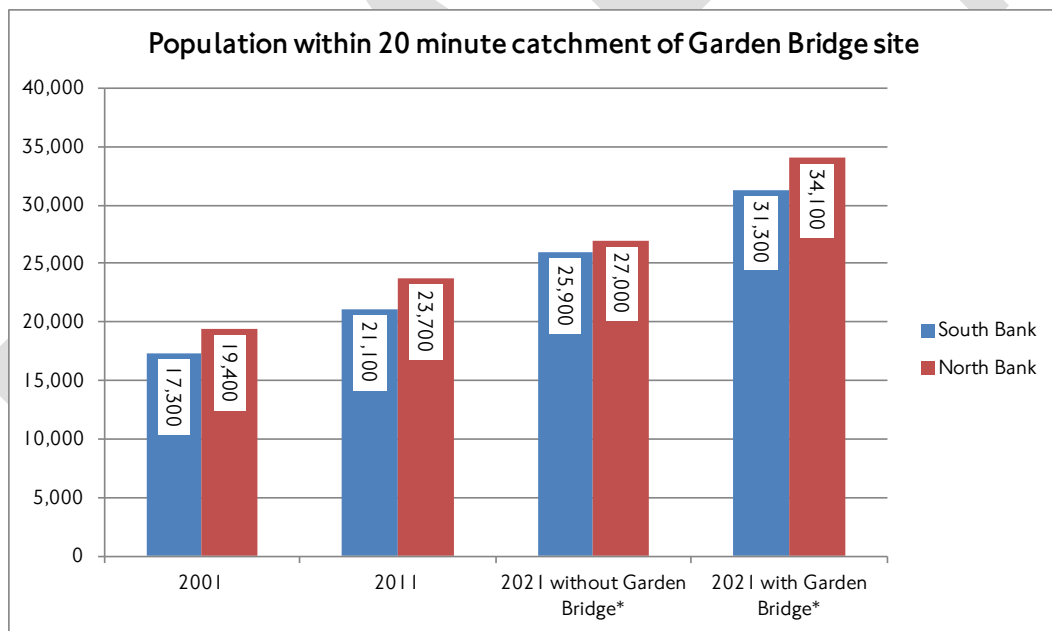
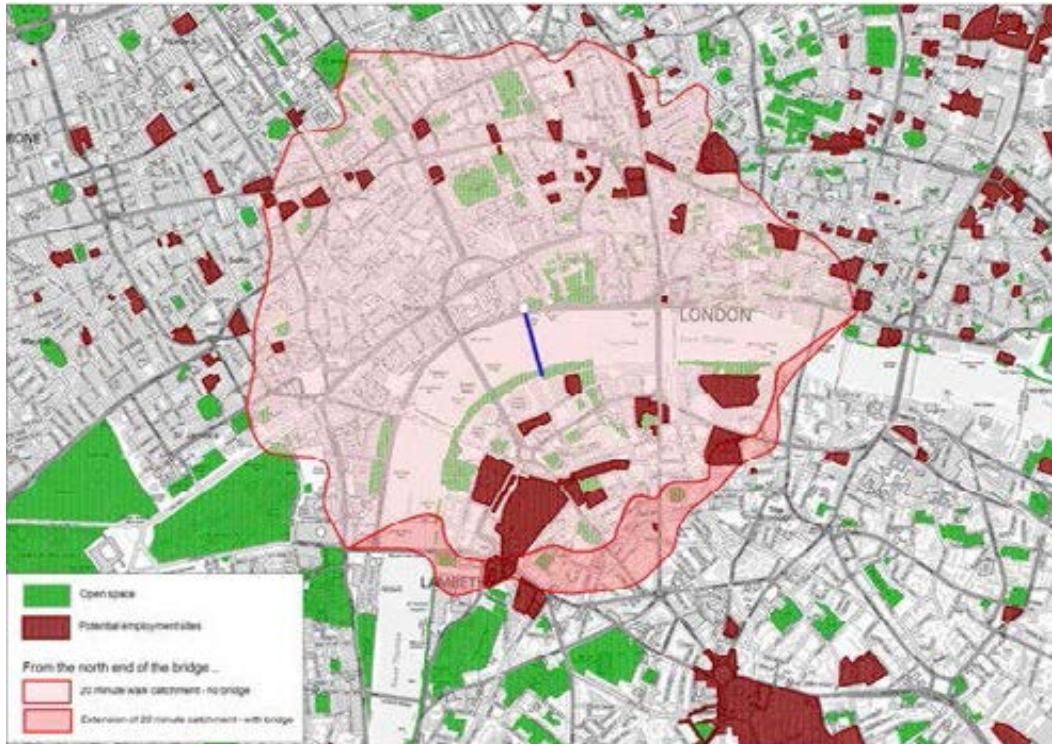
While the population and employment in catchment area is forecast to grow in the future, the improved connectivity and urban permeability that the Garden Bridge will bring will further increase the people and jobs within the 20 minute catchment of its proposed site.

## Impact of Garden Bridge on South Bank Catchment (20 minutes)



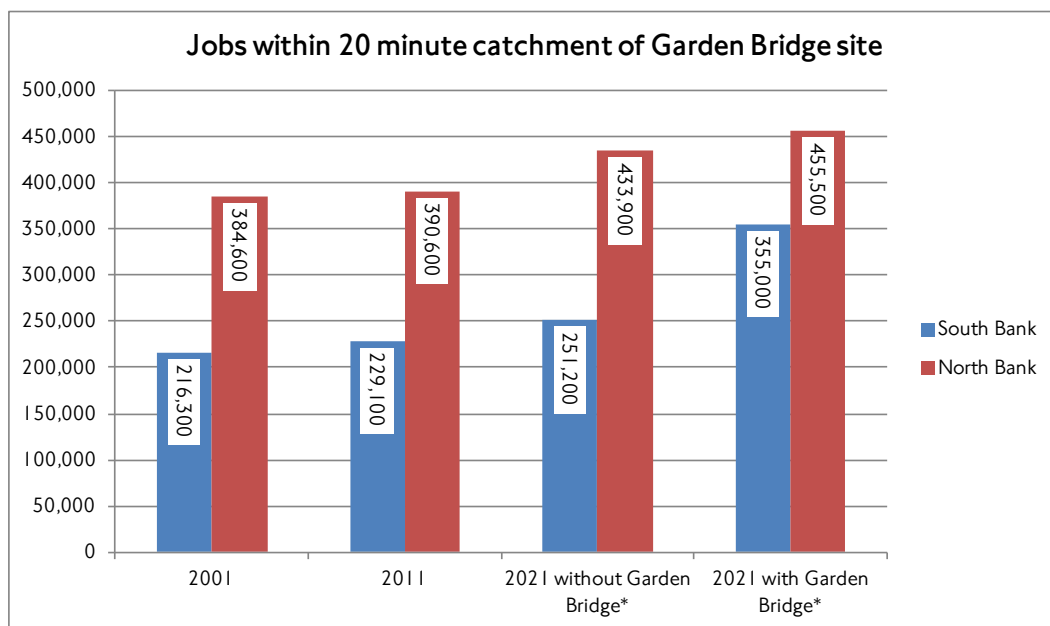
## Impact of Garden Bridge on North Bank Catchment (20 minutes)

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\* Forecast

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By 2021 it is estimated that there will be an additional 7,100 residents and 21,600 jobs within the 20 minute North Bank catchment due to the Garden Bridge's impacts on connectivity and permeability within the urban form and across the Thames.

By 2021 there is estimated to be an additional 5,400 residents within the 20 minute South Bank catchment due to the Garden Bridge's impacts. However the total number of jobs increase by 103,800 due to the extension of the 20 minute catchment into central London including Bloomsbury and Holborn.

The increase in the population and employment within the 20 minute walk catchment over and above trend forecasts can be expected to support:

- Increased levels of cross river pedestrian movement especially of commuters travelling north and south
- Increased leisure usage of the Garden Bridge by residents and workers (e.g. more than 103,000 workers north of the river will now be within a 20 minute walk of the South Bank).
- Increases in local market size and spend for retail, hospitality and other convenience or discretionary spend items
- Increases in density of commercial activity (e.g. turnover per square metre).

A full development impact study has not been possible but a number of examples show the scale of potential development benefits. A formal study would need to assess these benefits in aggregate across the whole impact area and account for the effects of deadweight and displacement.

## **Impacts on planned developments**

There is significant, high density development planned both north and south of the Garden Bridge. For example, recent and planned developments within about 500m of the Garden Bridge on the South Bank will provide 170,000 m<sup>2</sup> of office,

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commercial and other floorspace, 1,400 residential units and more than 1,000 hotel bedspaces. Together this £1.33 billion programme of investment would accommodate 10,000 jobs and 3,000 new residents. Similarly £351 million of residential development is planned at One Arundel Great Court and 190 Strand closing the northern landing point.

If the development value was increased by 5% due to the effects of the Garden Bridge (in line with the average in the literature) this would result in a one-off gross benefit worth **£84.1 million**.

## Recent and planned developments within 500m of Garden Bridge on the South Bank

- Doon Street: 329 private flats, the new headquarters for Rambert Dance Company, and 900 m<sup>2</sup> commercial in 43 storey tower.
- National Theatre: £80 million workshop extension, a new bar on the riverfront and the remodelling the Cottesloe theatre and surrounding workshops.
- 1 Blackfriars Road: 163 m tower with 52 floors of 74,000 m<sup>2</sup> and 275 flats.
- 20 Blackfriars Road: a £200 million scheme with two towers of 23 and 42 storeys providing 286 residential units and 18,000 m<sup>2</sup> commercial.
- 46-49 Blackfriars Road: An 18,600 m<sup>2</sup> development comprising a 182 bed Novotel and 297 bed Ibis.
- 240 Blackfriars Road: a £65 million scheme with a 19 storey tower providing 20,000 m<sup>2</sup> of offices and 10 apartments. UBM have taken have taken 9,800 m<sup>2</sup>.
- Sampson House/Ludgate House: a 145,000 m<sup>2</sup> including 489 flats, 45,000 m<sup>2</sup> of office space, 2,600 m<sup>2</sup> retail, 2,000 m<sup>2</sup> community uses and 1,000 m<sup>2</sup> gym.
- South Bank Tower: A refurbishment of 30 storey building including the additional of 11 additional floors proving 34,000 m<sup>2</sup> of office space and 6,700 m<sup>2</sup> of retail
- Sea Containers House: Refurbishment and addition of a 9 storey building and 359 bed Mondrian hotel opening in 2014.

These potential uplifts in development value suggest that there is a good case to consider a range of mechanisms to capture the development value to support the construction and longer term maintenance of the Garden Bridge including development contributions (S106, CIL) or other levies.

### ***Impacts on current businesses and property***

With increased footfall in the areas leading to and from the Garden Bridge as well as being known as a high profile destination, the Garden Bridge can be expected to affect the income generated by nearby businesses and the value and yield of existing property. With around 7 million visitors forecast the effects can be expected to be particularly strong on the North Bank due to its low levels of current footfall around Arundel Street.

While a detailed study would be required to assess the aggregate impact initial estimation for four business on the South Bank and two new developments near to



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the northern landing point have been assessed. The positive impacts of the Garden Bridge are estimated to be £13.5 million each year.

## Current Businesses

The potential positive effects on just five commercial suggests that a 5% enhancement could result in increased revenues of £4 million each year and also support increased levels of employment.

- The turnover of the **National Theatre** was £54 million in 2008/9 and 54% or £29 million from commercial sources comprising ticket sales and restaurant revenue. A 5% increase in commercial receipts resulting from the positive effects of the Garden Bridge would be worth £1.45 million each year.
- Covering 21 acres, the **South Bank Centre** including the Royal Festival Hall had 21 million visits in 2012/13 and employs 470 staff. Turnover is £42 million of which £21 million is commercial revenue resulting from various sources including one million ticket sales each year. The South Bank Centre also raises around £4 million a year in donations. A 5% increase in commercial receipts resulting from the positive effects of the Garden Bridge would be worth £1.05 million each year and support an additional 23 jobs.
- Opening in 2014, the new **Mondrian Hotel** in Sea Containers House will have 359 beds and around 215 staff<sup>30</sup>. Using London average of occupancy rate of 82% and an average daily rate of £138<sup>31</sup> the turnover would be approximately £14.7 million each year from rooms alone. A 5% increase in room receipts resulting from the positive effects of the Garden Bridge would be worth £0.73 million each year.
- The **Oxo Tower** comprises a 500 seat restaurant on the eight floor operated by Harvey Nichols, 78 flats on floors two to seven managed by Coin Street Community Housing Co-operative and two floors of designer stores, gallery space and retail. Assuming the restaurant achieves 300 covers a day an average cost of £30 a head the annual turnover of the restaurant is £3.3 million each year. A 5% increase in restaurant receipts resulting from the positive effects of the Garden Bridge would be worth £0.17 million each year. There would also be positive impacts on the commercial activities located on the lower floors.
- The turnover of **Somerset House** was £12 million in 2012/13 (excluding an exceptional one-off receipt from HMRC). A 5% increase in receipts resulting from the positive effects of the Garden Bridge would be worth £0.6 million each year.

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<sup>30</sup> At a rate of 1.67 bedrooms per employee.

<sup>31</sup> PWC – UK Hotels Forecast 2014.

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## Planned Developments

The Garden Bridge and its high levels of footfall on the North Bank will enhance the performance of a range of businesses located in this area. Given their proximity to the new bridge the impacts at One Arundel Great Court and 190 Strand have been estimated and this is where the greatest impacts can be expected to occur. Together these effects could amount to £9.5 million each year (gross).

### One Arundel Great Court

- The **new 116 room hotel** would benefit from the Garden Bridge. As before, using the London average of occupancy rate of 82% and an average daily rate of £138<sup>32</sup> the turnover would be approximately £4.8 million each year from rooms alone. A 5% increase in room receipts resulting from the positive effects of the Garden Bridge would be worth £0.24 million each year.
- The **8 retail units** have a gross floorspace of 2,993 m<sup>2</sup>. Assuming 75% of the floorspace is available for convenience / comparison retail activities<sup>33</sup> and the high levels of new footfall accounts for 30% of revenue, this is worth £6.73 million each year due to the Garden Bridge.
- The **54,253 m<sup>2</sup> of office space** is estimated to achieve £50 psf in line with other Grade A specification buildings in the area<sup>34</sup> and, allowing for 20% voids, a 5% uplift on rental yields would be worth £1.17 million each year.

### 190 Strand

- The **2 retail units** have a gross floorspace of 443 m<sup>2</sup>. Assuming 75% of the floorspace is available for convenience / comparison retail activities<sup>35</sup> and the high levels of new footfall account for 30% of revenue, this is worth £1 million each year due to the Garden Bridge.
- The **restaurant** (608 m<sup>2</sup>) is estimated to achieve a turnover of £2.4 million each year assuming revenue per m<sup>2</sup> of £4,000. The high levels of footfall due to the Garden Bridge account for 30% of this revenue, worth £0.36 million each year.
- In addition there is a planned leisure / gym use plus a business centre but these have been excluded from the estimation.

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<sup>32</sup> PWC – UK Hotels Forecast 2014.

<sup>33</sup> Assumed sales density of £10,000/sqm. GLA London Town Centre Assessment (2005) found that sales density in the West End was £11,556/sqm in 2001. Sales density for major convenience retailers (e.g. M&S, Sainsbury's and Tesco) ranged from £9,300/sqm to £19,400/sqm in 2005.

<sup>34</sup> For example MidCity Place, 71 High Holborn is currently being marketed at a rent of £62.50 psf.

<sup>35</sup> Op cit GLA (2005).

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In April 2014 the average asking price for residential property in the local area was between £1.2 and £1.8 million with about 740 properties available for sale (through Zoopla). Purchasers of these properties will be paying between £60,000 and £90,000 in Stamp Duty Land Tax (at the 5% band rate). Local monthly rents are between £2,100 and £3,350 pcm.

Residential Property Market	Zed Index	Average Current Asking Price (April 2014)	Properties for Sale	Average Current Rent (pcm, April 2014)	Properties to Rent
Waterloo, Bermondsey, South Bank, Borough (SE1)	£595,000	£1,250,000	596	£2,200	1745
Holborn, Strand, Covent Garden (part of WC2)	£997,000	£1,800,000	105	£3,350	587
Fleet St, Temple, Blackfriars, St Pauls (part of EC4)	£696,000	£1,200,000	39	£2,100	533

Source: Zoopla. The Zed-Index is the current average Zoopla Estimate of home values in any given area. The Zed-Index is calculated as the mean of all Zoopla Estimates within any given geography.

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## Appendix D – tourism benefit calculations

### Option 5 (Garden Bridge)

#### Calculation

#### Inputs

This section describes all of the inputs that have been taken from various sources and form the basis of the estimate described.

- Annual Visitors to London = 15 Million<sup>2</sup>
- Percentage of visits including visit to park / garden = 64%<sup>2</sup>
- Average spend per night = £125<sup>2</sup> (2013 Prices)

#### Assumptions

This section describes the assumptions made in estimating the additional revenue from tourism.

- 1% of international visitors who visit a park or garden during their visit to London would spend an additional hour in London on average as a result of a Garden Bridge being built. This assumption is discussed further below.
- Given a spend per night of £125 on average, the spend per each additional hour of time spent in London on average, is £125 / 24 hours = £5.21.

An assumption of 5% of the 64% of 15 million visitors as outlined above would be:

$$0.01 \times 0.64 \times 15 \text{ Million} = 480,000$$

In order to put this into context, the Table below shows the annual number of visitors to attractions / infrastructure which has at least some features in common with the Garden Bridge options. This shows that the 480,000 visitors assumed to spend an additional hour on average in London with a garden Bridge in place is equivalent to just 13% of the visitors to the London Eye which is the attraction in the table with the lowest number of visitors. It is also just 7% of the projected Garden bridge users.

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Table: Annual visitors to attractions and crossings

(Attraction	Number of Visitors per annum
London Eye	3.75 Million <sup>36</sup>
Millennium Bridge	6 Million
Hungerford Bridge	8.4 Million
Blackfriars Bridge	4.2 Million
Waterloo Bridge	4.7 Million
High Line, New York	4.4 Million
Hyde Park	5.3 Million <sup>37</sup>
Kensington Gardens	7.0 Million <sup>4</sup>
Garden Bridge (Estimate)	7 Million

Source (Unless otherwise referenced): Demand Forecasting for Garden Bridge, Arup 2013)

## Calculation of Additional Revenue

The additional revenue can be calculated as follows:

Number of visitors spending an extra hour on average in London (A) = 480,000

Spend per extra hour spent (B) = £5.21

Total extra annual revenue from tourism = £5.21 \* 480,000 = £2.5Million.

Over a 60 year appraisal period this would be **£62 Million** in 2014 prices (discounted).

<sup>36</sup> <http://www.londoneye.com/Sitelmages/Assets/8/EELE1018%20%281-11%29%20Press%20Pack%20Final%20low%20res.pdf>

<sup>37</sup> Visitors to the Royal Parks: Results of Steady State Count, Aug 2007

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## Appendix E – benchmarking with the High Line, New York

### Notes on tourism, comparison with High Line, New York, by EFTEC for TfL, 2014

There are some similarities between New York City's High Line and the proposed Garden Bridge project in London. These include the elevated garden / park aspect, as well as their location within two of the most populated 'Western' cities on the planet. A comparison to visitor numbers to the High Line in New York City may therefore provide an indication of the number of visitors likely to visit the Garden Bridge in London.

In 2013, New York City had around 54.3 million visitors, around 11.4 million of which were international visitors (or ~ 21% of total visitors) (NYC&Co, 2014). The High Line receives around 4.4 million visitors each year, or roughly 8% of total visitors to NYC. Of these 4.4 million, around half are residents of NYC, with the remaining half being split between international and domestic visitors (thehighline.org).

London had around 29.1 million visitors in 2013, roughly 17 million international visitors (or ~ 58% of total visitors) (ONS, 2014).

Applying the ratio of NYC visitors who visit the High Line (~ 8% of total visitors) to London, the Garden Bridge may attract around 2.4 million visitors. Applying the ratio of international to domestic visitors for London, around 1.4 million of these visitors may be international.

Table 1 provides a range of potential visitor numbers and expenditure, based on the direct High Line (above) comparison calculation (considered the 'High' scenario) and expenditure assumptions provided by TfL. 'Low' estimates are based on 50% of the direct High Line comparison calculation, with 'Central' estimates representing the mid-point between the two (or 75% of the 'High' scenario).

**Table 17: Potential tourism numbers and expenditure per annum, based on comparison with High Line**

Potential tourism numbers and expenditure per annum based on comparison with High Line			
	Low	Central	High
Number of visitors	680,015	1,020,022	1,360,029
Potential expenditure	£3,542,877	£5,314,315	£7,085,754
PV 60	£91,469,283	£137,203,924	£182,938,566

Notes:

1. A 3.5% discount rate was used.
2. Based on TfL estimated expenditure of £5.21.
3. Assuming constant number of visitors and expenditure over the 60 year time horizon.

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## References

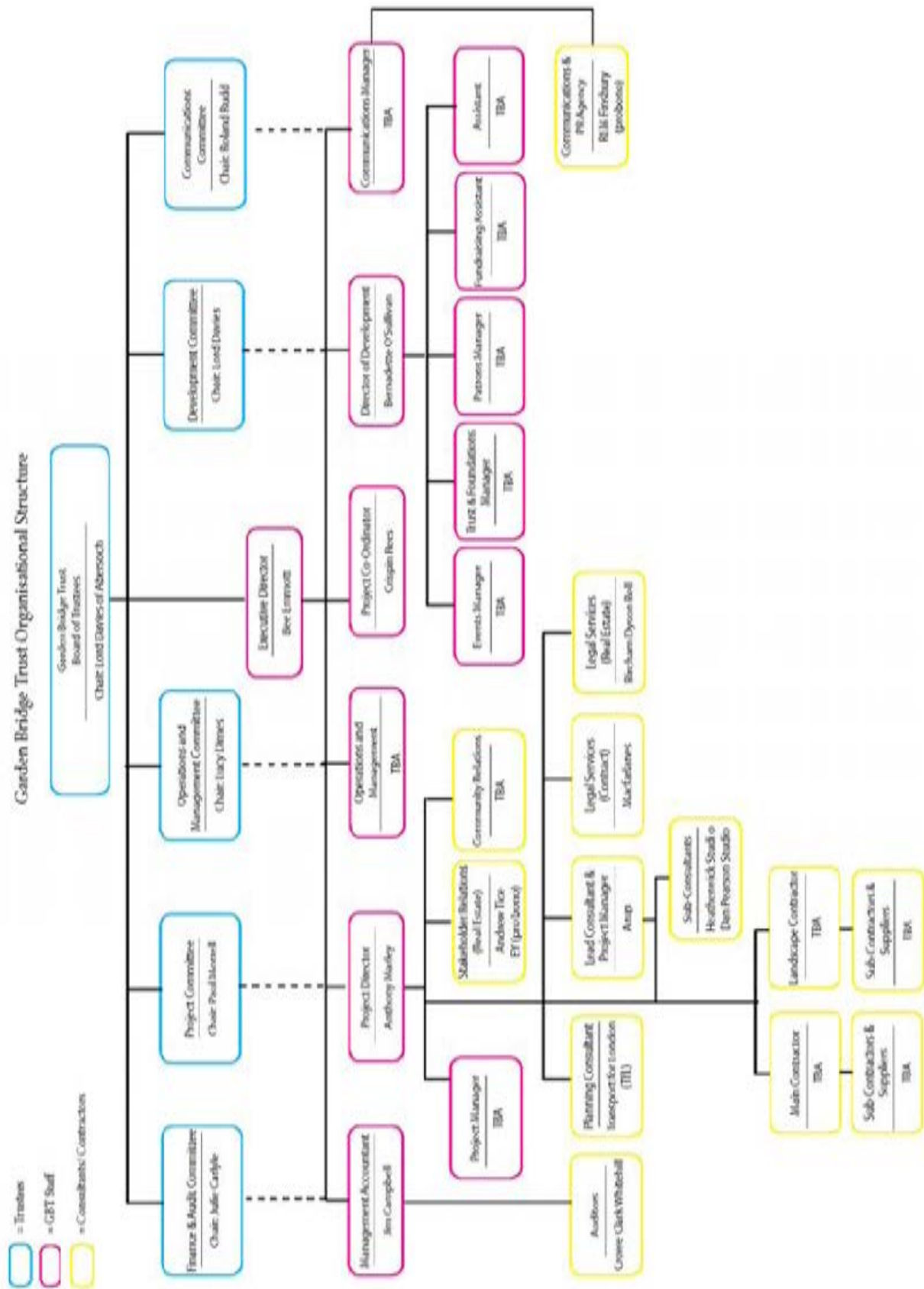
NYC&Co (2014). History of International Travel to NYC. Available Online: [http://www.nycandcompany.org/assets/files/pdf/History-of-International-Travel\\_2005-2013\\_PublicUse\\_012214\\_rb-dk.pdf](http://www.nycandcompany.org/assets/files/pdf/History-of-International-Travel_2005-2013_PublicUse_012214_rb-dk.pdf)

ONS (2014). Part of Travel Trends, 2013 Released on 08 May 2014. Available Online: <http://www.ons.gov.uk/ons/rel/ott/travel-trends/2013/sty.html>

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## Appendix F – Garden Bridge Trust organogram





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## Appendix G – Further supporting information

*Measuring the economic and wider impacts of public parks*

- Report from Peter Neal Consulting Ltd

*Support for the Garden Bridge Business Case: Review of Evidence*

- Report from EFTEC

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## The Garden Bridge

### **Measuring the economic and wider impacts of public parks**

Developing the evidence base for the outline business case

Transport for London

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- 1.0 Introduction
- 2.0 Direct economic impacts of public parks
- 3.0 Wider social, cultural and environmental benefits
- 4.0 Park Precedents
  - The High Line, New York
  - Promenade Plantée, Paris
  - Reading Viaduct, Philadelphia
  - Bloomingdale Trail, Chicago
  - Queen Elizabeth Olympic Park, London

DRAFT - 31 March 2014

Prepared by Peter Neal Consulting Ltd.



Heatherwick Studio

*View north from the South Bank of the proposed Garden Bridge*

## **1.0 Introduction**

This scoping paper has been commissioned by Transport for London (TFL) to inform the development of the outline business case for the proposed Garden Bridge. The project is planned to be constructed across the River Thames from the north bank, adjacent to the Temple tube station, to the south bank, near to the National Theatre, Gabriel's Wharf and the Bernie Spain Gardens.

In size, the span of the bridge will be around 370m with a varying width up to 30m at its widest point. This pedestrian crossing over the river will provide a strategic link between the West End, Covent Garden and the City to the South Bank and Waterloo Station. The green promenade is to be planted with trees, flowering shrubs, herbaceous plants and grasses providing a type of elevated urban park and public space in the heart of London.

To develop the methodology and content of the business case TFL needs to establish specific criteria for assessing the economic return on investment along with the wider direct and indirect benefits than can be gained by the project. This paper sets out recent practice and precedents that can be used to calculate the economic impact and wider benefits from investing in public parks.

## **1.1 Economic return**

It is an established fact that well designed and managed parks make a positive impact on land and property values and can contribute to the wider economy. Ever since the Prince Regent commissioned Nash to transform Regents Park, London has created parks for both their economic and wider amenity benefits. The Georgian squares and gardens of Bloomsbury, Kensington and Knightsbridge along with the large Victorian parks of the 19<sup>th</sup> century provide plenty of examples. More recently the Thames Barrier Park, opened in 2000, and the Queen Elizabeth Olympic Park, created for London 2012, were built in part to attract and enhance development at specific locations

in the city and provide wider economic benefit to their surrounding area. Section Two of this paper summarises published research and provides examples of the empirical evidence that has been used to demonstrate the economic return from public parks.

## **1.2 Wider direct and indirect benefits**

Through history parks have been built for social, cultural, health and environmental benefit and there is now a developing body of research that has started to analyse and quantify these wider returns. Such motives for investing in parks are becoming increasingly important for many global cities currently choosing to create new or improve existing public parks.

Paris developed an international reputation in building a number of innovative new parks towards the end of the twentieth century, Copenhagen is constructing a network of parks within its new city district of Ørestad and New York has spent a considerable amount of money on a series of waterfront parks surrounding lower Manhattan over the last ten years. In London a number of new city districts are also investing heavily in new parks and public spaces including the Nine Elms Linear Park, over ten new parks, gardens and squares at Kings Cross and more than two hectares of parkland proposed for the Earls Court regeneration. All are planned to deliver a mix of direct and indirect return on investment and these benefits are described in further detail in Section Three.

## **1.3 Park precedents**

In many ways the Garden Bridge is a unique project. Whilst London and many other cities have built a number of iconic pedestrian bridges in recent years, few include planting to any great extent. Very few planted bridges currently exist which will be part of the allure and draw of the Garden Bridge. Mile End Park in Tower Hamlets does have a short green bridge that links two separate sections of the park and there is the heavily planted Bridge of Flowers in Shelburne Falls, Massachusetts.

There are however a growing number of elevated parks that offer a relatively comparable public realm and pedestrian environment. Most have been created through the reuse of redundant rail lines and the best known examples are the Promenade Plantée in Paris, opened to the public in 1993, and New York's iconic High Line, which completed the first phase of development in 2009. In addition there are new elevated rail parks proposed in the United States for St Louis, Chicago and Philadelphia and several more planned at grade or above in Europe, Canada, Australia and Asia<sup>1</sup>. In the UK there are early proposals for a skypark over the Duddeston Viaduct in Digbeth, Birmingham, and an emerging scheme for a new elevated park over London's historic Bishopsgate Goodsyard.

With the exception of the High Line, there is limited empirical evidence of the economic impact these parks already have or are likely to have in the future although they do provide useful points of reference for the Garden Bridge. Section Four provides a summary of key park precedents that could be used to inform and illustrate the developing business case for the project.

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<sup>1</sup> Untapped cities (2013) *10 Plans for Elevated 'High Line' Parks Around the World*, Nancy Li 12/04/13. See: <http://untappedcities.com/2013/12/04/10-plans-for-elevated-high-line-parks-around-the-world-petite-ceinture-bloomingdale-trail-reading-viaduct/>



Sections of the Hudson River Park in New York has been shown to add 20% to the value of adjacent properties

## 2.0 Direct economic impacts of public parks

There is a growing literature on the economic impact of public parks and green spaces. Whilst this is still a developing discipline a number of studies can be used to inform the business case. In the UK much of this work has been led by public organisations including the GLA, CABE Space, Forest Research and Natural England. Academic bodies including Imperial College in London and Sheffield Hallam University, along with a number of specialist economic consultancies, have undertaken a number of recent studies. Although some research has focussed specifically on the economic benefit of parks and green spaces most of the recent studies have concentrated on the broader returns gained from green infrastructure and ecosystem services. Key references include:

- 2003 - GLA Economics, *Valuing Greenness - Green spaces, house prices and Londoners' priorities* (Updated in 2010) [01]
- 2005 - CABE Space, *Does Money Grow on Trees?* [02]
- 2008 - Natural Economy Northwest, *The economic benefits of Green Infrastructure: The public and business case for investing in Green Infrastructure* [03]
- 2010 - GLA Economics in Working Paper 42, *Valuing housing and green spaces: Understanding local amenities, the built environment and house prices in London* [04]
- 2010 - Forest Research, *Benefits of Green Infrastructure* [05]
- 2012 - Forest Research, *Economic benefits of greenspace* [06]
- 2013 - eftec/Sheffield Hallam, *Green Infrastructure's contribution to economic growth* [07]

The United States provides more detailed methodologies and techniques for assessing the specific economic value that public parks deliver. These have been developed by dedicated parks organisations such as the Center for City Park Excellence based within the Trust for Public Land (TPL), the City Parks Alliance and New Yorkers for Parks. There is also a strong academic literature

produced by John Crompton and colleagues at Texas A&M University. In addition a small amount of research is starting to be developed by the Parks Forum<sup>2</sup> in Australia and New Zealand although most of this relates to developing valuing methods for nature parks and wider conservation areas.

Key references from abroad include:

- 2000 - J. Crompton, *The impact of parks and open space on property values and tax base* [08]
- 2002 - American Planning Association, *How cities use parks for Economic Development* [09]
- 2005 - J. Crompton, *The impact of parks on property values: empirical evidence from the past two decades in the United States* [10]
- 2006 - Trust for Public Land, *The Benefits of Parks* [11]
- 2007 - J. Crompton, *The Impact Of Parks And Open Spaces On Property Values* [12]
- 2008 - Urban Land Institute (ULI), *Urban Design and the Bottom Line* [13]
- 2009 - Trust for Public Land, *Measuring the Economic Value of a City Park System* [14]
- 2010 - National Recreation and Park Association, *Measuring the Economic Impact of Park and Recreation Services* [15]
- 2013 - IPFRA, *Benefits of Urban Parks, A systematic review* [16]

In addition there have been a small number of studies in the United States that have calculated the economic value of specific parks or park systems. The key references for these are:

- 2008 - Trust for Public Land, *How Much Value Does the City of Philadelphia Receive from its Park and Recreation System* (one of many studies for particular US cities) [17]
- 2008 - Friends of Hudson River Park, *The impact of Hudson River Park on property values* [18]
- 2009 - Appleseed, *Valuing Central Park's Contributions to New York City's Economy* [19]
- 2011 - Texas A&M University, *Millennium Park, Quadruple net value report* [20]

## **2.1 Context of the business plan**

It is important to establish the key perimeters of the project that will provide the framework and context for the business plan. These may be split between the bridge and its immediate setting and the wider geographic catchment to the north and south of the river. From this it may be possible to identify both the direct economic return from the project and the wider impact it may have on the surrounding economy both for construction and during its operation over an agreed period of time.

Key parameters include:

- Defining the immediate project boundary and wider catchment of the bridge
- Areas of park and public space that will be created and improved
- Current pedestrian and traffic flows and use of public transport facilities
- Pedestrian capacity, pedestrian flows and wider connectivity created by the bridge
- Adjacent construction and development associated with the project
- Direct opportunities for concessions, retail outlets and business development
- Wider development opportunities within the defined catchment of the bridge
- Current commercial, retail and residential baseline including property and rental values

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<sup>2</sup> Parks Forum (2013) *Economic Value of Parks, Establishing the need for an industry wide approach*

## 2.2 Economic criteria

There are a number of common criteria that are used to measure the economic impact of individual parks and wider park systems. Work by the TPL suggest seven major factors that should be considered – property value, tourism, direct use, health, community cohesion, clean water and clean area – and can be enumerated. Two of the criteria provide *direct income* through tax generated by increased property value and increase sales tax on the proportion of spending than can be attributed to tourists and visitors specifically drawn to visit particular parks.

TPL also calculates the *collective wealth* gained through property appreciation and revenue from tourists and visitors, *direct savings* through free use, improved health and better community cohesion and *environmental savings* from the natural systems that are at work within a park. With these criteria geared towards parks in the traditional sense, not all will be applicable in assessing the impact of the Garden Bridge.

In building the business case it is suggested that the following four criteria may be considered to calculate the economic return. All are commonly used as indicators in several of the studies referenced.

## 2.3 Land and property value

A key feature of well-designed and well-managed parks is their ability to increase land and property value. The challenge for public investment is to find reliable ways to recoup a proportion of this investment back as public benefit. It is worth noting that the co-founders of the High Line<sup>3</sup> consider one of the biggest lessons for their project has been the failure to capture much of the value it has generated for others. It has been calculated that more than \$2bn that has been invested in the surrounding district as a direct result of the High Line's design and construction.

Ground rents, levies and service charges are often used as a means to recapture some of this value, but this may not be an option for the Garden Bridge. However it may be possible to calculate the increase in sales tax (Stamp Duty) from the sales of properties that are likely to increase in value from proximity to and association with the bridge. It may also be possible to calculate the increase in council taxes and business rates in a similar manner. In the United States this uplift in taxation provides a mechanism for investing public funds on park projects and is known Tax Increment Financing. Specific criteria may include:

- % of new retail, hotel, office and residential units constructed through direct and wider development associated with the bridge
- % increase in property, office and hotel rents adjacent to the bridge
- % increase in residential and commercial value attributed to views of the bridge
- Increase in revenue from increasing rents and leases for properties close to the bridge
- Increased resale values on properties adjacent to the bridge

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<sup>3</sup> BBC News Magazine (2012) *New York's High Line: Why cities want parks in the sky*, Robin Banerji 11/10/12 See: <http://www.bbc.co.uk/news/magazine-19872874>

CABE Space<sup>4</sup> found that there can be wide variations in the uplift in property values which can be up to as much as 34%, although properties adjacent to a park 'generally clustered at around a 5% to 7% premium over an identical property in the same market area, but outside of the influence of the park'. GLA<sup>5</sup> research notes that 'the presence of a regional or metropolitan park within 600 metres was found to add between 1.9% and 2.9% to total house value'. In the United States research from Dayton, Ohio<sup>6</sup>, found 5% of the selling price of homes near the Cox Arboretum and Park was attributable to the proximity to that open space. Whilst the impact of Chicago's Millennium Park<sup>7</sup> found that over six years 'rents in apartment buildings adjacent to the park increased 22.4% since the park opened in 2004'.

## **2.4 Direct use, income and return on investment**

This benefit is split between that which can be captured as a direct return on public investment and that which is generated as a wider benefit. This is described by the TPL as the collective wealth that may be generated by a park. Some direct public income can be captured through standard contributions from development gain. It may also be taken through concessions or rents generated directly by any publicly owned assets associated with the park. In addition the 'willingness to pay' for benefits that are free of charge that represent a saving or benefit to park users may be calculated. This may not be an appropriate criteria for the Garden Bridge which is specifically planned to be free to access as are all other bridges across the Thames. Specific criteria may include:

- Direct spending, rents or service charging that can be recouped by the public sector
- Development contributions including s106 planning gain and contributions to the Community Infrastructure Levy
- Indirect income generated by vendors in the park or from adjacent businesses, eg gift shops, restaurants, cafes and bars
- Indirect income generated privately through development and the growth of businesses associated with the bridge

Although very different in stature and character to the Garden Bridge, it has been calculated that New York's Central Park<sup>8</sup> generated \$135.5m in 2007 through the concessions and other businesses and organizations in the park. Using employment data supplied by the businesses and other organizations that operate in the park it was estimated that this directly generated \$6.2m in New York City income, sales, and business taxes. It was also calculated that the Department of Parks and Recreation collected \$8.7m in concession permits and \$1.1m in special events permits.

Whilst a much smaller example, concessions and the commercial hire of London's Potters Fields Park generate the majority of its operating costs each year. When projected over several years this represents a significant economic value and return for the park and it will be important that the Garden Bridge considers income generating opportunities at an early stage of its development.

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<sup>4</sup> CABE Space (2005), *Does Money Grow on Trees?* Summary p6

<sup>5</sup> GLA Economics (2003 & 2010), *Valuing Greenness - Green spaces, house prices and Londoners' priorities.*

<sup>6</sup> CABE Space (2005), *Does Money Grow on Trees?* Full report p12

<sup>7</sup> Texas A&M and DePaul University (2011) Millennium Park, Quadruple net value report, p29

<sup>8</sup> Appleseed (2009) *Valuing Central Park's Contributions to New York City's Economy*, p52





Peter Neal

*The High Line spends \$5m annually and employs 36 operational staff directly involved in maintaining and running the park*

## 2.5 Job creation through construction and maintenance

This is a relatively straight forward metric for assessing the employment and job creation impact of the bridge. It should look to include direct employment during construction as well as the long term maintenance of the park landscape and bridge structure. It may also assess the impact of associated job creation and employment generated by additional construction and business activity within the catchment of the project during construction and over the long-term. Specific criteria may include:

- Construction cost of bridge including capital generated through private sources
- Estimated job creation by both the project and by associated supporting activities
- Increase in construction, development and improvement adjacent to bridge
- Long-term job creation generated by increase in business supported by the bridge
- Staffing for the maintenance and management of the bridge over the long-term
- Annual costs spent for maintenance of the park

It is estimated that the construction of the Garden Bridge will cost approximately £150-170m. The first two phases of the High Line cost \$153m / £92.4m (by 2012) with the third stage estimated to cost a further \$90m / £54.2m (2014). The Promenade Plantée is estimated to have cost £15.3 (1998 figures). The budget for the Queen Elizabeth Olympic Park varies depending on which elements of enabling works are included but has been recorded to be approximately £200m for the construction of the park and adjacent green spaces.

It has been calculated that construction adjacent to the Millennium Park in Chicago<sup>9</sup>, valued at \$2.45bn, created over 70,000 additional construction jobs. Of this, more than 23,000 were direct jobs in construction, over 11,000 from indirect and 35,000 from induced job creation. Staffing for the management of the High Line includes 36 operational staff directly involved in maintenance of the park although the Friends of the High Line employs over 80 people. The annual operating budget is \$5m, although additional staffing and activity costs increase this to \$7.6m annually.

## **2.6 Tourism value**

The return from the tourist economy is expected to play an important part of the business case. Parks have been shown to benefit from considerably higher numbers of tourists than traditional visitor destinations. For example Clissold Park in Hackney enjoys the same number of visitors as the National Portrait Gallery and considerably more than St. Pauls Cathedral (2.1m, 2.1m and 1.8m respectively). Quality parks have also been shown to boost the tourist economy. Visit Britain<sup>10</sup> has found that of the 31 million tourists visiting Britain over a third enjoy visiting a park or garden, one of the most popular activities ranking above visiting a museum, castle, historic house or art gallery.

Calculating the economic contribution will require estimates of the number of people specifically coming to visit the bridge and their expected spending patterns for day visitors and those that stay overnight. Specific criteria may include:

- Projected number of annual visitors
- Projected number and catchment of annual events (if any)
- Direct spending generated from tourism and general use
- Tax revenue generated from tourism and general use

The TPL has undertaken some of the most details analysis of tourist spending for parks in the United States. A study on the spending of tourists who visited San Diego<sup>11</sup> specifically because of their parks was calculated to generate around \$114m in additional visitor spending per year and over \$8m in tax revenue for the city (2006). Millennium Park in Chicago<sup>12</sup> has 5m visitors annually and it has been projected that gross sales from visitor spending is £1.9-2.6bn (ten year estimate to 2015).

In addition to the direct draw that the Garden Bridge will have for tourists and visitors it will also play an important role in providing an important pedestrian-friendly tourist connector linking a number of other tourist attractions. This will contribute to enhancing the wider visitor experience along the Thames and increase the broader tourist offer and within central London.

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<sup>9</sup> Texas A&M and DePaul University (2011) Millennium Park, Quadruple net value report, p35

<sup>10</sup> Visit Britain (2013) *Overseas visitors love our parks and gardens*. See: [www.visitbritain.org/mediaroom/pressreleases/parksandgardens.aspx](http://www.visitbritain.org/mediaroom/pressreleases/parksandgardens.aspx)

<sup>11</sup> Trust for Public Land (2009) *Measuring the Economic Value of a City Park System*, p4

<sup>12</sup> Urban Land Institute (2008) *Urban Design and the Bottom Line*, p136



<http://www.bridgeofflowersmass.org/gallery.html> / Phil Haber Photography

*The Bridge of Flowers in Shelburne Falls, Massachusetts – one of the few other planted bridges in the world*

### 3.0 Wider social, cultural and environmental benefits

In addition to the direct economic return that can be gained from investing in public parks there are a number of wider direct and indirect social and environmental benefits that may be considered as criteria for the business case. The extensive evaluation of Chicago's Millennium Park used a quadruple benefit methodology described in the ULI's Urban Design and the Bottom Line. Net value metrics for real estate projects were determined for the sustainable; social and cultural; economic; and, sensory and environmental attributes.

In the UK, early research from CABI Space on The Value of Public Space<sup>13</sup> compiled empirical research on economic values along with impacts on physical and mental health; benefits for children and young people; reducing crime and the fear of crime; social dimensions; movement between spaces; and, the value from biodiversity and nature. More recently research into the valuing of green infrastructure and ecosystem services<sup>14</sup> has been structured around four key service attributes that were initially set by Millennium Ecosystem Assessment in 2005. These are Cultural Services, Provisioning Services, Regulating Services, and Supporting Services. Whilst the provisioning and supporting attributes are less likely to provide appropriate metrics for the business case, some of the cultural and regulating services may provide suitable criteria to consider.

<sup>13</sup> CABI Space (2004) *The Value of Public Space, how high quality parks and public spaces create economic, social and environmental value*. Commission for Architecture and the Built Environment, London.

<sup>14</sup> UK National Ecosystem Assessment (2011). *The UK National Ecosystem Assessment: Synthesis of the Key Findings*. UNEP-WCMC, Cambridge.

It is anticipated that the parallel review of evidence for the Garden Bridge business case being undertaken by ettec will set out evidence of metrics used to measure the wider economic, social and environmental impacts that can be gained from green infrastructure. The following table provides evidence of some additional benefits that can be gained specifically from investing in public parks and the wider public realm. The reference numbering relates to key studies referenced and numbered within this report.

<i>Criteria</i>	<i>Reference</i>
<b>3.1 Social and community benefits</b>	
A Physical health benefits - can be gained from greater pedestrian connectivity as 'even small increases in walking and cycling could benefit our health'	26/p6 ref 7
B Active lifestyle benefits - can be demonstrated to generate savings in health care savings. TFL has established a Public Health Benefits Calculator for assessing the health benefits of public parks.	14/p7-8
C Psychological benefits - when in proximity to nature, people have a more positive outlook on life, with higher life satisfaction and lower stress levels	23/p27
D Community participation benefits - establishing friends and park user groups provides opportunities for fundraising and participation in management. Volunteer time and monetary value can be calculated for this.	14/p9-10 25/p48
<b>3.2 Cultural and amenity benefits</b>	
A Visual amenity benefits - enhancing the visual amenity and character of the area increases users and adds value to both property and businesses	13/p140-1
B Brand association benefits - it has been shown that the place branding of urban districts and businesses includes associations with well-designed and managed parks	20/p24-25 24/p3-4
C Cultural benefits - can be derived directly from events and activities run exclusively by parks or in association with surrounding urban districts.	14/p6 20/p14
D Public art benefits - the installation and use of public art and cultural programmes enhances perception, profile, media interest and increases visitor numbers	19/p27 20/p15-16
<b>3.3 Urban Design and Placemaking benefits</b>	
A Character benefits - there is evidence of a relationship between the greenery, aesthetics and upkeep of parks and surrounding neighbourhoods and increased use and physical activity.	26/p12 ref 26 22/p15
B Safety benefits - well designed and managed parks can be shown to reduce crime and the fear of crime, lower reported crime and increase in public use	13/p253 20/p7

C	Accessibility benefits - improved access to public transport and better facilities for disable people can improve use and activity.	20/p66-7 22/p11
D	Pedestrian capacity benefits - increase in quality of pedestrian routes enhances value and better capacity will reduce overcrowding across the public realm	21/25

### 3.4 Environmental benefits

A	Environmental education benefits – opportunities for participating in planned events and activities along with interpretation resources can increase learning	19/p11 20/p48-49
B	Carbon reduction benefits - increased green space supporting walking and cycling contributes to carbon savings and reduces carbon emissions	14/p13-14 20/p44-6
C	Urban biodiversity benefits – green space can provide important habitat for flora and fauna and green corridors can support the movement of birds and insects	05/p171
D	Air quality benefits – green spaces, and trees in particular improve air quality through filtering particulates and can reduce peak summer temperatures	05/p70-5 14/p13-14

Additional references for wider benefits:

- 2007 - CABE Space, *Paved with Gold, the real value of good street design* [21]
- 2007 - Centre for Public Health, *Returning urban parks to their public health roots*. Liverpool John Moores University [22]
- 2007 - Journal of Public Mental Health v6/i3, *People and green spaces: promoting public health and mental well-being through ecotherapy* [23]
- 2010 - Konijnendijk, *Green Cities, Competitive Cities, Promoting the Role of Green Space in City Branding* [24]
- 2012 - Greenspace, *Community Networking Project* [25]
- 2013 - RIBA, *City Health Check, how design can save lives and money* [26]



P Neal / Map - Friends of the Highline

The High Line New York

#### 4.1 Park Precedents - The High Line, New York

##### Key Facts

- Rail line built in 1931 and ceased operation in 1980
- Friends of the High Line (FHL) established in 1999
- Design competition held in 2003, construction started in 2006 phase one opened in 2009
- 1.45m / 2.33km in length, 4.7 acres / 1.9 hectares in area (2009)
- Total cost of the project (by 2012) was \$153m / £92.4m, plus \$90m for phase three railyards
  - \$112.2m from NY City, \$20.7m from Federal Government, \$0.7m from NY State
  - \$19.4m raised by (FHL) - \$12.5m fundraising, \$6.9m developer contributions
- Total annual operating budget \$7.6m including \$5m direct operational costs
  - Maintenance calculated to be \$671,641 per acre (New York Post)

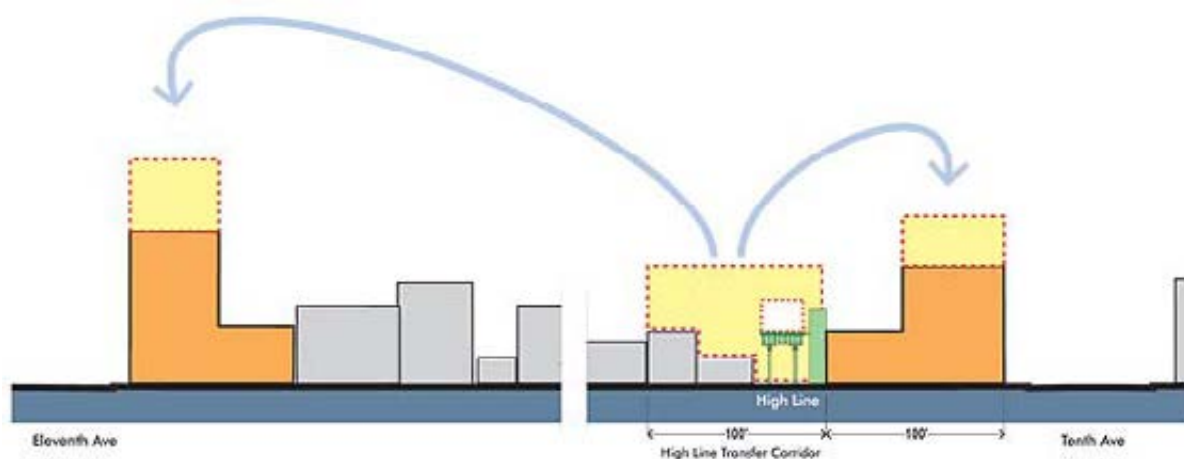
##### Economic Data

- Over 3.7m people visited in 2011 and over 4.4m in 2012 with 50% out of state
  - At peak times approximately 20,000 visit the high line per day
- 60% increase in population of surrounding district between 2000 and 2010
- 29 major development projects (19 complete, 10 underway in 2013)
- More than \$2bn private investment since 2006
  - Estimated \$900m (£563m) in new residential and commercial development (2007)
  - Estimated \$262m (£164m) in tax revenues over 20 years (2012)
- 8,000 construction jobs and 12,000 jobs in the area
- 2,558 new residential units
- Since opening price of apartments doubled to about \$2,000/SqFt (2011)
- 1,000 hotel rooms
- more than 423,000 square feet of new office space
- 85,000 square feet of new art gallery space

## Impact from Rezoning

A key mechanism in unlocking the sale of the High Line to the City was agreed during the rezoning of the East Chelsea district by the City. The transfer and sale of development rights that rested with the land owners under the High Line to designated receiving sites within Special West Chelsea District sites away from the High Line allowed the Chelsea Property Owners to withdraw their application for demolition. Within a 100-foot wide High Line Transfer Corridor, owners of property were permitted to transfer their development rights, equivalent to the base Floor Area Ratio (FAR) for the property, to designated receiving sites within the Special District.

Where needed, the construction of stair access to the High Line was required as a condition of the transfer on some properties. In addition, in certain areas where the structure of the High Line widened adjacent development blocks could receive additional FARs by providing significant improvements to the High Line including stair and elevator access, public toilets and maintenance space.



## High Line Economic and Fiscal Impact Analysis 2002 (RAA Inc.)

To secure public sector commitment for funding, the Friends of the High Line commissioned John Alschuler of Hamilton Rabinovitz and Alschuler Inc (HR&A) to undertake an economic feasibility report for the project in Summer 2002. HR&A had completed a similar study for New York's Olympic Bid that was to be centred on the Hudson Rail Yards at the northern end of the High Line and understood the socio-economic character of the district in great detail.

The content of 'The High Line: The Feasibility and Economic Impact of Re-Use' study was not made public although the report gave assurance that it was feasible to construct and operate the High Line in line with Federal and municipal regulations and laws. It also demonstrated that converting the rail line into a new public park would produce economic and social benefits that far outweighed the cost of demolition. In addition, new tax revenues created by the public space were shown to greatly exceed the costs of construction, projecting that a net present value benefit to the City from property taxes of approximately \$140m over a 20 year period could be achieved (this was increased to \$260m in 2007).

### **High Line Economic Impact Assessment 2011 (RAA Inc.)**

HR&A revisited their earlier 2002 economic assessment and provided an update in May 2011. This report has also not been made public. They worked with the research team of Corcoran-Shunshine, a real estate specialist to estimate the incremental uplift in residential property in the West Chelsea district of the High Line in comparison to adjacent neighbourhoods with similar characteristics.

The assessment also combined FHL visitor survey information with data from NYC & Co., the City's marketing and tourism partnership. This allowed for estimates to be calculated for net spending and City tax revenue generated through additional visitors to the City whose primary reason would be to visit the High Line. The economic review assessed:

- Development trends across the West Chelsea Neighbourhood surrounding the park
- Compared values with East Chelsea and Tribeca to provide a comparative baseline
- Tracked the use of the park in marketing, photo shoots and filming
- Mapped the increase in value of residential unit resale
- Calculated the increase in property tax revenue for the district
- Assessed proportion of visitor spend that could be attributed to the High Line  
Split between Direct Economic Activity and Multiplier Economic Activity

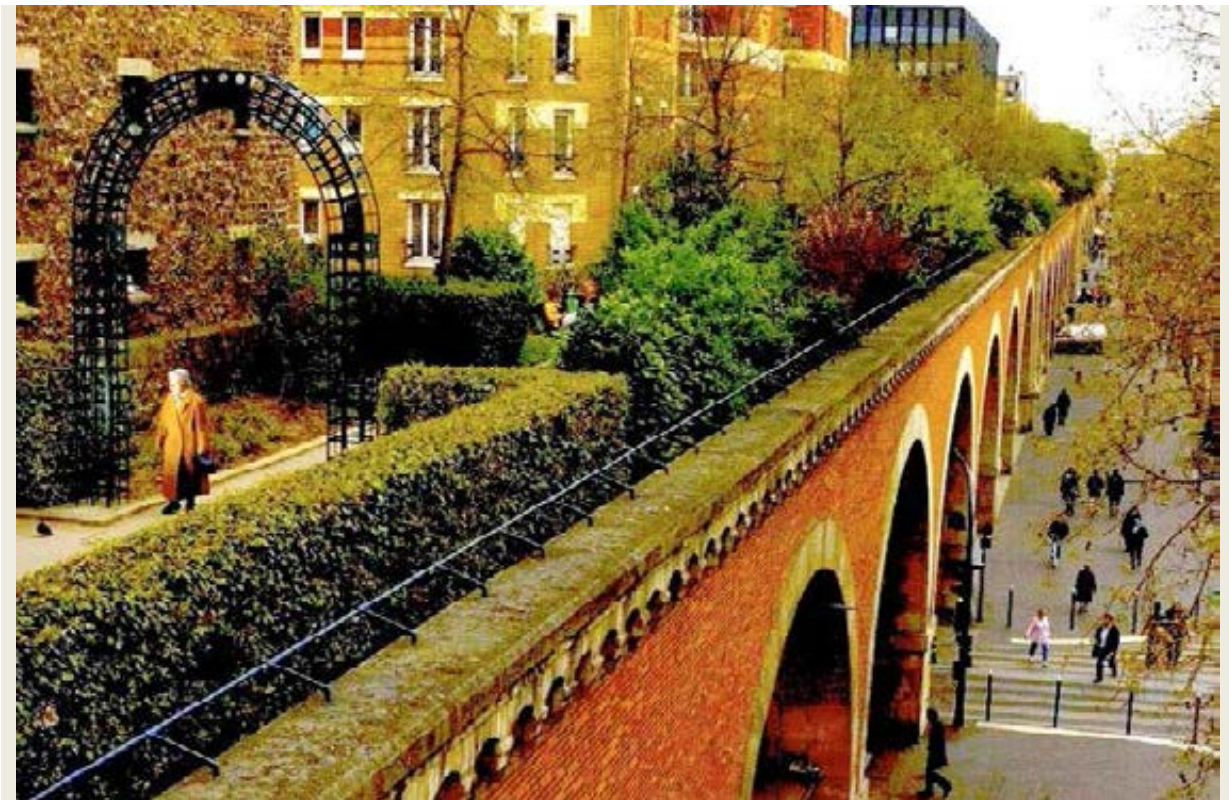
### **Direct correspondence**

- Robert Hammond - Co-Founder, Friends of the High Line
- Kate Lindquist - Director of Communications and Marketing, Friends of the High Line
- Peter Mullan - Executive Vice President, Planning and Design, Friends of the High Line
- Candace P. Damon - Vice Chairman, HR&A Advisors Inc.

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- NYC Planning (2011) Mayor Bloomberg opens section two of the high line. Press release 7 June , 2011. <http://www.nyc.gov/html/dcp/html/about/pr060711.shtml>





<http://timspears.blogspot.co.uk/2013/11/01/archive.html> - Image courtesy of Eurotrips

*Promenade Plantée, Paris*

## 4.2 Park Precedents - Promenade Plantée, Paris

### Key Facts

- Railway opened in 1895 and ceased operation in 1969
- Park built on top of obsolete railway infrastructure in the 12th arrondissement of Paris
- Scheme designed by Landscape architect Jacques Vergely and architect Philippe Mathieux
- Section of elevated rail line 2.9 mile / 4.7 Km long with a total area 6.5 ha
- First opened to the public in 1998 and finished in mid-2000
- Also referred to as the Coulée verte (Green Corridor)

### Economic Data<sup>15</sup>

- Construction cost \$25m US/ £15.3m (1998 rate)
- Project has seen the addition of 75,000 Sqft of new commercial space and more than 200,000 Sqft of office space
- From 1990 88 old buildings with over 1,000 new housing units were restored
- Remaining 25 vacant building lots quickly leased or put under contract for housing, commerce, schools and recreational activities.
- Housing rent has increased by 10% adjacent to the Promenade Plantée
- Costs of park maintenance is covered through revenues from the shops underneath

<sup>15</sup> González-Campaña, J.(2002) From Promenade Plantée to the New York High Line, Yale School of Forestry page 8. See: [http://environment.yale.edu/hixon/files/pdf/2002\\_JGCampana\\_Promenade.pdf](http://environment.yale.edu/hixon/files/pdf/2002_JGCampana_Promenade.pdf) [accessed 20/03/14]



### Economic impact

The project came about through the expansion of the RER commuter rail system, which made the old elevated line in eastern Paris redundant by the early 1970s. Residents initially sought the demolition of the old viaducts that were underutilised and were having a detrimental impact on property values. During the 1980s the view shifted towards creatively refurbishing the 71 arcades for local business and establishing a fully accessible green corridor for pedestrians. The city of Paris and SEMAEST, a society for the development of eastern Paris, agreed to convert the elevated line into a linear park, and construction began in 1988. The project broke new ground for the city in its mix of public and private development objectives and has become an important point of reference for the adaptive reuse rather than demolition of old rail infrastructure.

However, the city was initially cautious about the economic benefit that the Promenade Plantée would be able to deliver for this declining and neglected district but, in contrast to the High Line which is exclusively a park project, the Promenade Plantée has been able to combine two separate, but interconnected projects - the commercial redevelopment of the now vibrant Viaduc des Arts (<http://www.leviaducdesarts.com/>) with an elevated green parkway. The arcades are home to an eclectic and creative network of boutiques, craftsmen and artists and since the completion of the project the wider neighbourhood has benefitted from additional investment and redevelopment.

The Paris parks department is responsible for managing the Promenade with rental income from the businesses cross funding this maintenance. A local development corporation manages the archway spaces and adjacent developments under an 18-year lease. It has been noted that these separate management arrangements have limited the ability to coordinate events and activities for the benefit of the wider city district.

### Direct correspondence

- Joseph Heathcote - Associate Professor of Urban Studies, The New School, NYC

### References

- González-Campaña, J. (2002) From Promenade Plantée to the New York High Line, Yale School of Forestry
- Heathcote, J. (2013) The Promenade Plantée: Politics, Planning, and Urban Design in Post-Industrial Paris. Journal of Planning Education and Research
- Plan of the Promenade Plantée available at: <http://equipement.paris.fr/coulee-verte-rene-dumont-ex-promenade-plantee-1772>



Urban Engineers and Studin / Bryan Hanes

*Illustrative proposals for the SEPTA Spur section of the Reading Viaduct in Philadelphia (Jan 2012) budgeted at \$6.8m*

#### 4.3 Park Precedents – Reading Viaduct, Philadelphia

##### Key Facts

- 1 mile long with 2 branches that covers 4.7 acres / 1.9 Ha
- Railway viaduct was constructed in the 1890s and last operated in 1984
- Friends of the Rail Park was established in 2010
- Preliminary designs prepared in 2012 by Studio Bryan Hanes and Urban Engineers for the 0.2 mile SEPTA (Southeastern Pennsylvania Transportation Authority ) Spur

The Center City District Business Improvement District commissioned an environmental and feasibility analysis of the entire viaduct in 2010. Urban Engineers, Cecil Baker + Partners; and Friends of the High Line appointed as consultants. Feasibility funded by \$75K grant from William Penn Foundation and the Poor Richard's Charitable Trust.

##### Initial project budgets and impacts:

- Full demolition of viaduct \$50m
- Option1 - Total renovation and remediation of the viaduct \$37m
- Option 2 – Initial construction of parks and connecting paths \$9.8m
- Impact of demolition +1-4% increase in value, impact of redevelopment +4-8% increase

##### Direct correspondence

- Paul Levey - CEO, Center City District BID, Philadelphia

##### References

- Reading Viaduct Project - <http://readingviaduct.org/> merged with Friends of the Rail Park - <http://therailpark.org/> in October 2013
- Summary of the project and video <http://www.centercityphila.org/about/viaduct.php>



<http://www.thehighline.org/newsletters/072310.html> / David Schalliol

View of Chicago's Bloomingdale Trail

#### 4.4 Park Precedents – Bloomingdale Trail, Chicago

##### Key Facts

- 2.65 mile long elevated railroad with 37 viaducts
- Constructed in 1873, last used in 2001
- City of Chicago first investigated conversion in 1997
- Friends of the Bloomingdale Trail (FBT), was formed in 2003
- Preliminary estimates put the total cost at \$91m.
- \$43m has currently been raised of which \$43m is from public funds
- Construction began on Phase 1 (\$53.7) in August 2013, scheduled to complete autumn 2014

The TPL was commissioned in 2010 to coordinate the Bloomingdale Trail Civic Engagement and Stewardship Project in partnership with Chicago Departments of Transportation, Parks, Housing and Economic Development and Cultural Affairs and Special Events. Phase I design team is led by ARUP with Carol Ross Barney, Michael Van Valkenburgh Associates, Burns & McDonnell, and the Chicago Public Art Group. A full framework plan was completed in 2012. Described as the longest elevated park in the world it has been branded as *The 606* as reference to the surrounding post code district. Whilst there is limited detail on the expected economic impact of the project, a 2011 study on Chicago's Millennium Park calculated that it generated \$2.45bn in adjacent development.

##### References

- History, background and FAQs on the project (2011):  
[https://www.cityofchicago.org/content/dam/city/depts/cdot/BloomingdaleTrail\\_INFO\\_2011.pdf](https://www.cityofchicago.org/content/dam/city/depts/cdot/BloomingdaleTrail_INFO_2011.pdf)
- Framework plan (2012) for the project available at:  
<http://the606.org/wp-content/uploads/2013/08/Bloomingdale-Framework-Plan-small.pdf>
- Detailed design drawings available at: <http://the606.org/design/final-design-plans/>
- Construction updates available at: <http://the606.org/march-28-2014-construction-update/>



Timber Lodge Café Queen Elizabeth Olympic Park

#### 4.5 Park Precedents – Queen Elizabeth Olympic Park, London

##### Key Facts

- Olympic Parkland 102ha in size which includes 45ha of ecological habitats
- Constructed between 2006 and 2011, opened in 2012, transformation complete in 2014
- Headline budget for construction of landscape and greenway £206m
- 75% of initial funding for the park has been retained in legacy.
- Capital expenditure for Park Opening and Operations - £92.3m (2012/13 )
- Revenue expenditure for Park Opening and Operations - £5.4m (2012/13)

Towards an Outline Business Plan for the Olympic Legacy Park was prepared by Grant Thornton for the Olympic Delivery Authority and the London Legacy Development Agency in 2007. The report was not made publically available but included comparative capital costs for constructing public parks and baseline operating costs for London parks. These were prepared for the Olympic Delivery Authority by CABE Space. An initial 10 Year Management and Maintenance Plan was prepared for the park by ETM Associates with LDA Design/Hargreaves Associates. This included details on the estimated annual operating costs for the park totalling £3.24m (2009) with a post-Games operating budget for 2013 estimated at £3.65m.

##### References

- London Legacy Development Corporation Business Plan 2013/14-2015/16 available at: [http://queenelizabetholympicpark.co.uk/~media/QEOP/Files/Public/LLDCBUSINESSPLANv42012\\_132015\\_161.pdf](http://queenelizabetholympicpark.co.uk/~media/QEOP/Files/Public/LLDCBUSINESSPLANv42012_132015_161.pdf)
- London 2012 - Delivering the Economic Legacy (2013) available at: <http://www.ukti.gov.uk/export/sectors/globalsportsprojects/olympics2012.html>
- Olympic Park Management and Maintenance Plan (2008) available at: <http://learninglegacy.independent.gov.uk/publications/the-olympic-park-management-and-maintenance-plan.php>
- Key economic impact statistics prepared by the London Legacy Development Corporation <http://www.londonlegacy.co.uk/news-and-resources/the-legacy-of-the-olympic-park/>



# Support for the Garden Bridge Business Case

## Task 1 Report - Review of Evidence

Submitted to Transport for London

March 2014

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# 1. Introduction

## 1.1 Background

The 'Garden Bridge' has been proposed as a new pedestrian crossing of the River Thames in central London, linking Temple station to the South Bank. The bridge will provide a new public garden featuring plants, trees and walkways. Transport for London (TfL), the statutory planning authority of transport in London, is preparing a business case that will examine the strategic, economic, commercial, financial, and management case for the public sector funding contribution for the bridge. The business case will be formally submitted to the Department of Transport (DfT) - in line with TfL's statutory remit - but will also be examined by DCMS and HM Treasury.

In developing the business case for the Garden Bridge, TfL has identified a lack of open urban green space in the local area as being a key problem for the project to address. A series of alternative options have been identified, which includes the proposed Garden Bridge:

- Do-nothing: no change to existing arrangements;
- Enhance Waterloo Bridge: change the layout of Waterloo Bridge, converting half of the surface area into a garden and pedestrian route, and keeping two traffic lanes;
- Extend Waterloo Bridge: create an additional structure with a garden and pedestrian route attached to the side of Waterloo Bridge;
- Garden Bridge (Temple to South Bank): create a new bridge with a garden and pedestrian route, linking between Temple station and the South Bank; and
- Garden Bridge (existing Blackfriars piers): create a new bridge with a garden and pedestrian route, using the existing bridge piers next to Blackfriars railway bridge

The business case also identifies the range of investment objectives and opportunities against which to appraise the set of options, the potential benefits of which include: a new urban park; improved pedestrian links; an iconic structure; visitor and tourism attraction; and regeneration. At present TfL is in the process of examining and compiling evidence on these potential benefits as part of the development of the business case.

## 1.2 Objective

The purpose of this study is to support the development of the TfL Garden Bridge business case. The specific objectives are:

1. Review and compile evidence from previous studies - including both UK and international evidence - that demonstrate and measure the benefits associated with similar types of projects; and
2. Provide guidance on how the available evidence may be applied in the Garden Bridge business case in the assessment of the potential benefits of the alternative options.

A particular emphasis of the work is the assessment of the relevance of the available evidence, and how this may be appropriately framed to align with the narrative of the TfL business case and potential benefits of the proposed options that are being examined. An informal steer from DCMS has indicated that the cultural and iconic value associated with the Garden Bridge should be principal focus of the benefit assessment. It is recognized, however, that the time frame for developing the business case means that it is not possible to undertake primary research using economic valuation methods (e.g. stated preference methods) to directly estimate the cultural

value associated with the project. Hence the assessment methodology will be reliant on ‘value transfer’ principles that seek to assess the benefits of the project under consideration based on evidence produced for similar projects. Further feedback from HM Treasury has indicated that a ‘weight of evidence’ should support assessment of benefits within the Garden Bridge business case, rather than relying on a single comparator project.

### 1.3 Report structure

This report presents a summary of the review of evidence from previous UK and international studies. It has been prepared in advance of a workshop with TfL on the 31<sup>st</sup> March 2014.

Following this introduction, the remainder of the report is structured as follows:

- Section 2: Review of evidence - this provides a high level summary of the content and types of evidence presented in previous studies.
- Section 3: Application of evidence - this summarises some initial conclusions from the review of evidence and outlines the next steps for applying this in Garden bridge business case.

In addition, the supporting annex provides a reference list of reviewed studies, detailing the type of project and benefits assessed, location, the type of evidence provided, methods and key results of literature reviewed.

## 2. Review of evidence

### 2.1 Overview

The review of evidence focuses on previous studies that have considered similar types of benefits to those being examined for the Garden Bridge business case. In summary these are outcomes and benefits associated with the following:

- New urban park: providing new public park space in central London, linking existing park areas and creating a new type of place and new perspectives on the city;
- Pedestrian links: improving the pedestrian environment in the local area, providing a further pedestrian-only bridge with step free access from river walkway to Waterloo and Blackfriars bridges;
- An iconic structure: creating a new architectural icon ensuring that London keeps pace with other international cities such as New York (High Line) and Paris (Promenade Plantee) and showcasing British design, engineering, and creativity;
- Visitor attraction and tourism: encouraging additional visitors and spending in the local area; and
- Regeneration: increasing activity in the area of the north bank compared to adjacent areas of central London (Northbank BID) and the Waterloo Opportunity Area.

The review encompasses published academic studies and wider literature, including reports from government and non-government organisations. Studies were identified from previous surveys of available evidence - including the benefits of green infrastructure (eftec, 2013; CABE, 2010; Duguid, 2011) and cultural and historic heritage (eftec, 2005; HLF, 2011) - and via searches of the following databases: the Environmental Valuation Reference Inventory (EVRI); Science Direct; Wiley Online Library; and Google Scholar. Both UK and international studies were reviewed in order to provide a broad scope of evidence that demonstrate and measure benefits associated with similar projects.

Two alternative perspectives of the potential benefits of the Garden Bridge are examined via the review of evidence: (i) the economic, social and environmental benefits associated with green infrastructure, which incorporates the urban park, pedestrian links, visitor and tourism, and regeneration aspects of the business case; and (ii) values associated with iconic cultural assets. This approach ensures that the review provides a comprehensive basis for identifying evidence that may be relevant all potential benefits being examined in the Garden Bridge business case.

For reference, the accompany annex provides a summary of relevant studies, detailing the type of project and benefits assessed, location, the type of evidence provided, methods and key results of literature reviewed.

### 2.2 Green infrastructure

'Green infrastructure' can be variedly and broadly define. However characteristically it can be considered as a planned approach to the introduction or management of nature (often in the urban environment) in order to provide benefits to residents, including features such as street trees, gardens, green roofs, community forests, parks, rivers, canals and wetlands.

### **2.2.1 Focus of studies**

Studies examining the impacts from green infrastructure focus (broadly) on its economic, social, and environmental benefits. The majority of studies reviewed examine the value of green infrastructure in terms of the provision of urban green space, including (proposed and completed) publically accessible squares, gardens, parks, etc. This includes the value associated with the visual amenity of green space along with recreational uses. Studies also typically examine the environmental benefits in terms of air quality and climate change regulation (i.e. carbon sequestration) (the provision of so-called 'ecosystem services'). These studies apply a variety of methods to quantify and measure the value associated with exposure (physical and visual) to and proximity to green space, including the evaluation of property markets and associated premiums in regard to proximity to green space (hedonic pricing methods) and surveys eliciting individuals 'willingness to pay' for an improvement in (or willing to accept as compensation for deterioration of) access or proximity to green space. Both approaches can provide a measure of the monetary value of the benefits to local populations of green space. Key evidence from these studies is discussed below.

A number of studies examine qualitatively how the built and natural environment 'looks and feels' in order to establish the significance of this in current and future resident's preferences towards different proposed developments, neighbourhoods, towns and cities. Largely the evidence indicates that the perceived aesthetic character of a location is among the most important factors in determining community satisfaction (Ahlfeldt, 2012; Florida et al., 2009; Alberini et al., 2003, 2004; Ernst and Young, 2003). This aligns with studies show that people have a preference for development projects and built environment that incorporates green space (Mell, 2012; Gensler and the Urban Land Institute, 2011; CABE, 2010; Chau and Chung, 2010; Alberini, 2003; Lindsey and Knapp, 1999).

### **2.2.2 Economic impacts**

Analysis of the economic impacts associated with green infrastructure focuses on the benefits that can arise from its visual impacts and transformative properties - i.e. the ability to significantly change the way people use and perceive a space. The rationale being that well-designed and maintained green space or infrastructure, can add to the aesthetic setting of an area, which can impact its attractiveness to prospective residents and businesses. This can result in an increase in the number of people and/or businesses and investors who want to live, visit and operate in the area, and can therefore increase inward investment (eftec, 2013; Heckert and Mennis, 2012; CABE, 2010; Jones et al., 2009; Alberini, 2004). This is a key reason why green infrastructure is frequently a component of regeneration projects, both in the UK and internationally.

The following types of economic impact are examined studies that consider new development, increased or improved green space and regeneration:

- Increased jobs and wider multiplier effects;
  - For example canal-side redevelopment programmes in Birmingham are calculated as having generated between 2,205 and 2,620 net FTE jobs within the immediate area (GHK, 2007)
- Increased property values in surrounding area;
  - Evidence suggests that developers are willing to pay a premium for land in close proximity to open space (in comparison to similar sites without such proximity), with some putting the premium as high as 15-20% (CoNY, 2011; CABE, 2005; Ernst and Young, 2003)
- Increased tax revenue (subsequent to increased property values);

- For example additional council tax revenue (net, per year) from the renewal of Glasgow Green is estimated to be between £800,000 - £2m per year (GEN Consulting, 2006) with 230 jobs supported and a 15% increase in rateable value of businesses
- Increased investment in a given area (business growth and start-up); and
  - For example after changing the zoning of the area from manufacturing to residential and commercial, and the start of the New York High Line's construction in 2006, new building permits in the immediate vicinity doubled accompanied by more than 29 major development projects accounting for more than \$2 billion in private investment (CoNY, 2011).
- Increased tourism/visitors and spend.
  - For example the direct increase in economic output in Merseyside from tourism spend by visitors to the Mersey Forest was estimated to be £252,000 net gross value added (GVA) per annum (eftec, 2013).

There are however, acknowledged difficulties in measuring these impacts. Where green infrastructure contributes to the attractiveness of a location, there can be a significant contribution to local economic growth (eftec, 2013; GHK, 2007; GEN Consulting, 2006). However the net impact overall is typically neutral due to the displaced activity elsewhere. Where the new activity is displaced from outside national borders, it can increase national economic growth. In addition, it is often difficult to explicitly establish the contribution of green infrastructure when it is included as part of a larger regeneration scheme (DCLG, 2010; Evans and Shaw, 2004; Tyler et al., 2003). Evidence from the reviewed studies also demonstrates that the impacts of green infrastructure projects and investment are dependent on multiple factors including size, location, and the characteristics of the beneficiary population.

The use of multipliers can help to communicate and calculate the wider effects of a project. For instance, use of an employment multiplier can help to evaluate the direct, indirect and induced jobs created or lost in an area due to a project or policy. Direct jobs are related to the specific industry, while indirect jobs are those that support the industry. Induced jobs are those that are a result of direct / indirect employee's spending money in the community, such as jobs supported by increased tourism spend initiated by a project. As an example, GHK (2007) estimated that the increased visitor spend resulting from a canal-side re-development in Birmingham city centre supported between 76 - 96 (full-time equivalent) jobs in the local community.

### **2.2.3 Social impacts**

Beyond the economic impacts, a number of studies also examine the wider social and potential health impacts associated with GI. In particular, there is strong evidence from a large number of studies spanning several years that green space helps alleviate stress, fatigue and other mental health issues, with positive effects on mood, concentration, self-discipline, and physiological stress (see, for example, Health Council of the Netherlands, 2004; Kaplan and Kaplan, 1989; Berman et al. 2008). This effect was found to be especially marked for residents in large urban areas, and in particular for children and young people (Kaplan, 1995; Taylor et al., 2001). Similar effects have been reported in relation to contact with nature in work (Largo-Wright et al., 2011).

There is also an emerging body of evidence linking improved mental and physical health to economic impacts. Mourato et al. (2010) identified three main types of economic benefits arising from improved health: cost savings to the National Health Service (NHS); increased economic output due to a reduction in ill health (morbidity), stress and absence from work; and increased economic output due to a reduction in the incidence of premature death (mortality).

Green space may also act as a catalyst for physical activity, as a number of studies have noted that people living in areas in close proximity to green space have a higher propensity to exercise (Jones et al. 2009; Nielsen and Hansen, 2007; Pretty et al. 2003).

There is also evidence which suggests that further social benefits can arise due to the addition or improvement of green infrastructure including, increased civic pride (improved perceptions of an area, reduced crime rates / reduced fear of crime), and community cohesion and inclusion (participation rates) (Gensler and the Urban Land Institute, 2011; Evans and Shaw, 2006; GEN Consulting, 2006; Ernst and Young, 2003).

#### **2.2.4 Environmental impacts**

The incorporation, improvement and management of green infrastructure can lead to environmental benefits. In particular, visual or aesthetic amenity, climate change regulation benefits (i.e. carbon sequestration and flood regulation), air quality benefits, health benefits and energy savings (i.e. due to shading effects) are among the most commonly discussed (see, for example, eftec, 2013; Gensler and the Urban Land Institute 2011; Green Infrastructure North West, 2010; GEN Consulting, 2006; USDA Forest Service, 2013; Alberini et al., 2004; Ernst and Young, 2003; Lindsey and Knapp, 1999).

To date most environmental benefits associated with green infrastructure projects have been discussed qualitatively in previous studies, but increased interest in valuing the benefits and services provided by the natural environment has led to more valuation techniques being explored. These valuation techniques include both market (i.e. avoided treatment costs) and non-market (i.e. willingness to pay) valuation techniques. As a result, estimates for the environmental services provided by green space are becoming more common, and studies are showing that the potential benefits can be significant (eftec, 2013).

For example, two case studies from the USDA Forest Service (2013) determined that for every US dollar spent on street tree maintenance in Pittsburgh, Pennsylvania, the city receives almost three dollars back in benefits, an average of US \$2.4 million in benefits per year from street trees alone. Research from Baton Rouge, Louisiana, reports that the trees remove about 178,000 tonnes of CO<sup>2</sup> a year, reduce annual home energy costs by approximately US \$8 million a year, and reduce air pollution by 860 tonnes per year.

### **2.3 Iconic structures and cultural assets**

Whilst there is a relatively well-defined body of evidence that examines the benefits of green infrastructure, studies considering values associated specifically with iconic cultural assets are limited. However examples include studies focusing on new stadiums / related to or created for a particular event<sup>1</sup>, and a small literature focused on the value of 'innovative' architectural design (Forte and Girard, 2009), and those associated with valuing structures designed by iconic or famous architects (Ahlfeldt and Mastro, 2012; Fuerst et al., 2011).

There is no consistent definition for an iconic structure or architecture that can be drawn from the literature. However, characteristically these are structures where a significant aspect of its design which derives from other aspects than purely functional and least-cost considerations. These structures usually include a unique or distinctive design, are easily identifiable and associated with

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<sup>1</sup> These studies were not included with the review of evidence as the values of the structures are difficult to assess as distinct from the perceived value of the event for which they were constructed.

specific projects or programme (i.e. The High Line Park in New York City is tied to the regeneration of the Lower West Side), place (i.e. the Sydney Opera House is synonymous with the image of the city) or idea (i.e. war memorials across the globe) (Ahlfeldt and Mastro, 2012; Duguid, 2011).

Among the few studies that have tried to quantify the cultural value of architectural design and iconic architecture, the available evidence does show that iconic architecture has the potential for positive economic impact due to: (i) spending by tourists visiting iconic architecture, (ii) image effects, increased social capital and consumer optimism, (iii) a direct benefit (utility) derived from the aesthetic setting; and (iv) increased identification and civic pride related to a landmark (Ahlfeldt and Mastro, 2012; Fuerst et al., 2011; Forte and Girard, 2009). Through an increase in demand for space in proximity to iconic architecture, these effects can potentially be capitalised in property and values.

For example Ahlfeldt and Mastro (2011) found a price premium of about 8.5% within 50-100m of the nearest Frank Lloyd Wright<sup>2</sup> building in Oak Park, Illinois, and about 5% within 50-250m. These results indicate that an external premium to iconic architecture does exist, although it may partially be attributable to the prominence of the architect. These results match those found by Fuerst et al. (2011) whose analysis suggests that, compared with buildings in the same submarket, office buildings designed by signature architects have rents that are 5% - 7% higher, and sell for prices 17% higher. The results also suggest a rental premium of approximately 5% for signature architects in large architectural practices.

Another strand of evidence that is potentially relevant is conservation of cultural and historic heritage. This features a wider set of studies that have valued the economic and social benefits of conserving the assets (see eftec, 2005). Whilst the focus of research in this area is often not architecture per se, architecture is normally one of the main reasons a structure is given landmark status or an area is designated as a historic asset. A number of studies provide evidence suggesting that people value the preservation of historic monuments and sites (see, for example, HLF, 2011; Alberini, 2004; Pagiola, 201; eftec, 2000, 2005; Garrod et al, 1996; Powe and Willis, 1996). Overall there is an evident complexity associated with culture / heritage goods and their defining characteristics, and no studies have attempted to distinguish the particular impact that architecture has on the cultural or heritage value.

Whilst no quantitative evidence is available in the specific context of footbridges with iconic designs and architecture, Duguid (2011) notes that these can have a role in changing the patterns of behaviour in an environment. In particular the study highlights that in standard a cost-benefit assessment, the preferred option presents the best balance between cost and facilitating rapid and reliable traffic flow. For a landmark footbridge, Duguid contends that there may be as much value in encouraging people to break their movement, to take time to pause and enjoy their surroundings, to gather, or to reflect. Many footbridges consciously foster this behaviour, by providing lean-rails or widened overlooks, and by creating new viewpoints both on and off the bridge.

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<sup>2</sup> Widely recognised as The US's most influential / highly-regarded architect (Ahlfeldt and Mastro, 2011).

### 3. Application of evidence

In advance of the workshop with TfL on the 31<sup>st</sup> March, this concluding section draws together some main findings from the review of evidence in terms of the potential application in the Garden Bridge business case.

#### 3.1 Summary of findings

Table 3.1 summarises findings from the review in relation the type of evidence presented in the reviewed studies. This covers the type of impact (economic, social, and environmental), the type of evidence, the outcomes measured and indicators used, and example studies.

Table 3.1: Summary of literature review findings

Type of impact	Type of evidence	Indicators	Example studies
Economic impacts	Increased jobs and wider multiplier effects	Direct, indirect and induced employment (use of multipliers) Employment rates	Evans, G., Shaw, P. (2004). The contribution of culture to regeneration in the UK: a review of evidence. A report to the Department for Culture Media and Sport. Mell, I. (2012). The VALUE project final report. For the European Regional Development Fund. Duguid, B. (2011). Benchmarking cost and value of landmark footbridges. Footbridge 2011, International Conference, Wroolaw, Poland. July 6 - 8 2011. GHK (2007) The Economic Impact of Waterway Development Schemes: Volume 4
	Increased tourism	Tourist / visitor numbers Tourist / visitor spend	GHK (2007) The Economic Impact of Waterway Development Schemes: Volume 4 GEN Consulting (2006) Glasgow Green Renewal Benefits Analysis, report to Glasgow City Council.
	Increased property values in surrounding area	Property market values	Ernst and Young (2003) How Smart Parks Investment Pays Its Way, New York: New Yorkers for Parks. City of New York (CoNY) (2011) Mayor Bloomberg, Speaker Quinn, and Friends of the High Line Open Section Two of the High Line. [press release] June 7, 2011.
	Increased occupancy	Properties purchased	GHK (2007) The Economic Impact of Waterway Development Schemes: Volume 4 GEN Consulting (2006) Glasgow Green Renewal Benefits Analysis, report to Glasgow City Council. Gensler and the Urban Land Institute (2011) Open Space: An asset without a champion? Report for the Urban Investment Network.



Type of impact	Type of evidence	Indicators	Example studies
	Increased tax revenue (from property value rise)	Increased tax collected through increase in property values	City of New York (CoNY) (2011) Mayor Bloomberg, Speaker Quinn, and Friends of the High Line Open Section Two of the High Line. [press release] June 7, 2011. GEN Consulting (2006) Glasgow Green Renewal Benefits Analysis, report to Glasgow City Council.
	Increased local investment	Business growth / start-up Amount (£) and number of new development applications Income / spending and 'wealth' in the area	GHK (2007) The Economic Impact of Waterway Development Schemes: Volume 4 GEN Consulting (2006) Glasgow Green Renewal Benefits Analysis, report to Glasgow City Council. Gensler and the Urban Land Institute (2011) Open Space: An asset without a champion?
	Time savings	Number of people estimated to change their mode of transportation	Department for Transport (2013). Updating appraisal values for travel time savings: phase 1 report.
Health impacts	Increased physical health	Number of people with improved health status	<i>No studies to date</i>
	Mental health and well-being	Number of people with improved health status	
Environmental	Air quality implications	•Filtration volume of NO, SO and other significant air emissions (dependent on factors such as species, location, etc.)	USDA Forest Service (2013). i-Tree Tools. Available Online: <a href="http://www.itreetools.org/">http://www.itreetools.org/</a> and Pittsburg case study
	Climate change regulation	CO2 sequestered per year	
	Water and nutrient cycles	Volumes per year (i.e. water absorbed)	
Cultural / social impacts	Increased civic pride	Perceptions Crimes rates / fear of crime	Florida, R., Mellander, C., & Stolarick, K. (2009). Beautiful Places: The Role of Perceived Aesthetic Beauty in Community Satisfaction. Martin Prosperity Institute Working Paper. GHK (2007) The Economic Impact of Waterway Development Schemes: Volume 4 GEN Consulting (2006) Glasgow Green Renewal Benefits Analysis, report to Glasgow City Council. Gensler and the Urban Land Institute (2011) Open Space: An asset without a champion? Report for the Urban Investment Network.
	Increased visual amenity	Property uplift	
	Cohesion / inclusion	Participation rates (frequency, profile, catchment)	

The following relates the findings from the evidence review to the potential benefits of the Garden Bridge:

- **Urban park:** the available evidence shows that economic impacts from new urban space are usually measured in terms of:
  - Increased property values in surrounding area;
  - Increased tax revenue (subsequent to increased property values);
  - Increased residential and commercial occupancy;
  - Increased investment in a given area (business growth and start-up); and
  - Increased tourism/visitor numbers and spend.
  - Increased jobs and wider multiplier effects;

Suitable evidence/benchmarks from the available studies that could be applied in the Business Case could focus on direct benefits in terms of increased property values. Visitor numbers and increased visitor spending should also be considered.

- **Pedestrian links:** the available evidence shows that in addition to travel time savings and reduced congestion on alternative transport links, foot bridges and green routes can provide health benefits. For example the number of pedestrians who change their means of travel to walking. An online tool developed by the World Health Organisation could potentially be used to value the benefits (in terms of health service cost savings) of increased physical exercise via the option of walking provided by the Garden Bridge.
- **Iconic structure:** the summary of evidence suggests that many of the benefits associated with iconic structure can be captured in estimates of increased property values and visitor expenditure. Hence there is an overlap with measurement associated with the urban park outcomes. It would be appropriate to consider the significance of cultural and iconic structure dimensions in the evidence/benchmarks that may be applied in the Business Case.
- **Visitor attraction and tourism:** provided visitor numbers can be estimated, relatively broad assumptions can be applied to estimate values associated with visitors and tourism, taking into account issues of additionality (e.g. the substitution of spending from other areas of London).
- **Regeneration:** the benefits of regeneration initiatives are typically diverse and diffuse, making it challenging to associate outcomes with a single investment. Hence it is likely to be difficult to disentangle additional benefits from the metrics that can be applied to the urban park, iconic structure and visitor spending aspects of the Business Case.

### 3.2 Next steps - application of evidence in Garden Bridge Business Case

The workshop with TfL and subsequent analysis will aim will be to identify the most relevant aspects of the available evidence that can be appropriately referred to and applied in the developing the Garden Bridge Business Case.

Based on good practice principles set out by Defra for the application of valuation evidence in project and policy appraisals (see eftec, 2010), a set of criteria can be set out to guide the selection and application of evidence. These focus on the factors that could lead to 'error' in the transfer/use of evidence in wider context. It focus on similarity of the available evidence with the Business Case requirements, including

- The benefits valued in the original project;
- The locations where the original project benefits are estimated;
- The population affected by the original project; and
- Wider contextual factors (such as the availability of substitutes for the benefits provided by the original product).

Application of these guiding principles will help the more detailed assessment of the relevance and suitability of the currently available evidence in relation to the Garden Bridge Business Case.

DRAFT

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## Annex A

See accompanying Excel spreadsheet.

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