

Thames Pedestrian and Cycle Bridge, Canary Wharf to Rotherhithe

Chapter 1: Introduction and Background

February 2016



Sustrans makes smarter travel choices possible, desirable and inevitable. We're a leading UK charity enabling people to travel by foot, bike or public transport for more of the journeys we make every day. We work with families, communities, policy-makers and partner organisations so that people are able to choose healthier, cleaner and cheaper journeys, with better places and spaces to move through and live in.

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Glossary of Terms

TfL	Transport for London
PLA	Port of London Authority
CWG	Canary Wharf Group
LBS	London Borough of Southwark
LBTH	London Borough of Tower Hamlets
CRT	Canal & River Trust
JPM	JP Morgan
EA	Environment Agency
EIA	Environmental Impact Assessment
UXO	Unexploded Ordnance
PEA	Preliminary Ecological Appraisal
BCR	Benefit Cost Ratio
MHWS	Mean High Water Springs (See Marico report Appendix C)
OD	Ordnance Datum (See Marico report Appendix C)
AOD	Above Ordnance Datum (See Marico report Appendix C)
Air draught	Height of a structure above water. (See Marico report Appendix C)
AM Peak	7-10am (peak hour is 8-9am)
PM Peak	4-7pm (peak hour is 6-7pm)
MMO	Marine Management Organisation

Executive Summary

Sustrans has prepared a detailed feasibility study for a 24 hour, accessible Thames crossing for pedestrians and cyclists between the Isle of Dogs and the Rotherhithe peninsula; specifically connecting Durand's Wharf Park in Rotherhithe to the Impound Dock at Limehouse Reach. The study updates and builds on previous work that Sustrans commissioned from Ramboll Whitby Bird and Colin Buchanan in 2006-8.

The study was kindly supported by Transport for London and two businesses active in the area.

Key stakeholders were regularly engaged in the work.

Outline Business Case

The proposal for a new walking and cycling crossing comes at an opportune time in light of both national and regional policy and goals, which include increasing sustainable travel, improving health, and supporting economic development. Growth in cycling across London, employment growth in Canary Wharf, and population growth due to new residential and mixed use development particularly at Canada Water are generating an increase in cycle demand in the area. With the Jubilee line close to capacity at peak times and the lack of appropriate or sufficient infrastructure to accommodate cyclists and pedestrians wishing to cross the river east of Tower Bridge, there is a strong case for a crossing to cater for demand.

An analysis of crossing options, including an upgraded ferry scheme and a tunnel, showed a bridge would be the most successful crossing type, due to the significantly greater journey benefits for pedestrians and cyclists, lower construction requirements and a stronger opportunity to enhance the area.

An updated demand analysis for a bridge at the site predicts that 2 million cycle trips and 1 million walking trips will be made in 2020. At 10,200 cycle trips per day, the bridge would be one of the most popular cycle routes in London. The full project cost of £204.9m – £272.0m reflects a strong positive BCR outcome of 2.5:1 - 1.8:1, and was calculated using an example preliminary design for the site.

The design and associated costs (including maintenance, operation and construction methodology) are critical to the business case for the bridge. It is paramount to select a design which offers a high quality experience for users, to facilitate the greatest possible use of the bridge, and is aesthetically attractive but is still affordable. To maintain value for money, it is recommended any design put forward does not exceed the base cost of £88m (2015 Q3 values not including contingency) and in fact should seek to reduce costs as much as possible through the design and early incorporation of operational and maintenance procedures.

Landing Sites and Bridge Alignment

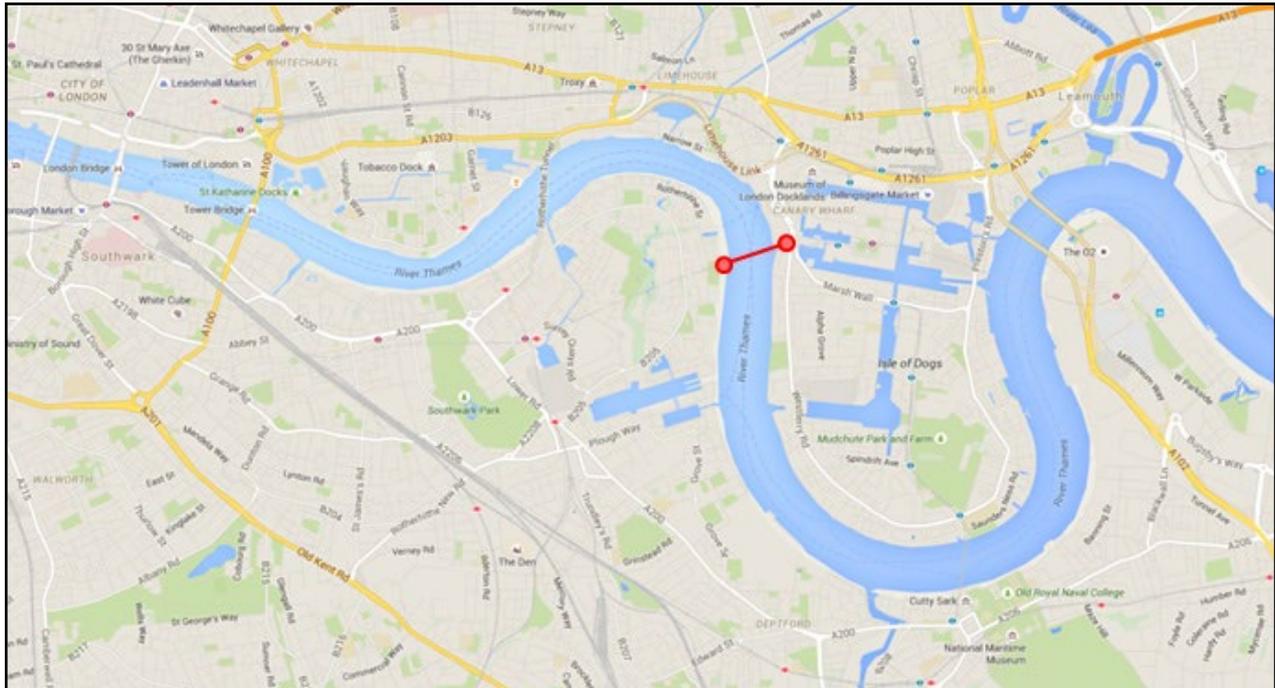


Figure 1: Proposed bridge location

Map data ©2015 Google

The study tested the preferred landing sites of Durand's Wharf (south bank) and the impounding dock on Westferry Road (north bank), which is adjacent to the planned landscaped park in the Riverside South development. As confirmed by previous work in 2008, this preferred alignment is the only one possible for a strategically located link from Rotherhithe to Canary Wharf, that both meets the needs of river traffic, and access for construction. The sites and the approximate bridge alignment were confirmed as feasible following consultation with key stakeholders.

A detailed bridge alignment and preferred cycle ramp arrangement for each bank is presented, following consultation with key stakeholders and an analysis of all significant site constraints, particularly existing and consented development, river traffic, obstruction of views, and clearances from existing infrastructure such as highways and the Jubilee Line tunnels in the riverbed. The key geometric constraints were also identified, including the need for segregated pedestrian and cycle decks, the gradient and turning circles of the cycle ramps, and pedestrian access onto the bridge.

On the north bank, the preferred arrangement is for the cycle ramp to cross over the Riverside South site public space, following consultation with leaseholders JP Morgan. It continues over Westferry Road to land at Westferry Circus, the most effective distributor for onwards journeys on the Canary Wharf Estate, and has minimal impact on riverside views. Stairs and lifts connect the bridge deck to the public space on the Riverside South site, allowing pedestrians and other users to continue their journey on the riverside, or to cross Westferry Road.

On the south bank, the preferred arrangement is for the cycle ramp and pedestrian lifts and stairs to be accommodated within Durand's Wharf, which has the least impact on existing residential buildings, but will have a greater impact on the park than other options. There is an opportunity to enhance the park through sensitive design of the ramps, accessibility improvements, and security and ecological enhancement.

Navigation and Operation

The alignment across the river and bridge geometry were agreed in principle with the PLA using a series of design options, subject to obligatory Ship Simulator Trials. A river traffic analysis showed the approximate pier locations and geometry to pose a low level of risk to traffic. The bridge needs to open or lift to a minimum height of 59.77m above Mean High Water Springs (MHWS), to accommodate all river traffic that can pass under the QE2 bridge downstream. The bridge has an overhead clearance zone of 20m above MHWS in the closed position to accommodate most river traffic without needing to open or lift, and a clearance zone of 45m high and 130m wide for larger ships to pass when the bridge is lifted.

With the proposed geometry, the bridge would allow 98.98% vessel traffic under the bridge without lifting, and will need to usually lift 3 times a day, with most lifts scheduled in advance. To mitigate disruption to commuters, an outline operational procedure was developed and suggests that crowd build up can be reduced significantly through effective public communication; however staff will be required to manage crowds onsite.

A bridge operator should be identified before seeking planning permission and should seek to minimise operational costs in consultation with key stakeholders, by integrating as far as possible any new operational procedures with existing river and land traffic, and public space, management resources.

Reducing the height of the bridge by 2-5m could be explored, which would reduce the cost, reduce the impact on the landing sites, and improve accessibility principally for pedestrians. This would be subject to consultation with the PLA, river and local stakeholders, as well as an assessment of the impact on functionality of such a change.

Designing for All Users

Cycle, pedestrian and inclusive route design principles and best practise were followed to determine key design features, appropriate for the predicted number of both commuters and leisure users. A combination of ramps for cyclists, and lifts and stairs for all users on each bank, were specified to give comfortable and direct access onto the bridge. Minimum design requirements include full segregation, signage, speed control measures and a cycle deck width of at least 5m, with a pedestrian deck width of 4m.

Journey types and connectivity

It is predicted 15% of trips will originate from Rotherhithe, but the majority of journeys are expected to originate from points towards Bermondsey, Peckham, Brixton, Lewisham and destinations further west, south-west and south, with the most popular destinations located within the Canary Wharf Estate, accounting for 87% of trips using the bridge. Additional trips originating from the growing residential development on the Isle of Dogs outside Canary Wharf are expected, but need to be quantified through a detailed demand analysis at the next stage.

There is sufficient capacity within the existing highway configuration to accommodate and disperse the expected cycle flows, however improvements for cyclists should be implemented to the key connecting routes of Rotherhithe Street, Salters Road, Westferry Road, Westferry Circus and West India Avenue. These should be investigated in detail at the next stage of work with Canary Wharf Group and the London Borough of Southwark respectively, alongside other planned strategic cycle route developments such as Cycle Superhighways and Quietways.

Engineering Requirements

The most suitable bridge type for the site would be a bascule bridge or vertical lift. The former would likely have a lower visual impact and be more desirable to local stakeholders. A bascule bridge would be the longest such bridge in the world, presenting a significant, but attractive, challenge in structural, cycle design and engineering terms.

The design and performance criteria for a bridge at the site were defined to inform the structural concept design work required for the next stage of the project. These were tested using an example concept design that was proven feasible during the study and was used to develop construction methods and a cost.

Conclusions and next steps

The feasibility study shows that the bridge would:

- provide a strategic cross-river connection, offering significant journey time reductions to people on foot, bike, and mobility aids, where there are no suitable river crossings east of Tower Bridge. It would become one of the most popular cycle routes in the capital
- be an accessible, free and easy-to-use transport link operating 24 hours a day that is expected to be used for at least 10,200 cycling trips and 3,000 walking trips a day, increasing access and transport options
- facilitate a mode shift to cycling and walking from the Underground and DLR, increasing levels of physical activity
- enhance London's cityscape through high quality design, and public realm by creating enhancement opportunities in underused public spaces
- showcase innovative design and engineering, by creating a new landmark for London that would be a world first
- cater for the area's growing residential population and workforce, sustainably, by providing a high-capacity, low-carbon and zero pollution connection from homes to jobs and leisure
- support the sustainable regeneration and development of East and South East London, by creating likely increases in land and property values, and increased commercial activity on both banks, benefiting residents, businesses and investors
- offer good value for money with a Benefit Cost Ratio of 2.5:1 - 1.8:1 over the 60 year lifespan
- be constructible by 2020, in line with development milestones in the area

The next stage of the project should focus on safeguarding the ramp arrangements at the landing sites with stakeholders, securing political and financial support, and selecting a concept design for the bridge and ramps. A project sponsor, owner and operator of the bridge should also be identified as soon as possible.

A bridge at the site was demonstrated to be technically feasible, with an attractive BCR. With key stakeholders engaged, existing enthusiasm from the community and businesses, and broader public support for bold active travel infrastructure and river crossings, now is the time to take the project forward.

1. Introduction

1.1 Background

Sustrans proposed the idea of London's first major, purpose-built cycling and walking bridge over the Thames nearly a decade ago, under plans to develop Greenways for the Olympics and London. Work previously led by Sustrans, with funding from Transport for London, London Borough of Tower Hamlets, London Borough of Southwark and Canary Wharf Group, resulted in:

- Preliminary report – Ramboll Whitby Bird, November 2006
- Technical Feasibility Study – Ramboll Whitby Bird, March 2008
- Outline economic appraisal – Colin Buchanan, March 2007
- Demand Forecast – Colin Buchanan, September 2008

The studies determined that a walking and cycling bridge at Canary Wharf to Rotherhithe would be both economically and technically viable. A benefit to cost ratio of 1.2-1.8 was estimated, and crucially a preferred landing site, of Durand's Wharf to West India Dock, was identified following consideration of navigational risk and access during construction on the Rotherhithe peninsula.

1.2 Scope of this Study

Since November 2014 Sustrans has worked to revive the proposal, seeking to update, challenge and develop previous work. The Bridge concept was put before the Mayor of London in Autumn 2014 and, subsequently, TfL contributed £170,000 to Sustrans for a detailed feasibility study into a crossing at the site. Additionally two private sponsors contributed to this study.

Aims of the study:

- Re-engage key stakeholders with the project
- Refresh the business case for a crossing at the preferred site and its funding requirements
- Define the detailed site constraints, and technical parameters of a bridge at the site
- Confirm the viability of a new pedestrian and cycle bridge at the preferred site that maintains the free right to navigation, is cost effective, meets planning authorities' outline requirements, meets walking/cycling needs, meets other key stakeholder requirements and is aesthetically pleasing

In order to develop the technical parameters of the bridge, and use a realistic cost to determine the business case, Sustrans commissioned a design team to produce a feasible, attractive concept design for the site.

This study is intended to be made available publicly or to bidders as part of any future procurement for the project.

1.3 Project Team

The feasibility work was conducted through collaboration with the following organisations:

Sustrans: project manager, lead author and CDM principle designer

reForm Architects, Elliott Wood LLP Structural engineers: design team and author of 'Site Parameters and Constraints' study. CDM designers.

Arup Ove: Cost consultants

Cass Hayward LLP Structural Engineers: specialist advisors, structural engineering for bridges

Marico Marine: Marine consultancy and author of Vessel Traffic Analysis

Technical advice was also provided by TfL. Significant technical contributions were gratefully received from the key stakeholders listed in Section 2.

1.4 Advice

Additionally advice and views were kindly given by:

- Savas Sivetidid - former Director of Cross River Partnership
- Bee Emmott - CEO, Garden Bridge Trust
- Peter Murray - New London Architecture
- Lord Richard Rogers - Rogers Stirk Harbour + Partners
- Paul Finch - World Architecture Festival
- Kevin Hickman - Wheels for Wellbeing
- Buro Happold
- Phil Cumming - Koru Sustainability Ltd
- Miles Price - British Land
- Jamie Bottono - Tower Bridge

2. Key Stakeholders

Critical to the progress of the project from feasibility to delivery is the acceptability of the proposals to the key stakeholders (TfL, LBS, CRT, CWG, PLA, LBTH). These were re-engaged at the start of this work, to form a key stakeholder group to challenge and review progress.

London Borough of Tower Hamlets (LBTH)	Planning authority for the northern landing site. Highway authority for some of the road network on the Canary Wharf Estate and for the connecting routes.
London Borough of Southwark (LBS)	Planning authority for the southern landing site and highway authority for most roads in Rotherhithe Landowner of Durand's Wharf The crossing is mentioned in LBS planning and transport documents.
Canal & River Trust	Landowner of the functional impounding Dock, including listed dock walls. Owner and operator of the impounding station.
Canary Wharf Group	Landowner of the Riverside South site (leased for 999 years to JP Morgan) Highway authority for much of the road network in the Canary Wharf Estate
Port of London Authority	Landowner of the River Thames at the site Statutory Consenting Authority and will need to issue a River Works License before works can proceed.
Transport for London	Statutory Consultee Significant recent experience in developing Thames crossings

Progress meetings, with attendance from all key stakeholders, were held on:

- 17th April 2015
- 10th June 2015
- 23rd July 2015

In addition, meetings were held with

- PLA to refine suitable geometries of the main span, to protect the needs of river traffic
- JP Morgan to examine the interaction of the bridge with the Riverside South site
- LBS Head of Planning to refine options of landing – concluding that landing the ramp in the park is the most suitable option, but that a minimal impact on the park should be the default approach
- CWG to discuss risks of preferred alignment and dispersal of cyclists & walkers through the Canary Wharf estate
- CRT to discuss the implications of building near the listed dock and potential heritage enhancements (outside the scope of this study)
- Tower Bridge to examine operational procedures, given Tower Bridge is the most relevant live bridge example to draw on

3. The Preferred Landing Sites: Durand's Wharf to West India Dock

The preferred approximate alignment of the bridge was previously identified by Ramboll Whitby Bird, following an appraisal of 23 landing sites across both banks against criteria including distance from the optimum crossing point, public accessibility of the site, and for the south bank sites the distance to the nearest bus service access point.

From a surface transport perspective, the optimum alignment was previously identified as Cuckold's Point (Rotherhithe) to Westferry Circus (Canary Wharf).¹ However, this alignment lies directly on a meander in the river, where the siting of bridge piers would create a high risk of vessel collision. This arises due to a necessary increase in vessel speed to maintain steerage around the bend.

The feasible landing sites were defined as Durand's Wharf, Rotherhithe, and West India Dock impounding lock, due to the following critical reasons:

- The alignment is as far from the meander in the river as possible, and could therefore pose least risk to passing river traffic
- Durand's Wharf and the Impounding Dock are near to the optimum crossing points
- There is adequate access and space available for construction at both sites. Durand's Wharf was previously the construction site for the Jubilee Line tunnel

The study focussed on the preferred landing site, testing the previous conclusions with the key stakeholders. A detailed site study is presented in Chapter 3: Site Parameters and Constraints.



Figure 2: Specific site location

Imagery ©2015 Google

¹ Ramboll Whitbybird, Sustrans Thames Pedestrian and Cycle Bridge (2008)