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0. DOCUMENT CONTROL**0.1 Document History**

Version	Date	Changes since previous issue
V0.1	07/06/2019	First Draft

0.2 Final Version Approval**Authors**

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1. ORGANISATIONAL OVERVIEW

1.1 Transport for London (TfL)

TfL is an executive body of the Greater London Authority (GLA), created in 2000 as the integrated body responsible for the Capital's transport system. Its primary role is to implement the Mayor of London's Transport Strategy and manage transport services across the Capital. TfL is made up of many predecessor organisations covering almost all transport modes in London, and therefore has the ingredients and accumulated experience to provide one of the largest integrated transport systems in the world.

TfL comprises of different modes. The modes are Surface Transport, Corporate, London Underground and Rail. TfL is a partner in Crossrail.

TfL manages London's transport network and is responsible for London's buses, the Underground, the Docklands Light Railway (DLR), London Overground, London River Services, Barclays Cycle Hire, electronic vehicles and policing. TfL also runs Victoria Coach Station and the London Transport Museum.

TfL is responsible for managing 360 miles (580km) of the TfL Road Network (TLRN) – all the red routes in London; including junctions, tunnels, bridges, flyovers, and all of London's 4,600 traffic lights, keeping them safe and the traffic flowing every minute of every day. In addition, it manages the London Congestion Charging and Lane Rental schemes and regulates the city's taxi and private hire trade. TfL also promotes a range of walking and cycling initiatives across the Capital.

1.2 Business Unit

The project is sponsored by TfL's Investment Delivery Planning (IDP) Directorate who lead on design, operation and management of London's road network through the use of 21st century techniques and technology, ensuring road space works efficiently for all users.

The concept design, detailed design and implementation for TfL's agreed projects is managed and delivered by TfL's Project and Programmes Directorate (PPD) who report to IDP as client.

TfL's Asset Investment team within IDP Directorate ensures TfL's Surface Transport assets: roads; pavements; bridges; lighting; traffic signals; bus stations; bus stops and shelters; and trees, within the boundaries of the TRLN, are provided and managed in a way that is fit for now and for the future, by minimising costs, and creating safe, reliable and cared for infrastructure for our customers. London Borough of Hammersmith & Fulham (LBHF) is the asset owner and operator and will act as Technical Approval Authority for any proposed works affecting Hammersmith Bridge.

2. INTRODUCTION

2.1 Background

- 2.1.1 TfL is acting on behalf of LBHF looking into undertaking repair and strengthening works to Hammersmith Bridge.
- 2.1.2 Hammersmith Bridge is a grade 2* listed structure owned by LBHF. Up to its closure on 11 April 2019, the bridge was restricted to vehicles with a maximum loading of 7.5T with an exemption for the emergency services and buses, up to 12T, one in each direction at any one time. Early surveys and inspections have shown serious faults within the pedestals at either end of the bridge which is a cause that led to LBHF taking the decision to close the bridge to traffic.
- 2.1.3 TfL in partnership with LBHF have undertaken extensive inspections and assessment of the existing bridge condition and have agreed that the bridge requires a major overhaul as elements of the bridge have exceeded their normal lifespan and it requires repair/renewal. In addition, TfL has requested strengthening of the bridge to allow double decker buses to use it.
- 2.1.4 The Grade II* listed structure spanning approximately 223m across the River Thames linking the London Borough of Richmond (LBR) upon Thames to the LBHF. It comprises the bridge, towers, abutment store, and intertidal foreshore substrate directly below and adjacent to the bridge, spanning across the River Thames with the northern side landing in Hammersmith and Fulham and the southern side landing in Richmond upon Thames. The A306 Castelnau Road crosses the bridge before joining Hammersmith Bridge Road on the northern side. The bridge itself is subject to high volumes of traffic as it is an important route for travelling through Hammersmith. Currently, the bridge is comprised of a timber deck bolted to cross girders, supported by longitudinal stiffening girders. The footway is a timber deck, supported by wrought iron cantilever beams connecting both into the main cross girders, and stiffening girder.

2.2 Objectives

- 2.2.1 The purpose of this commission is to progress the design work required for the repair and strengthening of Hammersmith Bridge. The commission will consist of a comprehensive review of the feasibility design work completed to date and the development of a concept design solution for the bridge design and construction. The indicative solutions proposed in previous studies and reports, which have been included in this specification, are provided for review as information only. The concept design is to achieve the requirements of TfL and the LBHF (the asset owner) and provide the necessary buildability assurance for TfL. The commission will consist of identification and confirmation of a design approach under an Approval in Principle.
- 2.2.2 The *Consultant* will develop design drawings and specification for Concept Design to pre-detailed design stage and will ensure buildability input (from an experienced Contractor) and engagement with LBHF council who is the Technical Approval Authority, and other stakeholders (e.g. Historic England, PLA) to ensure that design requirements are met and approved.
- 2.2.3 The *Consultant* must ensure that the design is progressed with the build methodology as a key driver. From a highways perspective the 2 lane operation of the bridge is currently closed to traffic with exception of cyclists and pedestrians continue to use the walkways either side of the bridge.
- 2.2.4 Further to this, the *Consultant* must undertake specialist surveys of the entire scheme. This will include an unexploded ordnance survey.

2.3 Site Information

2.3.1 Scheme Site Location



Figure 1 – Site Location Plan

2.3.2 Structure description

- 2.3.2.1 Hammersmith Bridge is a grade 2* listed structure built in 1887 and was the first suspension bridge built over the Thames and was designed by Sir Joseph Bazalgette.
- 2.3.2.2 Hammersmith Bridge is complex Victorian engineering built using a combination of cast iron, wrought iron and 999 individual wooden plates. It features structural copulas and seven crests. It is London's lowest bridge, with a water clearance of 12 feet at high tide.
- 2.3.2.3 The pier foundations that support the bridge are from the original Hammersmith Bridge that date back to 1825 which once sat on this site and was demolished in 1884 to make way for the new replacement.
- 2.3.2.4 The bridge has an overall length of approximately 210m. The deck has a width of 13m approximately measured square between the insides of the parapets. The main span of the bridge measures 121.9m.

2.3.2.5 The bridge carries the A306 which joins Castlenau and Hammersmith Bridge Road with 2 cantilevered pedestrian walkways either side separated from the carriageway by the longitudinal stiffening girders and hangers.

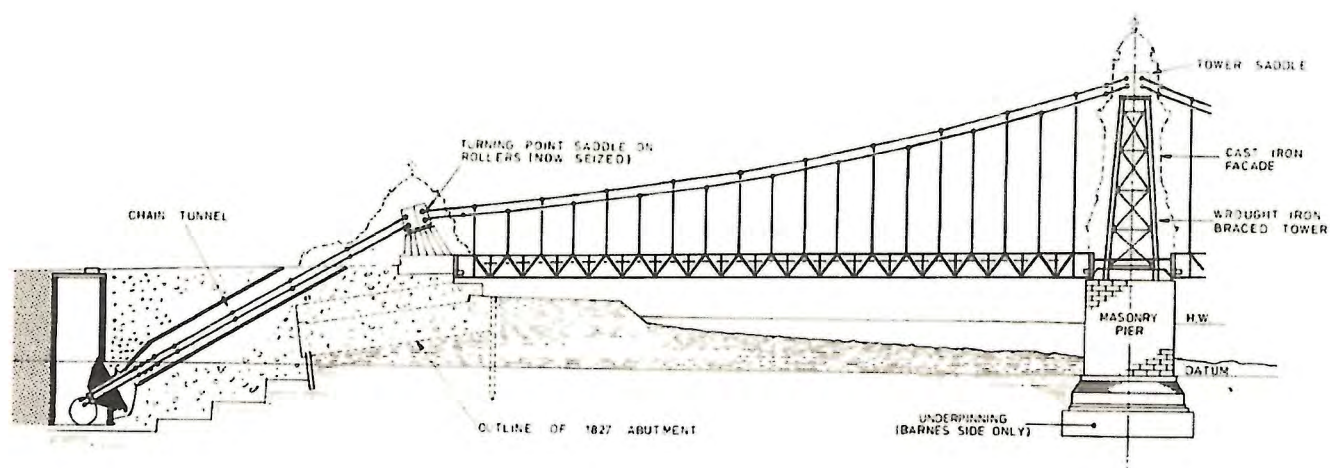
2.3.2.6 The bridge was refurbished in 1973 with replacement steel trusses, improvements to the mid-span hangers and new deck expansion joints. New deck timbers were installed and surfacing was changed from wooden blocks to coated plywood panels. These panels were subsequently replaced in 1987.

2.3.3 Structure Photographs





Cross Section Drawing



2.3.4 Statutory Undertakers Plant

The following services are recorded to be present within the cantilevered footways of the existing Hammersmith Bridge:

Downstream Footway

- 250mm dia LP Gas main
- 4 no. 98mm dia BT/Communication ducts

Upstream Footway

- 250mm dia MP Gas main
- 4 no. 98mm dia BT/Communication ducts
- 3 no. EHV Cables in steel trough system

The *Consultant* shall confirm all utilities and 3rd party equipment/plant affecting the scope of their work to inform their design.

The services all sit on supports resting on the cantilever section of the cross-girder riverside of the longitudinal stiffening girder. It is understood that historically these were lifted to allow repair work to be undertaken to the girder.

There are currently no services identified in the carriageway.

2.3.5 Site Information

- Please refer to appendices for all related site information compiled during the Feasibility Stage.

3. SCOPE

3.1 General Requirements

The *services* will include but not be limited to:

3.1.1 Project Management and Governance

TfL follows an integrated project management delivery methodology known as Pathway. Pathway comprises six stages:

- Stage 1 – Outcome Definition
- Stage 2 – Feasibility
- Stage 3 – Concept Design
- Stage 4 – Detailed Design
- Stage 5 – Delivery
- Stage 6 – Project Close

The scope of work for this commission is related to Stage 3 (Concept Design) only.

The consultant is to undertake Principal Designer role under CDM2015 to ensure all highway and structure designs and utility diversions interfaces are fully understood and seamless with the wider design at Concept Design stage. Co-ordination is defined under Interfaces in section 3.2;

3.1.2 Bridge Structural Design and Buildability Options - Phase 1: Appraisal

The scope includes but is not limited to:

- 3.1.2.1 Review of existing information (found in appendices), with careful consideration of the assessment report and previous feasibility structural design documents and design work relating to the structure are provided for information;
- 3.1.2.2 A review of public utility apparatus searches provided by TfL (and PAS128 information when available);
- 3.1.2.3 Surveys, a preliminary geotechnical desk top study and preparation of a report detailing the recommended ground investigations required to complete the structural Concept Design and inform the detailed design;
 - a) The report shall include identification and prepared detailed proposals for site investigation (including trial holes, testing, sampling, assessments, and surveys) which are required to inform the concept and detailed design and mitigate any risks. Following TfL and LB Hammersmith & Fulham approval of the recommendations, the *Consultant* shall commission the site investigation work. A cost

estimate shall be required by the Consultant upon the Employer's approval of recommended ground investigations from the Consultant.

- b) On completion of the site investigation, a detailed factual and interpretive report shall be provided. The report shall include any recommendations for any additional investigations and/or testing required at detailed design stage;
- c) Surveys, walk overs, studies, assessments, designs and the like shall be carried out in accordance with current good practice and the necessary and relevant standards, assurance and access protocols.

3.1.2.4 Identifying requirements and preparation of detailed proposals and specifications for undertaking any surveys, investigations, trial holes and the like that are required to complete the design, including 3D structure information model, for agreement by TfL. Boundaries of the site are shown in drawing entitled "Red Line boundary plan - HB." contained in Volume 2, Section 3 Scope, Appendix 3, Site Information Documents;

3.1.2.5 Liaison, agreed and facilitated by TfL, with affected 3rd parties and relevant Stakeholders to obtain approvals required to complete any agreed site investigation and the design. The *Consultant* is to allow for a single iteration process for submission of documentation;

3.1.2.6 Commission appropriate subcontractors to undertake the agreed site investigations and report on findings (factual and interpretative report).

3.1.3 Bridge Structural Concept - Phase 2: Design

The scope includes but is not limited to:

3.1.3.1 Concept design work to bring the bridge structure up to a loading capacity of "7.5T GVW with exceptions for 4no LT Midi buses (13T) or 2no electric double decker buses (19.5T) and Group 2 Emergency Vehicles" with the opportunity to increase this to an enhanced loading of "7.5T GVW with exceptions for 19.5T Double Decker buses and Group 1 or 2 Emergency vehicles", if instructed. If requested, the enhanced loading shall be priced by the *Consultant*;

With regard to the Feasibility Report, please refer to the attached technical note 383488 - MMD-HSB-TN-SE-00013 Rev A, Condensed Load Scenarios - Feasibility Study, Figure 4 on page 3 for the required options. This technical note is included as item k) in Appendix 7, Assessments, Volume 2 Scope.

3.1.3.2 The *Consultant* is to provide a Technical Note (as per the list of deliverables in Section 4) to define the following, to aid TfL in the decision of providing an enhanced loading capacity:

1. What additional aspects of the structure would be affected?

2. What further investigations and concept design will be required?
 3. What additional costs will be incurred?
 4. What additional resources will be required?
 5. Will the schedule be affected or could this be achieved with within the same timeframe?
 6. What additional risks would need to be considered?
 7. Are the construction costs and programme for the enhanced loading capacity implementation likely to be significantly different from the current scope?
- 3.1.3.3 Liaison with Stakeholders (via TfL) to identify constraints and requirements for the design and obtain approvals required to complete the proposed Concept Design, and identify approvals required for proposed construction methodology;
- 3.1.3.4 The Consultant is to undertake the design for critical repairs required to the deviators, saddles and bearings (on both the pedestals and towers). This design is to be up to Detailed Design to allow for the advanced repair works to be undertaken by a Contractor prior to the main works contract being let. The detailed design element will include Technical Approval in accordance with standard BD2/12 of the Design Manual for Roads and Bridges, Specification for the works, full Detailed Design Drawings and Calculations. Surveys will be undertaken by the Employer to ascertain a detailed condition of the pedestals. This information will be passed to the Consultant, to assist with the design of the repairs required, by the end of November 2019;
- 3.1.3.5 Review of C3 stage NRSWA 1991 utility equipment searches, survey information and asset surveys (co-ordination and provision of which is to be reviewed on appointment). The Employer's Agent will supply the *Consultant* with updated C2 estimates upon award.
- 3.1.3.6 Identification of impacts on utility services and diversionary works required. Liaise with utility companies and LBHF technical approver. Review opportunities to manage diversions (if required) as advanced works (see Interfaces in section 3.2).
- 3.1.3.7 Provision of preliminary design drawings for Concept Design and any necessary Temporary Works required;
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- 3.1.3.8 Provision of AIP documents for concept design and construction strategy with TfL, LBHF TAA and all Statutory Bodies (EA, PLA etc.) approvals;
- 3.1.3.9 Provision of preliminary calculations for the approved concept design;
- 3.1.3.10 Provision of detailed construction cost estimates for the approved concept design broken down into a bill of quantity. River licenses, utility and any other costs incurred for temporary and permanent construction work must be shown and taken into account. (See Appendix 6 for cost template). A detailed BoQ compliant with standard method of measurement shall form back up data to the cost estimate template as required;

- 3.1.3.11 Identification of all temporary and permanent land and access requirements to complete construction of the approved concept design;
- 3.1.3.12 Provision of a programme of works for the construction of the bridge to include third party activity and approvals required to complete the scheme and identify opportunity for advance and/or enabling works;
- 3.1.3.13 Pre-detailed design Specification (Works Information) for approved concept design ;
- 3.1.3.14 CAD design output from the review and redesign;
- 3.1.3.15 Prepare Construction Strategy for the approved concept design to include proposed construction method and sequence with high level programme identifying durations and including any constraints on access to site for construction and delivery to site of components for build (identify routes with height/weight/width limits for material/plant supply) and working space required;
- 3.1.3.16 Not used;
- 3.1.3.17 Identification of any river closures likely to be required for the project with recommendations for contingency planning;
- 3.1.3.18 Identification of Inspection and Maintenance requirements of the newly restored structure outlined within a Concept Maintenance Plan (See list of deliverables under 4.2);
- 3.1.3.19 Street lighting and surface drainage design drawings and calculation for modifications to existing infrastructure. Existing lighting columns are to be refurbished and light bulbs to be replaced with LED bulbs. Modern lighting levels to standard may not be able to be achieved due to the constraints of Historic England meaning new additional columns cannot be added to the structure and a derogation will need to be sought. Wiring throughout the structure will need to be replaced;
- 3.1.3.20 The *Consultant* shall consider the needs for road safety audits and advise the Employer when these may be required. Road safety audits shall be undertaken by TfL's in house team, unless instructed otherwise by the *Employer's Agent*.

3.1.4 Specialist Surveys

The *Consultant* shall carry out a desktop unexploded ordnance (UXO) study for the full project area. The desktop study shall risk assess the site and how likely it is to be affected by unexploded ordnance. Consulting a variety of historical records, UXO datasets and internet resources, this report will constitute the initial phase of UXO

surveys. The *Consultant* is to propose any further investigations and risk mitigation required. The *Consultant* shall carry out an unexploded ordnance survey for the full project area.

3.1.5 Geotechnical Investigations

Any ground investigations required for the development of the design shall be in accordance with the relevant sections of the Design Manual for Roads and Bridges (DMRB), the Specification for Highway Works (SHW) and the Manual of Contract Documents for Highway Works (MCHW) including Euro code 7 :BS EN 1997-2:2007 in conjunction with NA to BS EN 1997-2:2007.

3.1.6 Bathymetric Data

There is currently historic bathymetric data which can be found in the site information. If there are works identified within the Concept Design to be undertaken within the river additional bathymetric data will need to be sought by the *Consultant* to aid discussions and endorsement from the PLA and EA for the works as part of the overall approval process.

3.1.7 Environmental Assessment

3.1.3.1 An Ecological Appraisal has previously been undertaken and is included in Appendix 2. Work packages detailed below must fully address the outcomes of this report. Environmental assessment work is detailed below as to the minimum required. The *Consultant* is encouraged to suggest alternative methodologies and deliverables if appropriate to the concept design solution.

3.1.3.2 An Environmental appraisal will be conducted by TfL to determine the exact requirements and deliverables required for the project, this will be provided to the *Consultant* upon contract award. The *Consultant* is to progress an Ecological Report using any recommendations from the Ecological Appraisal produced previously. This is to include but not limited to habitat surveys. A Site Waste Management Plan shall be developed to provide solutions for managing waste throughout the construction phase, especially in regards of the river.

3.1.8 Programme

Programme to be provided for acceptance by TfL within 2 weeks of contract start;

3.1.10.1 Programme of works:

- a) Produced in Microsoft Project clearly stating name of each activity and their reference numbers as shown in the table of deliverables in Section 4 (MSP Unique ID column), duration and sequence with key deliverables shown;