

<b>Committees:</b> Corporate Projects Board <i>[for information]</i> Planning & Transportation Committee <i>[for decision]</i> Projects Sub <i>[for decision]</i> Culture, Heritage and Libraries Committee <i>[for information]</i>		<b>Dates:</b> 31 January 2019 19 February 2019 20 February 2019 25 March 2019
<b>Subject &amp; Project Title:</b> Tower Bridge Re-Decking and Approach Viaduct Waterproofing Project	<b>Unique Project Identifier:</b> 11505	<b>Outcome Report</b>  <b>Approval Route</b> <b>Complex</b>
<b>Report of:</b> Director of the Built Environment <b>Report Author:</b> Mark Bailey – Principal Engineer		<b>For Decision</b>

# PUBLIC

## Summary

### [S1] Key conclusions

The objectives set at Gateway 1/2 in 2014 were to implement essential major civil engineering maintenance works to the Grade 1 listed Tower Bridge and its approach viaduct structures, including replacement or refurbishment of the timber decking to the bridge bascules, replacement of expansion joints to the fixed spans and waterproofing the northern approach viaduct.

The scope was later modified at Gateway 3, at the request of members, in order to consider making further use of the disruptive three-month road closure required by these works, to include further cyclic maintenance of other operational and structural elements, in order to mitigate against future disruption to public and road users. This included waterproofing of the southern approach viaduct, full resurfacing of roads and footways, replacement of obsolescent traffic signals and related bridge control systems, works to bascule pawls/buffers and structural repairs to the bascule nosing bolt inspection gantry

These major works were successfully completed to scope/specification one week ahead of programme in December 2016 and within the project budget set at Gateway 5.

In addition, a replacement *average speed* traffic enforcement system for the bridge was commissioned in January 2018 as part of the capital project, incorporating new Automatic Number Plate Recognition (ANPR) cameras as well as back-office support systems in City of London Police property

Furthermore, arrangements have been negotiated during 2017 and 2018 with Transport for London and Southwark Council whereby a separate *weight-limit*

ANPR traffic enforcement system will shortly become fully operational, following an initial trial period, and enforced by Southwark Council on behalf of Transport for London (TfL), at no cost to the City of London.

The delay in bringing this report to committee is as a result of protracted discussions to implement the ANPR traffic enforcement arrangements to the satisfaction of officers and the time taken in auditing the final account for the construction contract.

#### **[S2] Key Learning and Recommendations**

1. The benefit realised in working closely with City Procurement from the early stages of the project and in selecting the most appropriate procurement strategy for the planning and execution of the works, conscious of the particular constraints and sensitivities of individual sites. For this project, the use of Early Contractor Involvement and a Design-and Build contract was key.
2. The benefit realised in early involvement and engagement with all stakeholders, particularly Transport for London (TfL), the Port of London Authority (PLA), local authorities, local businesses and local residents, in close liaison with the Town Clerk's Media Team and Tower Bridge Exhibition
3. The benefit realised in having the ability to respond quickly to compensation events under NEC3 works contracts by reference to allocated risk allowances, with expenditure from such allowance being subject to approval under urgency by Chairman and Deputy Chairman of Projects Sub Committee.
4. For future projects, advance consideration of enforcement measures to combat cyclists who elect not to use dedicated diversion routes and not dismount when passing along pedestrian pathways through bridge or other works.
5. For future projects, an understanding of the challenging constraints of carrying out major construction works on Tower Bridge, without adequate areas outside of the public highway for site welfare and site compound facilities. In previous projects of this type, advantage would have been taken from the yard area at Bridgemaster's House that has now been redeveloped
6. It is noted that, as was the case here, the main contracted works did not represent the full extent of the project and the timeframe for submitting the G6 Outcome Report was not entirely set by the contracted works programme

#### **[S3] Decisions required**

Members are asked to approve the content of this Outcome Report, and that the Project will be closed.

## Main Report

<b>Design &amp; Delivery, Variation and Value:</b>	
<b>Design &amp; Delivery Review-</b>	
<b>[1] Design into Delivery</b>	<p>It is our opinion that the decisions taken early in the project by the Engineering Team, in agreement with City Procurement, to opt for an Early Contractor Involvement (ECI) approach with a Design-and-Build contract, set the path to a successful project for a very intensive series of works on a very sensitive site with considerable logistical constraints.</p> <p>It was felt that a contractor was best placed to manage these risks and steer the design towards the most practical and efficient solutions to deal with these constraints.</p> <p>This included contractor involvement in investigations at an early stage (as well as the costs involved in those investigations), which it is considered greatly reduced subsequent construction stage financial and time risks.</p> <p>Whilst this resulted in greater upfront costs, these were outweighed by a clear benefit in de-risking the project and enabling an efficient start to the works to that dates agreed years in advance with the various statutory authorities.</p>
<b>[2] Options appraisal</b>	<p>It is believed that the procurement and engineering options chosen at Gateways 3 and 4 allowed the project to fully meet its objectives and provide long term value to the City. No compromises or significant changes were necessary against the options approved in order to deliver the project.</p>
<b>[3] Procurement Route</b>	<p>An openly tendered Design-and-Build contract with ECI set the path to a successful project for a very intensive series of works on a very sensitive site with considerable logistical constraints</p> <p>In addition to the Design-and-Build contractor, professional services were procured for Cost Consultancy services (using Capita, following open tender) and technical checking and contract supervisory services (using AECOM, under their term consultancy contract). AECOM were also employed to help develop the technical specification and contract documents for the new ANPR traffic enforcement systems</p> <p>The contract for the design, installation and maintenance of the average speed ANPR system (operated by City Police) was procured outside of (and subsequent to) the main works contract, by mini-competition using the Crown Commercial Services Framework RM1089 Lot 2: Traffic Management Technology - Traffic Monitoring and Traffic Enforcement Cameras</p>

<b>[4] Skills base</b>	The City of London was able to effectively manage and deliver this project, with the assistance of external resources in the areas of cost consultancy, contract supervision, technical checking and design consultancy services (ANPR traffic enforcement systems).				
<b>[5] Stakeholders</b>	<p>Very positive collaborative working relationships were maintained from a very early stage with Transport for London, Port of London Authority, Tower Bridge (Exhibition and Operational) and involving the Town Clerk Media teams, working in close and regular liaison with the Design and Build Contractor. This included a number of face-to-face public engagement sessions with local residents and businesses.</p> <p>Very little negative feedback was received during the project. Where received, this mainly concerned the failure of cyclists to observe signed diversion routes and observe clear signage on the bridge to dismount when travelling through dedicated pedestrian paths, once the road was closed to vehicular traffic.</p>				
<b>[6] Closing RAG rating</b>	<table border="1" data-bbox="533 936 1331 1003"> <tr> <td>Project Risk Assessment</td> <td><i>Low</i></td> </tr> <tr> <td>Project RAG rating</td> <td><i>Green</i></td> </tr> </table>	Project Risk Assessment	<i>Low</i>	Project RAG rating	<i>Green</i>
Project Risk Assessment	<i>Low</i>				
Project RAG rating	<i>Green</i>				
<b>[7] Positive reflections</b>	<p>The use of Early Contractor involvement and a Design-and-Build contract undoubtedly played a major part in contributing to the success and timely delivery of the project under very challenging and high-profile circumstances, thus protecting the City's reputation</p> <p>Early engagement and collaboration with all stakeholders, including Transport for London (TfL), the Port of London Authority (PLA), local authorities, local businesses and local residents, in close liaison with the Town Clerk's Media Team and Tower Bridge Exhibition also played a large part in the success and smooth execution of the works.</p> <p>It should be noted that the negotiations for road closures and reduced services for large cruise liners during the works (with TFL and PLA respectively) commenced 5 years before the works commenced and before project initiation.</p>				
<b>[8] Improvement reflections</b>	<p>It is considered that there are very few areas where improvement could be made, which tends to support the procurement and management approach used on the project. However, in retrospect:-</p> <ol style="list-style-type: none"> <li>1. It would have perhaps been prudent to liaise directly with Southwark Council highways department at an earlier time, at least as a courtesy, rather than relying on the assumption that TfL would do this (as is their responsibility as the relevant highway authority). This resulted in some slight friction near the</li> </ol>				

	<p>beginning of the project, albeit later overcome.</p> <ol style="list-style-type: none"> <li>2. Experience showed that it would have also been prudent to allow for additional highway enforcement resources to cope with numerous cyclists who ignored all signage and other efforts to dismount from their cycles while using the footways during the works. Whilst there were few complaints received from the public during the works, the vast majority of these related to this issue. Earlier identification of this issue may have resulted in the ability to allow for the costs of additional enforcement resources to be budgeted and made available during the works</li> <li>3. The previous loss of car parking and yard space to Bridgemaster's House meant that the contractors' facilities for a large project of this nature needed to be located within the works themselves and on the public highway. This reduced the available working area and complicated final resurfacing works at completion.</li> </ol>
<b>Variation Review-</b>	
<p><b>[9] Assessment of project against key milestones</b></p>	<p>Following gateway 1/2, all deadlines for subsequent gateway milestones were met, to ensure a start date on 1<sup>st</sup> October 2016 that had been agreed several years beforehand with Transport for London and the Port of London Authority. Discussions with these parties first commenced 5 years before the works began and prior to project initiation</p>
<p><b>[10] Assessment of project against Scope</b></p>	<p>The original scope set at Gateway 1/2 in 2014 was to implement essential major civil engineering maintenance works which included replacement or refurbishment of the timber decking to the bridge bascules, replacement of expansion joints to the fixed spans and waterproofing the northern approach viaduct.</p> <p>At the request of committee, the scope was later modified at Gateway 3, in order to consider making further use of the disruptive three-month road closure required by these works, to include further cyclic maintenance of other operational and structural elements, in order to mitigate against future disruption to public and road users. This included waterproofing of the southern approach viaduct, full resurfacing of roads and footways, replacement of obsolescent traffic signals and related bridge control systems, works to bascule pawls/buffers and structural repairs to the bascule nosing bolt inspection gantry</p> <p>These major works were successfully completed to scope/specification one week ahead of programme in December 2016 and within the project budget set at Gateway 5.</p>

	<p>The only part of the original project proposals not successfully completed (although now imminent) was the installation of a new Automatic Number Plate Recognition (ANPR) weight limit enforcement system for the bridge.</p> <p>As the City are not the highway authority for Tower Bridge, we are unable to enforce this (civil) offence, nor collect the revenue from Penalty Charge Notices (PCN) issued. After protracted negotiations by officers over several years, TfL have agreed for Southwark Council to enforce the weight limit on their behalf.</p> <p>Following a successful trial period in 2018 with an ANPR camera enforcing northbound traffic, Southwark are currently planning to install a new camera so that both directions will be enforced by the end of 2018. Southwark collect the revenue from the PCNs issued and – as a result – have purchased the new cameras and are operating the enforcement at no cost to the City. Southwark Council routinely submit statistics on the number of offences committed to the City, for our monitoring purposes, as indicated in Appendix 2 of this report.</p> <p>ANPR Average Speed enforcement systems were successfully replaced in January 2018 (subsequent to the main works) and are being operated by City Police (as a criminal offence). As with other criminal offences, the money received from Fixed Penalty Notices (FPN) is directed to the Home Office and cannot be used locally.</p>
<p><b>[11] Change</b></p>	<p>No changes to the scope of the works were necessary following Gateway 5.</p> <p>A number of Compensation Events became apparent under the works contract, arising from unforeseen conditions of buried elements (in spite of extensive prior investigations). These lead to increased costs that were well within the project risk allowance identified at Gateway 5, as report to committee by subsequent issue reports.</p>
<p><b>[12] Risks and Issues</b></p>	<p>As noted above, a number of risks pertaining to unforeseen condition of buried elements were realised during the work. These lead to an increase in the final contract sum but did not delay the works, which completed one week early than programmed in late December 2016, immediately prior to the Christmas holiday.</p> <p>In response to notifications for compensation events under the main works contract £245,000 (or 49%) of the £500,000 risk allowance approved at Gateway 5 was released to the project, although the final contract sum was settled at approximately £194,000 increase on the original contact sum. This represented £39% of the risk allowance and 4% of the original contract sum.</p>

<p><b>[13] Transition to BAU</b></p>	<p>As part of the stakeholder management plan, continual collaboration took place with Tower Bridge Exhibition during the planning and execution of the works, to ensure that inconvenience to visitors and events was mitigated as far as practicable.</p> <p>Dedicated pedestrian routes through the works were maintained to ensure minimal disruption to pedestrians. On the one weekend when this was not possible (due to prolonged raising of the bascules for maintenance works) the City procured a replacement passenger ferry service across the Thames between nearby river piers, at no cost to the public.</p> <p>The works were also designed and managed such that the City's obligations to lift the bascules to qualifying river vessels at 24 hours' notice was maintained throughout the works.</p> <p>The TFL road was fully re-opened to vehicular traffic upon completion, one week earlier than programmed.</p>
--------------------------------------	---

**Value Review**

<p><b>[14] Budget</b></p>	<table border="1" data-bbox="491 931 1369 994"> <tr> <td><i>Budget envelope at Gateway 2:</i></td> <td>£250,000 to £5 Million</td> </tr> </table> <table border="1" data-bbox="491 1025 1369 1379"> <thead> <tr> <th></th> <th><i>At Authority to Start work (G5) (£)</i></th> <th><i>At Completion (£)</i></th> </tr> </thead> <tbody> <tr> <td><i>Fees</i></td> <td>721,000</td> <td>661,834</td> </tr> <tr> <td><i>Staff Costs</i></td> <td>117,000</td> <td>116,992</td> </tr> <tr> <td><i>Works (exc. Risk)</i></td> <td>5,387,000</td> <td>5,235,184</td> </tr> <tr> <td><i>Purchases</i></td> <td>118,000</td> <td>107,245</td> </tr> <tr> <td><i>Other Capital Expend</i></td> <td></td> <td></td> </tr> <tr> <td><i>Risk/Contingency</i></td> <td>500,000</td> <td>245,000</td> </tr> <tr> <td><i>Recharges</i></td> <td></td> <td></td> </tr> <tr> <td><i>Other (Investigations)</i></td> <td>215,000</td> <td>203,239</td> </tr> <tr> <td><b>Total</b></td> <td><b>7,058,000</b></td> <td><b>6,569,494</b></td> </tr> </tbody> </table> <p>The project was completed within the agreed budget, as approved at Gateway 5, with the main contract works being completed 1 week ahead of programme</p> <p>The final account has been verified by the Chamberlain's Financial Services division</p> <p><i>State any outstanding issues, actions to be taken and timescales for resolution.</i></p> <p>The only outstanding issue is a lack of invoicing by Transport for London for services provided in 2016 in respect of traffic management and diversion signage to the value of approximately £62,000, despite repeated reminders. This remains a financial commitment by the City, for services provided, whose cost is included in the total project cost shown in the above table</p>	<i>Budget envelope at Gateway 2:</i>	£250,000 to £5 Million		<i>At Authority to Start work (G5) (£)</i>	<i>At Completion (£)</i>	<i>Fees</i>	721,000	661,834	<i>Staff Costs</i>	117,000	116,992	<i>Works (exc. Risk)</i>	5,387,000	5,235,184	<i>Purchases</i>	118,000	107,245	<i>Other Capital Expend</i>			<i>Risk/Contingency</i>	500,000	245,000	<i>Recharges</i>			<i>Other (Investigations)</i>	215,000	203,239	<b>Total</b>	<b>7,058,000</b>	<b>6,569,494</b>
<i>Budget envelope at Gateway 2:</i>	£250,000 to £5 Million																																
	<i>At Authority to Start work (G5) (£)</i>	<i>At Completion (£)</i>																															
<i>Fees</i>	721,000	661,834																															
<i>Staff Costs</i>	117,000	116,992																															
<i>Works (exc. Risk)</i>	5,387,000	5,235,184																															
<i>Purchases</i>	118,000	107,245																															
<i>Other Capital Expend</i>																																	
<i>Risk/Contingency</i>	500,000	245,000																															
<i>Recharges</i>																																	
<i>Other (Investigations)</i>	215,000	203,239																															
<b>Total</b>	<b>7,058,000</b>	<b>6,569,494</b>																															

[15] Investment	Not applicable
[16] Assessment of project against key measures of success	<p>At Gateway 5 (Authority to Start Work), the success criteria was defined by the ability of the contractor to complete the works within the 12 week road closure agreed with Transport for London (TfL) and the Port of London Authority (PLA), in accordance with the agreed specification and lump sum cost, whilst also managing the many stakeholders affected by the closure.</p> <p>It should be noted that the negotiations for road closures and reduced services for large cruise liners during the works (with TfL and PLA respectively) commenced 5 years before the works commenced and before project initiation.</p> <p>The works were completed to the agreed specification within the allocated programme (actual completion 1 week early).</p> <p>The final valuation of works was agreed at £5,162,955.62, which exceeded the original tender sum of £5,012,736.43 by approximately £150,000 or 3% due to unforeseen conditions experienced during the works and changes in scope to accommodate these. The additional sums were accounted for by budget adjustments within the overall project budget, as well as calling upon some of the £500,000 risk allocation agreed at Gateway 5, as released by subsequent issue reports.</p> <p>Tower Bridge Exhibition was kept fully open to the public (at normal opening hours) throughout the works, including for private events.</p> <p>All requests for bridge lifts by river traffic were fully accommodated by the contractor throughout the project.</p> <p>A pedestrian foot crossing was provided across the bridge at all times, with the exception of one Saturday – when the bascules needed to remain raised for maintenance works – whereupon the City arranged for an alternative free pedestrian ferry service.</p> <p>Subsequent to the main works, a new ANPR average speed enforcement system has been provided, operated by the City of London Police.</p> <p>A new ANPR weight limit enforcement system has been trialled and is soon to become fully operational, at no cost to the City. This has been negotiated with Southwark Council and TfL who are two of the relevant highway authorities who are able to enforce this offence.</p> <p>In addition, the project was awarded Civil Engineering Project of the Year (up to £10 Million) in the 2017 British Construction Industry Awards</p> <p>It is believed that the successful completion of the works within a tight timescale under difficult conditions, while successfully</p>

	managing all stakeholders, was a major factor in the success at the 2017 BCI Awards.
<b>[17] Assessment of project against SMART Objectives</b>	<p>SMART objectives did not form part of the report proforma when Project Proposals were submitted at Gateway 1/2 in late-2014.</p> <p>However, it should be noted that this project was successfully completed on time and within the project budget set at GW5</p>
<b>[18] Key Benefits realised</b>	<p>As well as reducing annual reactive maintenance costs, the refurbishment of key components of the varying structures mitigates the degradation of the structure under environmental conditions and ageing materials.</p> <p>This helped to satisfy the City's legal obligations to maintain the structures in respect of the Corporation of London (Tower Bridge) Act 1885 as well as our obligations in respect of listed structures status.</p> <p>The waterproofing of the northern approach viaducts mitigated the risk of legal action from Historic Royal Palaces for not keeping the arches in suitably maintained condition.</p> <p>On the south side, waterproofing of the viaduct serves to improve the environment for the Tower Bridge Exhibition (Engine Rooms)</p> <p>The implementation of new ANPR traffic enforcement systems for both speed and weight will also be a key benefit in protecting the bridge in the future from overweight vehicles and dynamic effects caused by excessive speed of vehicles</p>

<b>Lessons Learned and Recommendations</b>	
<b>Lessons Learned-</b>	
<b>[19] General Purpose Review</b>	<p>On the positive side,</p> <ol style="list-style-type: none"> <li>1. It is our opinion that the decisions taken early in the project by the Engineering Team, in agreement with City Procurement, to opt for an Early Contractor Involvement (ECI) approach with a Design-and-Build contract, set the path to a successful project for a very intensive series of works on a very sensitive site with considerable logistical constraints.</li> </ol> <p>It was felt that a contractor was best placed to manage these risks and steer the design towards the most practical and efficient solutions to deal with these constraints.</p>

This included contractor involvement in investigations at an early stage (as well as the costs involved in those investigations), which it is considered greatly reduced subsequent construction stage financial and time risks

2. Very positive collaborative working relationships were maintained between Built Environment, Tower Bridge (Exhibition and Operational) and Town Clerk Media teams, working in close and regular liaison with TfL and other key stakeholders, including Transport for London (TfL), the Port of London Authority (PLA), local authorities, local businesses and local residents. These were considered a key to the smooth execution of the project and in meeting the project timescales agreed years in advance.
3. The management of the NEC3 works contract was assisted by ability to respond quickly to compensation events by reference to allocated risk allowances approved in advance by committee, with expenditure from such allowance being subject to approval under urgency by Chairman and Deputy Chairman of Projects Sub Committee.

It is considered that there are very few areas where improvement could be made, which tends to support the procurement and management approach used on the project. However, perhaps worthy of note:-

1. It would have perhaps been prudent to liaise directly with Southwark Council highways department at an earlier time, at least as a courtesy, rather than relying on the assumption that TfL would do this (as is their responsibility as the relevant highway authority). This resulted in some slight friction near the beginning of the project, albeit later overcome.
2. Experience showed that it would have also been prudent to allow for additional highway enforcement resources to cope with numerous cyclists who ignored all signage and other efforts to dismount from their cycles while using the footways during the works. Whilst there were few complaints received from the public during the works, the vast majority of these related to this issue. Earlier identification of this issue may have resulted in the ability to allow for the costs of additional enforcement resources

	<p>to be budgeted and made available during the works</p> <p>3. Future works should be mindful of the challenging constraints of carrying out major construction works on Tower Bridge, without adequate areas outside of the public highway for site welfare and site compound facilities. In previous projects of this type, advantage would have been taken from the yard area at Bridgemasters House that has now been redeveloped. This meant that the contractors' facilities for a large project of this nature needed to be located within the works themselves and on the public highway. This reduced the available working area and complicated final resurfacing works at completion.</p>
<p><b>[20] Learning sharing and use</b></p>	<p>Disseminated informally within group, at Tower Bridge Strategic Coordination Group meetings and with the Town Clerk's Project Management Office</p>
<p><b>Recommendations-</b></p>	
<p><b>[21] Recommendations</b></p>	<ol style="list-style-type: none"> <li>1. That it be noted that the project was successfully delivered, on programme and within budget at a very sensitive and logistically difficult location, meeting the City's legal obligations and thereby protecting the City's interests and reputation.</li> <li>2. It is recommended that the lessons learnt be noted and the project be closed</li> </ol>
<p><b>[22] AOB</b></p>	<ol style="list-style-type: none"> <li>1. The delay in bringing this report to committee is as a result of protracted discussions to implement the ANPR traffic enforcement arrangements to the satisfaction of officers and the time taken in auditing the final account for the construction contract.</li> <li>2. The contractor must be congratulated on their performance during the planning, preparation and execution of works, paying due care to public engagement and general stakeholder management in liaison with the City.</li> <li>3. This is undoubtedly reflected by the fact that the project was awarded Civil Engineering project of the Year (up to £10M) at the prestigious 2017 British Construction Industry Awards.</li> <li>4. Credit should also be given to those at Transport for London who helped coordinate the road closures and</li> </ol>

	public engagement, which played a crucial role in the success of the project.
--	---

<b>Decisions required</b>	
If any decisions are required in addition to the approval of this outcome report please describe them here:	
N/A	

**Appendices**

<b>Appendix 1</b>	Project Coversheet
<b>Appendix 2</b>	ANPR Enforcement Statistics

**Contact**

<b>Report Author</b>	Mark Bailey
<b>Email Address</b>	<a href="mailto:mark.bailey@cityoflondon.gov.uk">mark.bailey@cityoflondon.gov.uk</a>
<b>Telephone Number</b>	020 7332 1972