

<b>Committees:</b>	<b>Dates:</b>
Planning and Transportation Committee Projects Sub-Committee	02 June 2015 16 June 2015
<b>Subject:</b> Gateway 3 Outline Options Appraisal: Tower Bridge Bascule Re-Decking and Approach Viaduct Waterproofing	<b>Public</b>
<b>Report of:</b> Director of the Built Environment	<b>For Decision</b>

### Summary

#### Dashboard

- Project Status - Green
- Timeline - Construction planned for Oct to Dec 2016
- Total Estimated Cost - £3,350,000 identified in Bridge House Estates 50 year plan for FY 2016/17
- Spend to Date - Staff costs only, approx. £2,000
- Overall Project Risk - Green

#### Progress to date including resources expended and any changes since previous gateway

Since starting with this project, it has become clear that we need to view the project as covering Tower Bridge and its approaches as a whole. Given that the original proposal of replacing the bascule decking would require (at the most) an estimated three month road closure, it makes sense to see what else can be done in that period. This report explains why we need that closure period, and what other works from the Bridge House Estates 50 year Repair & Maintenance Fund might be sensibly included in the project, to make best use of the closure. It also explains that investigations are needed at this stage to mitigate risks to the project, to assess possible alternative solutions and to ensure that the scope of the works is clearly identified prior to commencing.

Following Gateway 2 approval, further discussions have taken place with City Procurement regarding the procurement strategy for both consultancy services and works. The City's legal responsibility with respect to maintaining opening of the bascules to river traffic during works has also been clarified, as has the responsibility for maintaining the approach viaduct arches. Discussions with the Port of London Authority (PLA) and Transport for London (TfL) on the programming of the works have continued, as have preliminary discussions with potential specialist materials suppliers.

Whilst the project value and risk register dictates that this project should follow the *Regular* gateway project approval route, it is proposed to separate gateways 3 and 4 for this project. This is to allow investigations to take place to confirm or mitigate/eliminate risks, which will require the resources hereby requested at gateway 3 and which are considered necessary to fully inform a gateway 4 report, especially given the special importance of Tower Bridge.

### Overview of options

The following options were presented at Gateway 1/2:-

1. "Do Nothing"
2. Replace timber decking to Tower Bridge bascules only (retaining existing polyurethane block substrate)
3. Full re-decking of Tower Bridge bascules, including exposure and repair to underlying steel structure and replacement of lightweight carriageway construction
4. Full re-decking of Tower Bridge bascules (option 3) plus waterproofing works to approach viaduct arches

### Proposed way forward and summary of recommended option

It is proposed that further investigations and resources are procured in order to arrive at a firm recommendation for a construction option that best protects the City's long term interests. It is proposed that in order to obtain best use of the road closure, the works include maintenance to the operating equipment of the Bridge, and works to the approach viaducts (which have occupiers under them), and which require waterproofing to meet our obligations to Historic Royal Palaces.

In relation to the deck, to help establish exactly what needs to be done, it is considered necessary to carry out further investigation works to better assess the condition of the current polyurethane substrate to the bascule road decking, as well as the underlying steelwork. If it is found that both are in an acceptable condition with minimal risk of long term deterioration, there may be a considerable economic benefit of considering a further option that would allow replacement of just the timber road decking to the bascules (without renewal of steelwork protection and polyurethane fill, as well as waterproofing works to those approach viaduct works which are found to be in need of further protection.

To facilitate the bascule works, a road closure of 3 months is estimated as necessary, which has already been discussed with Transport for London, in terms of network coordination and diversion route planning. The bascules will be maintained as operable to river traffic at 24 hours' notice, in order to meet our obligations under Act of Parliament. The programmed date for October to December 2016 coincides with those months of the year that the bascules are typically least lifted – hence limiting disruption to both river traffic and the construction works to maintain the Bridge.

We have considered whether the work could be done in a different way, for example, whether the road could be closed one half-width at a time. However, this would not allow sufficient safety clearances beyond the centreline of the carriageway for construction and also maintain an adequate road width for single lane traffic (including buses). It is also considered a very high risk that unequal unloading of the bascules caused by these works (if worked on in halves longitudinally) will give rise to unacceptable twisting forces on the bascules and bracing system when these are lifted to any river traffic during the works. This may also adversely affect the mechanical operation of the bridge due to these

twisting effects, as well as complicating the removal/adding of counterbalance ballast that will be required as the works proceed.

However, we will consider as part of the GW4 report whether by allowing 24 hour working the duration for the works could be reduced and at what cost.

Subject to the above considerations and further investigations, it is proposed to coordinate and programme other significant mechanical maintenance works to the bridge at the same time (e.g. pawls, seating blocks), to take full advantage of closures.

Further resources are considered necessary to adequately inform the recommendations of the preferred construction option in a Gateway 4 report and to reduce project risks, namely:-

1. Consultancy services from the term structural consultant for the Bridge House Estates structures (AECOM), to assist in investigating practical outline solutions to the works, assist in the brief/tender for a Design & Build (D&B) contractor, as well as specifying and supervising exploratory works to inform the GW4 recommendations, the subsequent design proposals and to reduce construction stage risks – working in conjunction with the design and build contractor when appointed.
2. Cost consultancy services. Tender and appointment of a Cost Consultant for the project, to give high level cost advice.
3. Appointment of a Design & Build contractor, initially on an Early Contractor Involvement (ECI) basis up to Gateway 4 (GW4), to give logistical and practical support and develop outline design solutions.
4. Exploratory investigation works. Instruction to the term highways maintenance contractor and or Design & Build Contractor to conduct exploratory investigations to the bridge/approach, under the supervision of AECOM
5. Staff costs

#### Procurement approach

Between GW3 and GW4 it is proposed to instruct AECOM on a limited brief as stated above, to include assisting with the brief/tendering of a Design & Build (D&B) contractor and a Cost Consultant.

Post-GW4, it is proposed that the D&B contractor will take forward the development of detailed design proposals and provide a fully priced solution at GW5 that is based on open-book tendering. In the event that the City is not satisfied that the D&B's contractor's proposals offer the City best value, it will retain the right to re-tender the work.

It is proposed that the services of AECOM will be retained in a client advisor role as checking engineers and contract administrators post-GW4, in respect of checking the proposals of the D&B contractor, thus protecting the City's interests and the BHE structures

Please refer to the appended procurement strategy approach by City Procurement for full details (Appendix 1), as well as the estimates of required

resource in Appendix 2

Table with financial implications

The following figures have been taken from the BHE 50 year Repair & Maintenance Plan for 2016/17. These costs are inclusive of fees (but exclude staff costs), but which are not specifically broken down in this plan. Please refer to Appendix 2 for a breakdown of estimated project fees. No funds are currently allocated to Tower Bridge for this project in 2015/16

<b>Description</b>	<b>Option 1 ("Do nothing")</b>	<b>Option 2 (Bascule deck only)</b>	<b>Option 3 (Full bascule works - deck and substrate)</b>	<b>Option 4 (Full bascule works plus approach viaduct waterproofing)</b>
	<b>£</b>	<b>£</b>	<b>£</b>	<b>£</b>
Works Costs	-	1,150,000	2,350,000	3,350,000
Fees	-	(inc.)	(inc.)	(inc.)
Staff Costs	-	(inc.)	(inc.)	(inc.)
<b>Total</b>	-	<b>1,150,000</b>	<b>2,350,000</b>	<b>3,350,000</b>
Tolerance +/-	-			
<b>Funding Strategy</b>				
BHE 50 yr plan	-	1,150,000	2,350,000	3,350,000
<b>Total Funding Requirement</b>	-	<b>1,150,000</b>	<b>2,350,000</b>	<b>3,350,000</b>
<b>Investment Appraisal (e.g. NPV/IRR)</b>	-	N/A	N/A	N/A

**Recommendations**

It is recommended that:-

1. Approval is given to the Director of Built Environment to progress further investigations, in order to provide a firm recommendation on the preferred construction option at Gateway 4 to reduce construction risks.
2. Approval is given to the Director of Built Environment to instruct AECOM in a limited initial role, to investigate practical outline solutions to the works, assist in the brief/tender for a Design & Build (D&B) contractor, as well as specifying and supervising exploratory works to inform the GW4 recommendations, the

subsequent design proposals and to reduce construction stage risks – working in conjunction with the design and build contractor when appointed. It is recommended that this be on hourly rates as “additional services” under their current term contract, capped at an estimated value of £62,000 to Gateway 4

3. Approval is given to the Director of Built Environment to tender and appoint a Cost Consultant for the duration of the project (with estimated costs to GW4 as £39,000).
4. Approval is given to the Director of Built Environment to tender and appoint a Design and Build Contractor, with an initial appointment in an ECI role to GW4, estimated at £47,000
5. Approval is given to the Director of Built Environment to instruct intrusive investigation works to be carried out, to inform the design, estimated at £50,000 to GW4
6. Approval is given to the Director of Built Environment to allocate staff resources to an estimated value of £25,000, to progress the project to GW4
7. To allocate resources to the value of £223,000 to GW4 in Financial Year 2015/16 to this project, to cover the costs of consultant fees, investigations and staff costs (the breakdown for which is Appended to this report). It is proposed that the cost of these resources is covered by re-allocating from the sum of £459,000 in the current plan for 2015/16 for re-tensioning the suspension cables to Millennium Bridge, which are not required this financial year.

**Options Appraisal Matrix (Options as presented at GW1/2)**

*Please note that a further, hybrid option of 2 and 4 will be considered at GW4, following further exploratory investigations*

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>
<b>1. Brief description</b>	“Do Nothing”	Replace timber decking to Tower Bridge bascules only (retaining existing polyurethane blocks substrate)	Full re-decking of Tower Bridge bascules, including exposure and repair to underlying steel structure	Full re-decking of Tower Bridge bascules (option 3) plus waterproofing works to approach viaducts
<b>2. Scope and exclusions</b>	n/a	<ul style="list-style-type: none"> <li>Replaces timber decking only</li> <li>Does not expose existing hidden steel structure and assess/address potential corrosion</li> <li>Does not include works to approach viaduct</li> </ul>	<ul style="list-style-type: none"> <li>Replaces timber decking and substrate (currently polyurethane blocks)</li> <li>Addresses hidden steel corrosion risks</li> <li>Does not include works to approach viaduct</li> </ul>	As option 3, plus includes waterproofing of approach viaducts
<b>Project Planning</b>				
<b>3. Programme and key dates</b>	n/a	Works programmed for Oct-Dec 2016, during months with least bridge lifts, following early consultation with TfL and PLA		
<b>4. Risk implications</b>	<ul style="list-style-type: none"> <li>Increased reactive (unplanned) maintenance costs of decking to bridge, with risks of more frequent closures</li> </ul>	<ul style="list-style-type: none"> <li>Unknown deterioration of substrate and primary structure of bridge. Future risk of bridge closure to address this</li> </ul>	<ul style="list-style-type: none"> <li>Increased reactive (unplanned) maintenance costs of approach arches due to sustained water ingress.</li> </ul>	<u>Construction Risks</u> <ul style="list-style-type: none"> <li>Failure to secure PLA approval for longer duration bascule closures (&gt;24 hours)</li> </ul>

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>
	<ul style="list-style-type: none"> <li>• Unknown deterioration of substrate and primary structure of bridge. Risk of bridge closure</li> <li>• Increased reactive (unplanned) maintenance costs of approach arches due to sustained water ingress.</li> <li>• Deterioration of arch structures from sustained water ingress</li> <li>• Breach of agreement with Historic Royal Palaces to maintain vaults in a dry condition</li> <li>• Depreciation in asset value of bridge and approaches, including let-able value of arches and tourist/amenity value of bridge.</li> <li>• Risk of legal challenge on the duties of the City to maintain the</li> </ul>	<ul style="list-style-type: none"> <li>• Increased reactive (unplanned) maintenance costs of approach arches due to sustained water ingress.</li> <li>• Deterioration of arch structures from sustained water ingress</li> <li>• Breach of agreement with Historic Royal Palaces to maintain vaults in a dry condition</li> <li>• Depreciation in asset value of bridge and approaches, including let-able value of arches and tourist/amenity value of bridge.</li> <li>• Risk of legal challenge on the duties of the City to maintain the bridge under the Tower Bridge Act</li> <li>• Consequential reputational value to City</li> </ul>	<ul style="list-style-type: none"> <li>• Deterioration of arch structures from sustained water ingress</li> <li>• Breach of agreement with Historic Royal Palaces to maintain vaults in a dry condition</li> <li>• Depreciation in asset value of approaches, including let-able value of arches and tourist/amenity value of bridge.</li> <li>• Risk of legal challenge on the duties of the City to maintain the bridge (and approaches) under the Tower Bridge Act</li> <li>• Consequential reputational value to City</li> <li>• See also construction risks (Option 4)</li> </ul>	<ul style="list-style-type: none"> <li>• Failure to secure TFL approval for works (road closures)</li> <li>• Adverse weather during construction</li> <li>• Unforeseen conditions during construction</li> <li>• Public dissatisfaction at works and road closures</li> <li>• Failure to obtain Listed Building Consent for works</li> <li>• Limited contractors / suppliers &amp; competition due to specialist nature of works &amp; products</li> </ul>

	<i>Option 1</i>	<i>Option 2</i>	<i>Option 3</i>	<i>Option 4</i>
	bridge under the Tower Bridge Act <ul style="list-style-type: none"> <li>Consequential reputational value to City</li> </ul>	<ul style="list-style-type: none"> <li>See also construction risks (Option 4)</li> </ul>		
<b>5. Benefits and disbenefits</b>	<ul style="list-style-type: none"> <li>Short term cost benefits only, plus lack of disruption by major works</li> <li>Disbenefits as risks above, including depreciation in asset value and let-able value</li> </ul>	<ul style="list-style-type: none"> <li>Cheapest works option, which addresses the short-term deterioration of the bridge decking</li> <li>However, does not address other key risks (hidden structural deterioration of bridge) or approach arches</li> </ul>	<ul style="list-style-type: none"> <li>Addresses the issues/risks associated directly with the bridge</li> <li>Does not address the approach arch problems and risks</li> </ul>	<ul style="list-style-type: none"> <li>Addresses all risks</li> <li>Most expensive construction cost</li> </ul>
<b>6. Stakeholders and consultees</b>	n/a	<ul style="list-style-type: none"> <li>Port of London Authority</li> <li>Transport for London</li> <li>English Heritage</li> <li>London Boroughs of Tower Hamlets and Southwark</li> <li>Department of Culture, Heritage &amp; Libraries</li> <li>City Surveyors Department, Investment Property Group</li> <li>Thames Water (Tideway project)</li> <li>Bank Station upgrade project</li> </ul>		
<b>Resource Implications</b>				
<b>7. Total Estimated cost</b>	n/a	£ 1,150,000 (including replacement of expansion joints and road flaps)	£ 2,350,000 (including replacement of expansion joints and road flaps)	£ 3,350,000 (including replacement of expansion joints and road flaps)



	<i>Option 1</i>	<i>Option 2</i>	<i>Option 3</i>	<i>Option 4</i>
<b>8. Funding strategy</b>	n/a	Bridge House Estates, 50 year Bridge Repair & Maintenance Fund		
<b>9. Estimated capital value/return</b>	n/a	n/a	n/a	n/a
<b>10. Ongoing revenue implications</b>	Increased annual reactive maintenance costs (un-quantified). Reduced let-able/amenity value of assets	Reducing annual reactive maintenance costs. Increasing let-able/amenity value of asset		Reduced annual reactive maintenance costs (un-quantified) Maintain asset value
<b>11. Investment appraisal</b>	n/a	n/a	n/a	n/a
<b>12. Affordability</b>	n/a	Funds already identified in 50 year plan, although subject to review as project develops to GW4		
<b>13. Procurement strategy</b>	n/a	See appended report by City Procurement		
<b>14. Legal implications</b>	Breach of agreement with Historic Royal Palaces to maintain vaults and curved facing stone in an adequate condition	Normal construction & procurement contract risks Breach of agreement with Historic Royal Palaces to maintain vaults and curved facing stone in an adequate condition	Normal construction & procurement contract risks Breach of agreement with Historic Royal Palaces to maintain vaults in a dry condition	Normal construction & procurement contract risks
<b>15. Corporate property</b>	<ul style="list-style-type: none"> <li>Reduced lettability of approach viaduct arches, due to sustained or increasing water ingress and damage</li> </ul>			<ul style="list-style-type: none"> <li>Access to the Tower Bridge Exhibition and</li> </ul>

	<i>Option 1</i>	<i>Option 2</i>	<i>Option 3</i>	<i>Option 4</i>
<b>implications</b>				<p>all other tenanted areas will be maintained (wherever possible) throughout the duration of the works.</p> <ul style="list-style-type: none"> <li>• Reduced water ingress to the tenanted arches will improve their lettability.</li> </ul>
<b>16. Traffic implications</b>	Increased risk of frequent maintenance closures	Major disruption due to closure of Tower Bridge to road traffic, with diversions and alternative bus services	As option 2, but longer construction period anticipated	As option 2, but longer construction period anticipated (approach works would run concurrent with option 3 works)
<b>17. Sustainability and energy implications</b>	Negative sustainability effects of increasing structural depreciation and more regular maintenance interventions	The project proposes to investigate the potential for using sustainable materials with greater longevity, to reduce the frequency and extent of future maintenance interventions	The project proposes to investigate the potential for using sustainable materials with greater longevity, to reduce the frequency and extent of future maintenance interventions	The project proposes to investigate the potential for using sustainable materials with greater longevity, to reduce the frequency and extent of future maintenance interventions
<b>18. IS implications</b>	n/a	n/a	n/a	n/a
<b>19. Equality Impact</b>	n/a	n/a	n/a	n/a

	<i>Option 1</i>	<i>Option 2</i>	<i>Option 3</i>	<i>Option 4</i>	
<b>Assessment</b>					
<b>20. <u>Recommendation</u></b>	Not recommended	Not recommended	Not recommended	<b>Recommended</b>	
<b>21. Next Gateway</b>	n/a	Gateway 4	Gateway 4	Gateway 4	
<b>22. Resource requirements to reach next Gateway</b>		<b>Item</b>	<b>Reason</b>	<b>Cost (£)</b>	<b>Funding Source</b>
		Consultancy Services	To better define project risk and preliminary design	£148,000	BHE 50 year plan
		Exploratory Works	To better define project risk and preliminary design	£50,000	BHE 50 year plan
		Staff Costs	To manage the above and coordinate project with stakeholders/consultees	£25,000	BHE 50 year plan