

Decision Pathway – Report



PURPOSE: Key decision

MEETING: Cabinet

DATE: 05 September 2023

TITLE	Structural Repairs to Avon Fixed Bridge and associated Cumberland Basin Complex Structures		
Ward(s)	Hotwells and Harbourside, Southville and Bedminster		
Author: Shaun Taylor	Job title: Head of Service – Highways and Transport		
Cabinet lead: Councillor Donald Alexander, Cabinet Member for Transport	Executive Director lead: John Smith, Interim Executive Director Growth and Regeneration		
Proposal origin: Councillor			
Decision maker: Cabinet Member Decision forum: Cabinet			
Purpose of Report: <ol style="list-style-type: none">1. To inform and update Cabinet of the need to prioritise further investigations and potential repairs to Avon Fixed Bridge and the wider Cumberland Basin complex concurrently, over the next 3 to 5 years.2. To seek approval for additional Capital funding (including an ongoing increased annual Capital funding budget), in order that these strategic high priority Capital Works can be further progressed.3. To seek approval of a staged phased approach to dealing with these Capital Works requirements and future Capital funding streams and timeframe and phasing for these Capital works to progress.			
Evidence Base:			
Introduction <ol style="list-style-type: none">1. In July 2023, as part of the ‘Western Harbour vision and next steps’ report, cabinet noted a need to update or replace the Cumberland Basin road system. As the infrastructure of this network has become older, maintenance has become increasingly costly and the replacement of large parts of the system will be necessary in the near future.2. The Cumberland Basin was constructed between February 1963 and April 1965 and was officially opened to traffic on 14 April 1965. In developing the layout and capacity of the junction, emphasis was originally placed on the ultimate requirements of local traffic demands and forming new links with Bristol other road systems.3. Significant elements of the Cumberland Basin network are nearing the end of its intended working design life and are now deteriorating at a significant rate. The overall Cumberland Basin structure complex has deteriorated much faster than originally designed for, given that the current traffic figures are currently over 2.5 times the projected traffic figures in 1963-1965 anticipated, with the consequential increase in structural component deterioration.4. Given the condition of the Cumberland Basin network, additional capital investment is now required to manage its ultimate depreciation and decline, and to facilitate the emerging Western Harbour Development. Currently over a third of the £1m annual structures maintenance budget is being spent on the Cumberland			

Basin network alone.

5. The complex contains a broad range of reinforced concrete structures with the required repairs and component replacements now including structural concrete repairs, expansion joint replacement, re-surfacing and re-waterproofing of bridge decks, bearing condition assessment and potential full bearing replacement and parapet containment barrier railing refurbishment and wholesale railing replacement.
6. One of the key pieces of infrastructure is the Avon Fixed Bridge, which supports the A3029 over the River Avon. Because of its type of design and construction, we have inspected the condition of this bridge in detail. An Active Management Plan is proposed to be developed, as well as an access and monitoring regime.
7. Details of the overall Cumberland Basin complex can be found in the unsuccessful 2015 Challenge bid for £28 million at Appendix A3. Due to the inflation and depreciation in the structure, the estimated cost for repairs to the Cumberland basin network is envisaged to be between £40m to £50m.
8. The Western Harbour regeneration project intends to deliver affordable homes in this sustainable location, while modernising the wider transport network and a resilient flood defence system instead of simply replacing the network as is. Now at the master planning phase, it will consider the condition and functions of the Cumberland Basin network as more information is made available through the Active Management Plan this report proposes. The project will work closely with the Western Harbour team to ensure the impact of this project is fully considered with the emerging Western Harbour aspirations.

Ongoing management and future maintenance of remaining Cumberland Basin structures complex

9. Appendix A1 sets out the full layout and location of specific structures contained within the overall Cumberland Basin (excluding Junction Lock Bridge), and Appendix A2 contains photo images of general condition of Avon fixed bridge and examples of overall condition for the remainder of the full Cumberland Basin Complex.
10. The Structures Team has endeavoured to continue to manage strategically the overall decline of the complex using the allocated Annual Bridges Capital Budget and have undertaken the following Capital Works:
 - Strategic identified Concrete Repairs.
 - Strategic Expansion Joint Replacement.
 - Re-waterproofing of certain identified sections of elevated structures.
 - Resurfacing of certain identified areas of main carriageways along elevated structures.
 - Reactive ongoing Parapet railing RTC Repairs or replacement of any failed sections
 - Isolated identified drainage repairs due to faulty drainage,
 - Ongoing miscellaneous repairs.
11. The continuing ongoing deterioration cycle is now accelerating, despite BCC spending in the region of £250k to £500k on the whole complex annually. The entire annual Structures Capital Budget is currently about £1.0 million, meaning approximately 33% of Structures Capital Budget is spent on Cumberland basin complex, with the remainder Capital allocation then being spent on the remaining bridges throughout the city, many of them also critical to the transport network.
12. Despite this investment the Structures Capital Budget is not able to keep ahead of the degradation curve and

the rate of depreciation of the overall Cumberland Basin Complex. It is therefore recommended that BCC allocate capital funding to put in place an “Active Management Plan” to ascertain critical strategic regimes of repair and/or replacement of components outside the normal Annual Capital programme of works.

13. While there are ongoing statutory inspections, as well as the original information submitted within the unsuccessful 2015 Challenge Bid, more needs to be done to increase the level of structural condition knowledge of the Cumberland Basin complex. An additional regime of special inspections the structures within the complex with the aim of producing a master ongoing “Active Management Plan”. This will allow us to manage the continuing decline in structural performance of the entire complex. It is anticipated that a range of maintenance required across the structures will be:

Phase 1 - 2023/24 - £10,000 - £15,000

- Review of existing Asset Condition Data and Production of a suitable “Draft Active Management Plan”
- Provide Preliminary cost estimates based on existing Asset data and report.
- Provide preliminary draft inspection programme of delivery based on existing data, with costs.
- Production of Risk Management Plan to manage the decline of this complex of structures.

Phase 2 - 2023/24 - £25,000 - £35,000

- Plan and programme detailed special Inspections on whole complex to investigate and confirm condition, with particular attention to Bearings, parapets, drainage, expansion joints, waterproofing and concrete condition.
- Programme and cost inspection regimes of inspection, including access cost and specialist inspection costs.
- Production of proposed new Risk Management Plan to manage the decline of this complex of structures.

Phase 3 - 2024/25 - £150,000-£200,000

- Plan and execute agreed programme of Inspections in accordance with agreed Phase 2 programme.
- Provide full costing of findings after completion of new special inspections.
- Production of new revised Risk Management Plan to manage the decline of this complex of structures.

Phase 4 - 2026/TBD – Structural repairs and establishment of ongoing management (Capital Amounts to be determined)

- Based on the findings of previous three phases, there will be the required known level of detail to implement and appropriate evidenced active management plan.
- The prior of this Active Management plan will be determined and fully costed to understand the additional Capital that will now be required.
- This increased additional Capital Cost of this “Ask” will be then sought and approved to reflect the need to execute these strategic Capital works on an ongoing annual basis.

Avon Fixed Bridge Active Management Plan

14. The Avon Fixed Bridge supports the main arterial route Brunel Way, the A3029, over the tidal River Avon in the south-west of Bristol City. The road above consists of dual carriageway and pedestrian foot walks on both sides.

15. The twin deck structure, formed in three spans, includes a central portion suspended on reinforced concrete

half-joints. Each deck consists of three longitudinal voids separated by vertical concrete walls, containing post tensioning internal strand tendons. This type of structural design arrangement and construction is no longer approved in the UK for any new proposed highway structures as the potential risk profile of potential catastrophic failure is considered to be unacceptably high.

16. The bridge consists of a considerable number of inherent high-risk construction design features and including its increasing age, the high number of traffic usage (2.50 times its original design consideration), with the full combination of the high risk of catastrophic failure potential of the post-tensioning and/or half-joints, tendons in box-beam bottoms, and the ongoing road-water and gritting salt ingress leakage. Therefore the “Do Nothing Option” is not recommended for Avon Fixed Bridge.
17. Due to concerns about the structural integrity of “half jointed”/post tensioned fixed bridges, and to determine the current overall structural condition, a post-tensioned special inspection (PTSI) was completed in early 2021 to assess the structural existing performance of the bridge and these half joints. Following the PTSI report, urgent strategic capital works were undertaken in 2022 to re-waterproof and re-surface the bridge deck and replace all four expansion joints to mitigate the issue of water ingress into the structure, to reduce and de accelerate immediate rates of the deterioration cycle.
18. Now that the water ingress into the structure has been addressed, an “Active Management Plan” is now essential to avoid uncontrolled deterioration of the structure. Whilst further deterioration is likely given the age of the structure, the role of the Authority is to manage the decline of the whole of the Cumberland Basin until its overall future is clearly defined through the Western Harbour master planning.
19. The PTSI found extensive issues with the expansion joints and widespread concrete spalling around the half-joints and soffit. However, visual and limited evidence to date suggests currently there no known and observable significant loss of structural performance at this present time. As a result of the 2021 PTSI an “Active Management Regime”, will now be critical to continue to sustain and further monitor the continuing remaining performance assessment life of Avon Bridge.
20. The precise management of the rate of ongoing depreciation of Avon Fixed Bridge can be generally planned and programmed alongside the emerging Western Harbour masterplan. This proposed programme of work would be split into distinct phases over the next three years to five years as follows:

Phase 1 – 2023/24 – Produce Active Management Plan using WECA Framework (circa £120,000 - £150,000)

- Undertake Desktop study of existing bridge records and inspection reports (£15-20k).
- Undertake Condition Assessment of the bridge using remote access where needed (£30-40k).
- Fully costed “Active Management Plan”, outlining the necessary works programme (£30-40k)
- Temporary Works Scaffolding Design for access to the bridge soffit, half joints and piers, always keeping all four lanes of Brunel Way fully operational (possibly underslung scaffolding beneath Avon Bridge) (£15-20k).

Phase 2 – 2024/25 – Full Access and monitoring Investigation (circa £500,000-750,000)

- Installation of temporary scaffolding access to soffit and piers in order to undertake structural repairs.
- Principal Inspection of all bridge elements now accessible from the temporary access scaffolding arrangement

- Installation of required necessary monitoring equipment to enable further loss of structural performance to be measured, analysed and closely understood.
- Full Structural assessment of overall bridge Performance based on monitoring and inspection data and implication of this on the repair and monitoring regimes and associated costs.
- Full costing and proposed Programme and Priority Risk Matix interventions from Condition Assessment.
- Production of Outline “Active Management Plan” for Strategic Repairs

Phase 3 – 2025/26 – Structural repairs and establishment of ongoing management (circa £2,000,000 - £3,000,000)

- Completion of the works outlined as essential in the “Active Management Plan”, this includes works such as:
 - Concrete repairs to half-joints, soffit, bridge piers and main cantilevered bridge spans.
 - Installation of drip rails on each side of the half-joints to stop water tracking onto cantilevered sections
 - Other works as defined in the Active Management Plan and subsequent Principal Inspections
- Establishment of ongoing monitoring, inspection and bespoke maintenance regime programmes.

Phase 4 - 2026/TBD – Structural repairs and establishment of ongoing management (Capital Amount to be determined)

- Based on the findings of previous three phases, there will be the required known level of detail to implement and appropriate evidenced active management plan.
- The priority of this Active Management plan will be determined and fully costed to understand the additional Capital that will now be required.
- This increased additional Capital Cost of this will be then sought and approved to reflect the need to execute these strategic capital works on an ongoing annual basis.

Conclusion

21. As the Cumberland Basin Complex is a pivotal strategic arterial corridor route, after the required Capital Investment is implemented and executed, future consideration needs to be given on how we pay for the required capital works undertaken to bring the whole complex to required condition.
22. Based on this proposed “Active Management Plan” approach, the Authority will be sufficiently armed with the required level of new and complete asset condition data, which will be accurate, up to date and fully costed out. This will allow the Authority to further plan the ongoing management of the current “Cumberland basin Complex” and possibly seek further Capital funding to undertake further strategic targeted component replacement or repairs. This new asset condition data will be an essential tool to facilitate for further potential central government Capital funding bid submissions, which can be fully evidenced and quantified to promote higher quality successful bid submissions, unlike the unsuccessful 2015 Challenge fund bid.
23. The successful execution of Phases 1 and 2 recommended in this report will mean accurate and contemporary asset condition data will be available for all future Capital Bid submissions, such as CRSTS 2. It will also aid in the overall justification of any future Business Case to enable successful acquisition and securing the required and necessary Capital funding. Capital funding sought can also be from existing Prudential Borrowing, so any existing approved Capital underspends for other approved Capital Projects taken from Prudential Borrowing should now be rerouted to this new “Critical Ask”, along with any remaining

WECA (CRSTS 1 pot) underspend. Capital underspends and early engagement with WECA is therefore recommended to highlight this urgent new capital need for the Cumberland Basin complex and Avon Fixed Bridge. Further tranches of capital funding to be considered (CRSTS 2) and other Department for Transport funding streams.

24. As well as the support for further Capital funding submissions, the information will allow the Authority to accurately manage the ongoing decline of the Cumberland basin network determining how the whole area is to be managed in the interim as the Western Harbour designs and construction pipeline come on site.
25. It is stressed that the estimated costs contained in this paper at this stage, may be subject to increase once in-depth surveys have been completed. As with all major Bridges and Structures Projects, it is not until any project and scheme is physically executed on site (despite all reasonable investigations and previous Inspections), that many “unknowns” become apparent. Consequently, an appropriately cautious contingency in terms of Capital Costs and programmes adjustments will need to be always considered and fully managed within these projects. A further report will be brought back to Cabinet for approval or for information as required.

Cabinet Member / Officer Recommendations:

That cabinet:

1. Approves the allocation of the underspends from St Peters Rise of £457k, underspend from Park St. of £160k, any remaining underspend from Cumberland Road (to be confirmed at completion) estimated at £400k and utilisation of Highways block funding cumulatively assessed to be in the region of just over £1m to fund Phase 1 and 2 for Avon Fixed bridge and the Active Management Plan for the whole network.
2. Authorise the Executive Director Growth and Regeneration in consultation with the Cabinet Member Transport to take all steps required to spend the approved funding (including procuring and awarding contracts over the key decision threshold) as outlined in this report.
3. Note that execution and completion of phases 1 and 2 will facilitate for a strong new Business Case for any future Capital funding opportunities (i.e., CRSTS 2 funding or reallocation from any unspent CRSTS 1 funds) to then successfully deliver the estimated £2m - £3m for Phase 3 structural repairs to Avon fixed bridge itself and also any other urgent strategic Phase 3 repairs/component replacement on the remaining structures within the overall Cumberland complex, as a whole.

Corporate Strategy alignment:

The corporate strategy objectives of this specific project would be fulfilment of some of the corporate strategic themes with regard to Wellbeing, well connected and business as usual. The scheme will also fulfil the Councils main statutory duties, as Local Highway Authority.

City Benefits:

Refurbishment works will allow the bridge to continue to perform in an effective manner, meeting the Council’s statutory duty, obligations. It would also address the concerns of Corporate Council Insurers, regarding providing related corporate insurance cover for the structural performance aspects of the bridge along with the full Cumberland basin Complex.

It will reduce the risk of structural failure when the bridge, which could affect the operation of the surrounding highway network.

It will reduce risk of increased repair costs and operational costs due to attendance and additional mitigation measures, should there be significant delay in undertaking refurbishment work. Significant investment in updating the operational and performance aspects of the bridge will produce overall future operational savings and performance reliability, as well as a reduction in staff resources currently needed to ensure bridge performance. It also makes the waterfront upstream more marketable for BCC.

Consultation Details:

1. The Cabinet Member for Transport, Executive Director for (G&R) and Ward councillors have been briefed.
2. The Harbourmaster will be consulted and involved in the scheme developments.
3. The EA will require details of the proposed activities and will require to approve the appropriate Consents.
4. Local Frontages and local businesses will be informed of any significant traffic management that affects the network.
5. MetroBus, First Bus and relevant Emergency Services and relevant Stakeholders will also be kept up to date.

Background Documents:

None provided, other than the included appendices

Revenue Cost	£	Source of Revenue Funding	
Capital Cost	Up to £4.250m for phases 1-3 of both priority projects. Phase 4 tbc	Source of Capital Funding	Combination of underspends on capital projects, bids for capital funds
One off cost <input checked="" type="checkbox"/>	Ongoing cost <input checked="" type="checkbox"/>	Saving Proposal <input type="checkbox"/>	Income generation proposal <input type="checkbox"/>

Required information to be completed by Financial/Legal/ICT/ HR partners:**1. Finance Advice:**

The report sets out the infrastructure issues and concerns in the Cumberland Basin complex and particularly to the Avon Fixed Bridge. The assets require capital investment to maintain their safe operation.

The report currently estimates that the costs for the repairs to the Cumberland Basin network is up to £50m. This level of capital investment is not feasible in BCC's capital programme, so two key priorities have been identified in this report, along with a phased approach to completing the works and a strategy for applying the capital funds. The report also notes that the current capital investment issues with the Cumberland Basin complex and Avon Fixed Bridge will be reliant on the future proposals and aspirations of the Western Harbour Development and its vision for the area. It is important that the future vision is established asap as it has a significant impact on the approach and the scale of refurbishment that might be appropriate, especially if the Western Harbour development proposals include the dismantling of the current complex.

The report is recommending a phased approach to managing the projects, so work can commence, and data can be gathered to assist with planning and developing business cases. Phases 1 and 2 for both priorities is recommended which has an estimated total cost of around £0.950m and can currently (as per P3 capital reporting) be funded from underspends within existing transportation projects:

- St Peters Rise £0.457m
- Park Street £0.160m
- Cumberland Road £0.400m
- **Total** **£1.017m**

With phases 1 and 2 completed, phase 3 will require around £3.2m capital investment. The information and data gathered in phases 1 and 2 will help support business cases and applications for other capital funding bids, such as CRSTS 2, DfT funding bids and reallocations of underspends from other capital sources, such as CRSTS 1 or from the wider capital programme to complete phase 3 works.

The phase 4 funding and ongoing annual funds will need careful consideration, but by completing the first phases, it allows time for this to be determined, along with the future plans for the whole Cumberland Basin network and its links to the potential Western Harbour Development proposals.

Funding for Phases 3 & 4 are not being agreed as part of this report and will need to come back to Cabinet once the results Phase 1&2 are known and the future phases are fully costed.

As the service develops plans and firms up the financial costings for the capital works at each phase, they need to ensure financial reviews and discussions are scheduled with Finance, including at all the grant claim stages of the projects.

Like all major capital projects, there is the risk that the initial work identifies issues that result in higher costs than estimated, which could reduce the funds available for other maintenance and general transport works needed. Comprehensive project planning is required to ensure procurement, cost and time management of the capital programme remains on schedule, as any potential increases would need to be found from funding within the Highways capital programme, external funding or scale back proposals.

Finance Business Partner: Kayode Olagundoye, Finance Business Partner Growth and Regeneration, 13 July 2023

2. Legal Advice: The procurement process must be conducted in line with the 2015 Procurement Regulations and the Councils own procurement rules. Legal services will advise and assist officers with regard to the conduct of the procurement process and the resulting contractual arrangements.

Legal Team Leader: Husinara Jones, Team Manager/Solicitor 23 August 2023

3. Implications on IT: I can see no implications on IT regarding this activity

IT Team Leader: Alex Simpson Lead Enterprise Architect, 13 July 2023

4. HR Advice: There are no HR implications

HR Partner: Celia Williams HR Business Partner, 11 July 2023

EDM Sign-off	John Smith, Interim Executive Director Growth and Regeneration	21 June 2023
Cabinet Member sign-off	Councillor Donald Alexander, Cabinet Member for Transport	20 July 2023
For Key Decisions - Mayor's Office sign-off	Mayor's Office	7 August 2023

Appendix A – Further essential background / detail on the proposal A1 - Overall Layout and Location of Cumberland Basin Complex A2 – Condition Photos of Avon Bridge and Cumberland Basin Complex A3 - Executive Summary of Unsuccessful 2015 Challenge Fund Bid	YES
Appendix B – Details of consultation carried out - internal and external	NO
Appendix C – Summary of any engagement with scrutiny	NO
Appendix D – Risk assessment	NO
Appendix E – Equalities screening / impact assessment of proposal	YES
Appendix F – Eco-impact screening/ impact assessment of proposal	YES
Appendix G – Financial Advice	NO
Appendix H – Legal Advice	NO
Appendix I – Exempt Information	NO

Appendix J – HR advice	NO
Appendix K – ICT	NO
Appendix L – Procurement	NO