Agenda Item 12

Leicestershire County Council

CABINET – 24 MAY 2019

ZOUCH BRIDGE REPLACEMENT

REPORT OF THE DIRECTOR OF ENVIRONMENT AND TRANSPORT

PART A

Purpose of the Report

1. The purpose of this report is to set out the case for the necessary replacement of Zouch Bridge with a new structure and to seek approval for the provision of the required funds to build the new bridge.

Recommendations

2. It is recommended that -

   a) Zouch Bridge is replaced with a new bridge on land to the south;

   b) Additional funding of £5.548m required to construct a new bridge, over and above the £3.1m already allocated in the Medium Term Financial Strategy, be identified through Environment and Transport Department reserves and the Department's existing capital programme;

   c) It be noted that continued monitoring of the bridge will be undertaken to ensure safety.

Reasons for Recommendation

3. Continued monitoring of, and repairs to, Zouch Bridge combined with reactive weight restrictions (weight limits, lane closures and/or road closure) where necessary may suffice to keep it open for the next few years, but the bridge is nearing the end of its useful life and needs to be replaced.

4. Replacement of the bridge with a new structure to the south will avoid serious adverse impact on Leicestershire's road network, minimising disruption to traffic and business, and doing this at the earliest opportunity should enable the project to be completed before reactive weight restrictions are required.

5. To ensure that any safety risks associated with the ageing bridge are identified and addressed.

Timetable for Decisions (including Scrutiny)

6. Subject to agreement by the Cabinet, it is intended that work on construction of the new bridge (Option A) would commence in spring 2020, with an anticipated duration of 22 months.

Policy Framework and Previous Decisions

7. The Local Transport Plan (LTP3), which was approved by the Council in March 2011, set out the Council's approach to managing the network, including providing improved journey time reliability for the movement of materials, goods and people and promoting and supporting the efficient and safe movement of freight.

8. In February 2014, the Council approved the Medium Term Financial Strategy, which included capital funding of £3.0m for the replacement of Zouch Bridge. Subsequent approvals resulted in total funding of £3.1m being available.

9. Previous reports to the Cabinet in July 2014 and February 2016 resulted in approval to make Compulsory Purchase Orders and other Orders necessary to proceed with a replacement bridge.

Resource Implications

10. The funding allocated to date for the replacement of Zouch Bridge in the Department's capital programme is £3.1m. As explained in Part B of the report below, the total scheme cost for construction of a new bridge is now estimated to be £9.379m. The Cabinet is therefore being asked to agree an additional £5.548m for the work as follows:-

	£000
Estimated total cost (Option A)	9,379
Spend to date	-731
Funding requirement	8,648
Environment and Transport Capital programme	-3,100
Additional funding requiring the Cabinet's approval	**5,548**

11. As with any construction contract, there is a potential for increased costs, mainly due to unforeseen ground conditions and working in the River Soar flood plain. Ground investigation work has been undertaken and the works would commence in spring, thus minimising the potential for such events. A risk contingency sum is included in the Works Budget Price.

12. There is a possibility that Department for Transport Challenge Funding may become available, but the timescale for that is uncertain at this time. If the opportunity was to arise within the appropriate timescale, the Council would investigate the opportunity to bid for this funding, but a successful outcome could not be guaranteed.

13. The Director of Corporate Resources and the Director of Law and Governance have been consulted on this report.

Comments of the Director of Corporate Resources

14. A review and prioritisation of the Environment and Transport Department reserves and future capital programme is underway to release funding to be allocated to the scheme. The additional funding will be required in financial years 2020/21 and 2021/22.

Circulation under the Local Issues Alert Procedure

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PART B

Background

16. The existing bridge was built in 1930. It forms part of the A6006 which is strategically important in terms of transport infrastructure and the regional economy. It links Leicestershire and Nottinghamshire by crossing the River Soar between the villages of Hathern, in Charnwood, and Zouch, in Rushcliffe Borough (see Appendix A). It comprises two main river spans and eight flood spans. The cumulative span is approximately 80m.

17. It became clear that the bridge was approaching the end of its useful life and a Condition Survey (Special Bridge Inspection) was carried out by the Council's Structures Team in February 2013 which recommended that the bridge be demolished and replaced.

18. A total of £270,000 had been spent on concrete repair works since 1999 and an ongoing problem has been identified with the integrity of the ageing concrete. The waterproofing system is no longer fully bonded to the failing concrete in the deck, resulting in numerous failures in the carriageway surfacing (see Appendix B). The design work and feasibility of the required works has been progressed and is indicating significant increases will be needed from the original budget.

19. The bridge continues to deteriorate and, in the medium term, is likely to require a weight restriction and, ultimately, closure. If the bridge was closed before the replacement was built, this would have an impact on the effectiveness of Leicestershire's road network, increasing journey times and business costs, and would affect the delivery of the Council's strategic transport objectives over a significant part of the County.

20. Should the bridge be closed, the signed diversion route is 28 miles long (shown at Appendix C). A traffic count undertaken on the route in 2017 indicated that the Average Annual Daily Traffic was 12,137 vehicles, of which 524 (4.3%) were HGVs.

21. Since 2013, the Council has been working on the project to replace the bridge (Option A is the preferred option; further details are provided at paragraph 61 and Appendix D), on the basis that closing the road and demolishing the existing bridge prior to building a replacement represents an unacceptable disruption to the road network and will cost more to undertake, as the existing services would need to be diverted onto a temporary service bridge across the River Soar and then re-diverted back onto the new bridge.

22. Since the report to Cabinet in February 2016, the Council has made the Leicestershire County Council (Zouch Bridge Replacement) Compulsory Purchase Order 2017, the Leicestershire County Council (A6006 Zouch Bridge Replacement, Classified Road) (Side Roads) Order 2017 and the Leicestershire County Council (Zouch Bridge Replacement) Bridge Scheme 2017.

23. A detailed explanation of the work undertaken to date and the issues involved is given below. In view of the forecast increase in costs for Option A, two other Options are also presented for the Cabinet's consideration.

24. A page has been set up on the Council's website to keep interested parties updated on progress with the project. The content includes details of the Orders, the Public Inquiry and the planning application.

Statutory Duties Related to Road and Bridge Maintenance

25. The Council has duties under the Highways Act 1980, as follows:-

- Section 41 *(duty to maintain the highway);*
- Section 130 *(duty to assert the public rights of way)* and;
- Section 328(2) *(where a highway passes over a bridge or through a tunnel, that bridge or tunnel is to be taken for the purposes of this Act to be a part of the highway)*.

26. The Council also has duties under the Traffic Management Act 2004 *(duties regarding safe and efficient movement of traffic).*

The Design Process

27. Consultants AECOM (formerly URS) were engaged to carry out the Preliminary Design for the project in November 2013. This included a feasibility study into the bridge options. They were subsequently engaged to carry out the Detailed Design in October 2014.

28. When life-expired bridges are replaced, they do not usually require planning permission, as Section 92 of the Highways Act 1980 sets out the provisions for such renewals. However, in February 2015 the County Solicitor advised that planning permission should be sought in this instance, as the bridge spanned a navigable waterway and was to be partly constructed in Nottinghamshire.

29. In April 2017, separate planning applications were submitted to the County Council and Rushcliffe Borough Council. Both authorities granted planning permission in July 2018.

Analysis of the Issues Affecting the Project Forecast

30. The project was now subject to the planning process and that necessitated much additional work to satisfy the Environment Agency on flooding issues, including the re-design of the highway vertical alignment and the bridge structure itself.

31. The planning application received two objections which could not be resolved, thus resulting in the holding of a Public Inquiry between 21 and 24 August 2018.

32. An analysis of the reasons for the forecast increase in project costs is given in following paragraphs.

Planning Application

33. The planning application required a Noise Assessment, Ecological Survey, Air Quality Assessment Report, Transport Impact Assessment, Flood Risk Assessment, Environmental Impact Assessment, Construction Impact Assessment and a Design and Access Statement. AECOM's Detailed Design brief was extended to include the production of these reports.

34. The additional fees associated with the decision to seek planning permission have been assessed as circa £52,000, with the delay to the project being approximately 41 months in total.

Re-design Process

35. Initial contact was made with the Environment Agency (EA) in May 2013 to discuss the impact of the proposals on the River Soar and its environs.

36. Following a period of discussion and information exchange, the EA provided advice in late October 2014, stating that the proposed three-span replacement bridge was a 'betterment' and therefore acceptable from a flood risk perspective. These views were reiterated in subsequent correspondence, both with the Council and local residents. Notwithstanding this, the planning application necessitated a Flood Risk Assessment (FRA).

37. AECOM were engaged to undertake the FRA in March 2016.

38. Early FRA modelling, received in late July 2016, showed that the existing flood paths across the valley floor would be interrupted by the proposed changes to the highway vertical alignment. The flood model predicted an adverse effect on the upstream flood levels, potentially affecting residential properties in Zouch village. This was unacceptable and led to further work to re-design the carriageway alignment and the proposed bridge to mitigate these effects.

39. Several design iterations, with corresponding flood modelling, were carried out until predicted flood levels were deemed acceptable by the EA. This was achieved in June 2017.

40. The bridge was also widened by 1.45 metres to accommodate visibility lines for those exiting Zouch marina and the caravan park on the west side of the bridge.

41. The additional fees associated with the re-design process have been assessed as being in the region of £160,000, with the attributable delays already included within the period for dealing with the planning application.

Public Inquiry (including the Order Process)

42. Three Orders were required before the project could progress – a Compulsory Purchase Order under the Highways Act 1980 and the Acquisition of Land Act 1981, a Side Roads Order and a Bridge Scheme, both under the Highways Act

1980. The Orders were issued to the Department for Transport in October 2017.

43. Objections to the proposed Orders were submitted to the Secretary of State by a local resident and one of the affected landowners on 27 October 2017 and 28 November 2017 respectively. The objections were subsequently upheld by the Secretary of State, who, on 8 January 2018, declared that a Public Inquiry was required.

44. The Public Inquiry was held between 21 and 24 August 2018. The Inspector's Report concluded that '*the benefits of the proposed scheme justify its selection over alternative schemes'* and the Secretary of State confirmed with modifications the necessary Orders on 28 January 2019. The expiry of the challenge period was 12 April 2019.

45. The additional fees directly associated with the preparation and undertaking of the Public Inquiry have been assessed as approximately £191,000 and the process caused a further delay to the project of 6 months.

46. Following the Public Inquiry, the Director of Law and Governance, in conjunction with the Director of Environment and Transport and the Director of Corporate Resources, is working towards implementing the Orders and arranging for the vesting of the land in the Council. Vesting of the land takes place three months after the serving of a notice upon all affected parties.

47. The process of formally acquiring the land will result in a further delay to the commencement of the project of 6 months.

Statutory Undertakers

48. The diversion of Statutory Undertakers' (SU) apparatus was estimated to cost £100,000 in 2014; however, current quotations total around £550,000.

49. This summer, Severn Trent Water proposes to install an additional service main across the bridge that will require diversion once the new bridge is completed. The price for this work is included in the latest estimate. A contribution towards the additional costs is being sought from Severn Trent Water.

50. The additional price directly associated with the diversion of the Statutory Undertakers' apparatus has been assessed as approximately £450,000.

Property Fees/Legal

51. The additional Property and Legal fees associated with securing planning permission, negotiating with the relevant landowners and land acquisition costs is estimated to be about £53,000, with the attributable delays already included within period for dealing with the planning application.

Works Price

52. In understanding how the forecast works price has increased, a review of the background and basis for the 2014 Outline Works Price against the 2019 Initial Works Budget Price has been undertaken.

53. A contractor was engaged under the *Midlands Highway Alliance (MHA) Medium Schemes Framework (MSF2)* in June 2014 to provide (unpaid) Early Contractor Involvement, including assistance with buildability and supply chain advice and financial forecasting for the project.

54. An Outline Works Price was developed based on the original design to the sum of £3.1m. This figure was incorporated into the whole project forecast, along with a forecast for fees and utility diversions.

55. In October 2016, when it became clear that the prospect of a confirmed start date was unlikely, the original contractor was stood down and no additional pricing work was undertaken until the appointment of a new contractor via the *MHA MSF3* contract on 17 January 2019. The *MHA MSF3* is a Framework Agreement which uses the NEC form of contract, which is based on long-term mutual trust and cooperation between the client and contractor, to achieve good project management, with an 'open book' approach to financial control.

56. In early January 2019, the Outline Works Price was uplifted for inflation to £3.42m, using construction price indices for key components of the project, and reported to the Director of Corporate Resources.

57. The new Initial Budget Works Price, based on the final design, is £7.9m which, when the other project costs are added (e.g. design fees, legal fees, public inquiry costs etc.), brings the total amount required to complete the project to £9.379m.

58. The reasons for the difference between the two prices, calculated in 2014 and 2019, include:-

    i. A change to the basis for pricing. The original 2014 Outline Works price was based on a price/m2 estimate which was then uplifted to reflect the specific constraints of the site e.g. working under the overhead High Voltage cables, bridge launching, etc. The price was established during the early stages of the original Early Contractor Involvement process and before any changes in scope. The impact is difficult to quantify in monetary terms, but could represent an underestimate of the original 2014 Outline Works Price in the range of 20% to 40%;

    ii. Construction inflation since 2014: The increase in construction inflation is determined by reviewing the key components of a project (plant, labour and materials) and the ratio between these three varies on every project. In December 2018, inflation for the period since 2014 was assessed at 10.2% and reported as such, but the contractor estimates that it may be as high as 21.7%, based on a typical 4% increase per annum. This is supported by the

volatile steel prices, which have risen from £2,750/Tonne to £3,750/Tonne since 2014, a 36% increase. Using the higher inflation figure would increase the original 2014 Outline Works Price by £350,000 at today's prices;

iii. Steel requirement: The revised bridge design requires more beams of shallower depth and this has increased the steel tonnage by 62%. Using this increased tonnage and the higher steel price inflation (above) would increase the original 2014 Outline Works Price by £600,000 at today's prices;

iv. Changes to the scope of the works: Considerable design changes have been made since the original Outline Works Price was developed in 2014. These changes include widening the bridge and amending the vertical alignment of the carriageway to meet EA requirements. The impact on the price is difficult to quantify in monetary terms, but it is estimated that it could represent an increase in the 2014 Outline Works Price in the range of 10% to 15%;

v. The basis for the 2019 Initial Works Budget Price: Due to time pressures, this Price includes several assumptions and many of the sub-contracted items are based on prices received from a single supplier. This will be addressed and refined during the Early Contractor Involvement phase. It is likely that they could have resulted in an over-estimate of the Initial Works Budget Price in the range of 10% to 20%.

Proposals/Options

59. The bridge is approaching the end of its useful life and it continues to deteriorate, commensurate with a bridge of its age. It is likely that, due to contamination with chlorides from road salts, the deterioration of the rebar[1] within the concrete will be proceeding with little outward sign. The Council continues to monitor its condition to ensure public safety.

60. In light of the increased forecast costs, the following strategies to address the continuing deterioration of the bridge have been considered:-

Option A – replacing the existing bridge with a new bridge to the south;
Option B – continuing with reactive maintenance to the concrete; monitoring the bridge and carrying out repairs as required;
Option C – imposing weight restrictions, by way of limiting vehicle weights, closing lanes, or closing the road, as necessary.

[1] Rebar ("reinforcing bar") - a steel bar or steel wire mesh used in reinforced concrete to strengthen and aid it under tension.

These Options are considered in detail below:-

Option A – Replacement as planned (Off-line construction)	
Construct the replacement bridge to the south of the existing bridge, then divert traffic on to new bridge and demolish the existing bridge.	
Advantages: • Minimises the duration of the current safety risk by replacing the ageing structure. • Minimal traffic/community/ business disruption (i.e. no significant delays during works). • Utility costs significantly reduced as they are moved only once (from existing bridge to new). • Minimal medium-term maintenance costs (20+ years).	*Disadvantages*: • Significant further investment of £8.648m • Forecast project costs are currently substantially higher than approved budget.

Option B – Reactive Maintenance (Concrete Repairs)	
Carry out further concrete repairs and/or strengthening dependent on the outcome of further testing and re-assessment. <u>This will not remove the need for eventual replacement of the bridge</u>.	
Advantages: • Lower initial investment to cover further testing and re-assessment (circa £100,000). • Bridge replacement expenditure could be deferred for between 3 to 5 years.	*Disadvantages*: • Much of the original reinforced concrete will remain in poor condition and is likely to be contaminated with chlorides from road salts which corrodes the rebars, hence ongoing deterioration of the concrete will be proceeding with little outward sign. • Increased eventual costs, as replacement of bridge is still required. • Extent of concrete repairs difficult to assess, but likely to be substantial – extensive testing required. • Immediate re-waterproofing required following extensive repairs to the bridge deck – estimated cost £2.8m.

	• A 28-mile traffic diversion during closures for repair work leading to increased journey times and costs to businesses and public dissatisfaction. • Planning permission will need to be renewed if the eventual replacement project does not start within 3 years (i.e. by July 2021).

Option C – Reactive Weight Restrictions (Weight limits, lane closures and/or road closure)	
If no action is taken it will be necessary to progressively limit the loading being carried by the bridge, dependent on the outcome of further testing and re-assessment. This could entail limiting HGV usage, imposing single-lane running under traffic signal control and, ultimately, the closure of the bridge to all motorised users.	
Advantages: • Minimal (initial) traffic disruption. • Lower initial investment to cover further testing and re-assessment (circa £100,000). • Bridge replacement expenditure deferred for between 3 to 5 years.	*Disadvantages*: • Increased risk of bridge failure due to unseen corrosion of the rebars. • Increased eventual costs, as replacement of bridge is still required. • Substantial traffic disruption caused by progressive vehicular restrictions. • Queuing traffic during lane closures and 28-mile traffic diversion during full closure, leading to public dissatisfaction. • Increased inspection frequency required - anticipated to be circa £3,000 per inspection every six months • Planning permission will need to be renewed if the eventual replacement project does not start within 3 years (i.e. by July 2021).

61. After careful consideration of these Options, and in line with the principles of risk-based and evidenced-led decision making set out in *Well-managed Highway Infrastructure – Code of Practice* produced by the UK Roads Liaison Group, it is concluded that Option A (replacing the existing bridge with a new bridge to the south) is the optimal solution. (See Appendix D).

Financial Summary

62. The financial impact of Option A is summarised in the table below:-

Task	Nov 2014 £000	Jan 2019 £000	Increase £000
1. Planning Application	£0	c. £52	c. £52
2. Re-design process	£0	c. £160	c. £160
3. Public Inquiry	£0	c. £191	c. £191
4. Statutory Undertakers	c. £100	c. £550	c. £450
5. Property Fees/Legal	c. £27	c. £80	c. £53
6. Works	c. £3,100	c. £7,900	c. £4,800
7. Design fees & other costs	c.£446	c. £446	£0
		c. £9,379	

63. As this project has been ongoing for a number of years, the spend to the end of 2018/19 was £731,000. The spend profile for the entire project to completion is now forecast as follows:-

	Actual costs					Forecast costs			
Financial Year	**14/15 £000**	**15/16 £000**	**16/17 £000**	**17/18 £000**	**18/19 £000**	**19/20 £000**	**20/21 £000**	**21/22 £000**	**Totals £000**
Fees etc.	£180	£207	£123	£68	£153	£108	£60	£30	**£929**
SU costs	-	-	-	-	-	£550	-	-	**£550**
Works	-	-	-	-	-	£205	£5,200	£2,495	**£7,900**
Totals	**£180**	**£207**	**£123**	**£68**	**£153**	**£863**	**£5,260**	**£2,525**	**£9,379**

Project Risks

64. A risk register has been established and the main project risks are identified as follows:-

- Safety – The safety of road-users is clearly of paramount importance. An extended delay to the replacement of the bridge will carry an associated increase in the risk of bridge failure and potential injury to road users. The bridge is, however, being regularly inspected and there is no immediate risk.

- Financial (Option selection) – If insufficient funds are made available to proceed with Option A the eventual replacement costs will inevitably be higher in the future. Furthermore, short-term repair works will become abortive once the replacement is eventually constructed.

- Financial (potential overspend) – Potential for unforeseen ground conditions and for working in the flood plain. The risk contingency sum included in the 2019 Initial Works Budget Price is £344,000. The risks will be proactively managed through the duration of the works.

- Traffic Disruption – The disruption to the travelling public, businesses and local communities as a result of proceeding with Options B or C would be substantial and the damage to the reputation of the Council could be significant.

- Repetition of previous work – Many of the previous permissions, permits and surveys would be subject to re-application or the need to re-visit (e.g. planning permission, flood defence consent, ecological surveys etc.) if work on a new bridge does not commence soon.

- Objection – Any re-application for planning permission risks further objections to the project and further delay.

Project Governance

65. A Project Board has been established which includes officers from the Department and representatives from AECOM. Financial updates on the project will continue to be provided to the Director of Corporate Resources.

66. Project updates will be submitted to the Programme Monitoring Board at their bi-monthly meetings and financial updates will continue to be submitted to Corporate Finance on a monthly basis.

67. The Council has been liaising with officers from Nottinghamshire County Council throughout this process.

Conclusion

68. Zouch Bridge is nearing the end of its useful life and its condition continues to deteriorate. Deferring its replacement exposes the Council to unnecessary risk. Accordingly, the optimal management strategy is to replace it in a timely manner.

69. The preferred solution is *Option A: Planned replacement – Off-line construction*. This approach eliminates the safety risks, removes the need for substantial traffic diversions which would be needed if the replacement bridge was built in the same place and avoids abortive short to medium term repair and maintenance costs until a new structure can no longer be delayed.

Equality and Human Rights Implications

70. The proposed bridge replacement scheme has been designed to current standards. Accordingly, there are no equality or human rights implications arising from the recommendations in this report.

Environmental Implications

71. With reference to the Council's Environmental Implications Toolkit, proceeding with Option A results in a slightly negative impact (-1).

72. The implication of not proceeding with Option A, and eventually requiring the use of the diversion route, results in a more negative impact (-4).

Background Papers

5 February 2016 – report to the Cabinet – 'Zouch Bridge Replacement – Compulsory Purchase Order (and Associated Statutory Orders) for Land Required for a Replacement Bridge'
http://politics.leics.gov.uk/ieListDocuments.aspx?CId=135&MId=4599&Ver=4

15 July 2014 – report to the Cabinet – 'Zouch Bridge Replacement – Compulsory Purchase Order for Land Required for Replacement Bridge':
http://politics.leics.gov.uk/ieListDocuments.aspx?CId=135&MId=3992&Ver=4

19 February 2014 – report to the County Council – 'Medium Term Financial Strategy 2014/15 to 2017/18':
http://politics.leics.gov.uk/ieListDocuments.aspx?CId=134&MId=3961&Ver=4

Zouch Bridge Replacement Scheme:
http://bit.ly/2J9vId2

Appendices

Appendix A – Zouch Bridge Location Plan
Appendix B – Condition of Existing Bridge
Appendix C – Traffic Diversion Route (in event of bridge closure)
Appendix D – Bridge Replacement - Option A