



Annual Status & Options Report Structures, 2022/23

Summary

This report presents the status of the council's structure in terms of condition and investment at March 2023. The report states:

- **Condition (inspection results):** Out of a stock of 275 highway structures, 10 are currently rated to be in a very poor condition and a further 31 in a poor condition.
- **Investment:** Over the next 5 years £3,000k pa is to be invested in structures maintenance which will enable 7 very poor and 9 poor structures to be refurbished. The investment will address over 20 structures and reduce the current structures backlog to approximately £6.5m
- **Steady State:** It is estimated that on average approximately £1.3m pa is required to counteract ongoing deterioration, in addition to any investment made in refurbishing structures in a deteriorated (very poor or poor state).
- **Backlog:** The estimate cost of repairing all the defects identified on the structures "total backlog/workbank" is £21m. Within this there is £9.4m worth of works required to structures that are in a "very poor" or "poor" condition.
- **DfT Investment:** from time to time the department of Transport release funds that the council can bid for structures works. The council will continue to bid for those when they are available. #

The prediction in this report do not assume any DfT monies are available. An updated report will be produced should DfT structures funding become available to the council

1. Purpose

This report provides managers and elected members with information to enable standards to be set and included in the Highway Asset Management Plan (HAMP) for highway structures

2. Scope

Status

The report describes the status of the council's highway structures in terms of condition and investment as of March 2023.

Options and Impacts

Options are presented for how future investment may be directed. The options consider variation to the budget allocated for structures works and how that budget is spent.

The impact of different options is reported to the extent that current data and prediction methods allow.

3. The Asset

Scale

The council manages 275 highway structures ranging from large bridges to small culverts and retaining walls, made up as follows:

- | | |
|-----------------------|-------------------------|
| - 46 road bridges | - 8 subways |
| - 21 footbridges | - 11 CCTV supports |
| - 89 retaining walls | - 9 traffic signal arms |
| - 40 culverts | - 12 gantries and |
| - 36 high mast lights | - 3 chambers |

None of the structures are considered to be unusual to the extent that they require their own specific plans for maintenance. None of the structures are currently subjected to a special monitoring regime.

Value

In 2022 the total replacement value (gross replacement cost, GRC) of the highway structures asset was estimated at £160m.

4. Condition

Condition of Stock

Structure's condition is reported using a bridge stock condition indicator (BSCI).

Bridge Condition Indicators (BCIs) use information collected during inspections to give a rating that reflects the condition of the structure. Two ratings are given BCI_{ave} and BCI_{crit}. BCI_{ave} gives an average of the condition scores given all the components of the structure. BCI_{crit} gives an average of the condition of the components that are considered critical to the structure. These indicators provide information that enable structural engineers to form a view of the maintenance needs of the structure. BCI scores are grouped into bands ranging from very poor to good. The BCIs score is used to aid the planning of maintenance.

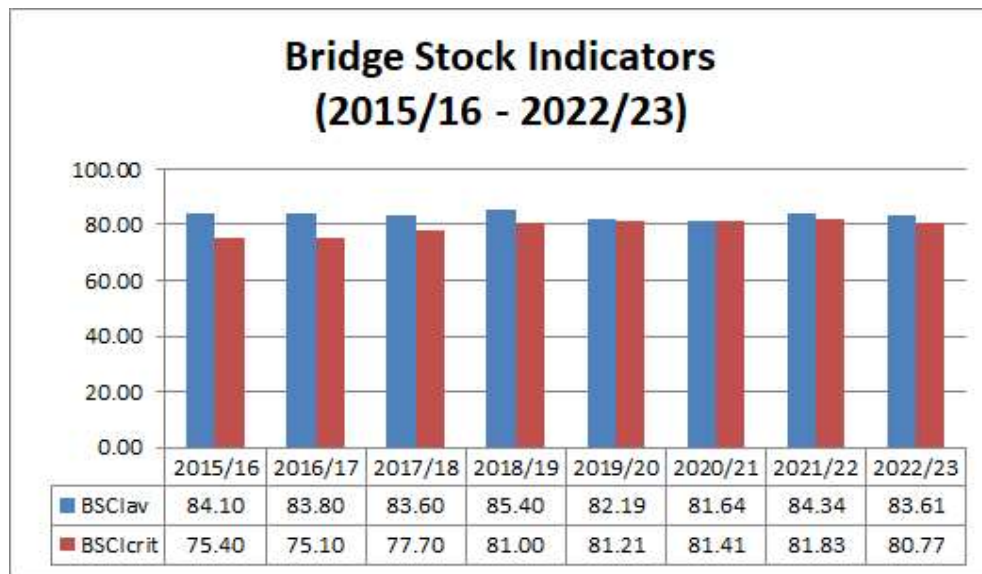
Structures in very poor condition (based on the BCI scores) are generally still safe to use. The structure will only be considered unsafe if the structural integrity has been compromised. Where, following an inspection, the structural engineer is concerned about the structural integrity of a structure a further investigation may be undertaken and an assessment of its structural capacity made. If a structure is assessed to be weak restrictions on use such as weight restrictions, lane restrictions or closure to vehicles may be imposed, or a monitoring and testing regime used to enable the structure to continue to be safely used.

BSCI figures are indicators of the total stock of structures managed by an authority. Large number of structures in a very poor or poor condition indicate that there is a need for maintenance in the short term. It does not mean that the stock or in fact any individual structure is unsafe for use.

The figures reported are at a stock level i.e., the average for all structures and are:

- BSCI_{ave}; the average condition of the stock based upon the rating given to all components of the structures and
- BSCI_{crit}; the condition based upon ratings of components of structures that are considered critical to the load carrying capacity of the structure i.e., "critical components" only.

The results are shown below for the last 8 years.



The results show that the average condition of the stock over the last 8-years is relatively stable.

Strengthening Need

A structure in need of strengthening has typically had a structural assessment completed on it and been identified as being weak. Management of these structures can include monitoring, the use of weight or other use restrictions.

- 25 structures have been identified for strengthening improvements.

Refurbishment Need

Stock level indicators are based on figures that include the numbers of structures in a very poor or poor condition. Structures deteriorate slowly over time. Timely routine maintenance can greatly assist to ensure that structures require the minimal amount of the more expensive major refurbishment works but there will come a time in most structures lives when refurbishment is required. Refurbishment usually includes works to several components and will restore it to a good condition.

Structures in Very Poor Condition (based on their BClrit values)

Structures with a BClrit value of less than 40 are deemed to be in a very poor condition.

- **10 structures are in a “very poor” condition (including 2 road bridges)**
- (The estimated cost addressing these structures is £3.7m)

Structures in a Poor Condition

In addition to the very poor condition structures a further 31 structures are deemed to be in a poor condition with BCIcrit values between 40 and 65.

- **31 structures are in a “poor” condition (including 6 road bridges)**
- (The estimated cost addressing these structures is £5.7m)

Parapet Upgrading

Parapets provide protection for users to limit the risk of falling from the structures (as a pedestrian or more likely in a vehicle). The parapets on many structures do not meet modern design standards. The risk associated with these parapets is a function of their use, some pose a higher risk than others.

- **6 structures have been identified for parapet upgrading**

Reactive Maintenance Needs

In addition to the specific deficiencies noted above there is an ongoing need to carry out reactive maintenance, for example where vehicle impact requires repair and routine maintenance. Reactive maintenance needs are unpredictable. They are best predicted by reference to historical costs.

- **Historically reactive maintenance needs have been met from a budget of c£8k**

Routine Maintenance Needs

Routine maintenance works are “good housekeeping”, work is small in scale and cost but necessary to prevent more costly repairs being required in the future. Typical works include vegetation removal, drainage cleansing, minor repointing, minor concrete repairs etc. CSSWales* has created an initial model that has been developed to estimate a range of budget levels appropriate for routine maintenance needs. Applying this method of estimating to Reading's stock gives an indicative routine maintenance budget need range of £90k to £120k pa.

- **Estimated Total Routine Maintenance needs is in the range of £90k to £120k pa**

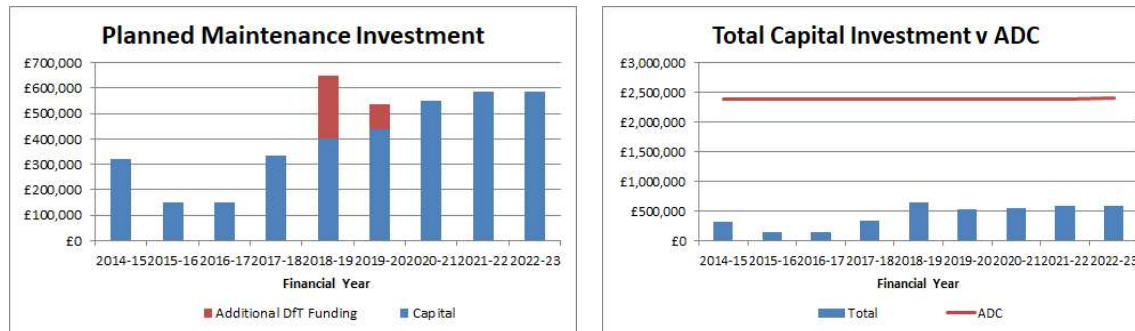
(*CSSW = County Surveyors Society of Wales representing the 22 Welsh highway authorities. Under their ongoing national highway asset management project CSSW has created estimating methods for forecasting a broad assessment of routine maintenance needs for structures)

5. Historical Investment

The results above have been achieved from investment over the period reported. The levels of investment made to deliver the standards that have been achieved are reported below.

Total Investment

Historical investment in structures has been as shown below with council capital funding shown in blue and additional DfT monies in red.



Planned Investment (Capital)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Capital	£323k	£150k	£150k	£336k	£400k	£440k	£550k	£585k	£585k
Additional DfT Funding	£0	£0	£0	£0	£250k	£97k	£0	£0	£0
Number of Structures	10	11	2	9	20	3	2	2	1

Average Investment

The average investment in planned maintenance between 2014/15 and 2022/23 is £430k pa.

Annual Depreciation Charge (ADC)

In 2019 the ADC of the structures asset was estimated at £2.4m. The ADC represents the average investment in replacement of the asset required each year over its lifespan to keep it in service. It is theoretically additional to the investment required to address the maintenance backlog.

Investment/Cost of Routine, Reactive and Cyclic Maintenance

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Revenue (Works)	£86.7k	£90.7k	£99.1k	£103.1k	£134.6k	£134.6k	£134.6k	£134.6k	£134.6k
Revenue (Fees)	£106.1k	£106.1k	£108.6k	£111.1k	£132.3k	£132.3k	£132.3k	£132.3k	£132.3k
Total	£192.8k	£196.8k	£207.7k	£214.2k	£266.9k	£266.9k	£266.9k	£266.9k	£266.9k

The average investment in routine, reactive and cyclic maintenance works between 2014/15 and 2022/23 was £117k pa.

6. Service Standards

The options presented below are based on the following service standards assumptions.

Reactive Maintenance

It is assumed that the funding required to meet reactive repair needs, estimated based upon recent expenditure to be £10k, will continue to be provided.

Routine Maintenance

It is assumed that the funding required to meet routine maintenance need, estimated to be approximately £105k will continue to be provided.

Proposed Condition Standard

The proposed condition standards are adopted based upon setting targets for the number of structures in very poor and poor condition.

		Standard
Number of structures in a poor condition; the number of structures with a BClcrit of very poor kept below		To not exceed 9 no.
Number of structures in a poor condition (BCIcrit); the percentage of structures with a BCI of poor kept below		To not exceed 33 no.

7. Option

Reactive Repair

Assuming the historical level of reactive repair need are typically £8k pa a figure of £10k has been allowed as required to meet reactive repair needs. It should be noted that reactive repair needs fluctuate a one-year reduction does not indicate a trend of long-term reduction in need.

Routine Maintenance

CSSW has created an initial estimate of routine maintenance needs based upon the experience of an authority with a stock in good condition and a well-developed routine maintenance regime that has been in place for many years. Applying this method of estimating to Reading's stock give an indicative routine maintenance budget need range of £90k to £120k pa. Based upon this method an average figure of £105k pa is required to meet routine maintenance needs.

Works Already Planned

A programme of works for the next 5 years (2023/24 – 2027/28) has already been prepared and prioritised. A copy of the programme is included in Appendix A. It is assumed that the condition of the structures in this programme will be refurbished to a 'good' level.

Further investment will be required from 2028/29 to undertake works on structures which have are in 'poor' or 'very poor' condition at that time.

Option 1

The following table provides a summary of the Option

Work Category	Financial Years	Approximate Annual Funding
Reactive Maintenance	All	£10k
Routine Maintenance	All	£105k
Planned Maintenance	2023/24 – 2027/28	£3,000k

During this period deterioration of structures will continue unless investment is made to counteract ongoing deterioration. The estimated annual cost of counteracting ongoing deterioration is £1.3m pa.

Appendix A: Funded Works

Financial Year 2023/24 Programme			
Structure and Works Description	Financial Year	BCI Crit	Costs £k
KENNETSIDE RETAINING WALL STRENGTHENING	2023/24	50.3	£550k
ORBIT FOOTBRIDGE DECK REPAIRS AND REPAINTING	2023/24	28.1	£300k
BERKELEY AVENUE CANAL BRIDGE REFURBISHMENT	2023/24	78.9	£450k
BERKELEY AVENUE RAILWAY BRIDGE REFURBISHMENT	2023/24	28.1	£450k
DENBEIGH PLACE CULVERT STRENGTHENING WORKS	2023/24	28.0	£450k
HERON ISLAND CONCRETE REPAIRS	2023/24	50.3	£200k
IDR FOOTBRIDGE DECK WATERPROOFING REPLACEMENT	2023/24	58.0	£250k
DUKE STREET CULVERT INVESTIGATION AND REPAIRS	2023/24	50.3	£100k
HIGH BRIDGE REPAIR / REPLACEMENT OF STONE PARAPET	2023/24	58.0	£250k
		Total	£3,000K

Financial Year 2024/25 Programme			
Structure and Works Description	Financial Year	BCI Crit	Costs £k
CAVERSHAM BRIDGE DECK WATERPROOFING REPLACEMENT AND CONCRETE REPAIRS	2024/25	80.0	£650k
OXFORD ROAD BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	78.9	£1,400k
CASTLE STREET NORTH BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	81.0	£900k
CASTLE STREET SOUTH BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	81.0	£900k
CHATHAM STREET NORTH BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	81.0	£850k
CHATHAM STREET SOUTH BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	81.0	£850k
IDR KENNET BRIDGE – REPLACEMENT OF BEARINGS AND EXPANSION JOINTS	2024/25	81.0	£1,135k
PODIUM STRUCTURE (STATION APPROACH UNDERSTRUCTURE EAST) INFILLING	2024/25	58.0	£600k
CAVERSHAM MILL FOOTBRIDGE DECK REPLACEMENT	2024/25	55.5	£50k
		Total	£7,335K

Financial Year 2025/26 Programme

Structure and Works Description	Financial Year	BCI Crit	Costs £k
KENNETSIDE RETAINING WALL STRENGTHENING	2025/26	50.3	£500k
RANDOLPH ROAD CULVERT STRENGTHENING	2025/26	40.0	£400k
ADDISON ROAD CULVERT STRENGTHENING	2025/26	40.0	£400k
		Total	£1,300K

Financial Year 2026/27 Programme			
Structure and Works Description	Financial Year	BCI Crit	Costs £k
NEWPORT ROAD CULVERT STRENGTHENING	2026/27	28.0	£400k
BROOK STREET WEST RETAINING WALL STRENGTHENING	2026/27	50.3	£750k
		Total	£1,150K

Financial Year 2027/28 Programme			
Structure and Works Description	Financial Year	BCI Crit	Costs £k
HOLLY BROOK RETAINING WALLS STRENGTHENING	2027/28	50.3	£400k
SWANSEA ROAD CULVERT STRENGTHENING	2027/28	40.0	£400k
DE MONFORT ROAD CULVERT STRENGTHENING	2027/28	55.0	£400k
		Total	£1,200K

Appendix B: Structures in Very Poor Condition (based on BCI_{crit})

Ref	Structure Name	BCI _{crit}	Total estimate of works
1273	FOBNEY	26.3	£230,000.00
1291	BERKELEY AVENUE RAILWAY	28.1	£450,000.00
1820	KINGS MEADOW FOOTBRIDGE	28.1	£225,000.00
2618	DENBEIGH PLACE CULVERT.	28.0	£450,000.00
2619	RANDOLPH ROAD CULVERT.	40.0	£400,000.00
2620	ADDISON ROAD CULVERT.	40.0	£400,000.00
2621	NEWPORT ROAD CULVERT.	28.0	£400,000.00
2624	SWANSEA ROAD CULVERT	40.0	£400,000.00
2629	KINGS MEADOW ROAD CULVERT	36.6	£440,000.00
2684	ORBIT	28.1	£300,000.00
			£3,695,000.00

Approximately £3.7m worth of works is required to address structures currently identified to be in a very poor condition.

Appendix C: Structures in a Poor Condition (Based on BCIcrit)

Ref	Structure Name	BCI _{crit}	Total estimate of works
1127	SOUTHAMPTON STREET SIGN GANTRY	55.5	£20,000.00
1267	HIGH	58.0	£250,000.00
1282	ROSE KILN BROOK	58.0	£80,000.00
1283	WILLOW STREET	58.0	£45,000.00
1286	IDR FOOTBRIDGE	58.0	£250,000.00
1292	CAVERSHAM ROAD CULVERT	55.0	£130,000.00
1303	CAVERSHAM MILL FOOTBRIDGE	55.5	£50,000.00
1304	KINGS (READING)	63.6	£310,000.00
1732	ALBION PLACE RETAINING WALL	55.5	£85,000.00
1762	SEWAGE FARM CULVERT	58.0	£25,000.00
1809	HOLY BROOK RETAINING WALL 1	55.5	£100,000.00
1812	HOLY BROOK RETAINING WALL 4	50.3	£100,000.00
1814	HOLY BROOK RETAINING WALL 6	55.5	£100,000.00
1815	HOLY BROOK RETAINING WALL 7	55.5	£100,000.00
2203	WATER SLUICE RETAINING WALL	55.5	£100,000.00
2208	BROOK STREET RETAINING WALL	58.0	£9,000.00
2229	GREYFRIARS CENTRE RETAINING WALL	58.0	£35,000.00
2239	KENNET SIDE RETAINING WALL	50.3	£550,000.00
2244	KENNET MOUTH RETAINING WALL	55.5	£950,000.00
2423	FORBURY ROAD BRICK RETAINING WALLS	55.5	£14,000.00
2424	SURLEY ROW RETAINING WALL	55.5	£23,000.00
2487	ROSE KILN LANE CULVERT NORTH	50.3	£100,000.00
2528	DUKE STREET (HOLYBROOK)	50.3	£100,000.00
2535	BRUNEL ROAD ALLOTMENTS	55.5	£40,000.00
2537	HERON ISLAND	50.3	£200,000.00
2538	HILLS MEADOW FOOTBRIDGE	55.5	£15,000.00
2623	YORK ROAD CULVERT	64.5	£50,000.00
2625	DE MONTFORT ROAD CULVERT	55.0	£400,000.00
2626	LYNMOUTH ROAD CULVERT	65.0	£76,000.00
2633	STATION APPROACH UNDERSTRUCTURE EAST	58.0	£600,000.00
2738	BROOK STREET WEST RETAINING WALL	50.3	£750,000.00
			£5,657,000.00

Approximately £5.7m worth of works is required to address structures currently identified to be in a poor condition.

Appendix D: Parapet Upgrading

Ref:	Structure Name	Cost (£)
2239	KENNET SIDE RETAINING WALL	£69k
2240	SAPPHIRE PLAZA RETAINING WALL	£32k
2242	BLACKES LOCK RETAINING WALL	£72k
2243	GAS WORKS RETAINING WALL	£30k
2244	KENNET MOUTH RETAINING WALL	£24k
2729	GEORGE STREET HILLS MEADOW CULVERT	£7k
2738	BROOK STREET WEST RETAINING WALL	£57k
	Total	£291k