Appendix 2C – Life Cycle Management Plan for Highway Structures

Introduction

Gloucestershire County Council is responsible for over 1,000 bridges, culverts and footbridges. These figures do not include structures on public rights of way. Additionally within the county there are a further 250+ bridges carrying or crossing the highway, owned by other transport undertakers (e.g. Network Rail, Canal & Rivers Trust etc.) or privately.

Condition

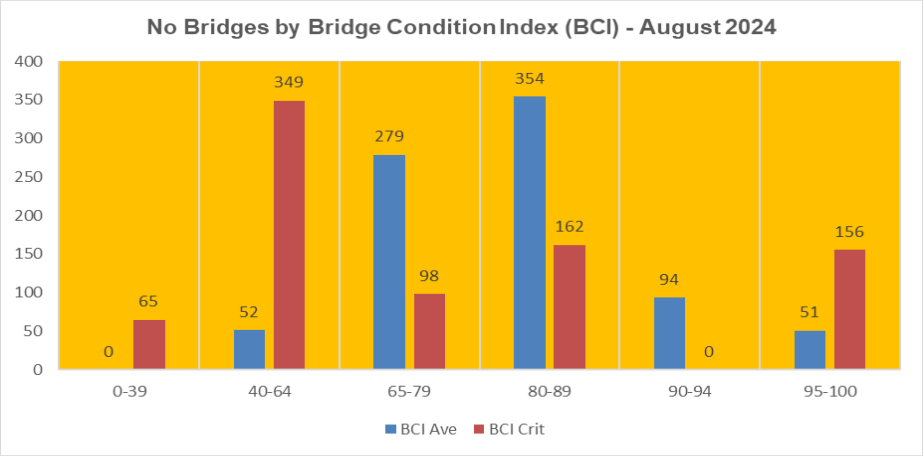
The overall condition of Highways Structures is deteriorating. The condition and performance of all highway structures is based on 2 different things: condition as determined by inspection, and capacity as determined by assessment. We use the Bridge Condition Index Score (BCI).

The condition of bridges and structures is assessed through detailed visual inspections. All bridges are inspected visually at two-year intervals, with additional, more detailed inspections for many bridges being carried out generally at 6-year intervals. These more detailed inspections are called Principal or Engineer Inspections. Severity and extent of defects is noted, and this data is used to determine the bridge condition index for each individual bridge and groups of bridges. This also enables stock condition to be determined and trends to be identified. Further details can be found at Chapter 3.

Each asset is organised into a respective sub-group with additional inspections being undertaken dependent upon the sub-group in line with DMRB standards. Gloucestershire has taken a risk based approach to determining the interval of any other inspections. We have for historically used the "Engineer" inspection, which a simplified version of the Principal Inspection, but is still a "touching distance inspection by an Engineer". Substandard bridges get a minimum of an annual inspection, with some having particular elements inspected on a three monthly basis.

Bridge Condition Index Scores and Bands		**Comments**
Very Good	>=90 to <=100	The current BCI average condition for Bridges is 68.9 (Critical) and 80.9 (Average)[1] and similar calculations can be run for Culverts and Footbridges. See Chapter 3 for further details.
Good	>=80 to <90	
Fair	>=65 to <80	
Poor	>=40 to <65	
Very Poor	<40	

[1] This was previously calculated as 85.5 in March 2014.



The Life Cycle

Creation/Acquisition: Acquisition of Highways structures is normally associated with the taking up of maintenance responsibilities following new developments through the adoption process. The development control team using Section 38 or 106 legal agreements normally manage this process
Operations/Maintenance – Operate and maintain the Assets on a routine basis
Upgrade or Renew: - Replace and renew based on condition, safety or capacity reasons.
Disposal/Decommission: Assets very rarely become redundant except when there is upgrading works. This is normally considered in association with renewal and replacement. Existing assets are seldom disposed of and are either utilised as part of the new design or decommissioned.

Deterioration
Deterioration of highway structures is highly dependent on component materials, age, condition, weather exposure and function. The following summarises some of the potential deterioration considerations:

- Bridges in locations where road casualties are occurring.
- Bridges failing to meet load carrying requirements.
- Reducing the risk of 'Accidental Road Vehicle Incursion onto Railways'.
- River foundation damage (also known as 'scour' or 'washout').
- Weak parapets and edge protection.
- Bridges and structures where size, vehicle clearance and road alignment may present a potential hazard.
- 'Overbridges' with 'fragile/vulnerable' supports.
- Significant reinforced concrete deterioration.
- Significant metal corrosion.
- Long term water ingress.
- Other serious/progressive structural deterioration (ie being damaged by serious vehicle strike).

Standstill and Backlog Costs
Various models exist to determine the Standstill and Backlog costs. The Standstill cost is how much needs to be spent every year in order to maintain the asset in the condition it's in today (plus inflation). The Backlog cost is how much you would need to spend to return the whole asset to very good condition. The following figures represent the latest data for structures:

- Standstill - £22.5M Capital
- Backlog - >£90M Capital

Funding from the revenue budget for Reactive/Cyclical repairs to structures is around £1.5M which includes Geotechnical (see Appendix 2H).

Approach

The recent approach has been to prioritise carriageways within our Structural Maintenance spend, with less than 10% of our capital budget being allocated to Highways Structures. The current funding demonstrates improvements in some asset conditions (eg Carriageways) however there are risks remaining in terms of the continued deterioration of other assets including Bridges and Structures.

Consideration should be given to increasing the proportion/funding of the overall capital budget for Bridges and Structures to firstly maintain the asset condition and, in the longer term, improve the structural status. This is an area of high as it is significantly underfunded and failures in this area are more expensive to rectify, force long term closures of parts of the network as well as the inherent safety aspects.