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<b>1</b>	<b>Summary of Current Status – Year 2009/10 .....</b>	<b>3</b>
1.1	Current Issues .....	3
1.2	Current Strategies .....	4
<b>2</b>	<b>The Asset: Physical Parameters .....</b>	<b>5</b>
2.1	Inventory .....	5
2.2	Quality of Inventory & Asset Register .....	6
2.3	Asset Growth .....	7
<b>3</b>	<b>Service Expectations.....</b>	<b>8</b>
3.1	Customer Perceptions .....	8
3.2	Council’s Strategic Topics and Themes .....	8
3.3	Use of the Asset .....	8
3.4	Safety Considerations. ....	9
3.5	Utility Activity .....	9
3.6	Insurance Claims .....	10
3.7	Environmental Considerations.....	10
3.8	Network Availability .....	11
3.9	Amenity Value Considerations .....	13
<b>4</b>	<b>Management practices .....</b>	<b>14</b>
4.1	Policies .....	14
4.2	Inspection Regime .....	14
4.3	Condition Assessment.....	15
4.4	Load Assessment .....	16
4.5	Construction/Asset Acquisition .....	17
4.6	Planned Maintenance – Renewals .....	17
4.7	Reactive Maintenance .....	17
4.8	Routine/ Cyclic Maintenance .....	18
4.9	Disposal.....	18
<b>5</b>	<b>Investment.....</b>	<b>19</b>
5.1	Historical Investment .....	19
5.2	Output from Investment (To be developed) .....	19
5.3	Forecasting Financial Needs .....	19
5.4	Valuation.....	20
<b>6</b>	<b>Forward Works Programme.....</b>	<b>21</b>
6.1	Existing Programmes .....	21
6.2	Programme Coordination .....	21
6.3	Option Appraisal. ....	21

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<b>7</b>	<b>Risk</b> .....	<b>23</b>
7.1	Risk Management Framework.....	23
<b>8</b>	<b>Performance Measurement</b> .....	<b>24</b>
8.1	Performance Management Framework .....	24
8.2	Currently Reported Performance Indicators .....	24
8.3	Future Planned Performance Indicators .....	24
<b>9</b>	<b>Future Strategies</b> .....	<b>25</b>
<b>10</b>	<b>Service Improvement Actions</b> .....	<b>26</b>

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## 1 SUMMARY OF CURRENT STATUS – YEAR 2009/10

### 1.1 Current Issues

It is estimated that it would cost £122 million to replace the Council's road structures asset with a modern equivalent asset. Data Source: Road Structures Initial valuation of Gross Replacement Costs (SCOTS RAMP Project 2009).

The Depreciated Replacement Cost is currently unknown. However, anecdotal evidence suggests that historical and current levels of allocated resources suggest that the asset continues to deteriorate.

Also:

- The level of funding, historically and currently allocated to the management and maintenance of road structures, is insufficient to allow the Service to carry out routine Safety Inspections and Principal Inspections of bridges and has resulted in a backlog of structural defects that require attention.
- The Council's bridge-strengthening programme has yet to be completed. 12 structures are permanently weight restricted. 25 structures require to be refurbished, strengthened or replaced at an estimated cost of £3.3M
- Stirling Council has yet to start the new round of bridge load assessments The Code of Practice for the Management of Highway Structures 2005, Section 7.4.1.8 recommends that an ongoing regime of Structural Reviews and Assessments be established to determine the continuing adequacy of structures to support imposed loads.
- A number of structures on the road network are the responsibility of other owners, such as Network Rail and British Railways Board (Residuals) Ltd. who have no statutory duty to strengthen their bridges to the current standards. (See Table 2.1b)
- There is a requirement to improve inventory data regarding the stock of retaining wall assets in regard to location, condition, ownership and maintenance responsibilities.

## **1.2 Current Strategies**

The Council has an established and ongoing “Bridge Assessment and Strengthening programme.” Strengthening and replacement of structures that have either failed the load assessment or where significant deterioration of the bridge fabric has occurred are prioritised, with the highest priorities funded from the capital budget allocation.

There are no other formally approved Council strategies that relate directly to this asset group. However, the RTOS Service manages the Councils roads structures via a number of different best practices.

- All inspections and reports are carried out in accordance with the regime developed by the County Surveyors Society.
- All management practices laid down in the Code of Practice for the “Management of Highway Structures” have been accepted in principle and are being implemented as part of the development of the RAMP for Stirling.
- All bridges greater than 2-metre span (both Council and privately owned) are load assessed to current standards.
- All inventory and inspection information records are stored in an electronic database called the “Structural Management System” (SMS), by WDM
- Routine and reactive maintenance works are scheduled in a programme and funded from the assigned revenue budget

## 2 THE ASSET: PHYSICAL PARAMETERS

### 2.1 Inventory

#### Definitions

**Bridge:** A structure with a span of 1.5m or more spanning and providing passage over an obstacle, e.g. watercourse, railway, road, valley. This category also covers subways, footbridges and underpasses.

**Culvert:** A drainage structure with a span of 1.5m or more passing beneath a highway embankment that has a proportion of the embankment, rather than a bridge deck, between its uppermost point and the road running courses. Culverts are normally rectangular or circular in cross section.

However, BD 2/02 (Technical Approval of Highway Structures) applies to all highway structures with a clear span or internal diameter greater than 0.9m.

<b>Table 2.1a Stirling Council Road Structures Inventory</b>				
<b>Type of Structure</b>	<b>Construction Material (primary structural element)</b>	<b>Number of Bridges</b>	<b>Number of Culverts</b>	<b>Totals</b>
Special / Listed Bridges	Masonry	37		37
	Steel Composite (concrete or timber)	-		
	Reinforced Concrete	-		
	Prestressed Concrete	-		
	Timber	-		
Bridges carry Road over Road	Masonry	9	2	11
	Steel Composite (concrete or timber)	11	-	11
	Reinforced Concrete	7	-	7
	Prestressed Concrete	-	-	
Bridges carry Road over Rail	Masonry	2	-	7
	Steel Composite (concrete or timber)	6	-	6
	Reinforced Concrete	-	-	
	Prestressed Concrete	4	-	6
Bridges carry Road over Water	Masonry	163	157	320
	Steel Composite (concrete or timber)	17	13	30
	Reinforced Concrete	64	79	143
	Prestressed Concrete	6		6
	Timber	-		
Footbridges	All	27		27
<b>Total Bridges</b>		<b>353</b>	<b>251</b>	<b>604</b>
Retaining Walls	All			163*
<b>Total Road Structures</b>				<b>767*</b>

\* The retaining walls database is still under development. The figure shown is estimated.

<b>Table 2.1b Private Bridge Ownership</b>				
<b>Bridge Code</b>	<b>Bridge Name</b>	<b>Easting</b>	<b>Northing</b>	<b>Owner</b>
A9/210	Bridgehaugh Railway Under Bridge	279909	694675	Railtrack
A820/045	Railway Bridge near Mill Lade	277988	701555	Railtrack
B834/010	Killearn Station	250966	685370	British Rail Property Board
B9124/020	Airth Station	287124	687259	British Rail Property Board
B8033/050	Kinbuck Railway Bridge	279308	704808	Railtrack
B9124/040	Gallamuir Over Railway	283984	687891	Railtrack
B9124/080	Over Railway	282902	689558	Railtrack
C31/040	Over Disused Railway	250376	686955	British Rail Property Board
C83/010	Under Disused Railway	273011	701750	British Rail Property Board
C83/040	Over Disused Railway	274675	701814	British Rail Property Board
C11/020	Seaforth Place Railway Bridge	279742	693754	Railtrack
U010060/010	Over Disused Railway	258558	722985	British Rail Property Board
U040400/010	Over Disused Railway	251697	688756	British Rail Property Board
U020045/010	Auchintock Under Bridge	275532	701857	British Rail Property Board
U020210/040	Over Disused Railway	270434	703109	British Rail Property Board
U020370/010	Over Disused Railway	276258	701885	British Rail Property Board
U070515/020	Over Disused Railway	285363	686406	British Rail Property Board
U101610/010	Powdrake over dis'd railway	286804	686784	British Rail Property Board
U050400/010	Under Railway	278571	697217	Railtrack
U050930/010	Under Railway	277989	701589	Railtrack
U062835/010	Under Railway	281717	690612	Railtrack
U061730/010	Under Railway	279818	694327	Railtrack
U061730/020	Under Railway	279802	694333	Railtrack
U070550/010	Station Road, Cowie	283510	688480	Railtrack

## 2.2 Quality of Inventory & Asset Register

The definitive record of the road structures asset is stored and maintained within an electronic asset management system (WDM-SMS). The figures in table 2.1 have been derived from the existing asset inventory, updated by inspection surveys and are considered to be of good reliability, with approximately 80% of the detailed records of bridges and culverts thought to be accurate. Retaining structures data is less reliable, but is considered to be sufficiently detailed in terms of location and structural form. Knowledge of ownership and current condition is incomplete for retaining structures.

**Improvement Action IAS1:** Complete the population of the road structures asset inventory with structures information.

**Improvement Action IAS2:** Investigate methods for obtaining ownership data in relation to retaining walls.

**Improvement Action IAS3:** Develop an asset information and records strategy to determine the information required to be held, the information currently held, where and in what format, the missing information, the collection methods for the missing information and any proposed changes to the storage method.

The information held in asset management system comprises:

- Structure – name, number, reference, type, owner, maintaining agent, asset carried, obstacle crossed, status, last inspection, next inspection
- Location – grid reference
- Description – narrative description of structure, heritage type, access difficulties
- Construction – structural form, primary material, secondary material
- Superstructure – construction, end widths, waterproofing, parapet, end expansions joints, length, span count, end skew, manufacturer, largest square span, c/way width, deck area, parapet height, date installed if known
- Substructure – bearings, end support, end material, intermediate support, intermediate material
- Inspection Schedule – date last inspected and date next inspection due

It is essential that the asset management system is kept up to date with all additions, removals, renewals, inspections and works undertaken. The database is in need of scrutiny to determine areas of empty data fields and conflicting information.

Road structure drawings are held in the form of microfiche cards and paper copies both of which have been scanned and stored electronically. New works are prepared on AutoCAD and are stored on the main server for the Roads Maintenance Service. It is planned to have all of these electronic records held within the asset management software.

**Improvement Action IAS4:** Develop & implement a formal data management process to ensure updating of the asset register and notification of changes to appropriate parties.

The current asset management system is capable of producing works orders and recording works carried out but requires to be developed.

**Improvement Action IAS5:** Investigate the possible development of WDM-SMS to improve the workflow process

### **2.3 Asset Growth**

Some structures may be deleted as a result of stopping up, or by replacement of retaining walls with embankments. However, over time, it is anticipated that structure asset numbers will grow nominally in line with local development growth.

### 3 SERVICE EXPECTATIONS

#### 3.1 Customer Perceptions

Section 3 of the main document provides detailed information on the results of various customer surveys that the Council has undertaken in the last few years. However no specific customer perception data related to the structures asset has been collected.

#### 3.2 Council's Strategic Topics and Themes

Part 1: paragraph 1.5 of the main document provides information on where overall Road Asset Management practices and principles relate to the Councils Strategic Topics and Themes. Whilst there is no specific mention of Road Asset Management in the Councils adopted Strategic Plan (Shaping Stirling: Strategic Plan 2008 – 2012) and the current Single Outcome Agreement (published in 2008-09), the development of asset management practice has clear links with the planned local outcomes related to the Councils established Strategic Topics and Themes. In relation to the structures asset group, Topic 5 and Theme A have a direct relationship.

**Strategic Topic 5: We will make Stirling a place where the environment is protected and well managed.**

Related Local Outcomes

- Better Roads that are well maintained
- Improved public realm
- Protected and enhanced natural and built environment

**Strategic Theme A: We will make Stirling a place with better services**

Related Local Outcomes

- A robust performance management and improvement culture across the Council
- Effective, efficient and modernised service delivery
- Improved customer focus

#### 3.3 Use of the Asset

The Council's adopted Local Transport Strategy (LTS) is a sister document of the RAMP. Whilst the RAMP deals primarily with the maintenance of the road network the LTS deals primarily with the current use and future demands relating to the movement of people and goods on the road network.

The LTS is an umbrella document encompassing the City Transport Strategy, the National Park Transport Strategy and the Smaller Towns and Villages Transport Strategy. The LTS fits into a wider framework of Regional and National Strategies.

The aim of the LTS is to:

- Widen travel choices by creating conditions to encourage more sustainable travel
- Reducing the need to travel through integration of land-use and transport
- Ensure that the existing transport network is adequately maintained and managed
- Plan accordingly to address safety and accessibility issues within communities, acknowledging the diverse urban and rural nature of the area.

As part of the work to ensure that the existing transport network is adequately maintained and managed, the RTOS Service gathers and maintains records of traffic volumes from a number of permanent and temporary counter sites.

### **3.4 Safety Considerations.**

Safety is a major aspect of the management and maintenance of road structures. Load assessments and regular inspections of these structures can give early warning of problems that require urgent rectification or alternatively the imposition of safety measures, such as the implementation and enforcement of weight or lane restrictions. Structural assessments have been undertaken on 98% of the Authority's bridges with appropriate safety measures having been put in place where required.

### **3.5 Utility Activity**

Co-ordination of utility works is undertaken by the Service in accordance with the New Roads and Street Works Act, as amended by the Transport (Scotland) Act 2005. Under the overview of the Traffic Commissioner and the National Roads Authorities & Utility Committee (Scotland) (RAUC(S)), formal co-ordination meetings take place at two levels every quarter. 1) The local area RAUC brings together Stirling with Falkirk and Clackmannanshire Councils and Statutory Undertakers utility companies to discuss programmes of work and local issues and 2) The Tayforth Regional RAUC where more strategic issues are discussed and appropriate actions taken.

The Traffic Commissioner monitors the activities of both Councils and Statutory Undertakers, publishing quarterly performance information. For Stirling, a small, dedicated team established within the service, carries out detailed co-ordination of both Statutory Undertakers and the Councils own activity. Recent work carried out by the NRSWA team includes the introduction of Fixed Penalty Notices, generated when Undertakers fail to comply with the Noticing process. Planned works include the inspection of all reinstatements prior to the end of the two-year guarantee period.

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Actions by Statutory Undertakers can and do have a major impact on the maintenance and management of the structures asset. Where new apparatus is required or where it is necessary to refurbish existing apparatus, this can have a major impact on the availability of the structure and road.

Where there is planned maintenance work on a structure, existing apparatus may require protection and even diversion of the services, with a substantial increase in cost for the scheme.

When ever possible the Service tries to discourage statutory undertakers from putting new apparatus within a structure and refuses to allow them to attach any cable or pipes to the external walls and soffits. When new apparatus is placed within the overburden of a bridge the utility is required to do so as directed by the Council. Utility apparatus laid within a structure is a regular cause of water ingress, which leads to the need for remedial works.

### 3.6 Insurance Claims

Pubic liability Insurance claims (PLICS) data has been collected over a number of years. However, very few claims relate directly with the condition of structures, nearly all are attributed to the condition of the walking surface or the carriageway.

Damage caused to council structures by vehicular impacts is a regular occurrence. Once damage has been identified, the location is made safe and a police incident report is requested. This is required to attempt to recover payment for reactive remedial works. Where there is no police incident report, all costs of remedial work are met from the revenue budget. Accident statistics for structural assets are not currently recorded in a form that is suitable for easy analysis. [Improvement Action IAS6: Establish methodology for recording accident damage and third party claims costs.](#)

### 3.7 Environmental Considerations

Stirling Council is committed to protecting the environment and promoting sustainable transport. The LTS includes information on Policy and actions, relevant to the structures asset, on air quality, noise pollution, water quality, climate change and flooding.

In addition the Service is committed to maximising recycling of road construction materials and thereby minimising the need for material arising from road works to be sent to landfill.

#### Natural Environment

A number of structures are within or adjacent to sites of particular environmental classification (e.g. SAC, SSSI etc). Work on bridges could easily be affected by the presence of bats, salmonids, otters, breeding birds or other protected creatures. Enquiries are made through the Council's Countryside Service and relevant GIS mapping data to initially ascertain the

likelihood of the presence of these creatures. In some cases, a more substantial survey may be required from a specialist. A licence to work may even be required.

It is normal to consult SNH to determine whether there would be any restrictions on types of work and materials used. There may even be a need to schedule the timings of the work to suit breeding periods.

### **Historical Environment**

Numerous structures are listed, or lie in the environs of other Listed properties and Conservation Areas, which may require consultations with the Planning Authority and Historic Scotland to determine the materials to be used and the extent of the work.

### **Water Environment**

The Scottish Environment Protection Agency (SEPA) is responsible for maintaining and improving the environment and regulating environmental emissions. It has a duty to discharge its functions to protect and enhance the environment and to promote conservation and recreation.

The Water Environment (Controlled Activities)(Scotland) Regulations 2005 apply to any works on Structures that are over or adjacent to a watercourse and imposes a requirement upon the Council to notify SEPA of all works on such structures, based on a number of criteria, and for a licence to be granted where appropriate. The Council undertakes works in a sustainable and environmentally friendly manner and has developed repair techniques that ensure the minimum risk to the environment.

A 'decision flow process' would be beneficial to ensure that the notification criteria is followed correctly.

## **3.8 Network Availability**

Any works required on the asset must be registered on the Scottish Road Works Register (SRWR). The SRWR allows the Council to limit the times that certain works can take place on what are known as traffic sensitive routes. All main transport routes in the Stirling Council have an established level of traffic sensitivity, reviewed in 2009. Works are also co-ordinated to ensure that delays on these main routes are minimised.

Nineteen bridges currently have a weight or height restriction. Of these six are British rail board or Network Rails responsibility. Six (road) bridges have a width (between parapets) of less than 3.65m.

<b>Table 3.8a Weight Restricted Bridges</b>				
<b>Structure Code</b>	<b>Structure Name</b>	<b>Main Obstacle</b>	<b>Owner</b>	<b>Restricted Weight (Tonnes)</b>
B8033/060	River Allan Bridge	Water	Stirling Council	13
B8034/030	Cardross Bridge	Water	Stirling Council	10
B818/150	Low Bridge (Gonachan)	Water	Stirling Council	26
C114/010	Gartchonzie	Water	Stirling Council	13
C23/060	Honeyholme	Water	Stirling Council	13
C57/040	Chapellaroch	Water	Stirling Council	10
C57/060	Cobleland	Water	Stirling Council	7.5
U020200/010	Ardoch Bridge	Water	Stirling Council	13
U050470/010	Dunblane Cemetery	Water	Stirling Council	7.5
U051490/020	Old Wharry	Water	Stirling Council	7.5
U062300/010	Old Bannockburn	Water	Stirling Council	18
U070195/010	Chartershall Old	Water	Stirling Council	3

<b>Table 3.8b Height Restricted Bridges</b>				
<b>Structure Code</b>	<b>Structure Name</b>	<b>Main Obstacle</b>	<b>Owner</b>	<b>Height Restriction</b>
A9/210	Bridgehaugh, Stirling	Rail over road	Network Rail	4.3 m
A9/230	Bridge of Allan Station	Road over road	Stirling Council	3.9 m
C25/010	Bannockburn Station Road)	Rail over road	Network Rail	13' 5 "
C83/010	Under disused railway	Rail over road	BRB	11' 9"
U050400/010	Under disused railway	Rail over road	BRB	13' 6"
U061730/010	Lover's walk	Rail over road	Network Rail	10' 3"
U061730/020	Lover's walk	Rail over road	Network Rail	10' 3"

There are several Council roads that provide sole access to communities or businesses that also have structures along their lengths. These routes require special treatment if as part of a maintenance project there is a requirement for general traffic management or total closure.

Additionally, works over railways are subject to restrictions imposed by the rail authority.

<b>Table 3.8c Sole Access Routes with Structures</b>		
<b>Route</b>	<b>Road Name</b>	<b>Affected Settlement</b>
B829	Kinlochard Road	Inversnaid, Kinlochard
B837	Drymen to Milton of Buchanan Road	Balmaha, Milton of Buchanan
C6	Rowardennan Road	Rowardennan
C33	Balquhidder Road	Balquhidder Glen
C68	Inversnaid Road	Inversnaid
C90	Lochay Road	Kenknock Farm, Killin
U010070	Glenbuckie Road	Ballimore, Balquhidder
U020340	Invertrossachs Road	South Loch Venacher
U020412	Manse Road	Kirkton, Aberfoyle
U020200	Castle Road	Doone
U020395	Lerrock Road	Argaty & Lerrocks, Doone
U020370	Kilbryde & Brack Road	Bows, Dalbrack, Nether Glastry, Doone
U030140	Culbowie Road	Glenside, Easter Culbowie, Buchlyvie
U030310	Mye Road	Nether Easter Offerance, Buchlyvie
U030270	Middleton Road	Middleton & Causewayhead Farms, Arnprior
U020500	Poldar Road	Easter Poldar, Thornhill
U040090	Barnford Road	Castle Mill, Gartness

### **3.9 Amenity Value Considerations**

The amenity value of structures is generally only considered when it is situated in a heritage or high amenity area and adds to the aesthetic value of the area and/or is listed in accordance with the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. In these circumstances, there is recognition that all works should be in keeping with the local area and the original materials used. In most circumstances this requires consultation with and formal consent from the Planning Authority, Historic Scotland and Scottish Natural Heritage.

## 4 MANAGEMENT PRACTICES

### 4.1 Policies

Only one Council approved policy exists relating to the structure asset

- Bridge Assessment & Strengthening Strategy *Environmental Quality Committee November 1998 plus various follow up reports*

This policy establishes the methodology for prioritising expenditure based on social, technical and historical factors.

Once adopted, the RAMP will introduce Council approved policy on the levels of service that can be achieved with the available budget and will establish associated performance targets

### 4.2 Inspection Regime

The bridge inspections regime accords with the guidance and recommendations of the Code of Practice (COP) "Management of Highway Structures", (Sep 2005).

#### 4.2.1 Safety Inspections (Routine Surveillance)

All structures should be subjected to routine surveillance as part of regular road safety Inspections carried out by road maintenance Inspectors.

Paragraph 4.2.1 of the Carriageways LCP provides details of the current road safety inspection. Inspectors should immediately report to the Bridges Team any obvious defects that are apparent from the vehicle which need urgent attention, such as damage to the superstructure and bridge supports of overbridges, damage to parapets, flood damage, insecure expansion joint plates, etc. The Structures Team Leader should be satisfied that the frequency of road safety inspections is suitable for the routine surveillance of structures.

Due to resource limitations, Stirling Council currently only carries out safety surveys on approximately one third of its road network. The remainder of the road network relies on reactive inspections by Inspectors and reports of defects by the general public.

The Carriageway LCP includes actions to address this issue.

#### 4.2.2 General Inspections

General Inspections comprise a visual inspection of all parts of the structure and, where relevant to the behaviour or stability of the structure, adjacent earthworks or waterways that can be inspected without the need for special access or traffic management arrangements. Riverbanks, for example, in the vicinity of a bridge should be examined for evidence of scour or flooding or for conditions, such as the deposition of debris or blockages to the waterway,

which could lead to scour of bridge supports or flooding. Structures should be subject to a regular General Inspection not more than two years following the previous General or Principal Inspection.

The results of well-detailed General Inspections are used as the bases of determining the programme of maintenance works. As well as reporting the extent and severity of defects the Officers still apply a modified 'prioritising system' to categorise the significance of defects applicable to a structure. This results in a structure being given a value of 0.1 to 0.9 where the lower number indicates a defect of higher significance. Ideally for 'steady state' maintenance all structures with priority numbers of 0.5 and less should be addressed. Present funding and resources only permit structures with a priority number of 0.3 and less to be considered.

#### **4.2.3 Principal Inspections**

Principal Inspections comprise a close examination, within touching distance, of all accessible parts of a structure, including, where relevant, underwater parts and adjacent earthworks and waterways, utilising suitable access and/or traffic management works as necessary. Closed circuit television may be used for areas of difficult or dangerous access, e.g. obscured parts of a structure, confined spaces and underwater inspections. All structures should be subject to a regular Principal Inspection not more than six years following the previous Principal Inspection unless a risk assessment has been carried out to define an alternative interval.

#### **4.2.4 Special Inspections**

There are occasions when a more specific inspection, concentrating on the condition of particular parts of the structure, is required. This is known as a Special Inspection. The need for a Special Inspection normally arises due to specific circumstances or following certain events. In some cases, where specific monitoring of condition may be important (the structure has failed assessment and a formal interim measure has been put in place), inspection intervals are reduced.

#### **4.2.5 Bridges Inspectors**

Stirling Council currently employs one dedicated Bridge Inspector.

### **4.3 Condition Assessment**

The results of Bridge Inspections allow the production of Bridge Condition Scores (Bcs) produce Bridge Condition Index (Bci) values, as recommended within the Code of Practice. The Bridge Stock Condition Index (BSci) is an average measure of the physical condition of the structure stock. This is evaluated using the Bci values for each bridge, weighting it by the area of the deck and taking BSci as an average of all of the bridge stock produces the Bridge

stock condition Index average (BSci-av). In the same way a critical Bridge stock condition index (BSci-crit) can be evaluated by taking account of highly important elements of the structure. Taken in total for the whole structures stock, average (BSci-av) and critical (BSci-crit) values are obtained which may be used, over time, to gauge improvement or deterioration in the road structures stock condition.

**Improvement Action IAS7:** Continue to develop condition index data to produce a meaningful PI that can be benchmarked with other authorities.

#### 4.4 Load Assessment

Load assessment of bridge structures is undertaken to establish safe working vehicular loading. Ad hoc load assessments may be required where exceptional use, or the movement of abnormal indivisible loads (AIL) are proposed.

Bridges not designed to modern standards have been part of a programme of load assessment since 1989. This programme was to determine whether the bridges achieved “Construction and Use” capacity. Where bridges fail to achieve this assessed capacity, they are considered for strengthening/replacement or monitoring, or may have a restriction placed on their use (traffic lights, narrowing of carriageway or weight restrictions).

Table 4.2 shows the current (2010) assessment status of the bridge stock.

<b>Table 4.4 – Bridge Load Assessment Status (1989 to 2010)</b>	
<b>Bridge Group</b>	<b>Number</b>
Bridges which have passed their load assessment	167
Bridges which have been strengthened/replaced	57
Bridges which have been permanently restricted	12
Bridges which have been permanently closed	-
Bridges subject to temporary weight and width restriction, in lieu of strengthening	8
Bridges which still require strengthening or replacement	12
Bridges which still require load assessment	-
<b>Total</b>	<b>256</b>

256 bridges have been assessed of which 167 were proved able to carry the current imposed live loads. 89 failed the assessment and to date, 57 have been strengthened or replaced. 8 roads are temporarily restricted. 12 have permanent weight restrictions imposed, as the restriction did not adversely affect the operation of the network of roads. The remaining 12 are being monitored in accordance with formal interim procedures. On the assumption that

current vehicle weights will not change and current funding levels will be maintained, the programme is expected to extend to 2020.

**Improvement Action IAS8:** Complete strengthening programme.

#### **4.5 Construction/Asset Acquisition**

New assets are typically acquired through road adoption, or through improvement works completed by the Council, or from developers acting through road construction consents. Design and construction standards for new or altered structures are enforced through an established Technical Approval process

**Improvement Action IAS9:** Develop a procedure to assess the ongoing maintenance liability of new assets and ensure these figures are included within the design calculations or added to the service business plan.

#### **4.6 Planned Maintenance – Renewals**

Works that substantially improve and extend the life and durability of a structure or works that replace a structure are funded through the Capital budget.

The bridge capital programme was originally established following a comprehensive assessment programme for the introduction of the 40 tonne vehicle to the UK's roads in 1999. Works programmes typically comprise strengthening / replacement of structures that have failed the assessment, arch stabilisation or deck/culvert replacements where it would be uneconomic to continue with other maintenance options and widening or replacing sub-standard elements such as parapets. Works may also include major masonry, lime mortar pointing, scour damage works and other specialists works requiring the engagement of specialist contractors and other sub contracting tradesmen.

There is currently, no planned programme of or policies for retaining wall or cattle grid renewal / replacement.

#### **4.7 Reactive Maintenance**

Reactive repairs that are identified during the bridge inspection process are prioritised using the engineering judgement of responsible officers and funded through the revenue budget. Work includes minor masonry and pointing works and scour repairs.

<b>Table 4.6 Reactive repair prioritisation categories</b>	
<b>Emergency</b>	Works undertaken as soon as physically possible, structure may be restricted or closed until works are undertaken.
<b>Urgent</b>	Works undertaken as soon as practical, based on financial and resource availability

<b>High</b>	Works programmed for completion within 24 months wherever possible, subject to financial constraints.
<b>Medium</b>	Structures monitored or work undertaken in conjunction with any works identified above.
<b>Low</b>	Note placed on file and subject to additional review during next scheduled inspection.

Reactive repairs to the associated carriageway, such as pothole repairs is covered by the Carriageway LCP

#### **4.8 Routine/ Cyclic Maintenance**

There is currently no identified and planned routine maintenance works on structures. The Carriageway LCP covers routine maintenance of the associated carriageway, such as weed spraying and cleaning of drainage channels.

#### **4.9 Disposal**

The disposal of structure assets is relatively rare from the perspective of a Council disposing of all responsibility for the structure. However there have been a few occasions where the enforced redundancy of a length of carriageway or footway due to the introduction of a new route, for example, has resulted in a “stopping up” order being invoked with the structure and its ongoing maintenance liabilities reverting to the responsibility of the adjacent land owners. In such circumstances it is the responsibility of the Council to ensure that the structure is of an adequate standard prior to its disposal.

Other instances may be where watercourses have been diverted or dried up naturally and the structure is in-filled, often with the provision of a drainage pipe, such that the structure becomes part of the carriageway or footway.

This is also carried out if a pedestrian underpass is made redundant in which case the void is normally filled with foaming concrete and the ends are landscaped as required. If the structure is not physically removed but remains as an underground obstruction then it will remain on the Bridge Register as a buried structure.

## 5 INVESTMENT

### 5.1 Historical Investment

Table 5.1 Revenue and Capital Spend on Structures			
Year	Revenue	Capital	Total
99-00	£166,927	£159,000	£325,927
00-01	£220,000	£164,000	£384,000
01-02	£230,055	£163,157	£393,212
02-03	£243,200	£384,000	£627,200
03-04	£253,805	£482,000	£735,805
04-05	£235,000	£305,000	£540,000
05-06	£235,000	£505,000	£740,000
06-07	£235,000	£519,540	£754,540
07-08	£235,000	£348,178	£583,178
08-09	£235,000	£321,159	£556,159
09-10	£244,400	£345,830	£590,230

### 5.2 Output from Investment (To be developed)

Table 5.1 Output from Investment in Structures							
Description	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Strengthening							
Bridge Replaced							
Culvert replaced							
Deck replaced							
Arch stabilisation							

**Improvement Action IAS10:** [Develop appropriate output from investment data.](#)

### 5.3 Forecasting Financial Needs

There is currently no formal process in place that establishes ongoing, long term, budgetary requirements for the maintenance and management of the structures asset. However an exercise is ongoing to identify the types and frequency of maintenance activities required and to initially establish the resource required to maintain a steady state level of service.

Activities and indicative costs, relating to industry recommended standards, will be developed in a format similar to that shown in Table 5.3, below.

<b>Table 5.3 Structures Maintenance Activities and Projected Costs</b>								
<b>Description of Activity or Treatment Type</b>	<b>Rate at 2009</b>	<b>Annual Quantity</b>	<b>Standard Regime</b>	<b>Current Regime</b>	<b>Proposed Regime</b>	<b>Standard Annual Cost</b>	<b>Current Annual Cost</b>	<b>Proposed Annual Cost</b>
<b>Principal Inspections</b>	£***	Item	9 years	9 years	6 years	£***	£***	£***
<b>Scour Inspection (diving)</b>	£***	Item	9 years	9 years	6 years	£***	£***	£***

This data will help identify the Depreciated Replacement cost and the annual investment required to maintain the asset to the industry recommended standards. It will also help identify the impact of the actual level of investment in the asset

**Improvement Action IAS11:** [Develop a formalised process for establishing the ongoing, long term, budgetary requirements for the maintenance and management of the structures asset.](#)

#### **5.4 Valuation**

An initial exercise to calculate the gross replacement costs of the structures asset has been completed. It is estimated that it would cost £122 million to replace the Council's road structures asset with a modern equivalent asset. Data Source: Road Structures Initial valuation of Gross Replacement Costs (SCOTS RAMP Project 2009).

The Depreciated Replacement Cost is currently unknown. However, anecdotal evidence suggests that historical and current levels of allocated resources suggest that the asset continues to deteriorate.

## 6 FORWARD WORKS PROGRAMME

### 6.1 Existing Programmes

Structures works programmes have historically been developed on an annual basis to match with the Council's annual budget setting process. Forward planning beyond this period is not possible as budgets continue to vary year on year.

Prior to the start of the new financial year, a potential schemes list is compiled using data gathered from the bridge strengthening assessments and the ongoing condition assessments.

The list is then prioritised on the basis of the bridge condition indices (See 6.3)

The prioritised list of schemes up to the value of the allocated budget is then included in the master programme (see 6.2). Lower priority schemes that do not make the list are considered for inclusion in the following years programme.

### 6.2 Programme Coordination

A master programme of works is then established, which includes all major planned works including new roads projects, bridges and lighting schemes. Regular monthly meetings take place to monitor progress and to adjust the programme accordingly. Processes are in place to ensure all works are added to the Scottish Roadworks Register (SRWR) in accordance with the notification standards. Statutory Undertakers receive copies of this programme at the quarterly meetings.

### 6.3 Option Appraisal.

The identification of the appropriate treatment required at an individual location is based at present on the engineering judgement of the responsible officer rather than on any set criteria.

A prioritisation process (0.1 to 0.9) is used to rank the available projects. For 'Steady State' maintenance it is considered that all those structures with priority values of 0.6 and less should be worked on. In reality the cut off is determined by the allocated budget. In most years the priority range attained is 0.4 and less

There has been no assessment of this system of prioritisation that would determine if in the long-term the expenditure of the budget in this way is effective.

A process will be developed to consider how options are identified and appraised for this asset group including consideration of whether it is better value to invest in:

- Different available maintenance treatment options
- Maintenance or asset improvement works
- Routine maintenance or planned renewals

- Asset options against “non asset options” e.g. demand management
- Preventative maintenance as opposed to corrective maintenance activities
- Renewal of asset components or full asset replacement

**Improvement Action IAS12:** Develop an option appraisal process to consider how maintenance options are identified and appraised for structures

## 7 RISK

### 7.1 Risk Management Framework

Stirling Council has an established framework for risk management, which includes both a Council Risk Register and a Service Risk Register. Details of the Framework are provided in Section 8 of the Main RAMP Document. Identified risks associated with structures are included in the ***Service Risk Register (see Appendix D)***.

It should be noted that this Framework relates to overall business risk but includes, where appropriate, risk associated with health and safety. However risk management in terms of compliance with the Health and Safety at Work etc Act 1974 is covered in more detail through the Services Quality Management System and compliance with the Health and Safety Standard OHSAS 18001:2007.

**Improvement Action IAS13:** Review Service Risk Register to include identified risks associated with structures

## 8 PERFORMANCE MEASUREMENT

### 8.1 Performance Management Framework

The Services Road Management Plan 2007-2011 sets out the proposed actions, performance measures and targets we aim to achieve over the next four-year period. The actions, measures and targets are related to most activities of the Service. These are reported, evaluated and reviewed on at least an annual basis by the Roads, Transport & Open Space (RTOS) Management Team. The Plan also includes a list of policies to be formulated, which will guide how we deliver and improve our services. To ensure we meet our objectives, a comprehensive set of performance measures and targets (PIs) are being developed that cover all areas of our activity. These measures and targets are used to monitor how individual service units are performing and whether our collective objectives are being met.

### 8.2 Currently Reported Performance Indicators

There is currently no sufficiently developed and reported performance Indicators relating the structures asset.

### 8.3 Future Planned Performance Indicators

All Scottish Councils, through SCOTS, are currently developing a suite of performance indicators, statistics and management information as part of the holistic development of Asset Management throughout Scotland. **See Appendix B for details of developing performance information.**

**Improvement Action IAC14:** New Performance Indicators: Develop methods of capturing required data

## 9 FUTURE STRATEGIES

The immediate future strategy is to

- adopt asset management as the corporate strategic approach that will start to help in the process of optimising the allocation of resources to areas of greatest need and
- embed the practices of asset management within the Service.

More detailed strategies for the management of the structures asset can then be developed in line with the development of this lifecycle plan, allowing the introduction of better long-term planning.

## 10 SERVICE IMPROVEMENT ACTIONS

The Table below provides information on the current planned actions for the continuing development of the Structures Lifecycle Plan. This information is also include in **Appendix E, the overall Improvement Action Plan**

<b>Table 10.1 Improvement Actions (Structures)</b>			
<b>Ref</b>	<b>Action</b>	<b>By</b>	<b>Responsibility</b>
IAS1	Complete the population of the road structures asset inventory with structures information.	2014	Structures Team Leader/ Asset Coordinator
IAS2	Investigate methods for obtaining ownership data in relation to retaining walls.	2011	Structures Team Leader
IAS3	Develop an asset information and records strategy to determine the information required to be held, the information currently held, where and in what format, the missing information, the collection methods for the missing information and any proposed changes to the storage method.	2011	Structures Team Leader/ Asset Coordinator
IAS4	Develop & implement a formal data management procedure to ensure updating of the asset register and notification of changes to appropriate parties.	2012	Roads Support Manager/Structures Team Leader/ Asset Coordinator
IAS5	Investigate the possible development of WDM-SMS to improve the workflow process	2012	Roads Support Manager/Structures Team Leader/ Asset Coordinator
IAS6	Establish methodology for recording accident damage and third party claims costs.	2014	Structures Team Leader
IAS7	Continue to develop condition index data to produce a meaningful PI that can be benchmarked with other authorities.	2012	Structures Team Leader
IAS8	Complete strengthening programme	2015	Structures Team Leader
IAS9	Develop a procedure to assess the ongoing maintenance liability of new assets and ensure these figures are included within the design calculations or added to the service business plan.	2013	Structures Team Leader
IAS10	Develop appropriate output from investment data.	2011	Structures Team Leader

<b>Table 10.1 Improvement Actions (Structures)</b>			
<b>Ref</b>	<b>Action</b>	<b>By</b>	<b>Responsibility</b>
IAS11	Develop a formalised process for establishing the ongoing, long term, budgetary requirements for the maintenance and management of the structures asset.	2013	Roads Maintenance Manager/Structures Team Leader
IAS12	Develop an option appraisal process to consider how maintenance options are identified and appraised for structures	2012	Roads Maintenance Manager/Structures Team Leader
IAS13	Review Service Risk Register to include identified risks associated with structures	Annually	Roads Maintenance Manager/Structures Team Leader
IAS14	New Performance Indicators: Develop methods of capturing required data		Structures Team Leader/ Asset Coordinator