Bridge Asset Management Plan 2020-2030

Adopted by Council
17 August 2020 Council Meeting
Minute 123/20
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GLOSSARY

Asset condition assessment	The process of continuous or periodic inspection, assessment, measurement and interpretation of the resultant data to indicate the condition of a specific asset so as to determine the need for some preventative or remedial action.
Asset consumption ratio	The current value of Council's depreciable assets relative to their current replacement cost. $\frac{\text{Current Value of asset (Bridges)}}{\text{Current replacement cost of assets}}$
Asset sustainability ratio	The approximation of the extent to which the infrastructure assets managed by Council are being replaced as they reach the end of their useful lives. $\frac{\text{The capital expenditure on the renewal of asset}}{\text{Depreciation expense}}$
Current replacement cost	The current cost of replacing an asset with a similar modern equivalent asset, i.e. the total cost of replacing an existing asset with an as new or similar asset expressed in current dollar values.
Depreciable amount	The cost of an asset, or other amount substituted for its cost, less its residual value (AASB 116)
Depreciated replacement cost	The current replacement cost of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset.
Depreciation	The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.
Life cycle cost	The life cycle cost (LCC) is average cost to provide the service over the longest asset life cycle. It comprises annual maintenance and asset consumption expense, represented by depreciation expense. The LCC does not indicate the funds required to provide the service in a particular year.
Life cycle expenditure	The life cycle expenditure (LCE) is the actual or planned annual maintenance and capital renewal expenditure incurred in providing the service in a particular year. LCE may be compared to LCC to give an initial indicator of life cycle sustainability.
Planned maintenance	Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspections, assessing the condition against failure/breakdown criteria/experience, prioritising scheduling, actioning the work and reporting what was done to develop a

	maintenance history and improve maintenance and service delivery performance.
Renewal gap	The difference between the required spend as determined by a specialist (AusSpan) and the forecast spend as determined by Council.
Useful life	Either: (a) the period over which an asset is expected to be available for use by an entity; or (b) the number of production or similar units expected to be obtained from the asset by the entity. (AASB 116). It is estimated or expected time between placing the asset into service and removing from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the Council. It is the same as the economic life.

1. EXECUTIVE SUMMARY

Council provides bridge access to Council's transport network in partnership with funding assistance from the Tasmanian and Australian Governments. This enables Council to maintain and rehabilitate the bridge access service to a standard that is fit for use by the community.

At 20 May 2020, Council had 114 complete bridge assets with a current replacement cost of $26.7 million. These assets are currently recognised at a depreciated replacement cost of $18.1 million with an annual depreciation charge of $424,000.

Plans for the Future

Council plans to operate and maintain bridge access to achieve the following strategic objectives:

1. Ensure that bridge and culvert structures are maintained at a safe and functional standard as set out in the Bridge Asset Management Plan (BAMP).
2. Ensure that bridge and culvert renewal is affordable and sustainable for the rate payer and broader community.
3. Ensure that the bridge network services the needs of the community.

Cost

The life cycle cost (average cost of the life of the asset) to provide bridge access to Council's transport network for the next 10 years is estimated at $298,000 p.a. Council's planned life cycle expenditure for the BAMP is $353,000, which is higher than the projected life cycle costs due to the renewal of certain assets being brought forward in the cycle.

The Next Steps

This actions resulting from this asset management plan are:

- Maintain Civica Authority Asset Module (Section 8.2)
- Address known performance deficiencies (Section 5.2)
- Investigate below benchmark asset sustainability ratio (section 5.3)

2. INTRODUCTION

2.1 Background

This asset management plan covers the following infrastructure assets:

Asset Class	Inventory	Current Replacement Cost		
		Sub-structure $'000	Super-structure $'000	Total $'000
Bridge - Concrete	60	7,234	10,824	**18,058**
Bridge - Timber	35	2,999	2,898	**5,897**
Bridge - Pedestrian	3	237	218	**455**
Bridge – Precast /Timber	1	154	153	**307**
Culvert - MPC	7	-	587	**587**
Culvert - RCBC	6	-	1,077	**1,077**
Ramp	1	-	190	**190**
Pontoon	1	6	150	**156**
Total	**114**	**10,630**	**16,097**	**26,727**

2.2 Goals and Objectives of Asset Management

Council's goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers. Council goals and objectives and how these are addressed in the BAMP are:

Goal	Objective	How Goal and Objectives are addressed in Bridge AMP
Bridges Construction and Maintenance Resources		
Ensure measured and predictable allocation of resources through proactive planning and a sustainable budgetary commitment.	Maintain and endeavour to increase bridges maintenance and construction funding. Develop plans for the stable and predictable allocation of resources over the long term. Where possible ensure that bridge construction and maintenance activities are undertaken in an environmentally sustainable manner.	Implement asset management systems and processes. Funding allocated in long term financial plan and annual budgets.
Future Facilities		
Ensure a measured and predictable allocation of resources to meet asset acquisition, construction and maintenance through proactive planning and budget commitments.	Plan for the future development of community facilities as the need arises, taking into account priorities identified by Councillors and the community.	Establish long term financial and asset plans, and annual budgets that adequately meet the resource demands of future bridge requirements.

3. LEVELS OF SERVICE

3.1 Current Levels of Service

Municipal bridges are designed and constructed in accordance with AusRoads bridge design codes and applicable standards. Council has adopted a Bridge Management System (BMS) developed by AusSpan. AusSpan is engaged by Council to undertake annual bridge inspections and to provide recommendations on future maintenance and renewal requirements.

3.2 Desired Levels of Service

The current methodology of renewing and maintaining bridge assets is deemed to be appropriate. Council is proactive in renewing timber structures with concrete/steel structures that have an increased load capacity, where appropriate, to provide adequate access to commercial ventures and take advantage of lower asset life cycle costs.

4. FUTURE DEMAND

4.1 Demand Forecast

Demand factor	Present Position	Projection	Impact on services
Environmental Factors	Acid soil leachate into waterways is problematic in some areas of the municipality. Concrete abutments and piers are susceptible to corrosion and reduce the design life of these assets. Maintenance cost on these assets is higher.	Intensive agriculture in designated irrigation scheme areas may significantly and detrimentally impact waterway pH with increased acid corrosion on concrete bridge assets. Increased asset monitoring and corrosion protection activity may be required.	Nil, except for decreased useful life and increase life cycle renewal cost and maintenance.
Forestry, Mining, Agriculture Crane Access	Council has several classes of bridge and culverts, each with different design loads. In addition, a number of timber structures are approaching the end of their useful life and where reduced load limits have been applied. Reduced gross load limits may prevent access to transport goods. Industry prefers to use High Productivity and High Mass Load vehicles on Councils road network. Vehicle access in this category is controlled via a permit system managed by the National Heavy Vehicle Regulator (NHVR)	**Replacing timber structures in timber** provides access to General Access vehicles (44T Gross load) for approximately 75% of the assets design life, after which structural integrity declines and lower gross limits are applied and enforced. It is expected that several assets will be replaced in timber over the life of this plan. It is projected that industry will continue to lobby for increase productivity and mass loads (min SM1600 under AS5100). It is projected that the industry expectation will not change and that Council may consider replacing relevant bridges to SM1600.	Effective T44 loading is available for 75% of asset life. Reduced load limits impact negatively on commercial operations. Constructing bridge and culvert assets to SM1600 provides for commercial needs.

4.2 Demand Management Plan

Currently no demand exists for new bridge or major culvert construction, based on currently known and forecast municipal development strategy or plan.

5. LIFECYCLE MANAGEMENT PLAN

5.1 Asset Capacity and Performance

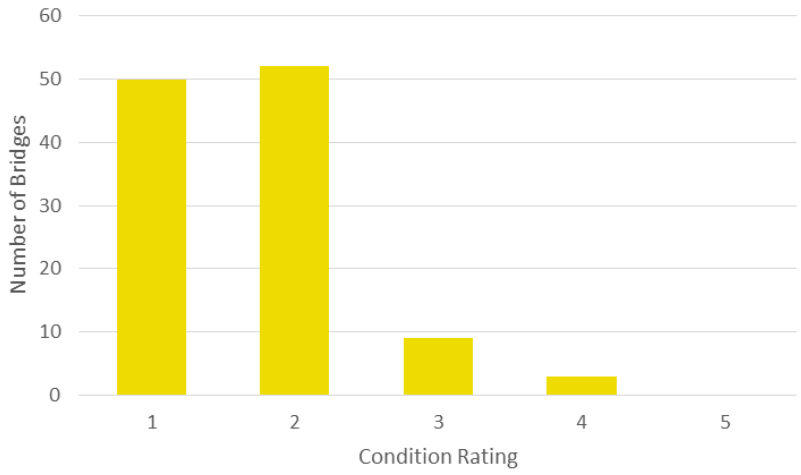
Council's bridges and major culverts are designed and maintained to meet municipal transport needs. Locations where deficiencies in service performance are known are outlined below.

Location	Service Deficiency
Bridge 1542 – Barnetts Farm Rd	Timber structure constructed to T44 design load. Currently has 8 Tonne load limit due to aging timber superstructure. Road provides access to rear of one property.
Bridge 1583 – Bonds Rd	Timber superstructure with concrete substructure constructed to T44 design load. Currently has a 20 Tonne load limit due to aging timber superstructure. This is likely to be further reduced in the near future. Road services one resident.
Bridge 1526 – Banca Rd	Timber structure constructed to T44 design load. Banca road provides a link between the farming areas of Winnaleah and Waterhouse. Council has received requests for increased axle loadings on heavy vehicles however these have been rejected due to the design limitations of this structure.
Bridges 1626 and 1628 Gladstone Rd	Both these concrete structures where built in the mid 1960 to a HS 20 (33 Tonne) design load. Responsibility for Gladstone Road was transferred from the State to Dorset Council in 2015. The road was transferred as a gazetted Higher Mass Limits (HML) route which allows heavy vehicles to carry increased axle loads increasing vehicle productivity. This HML classification exceeds the design load for these structures. Council will undertake an annual assessment of both structures to determine their current performance and future management options.
Bridge 1549 – Sandy Points Rd	Concrete structure built in 2003 to T44 design load. It is likely that due to the construction of the Jarvis Link and the intensive development of agriculture west of this structure Council will receive requests for higher productivity vehicles that exceed the design standard of this structure. Council will undertake an annual assessment to determine the current performance and future management options for this structure.

5.2 Asset Condition

The condition profile of Council's bridge assets is shown.

Figure 1 | Asset Condition Profile



Condition Rating Summary

1 = Very Good overall condition

2 = Good overall condition – deterioration minor

3 = Fair overall condition – deterioration obvious

4 = Poor overall condition – deterioration severe

5 = Very Poor overall condition – renewal required

5.3 Asset Sustainability and Consumption

Council's sustainability reporting reports the average rate of annual asset consumption and compares this to asset renewal and asset upgrade and expansion over the life of the asset class.

Asset consumption ratio: 67.7%

This ratio shows the current value of Council's depreciable assets relative to their "as new value" in current prices. This ratio seeks to highlight the aged condition of the physical assets. In this case the above percentage indicates that Council has consumed approximately one third of the service potential of its bridge assets. Overall, at this point in time, when looking at the level of consumption combined with the average condition rating of Council's bridge assets there is sufficient capacity to continue to provide service to Dorset ratepayers and other road users.

Asset sustainability ratio: 78.8%

This ratio calculates the extent to which Council is maintaining operating capacity through the renewal of its existing assets. The benchmark prescribed by the Tasmanian Audit Office for this ratio is 100%. Council is currently below the prescribed benchmark which indicates Council's current

level of annual investment in its bridge assets is less than the annual decline in value of these assets (i.e. annual depreciation). This could be due to a number of factors including the annual rate of depreciation or the average annual investment in these assets does not reflect the actual current market cost to renew these assets. An action item to investigate this has been included in the next steps.

5.4 Risk Management Plan

An assessment of risks associated with the current asset condition has identified critical risks to Council. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

Very High:	Critical risks, requiring immediate corrective action;
High/Medium:	Requiring prioritised corrective action; and
Low:	Requiring regular monitoring

Risks identified in the infrastructure risk management plan are summarised below.

What can Happen	Risk Rating (VH, H,M, L)	Risk Treatment Plan
Monitor Structural Condition Failure to monitor ageing components and replace as required may lead to structural failure and loss of asset[1].	H, VH	*BMS Code 5: Monitor –Bridge Assets (3)* Action is to monitor assets as prescribed in AusSpan BMS report and repair/replace component to avoid elevated risk. Annual budget allocation is required.
Erosion Control Potential for washout of abutments and earth fill leading to asset failure, especially during significant flood events.	H	*BMS Code 5: Erosion Control – Bridge Assets (6)* Action is to undertake work on assets within prescribed timeframes stated in the BMS to prevent further deterioration. Budget allocation is required.
Minor Damage Reduces structural integrity and may lead to possible component failure.	H	*BMS Code 5: Minor Damage – Bridge Assets (2)* Action is to undertake work on assets within prescribed timeframes stated in the BMS to prevent further deterioration. Budget allocation is required.
Component Renewal Failure to renew structures at end of safe operational life will lead to the initial application of reduced load limits. Component decay rate increases geometrically at end of safe operational asset life with imminent failure and loss of asset.	H, VH	*BMS Code 5 & 6: Component Renewal – Bridge Assets (4)* Action is to undertake work on assets within prescribed timeframes stated in the BMS to prevent further deterioration. Budget allocation is required.
Vegetation Clearing around abutments and piers Reduces peak water flow and may lead to a reduction in structural integrity and potential for washout of abutments and earth fill leading to asset failure.	H, VH	*BMS Code 5 & 6: Vegetation Clearing – Bridge Assets (4)* Action is to undertake work on assets within prescribed timeframes stated in the BMS to prevent further deterioration. Budget allocation is required.
Traffic Barrier Design Check (Compliance Action) Non-compliant barrier on 31 structures	M. L	*BMS Priority Code 5: Barrier Design – Bridge Assets (31)* Action – Council engaged Pitt and Sherry to provide a risk rating on 46 bridges identified by BMS in 2013 in accordance with AS 5100. 11 of the highest risk structures where then upgraded with a further 8 being transferred to the State as part of the 2015 road swap. The remaining low risk structures are being monitored with upgrades occurring when structures are renewed.

[1] Council has participated in a Statewide project associated with the introduction of NHVR. This has resulted in acceptance of a lower Live Load Factor (down from 2 to 1.5) when assessing the ability of structures to carry OSOM, HML and SPV vehicles. This has allowed greater access for heavy vehicles. As part of the risk management strategy allowing this reduction AS 5100 requires regular monitoring of structures for signs of distress. We need to capture this to ensure at least yearly formal inspections are budgeted for.

5.5 Maintenance plan

Planned maintenance is identified and managed through the BMS. BMS activities include inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

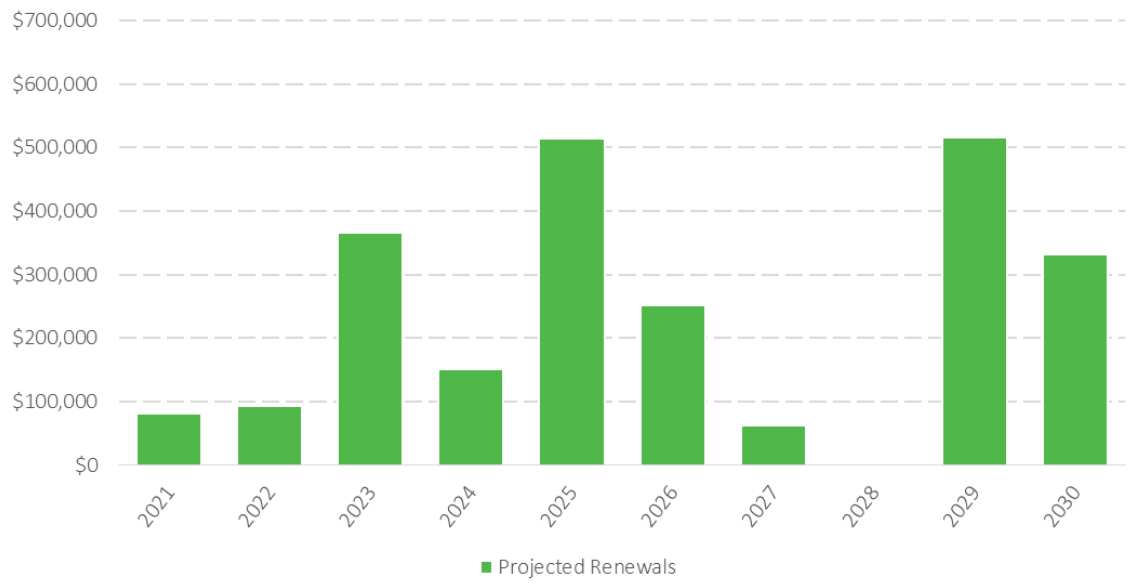
Cyclic maintenance is undertaken on a regular cycle including repainting bridge rails, remedial approach works, clearing debris and replacing signage.

Reactive maintenance is carried out as a result of defects logged through periodic condition monitoring, Customer Service Requests received and as a result of traffic incidents, vandalism and localised flood damage.

5.6 Renewal/Replacement Plan

Projected future renewal expenditures are forecast to increase over time as the asset stock ages. The costs are summarised in Figure 2. The projected capital renewal program is shown in Appendix A.

Figure 2 | Projected Capital Renewal Expenditure



5.7 New Bridge Assets

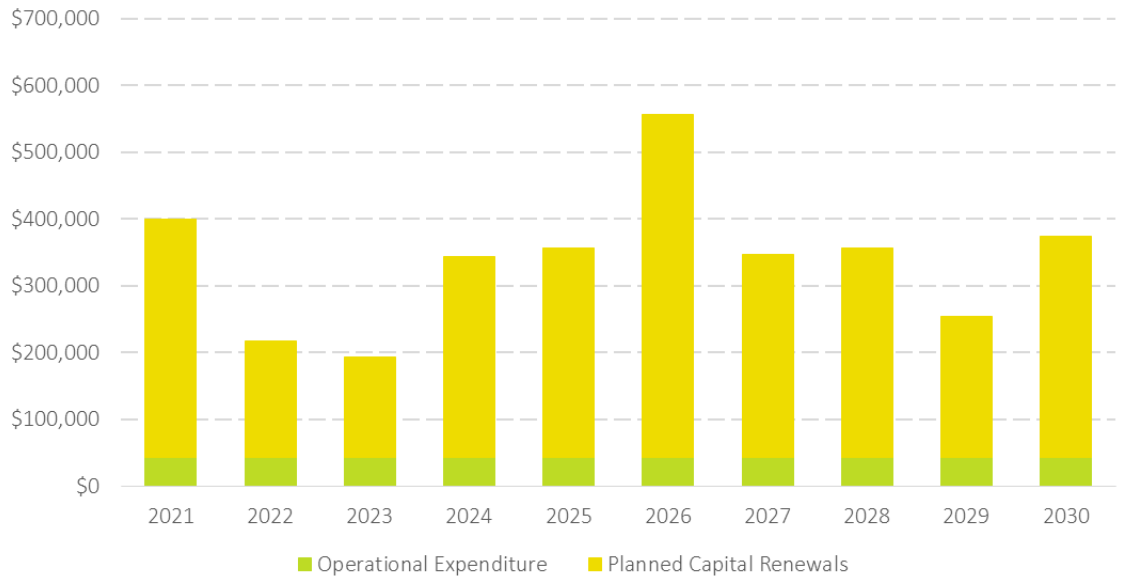
New bridge assets may be identified from various sources such as councillor or community requests, or proposals identified by strategic plans. Proposals for new bridge assets would be assessed against Council's policy for investment in new and improved assets.

6. FINANCIAL SUMMARY

6.1 Financial Statements and Projections

The financial projections are shown in Figure 3 for planned operating and capital expenditure.

Figure 3 | Planned Operating and Capital Expenditure



6.2 Sustainability of service delivery

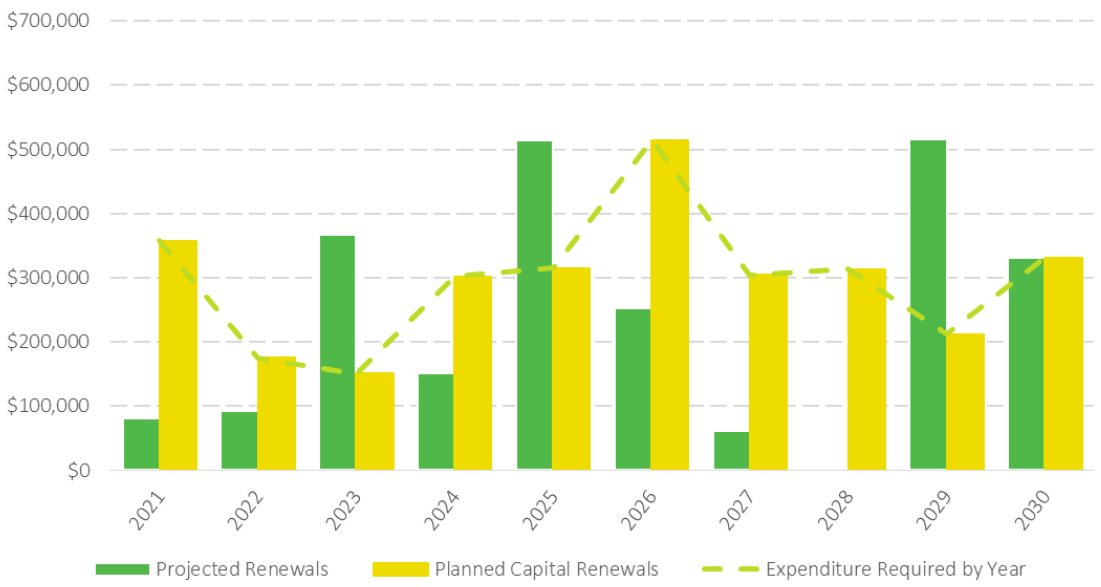
There are two key indicators for financial sustainability are long term life cycle costs and costs over the long term financial planning period.

Life cycle costs are the average costs that are required to sustain the service levels over the average asset life and include maintenance and depreciation. The annual average life cycle cost for the services covered in this asset management plan is $473,000.

Life cycle costs can be compared to life cycle expenditure to give an indicator of sustainability in service provision. Life cycle expenditure includes maintenance plus capital renewal expenditure. Life cycle expenditure will vary depending on the timing of asset renewals. The average annual planned life cycle expenditure covered in this asset management plan is $353,000.

Figure 3 shows the projected asset renewals in the 10 year planning period from the asset register. The projected asset renewals are compared to planned renewal expenditure in the capital works program as shown in Figure 4.

Figure 4 | Projected and Planned Renewals and Current Renewal Expenditure



The annual and cumulative funding gap between projected and planned renewals is shown in Appendix B. Projected renewals refers to the schedule of renewals as provided to Council (by the consultant – AusSpan) as part of the revaluation process. Council then reviews this schedule and may make adjustments to the renewal schedule for various reasons (e.g. community and road user needs, timing of expenditure etc.). When adjustments are made to the schedule of projected renewals this then becomes the planned renewals.

Council has indicated the general intent of replacing bridge assets according to the planned renewal schedule. As a result, the current model returns a positive funding gap due to one of the bridges being renewed ahead of its projected renewal cycle because of recently discovering advanced deterioration in the timber beams. Council will continue to review the need and rationale to provide bridge assets as assets fall due for renewal, based on community and commercial access needs.

Council's long term financial plan covers a 10 year planning period. The total maintenance and capital renewal expenditure required over the 10 years is $3.4 million with an average annual expenditure of $353,000.

6.3 Funding Strategy

Projected expenditure identified in Section 6.1 is to be funded from capital grants, where possible, and then Council's operating and capital budgets. The funding strategy is detailed in the Council's long term financial plan with the intent of maintaining the current level of bridge compliance and hence the current levels of service. This will be measured by comparing average asset condition after each annual bridge audit / inspection.

7. ASSET MANAGEMENT PRACTICES

7.1 Asset Management Systems

Bridge asset data is maintained by AusSpan in a formalized BMS. The system holds information for identified assets in relation to date constructed/acquired, category of asset, location, inspection details, valuation, condition and attribute and financial data.

Council maintains the AM Asset Management Module. The responsibility of the AM system is primarily that of Corporate Services with other Council departments responsible for collation and validations of relevant data and information and includes the upkeep of the existing and new/acquired assets.

8. PLAN IMPROVEMENT AND MONITORING

8.1 Improvement Plan

The asset management improvement plan generated from this asset management plan is shown below:

Task No	Task	Responsibility	Resources Required	Timeline
1.	Maintain Civica Authority Asset Management Module	Accountant / Director Corporate Services	Budget & Asset Management Committee	**Ongoing**
2.	Address known Performance Deficiencies – Refer Section 5.2	Director Infrastructure	Budget & Asset Management Committee	June 2022

8.2 Monitoring and Review Procedures

This asset management plan will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process. One of the outcomes from the recent revaluations, is a process & procedural document to assist in future revaluations to ensure the process is completed efficiently and with minimal errors.

The Plan has a life of 4 years.

APPENDICES

Appendix A Planned 10 year Capital Renewal Works Program

Appendix B Projected and Planned Renewals and Expenditure Gap

Appendix A | Planned 10 year Capital Renewal Works Program

Bridge Capital Expenditure Schedule 2020 - 2030					
Replacement Year	Bridge No	River Name	Structure Type	Road Name	Actual Replacement Cost $
2021[2]	1502	Main Ck	Super-structure	Banks Rd	82,104
	1502	Main Ck	Sub-structure	Banks Rd	121,968
	1600	Little Forester Rv	Super-structure	Nook Rd	89,568
	1600	Little Forester Rv	Sub-structure	Nook Rd	63,504
Total 2021					**357,144**
2022	1515	Ringarooma Rv	Super-structure	Maurice Rd	80,736
	1515	Ringarooma Rv	Sub-structure	Maurice Rd	94,248
Total 2022					**174,984**
2023	1617	Brid Rv	Super-structure	Duncraggen Rd	92,274
	1617	Brid Rv	Sub-structure	Duncraggen Rd	57,960
Total 2023					**150,234**
2024	1514	Carries Brook	Super-structure	Coffeys Rd	77,750
	1572	Frenchs Ck	Sub-structure	Haas Rd	52,164
	1572	Frenchs Ck	Super-structure	Haas Rd	73,676
	1583	Great Forester Rv	Super-structure	Bonds Rd	98,338
Total 2024					**301,928**
2025	1556	New Rv	Sub-structure	New Rv Rd	85,239
	1556	New Rv	Super-structure	New Rv Rd	77,781
	1569	Great Forester Rv	Super-structure	Jensens Rd	151,519
Total 2025					**314,539**
2026	1507	Wyniford Rv	Sub-structure	Garibaldi Rd	189,000
	1507	Wyniford Rv	Super-structure	Garibaldi Rd	142,438
	1594	Little Forester Rv	Sub-structure	Greeta Rd	92,153
	1594	Little Forester Rv	Super-structure	Greeta Rd	90,936
Total 2026					**514,528**
2027	1589	Brid Rv	Sub-structure	Sledge Track	162,068
	1589	Brid Rv	Super-structure	Sledge Track	142,485
Total 2027					**304,552**
2028	1528	Boobyalla Rv	Super-structure	Banca Rd	91,745
	1541	Maurice Rv	Super-structure	West Maurice Rd	88,635
	1554	Hurst Ck	Super-structure	Boddingtons Rd	61,578
	1570	Tuckers Ck	Super-structure	Burrows Rd	71,375
Total 2028					**313,333**
2029	1542	Maurice Rv	Super-structure	Barnetts Farm Rd	107,482
	1588	Little Brid Rv	Super-structure	Dafts Rd	52,217
	1620	Hogarth Rvlt	Super-structure	Cuckoo Rd	51,782
Total 2029					**211,480**
2030	1512	Carries Brook	Super-structure	Barnetts Rd	77,626
	1582	Great Forester Rv	Sub-structure	South Springfield Rd	77,616
	1585	Brid Rv	Sub-structure	Unwins Rd	51,030
	1586	Brid Rv	Sub-structure	Unwins Rd	51,030
	1607	Denison Rv	Sub-structure	Ferny Hill Rd	73,899
Total 2030					**331,201**

[2] Above actual replacement cost amount does not include non-bridge work such as rails, road works and bypasses that may be included in the estimated renewal expenditure for certain capital budget projects.

Appendix B | Planned Renewals and Expenditure Gap

Year	Projected Renewals	Planned Renewals	Renewal Expenditure Gap	Cumulative Gap
2021	80,736	357,144	276,408	276,408
2022	92,274	174,984	82,710	359,118
2023	366,610	150,234	(216,376)	142,742
2024	151,519	301,928	150,409	293,151
2025	514,528	314,539	(199,988)	93,163
2026	251,755	514,528	262,773	355,936
2027	61,578	304,552	242,974	598,910
2028	-	313,333	313,333	912,242
2029	516,032	211,480	(304,552)	607,690
2030	331,201	331,201	-	607,690