Byron Shire Council

Transport Asset Management Plan

May 2018

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Asset Management Definitions

Maintenance is work performed on an asset that just keeps it in a useable condition, for example:

- filling potholes,
- replacing guideposts,
- repairing broken stormwater pipes,
- grading a gravel road

Capital Renewal is work performed on an asset to bring it back to a good or fair condition. It can include repairing an existing asset (like for like). Examples include:

- resealing a sealed road,
- reconstructing a portion of road segment
- putting new gravel on a gravel road

Capital New is work performed to create a new asset or additional work performed on an existing asset to provide more than what is currently there, for example:

- building a new roundabout or a new road from developer contributions;
- constructing stormwater pipes where there currently aren't any;

In relation to roads:

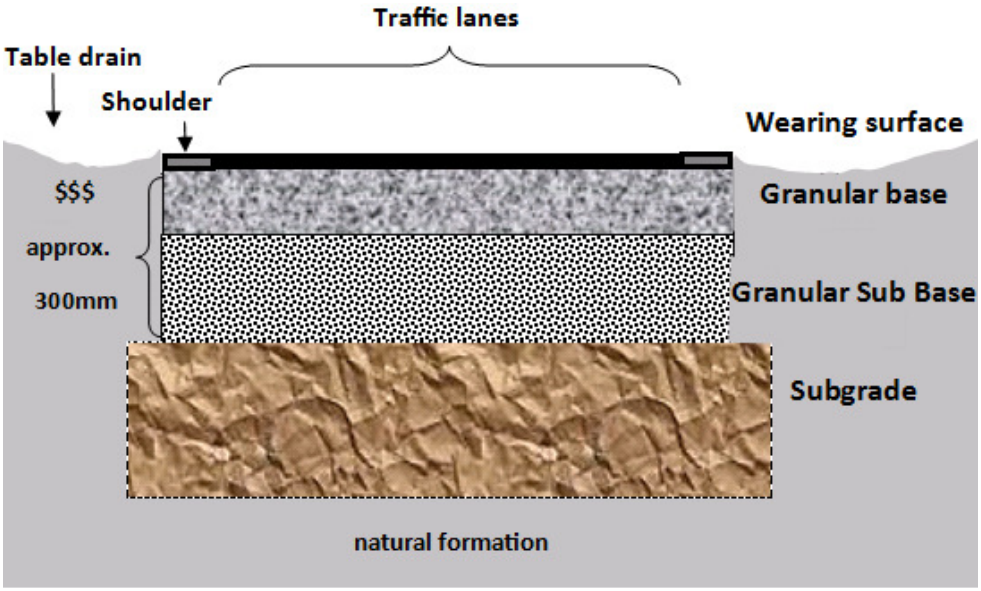
- **Resealing** is placing a new layer of bitumen or asphalt concrete over the existing pavement. The purpose of a reseal is to seal the base and sub-base to extend the life of the road.

  Resealing also involves new line marking, if required, and often guide post replacement, shoulder/side drain works or vegetation management.

- **Re-constructing** is tearing up the existing pavement, base course and often also the sub-base and replacing with new material (see diagram below).

  It also involves the reconstruction of shoulders and often side drains, or where there is kerb and gutter. It often involves vegetation management and working around or with other utility services in the road reserve, for example telecommunications, electricity, water or sewer services.

The typical cross section of a road and the names of the different components are:



1. Executive Summary

Byron Shire Council's (BSC) Transport assets enable the community to access and enjoy a range of services and facilities that Byron has to offer. It has an asset replacement value of **$364 million for road** and **$64.3 million for stormwater**, as at 30 June 17. The efficient management of these road and stormwater assets is vital to provide safe, reliable and efficient services.

Transport Assets do not include trains, bus or taxi services which are beyond council's responsibility. This Transport Asset Management Plan (TAMP) includes the following:

- Sealed Roads 508km
- Unsealed roads 96km
- Bridges 33 and Footbridges 12
- Rural Causeways 88 and Major culverts 90
- Footpaths/shared paths 89km
- Roundabouts / islands 727 and street signs
- Kerb and gutter 257km
- Road barriers 31 km
- Bus Shelters 40
- Retaining Walls 75
- Car Parks 24 off road

Key messages

- Asset Management needs to balance Levels of Service and whole of life costs.
- The challenge for council is to invest in capital renewal of existing infrastructure before building capital new assets which increase the assets portfolio and increase costs.
- The current long term financial expenditure on maintenance and capital renewal is insufficient to 'maintain' Transport assets.
- The current spend on road reseals and reconstructions fluctuate from year to year and can be affected by maintenance overruns (caused by competing maintenance and capital projects).
- Roads and stormwater have big financial challenges with a current Capital Renewal and Maintenance gap of $14.3M.
- Road 'Bring to Satisfactory'(Fair condition) backlog is $24M. Sealed roads have 41% in poor condition.
- Byron leads asset management with the latest technology and innovation.
- Asset management systems are well established and integrated.
- Byron Shire's assets have longer useful lives than industry average which requires more maintenance.
- There is insufficient maintenance for urban and rural drainage. The challenge is the competing pothole maintenance budget of $1.3M.
- To "maintain" the overall sealed road network condition, the average capital renewal needs to increase to 10.4M by 2018.
- The reseals target is 39km per year averaging at $ 3.8million.
- The reconstruction target is 6km per year averaging at $7.5M.
- Five Poor condition bridges will be replaced with steel Australian Defence Force bridges for $7.5M in early 2019.
- New and upgrade work is mostly funded through the Section 94 Plan.
- Asset Sustainability and Renewal Ratios appear to be improving as we have increased spending in order to make up the backlog of previously underfunded assets.
- Information provided in this TAMP on numbers of assets or dollar amounts are figures as at 30 June 2017 and they will change over time.

Failure to adequately plan for the replacement of these existing assets and the development of new assets will result in assets not meeting the needs of the community now, and into the future. Councils **'Bring to Satisfactory Standard'** (BTS) backlog (capital renewal) for Road and stormwater is **$35 million** out of a total of $38 million for all infrastructure (Special Schedule 7, 30 June 2017, Appendix A). To address this significant BTS backlog it will take consistent capital renewal effort over the next 20 years.

In the financial year of 2016/17 Council spent **$4.1 million** on maintenance and **$13.1 million** on capital expenditure for road and stormwater assets (including new assets – refer to Section 12). Based on the Assetic Predictor© modelling for roads (sealed and unsealed), footpaths and bridges current spending with the 7.5% rate increase will see the Transport assets overall condition deteriorate. Capital renewal for sealed roads needs to grow to $10.4 million in 10 years to maintain the overall condition of the road network. This work is for replacement of existing assets only and does not account for new assets such as roundabouts and new footpaths.

The current long term financial expenditure on maintenance and capital renewal is insufficient to 'maintain' existing Transport assets.

After Level 2 structural inspections of causeways and major culverts council has identified 7 urgent ($2.2million) and 16 high priority ($5.5million) poor condition rural drainage assets. The 7 urgent assets are either load limited and/or have temporary steel plates and require full replacement. If the 16 high priority rural drainage assets are not addressed in the very near future, load limits will be implemented. Renewal of these 23 rural drainage assets totalling $7.7 million is currently unfunded (Figure 1 Transport Assets Financial Gaps).

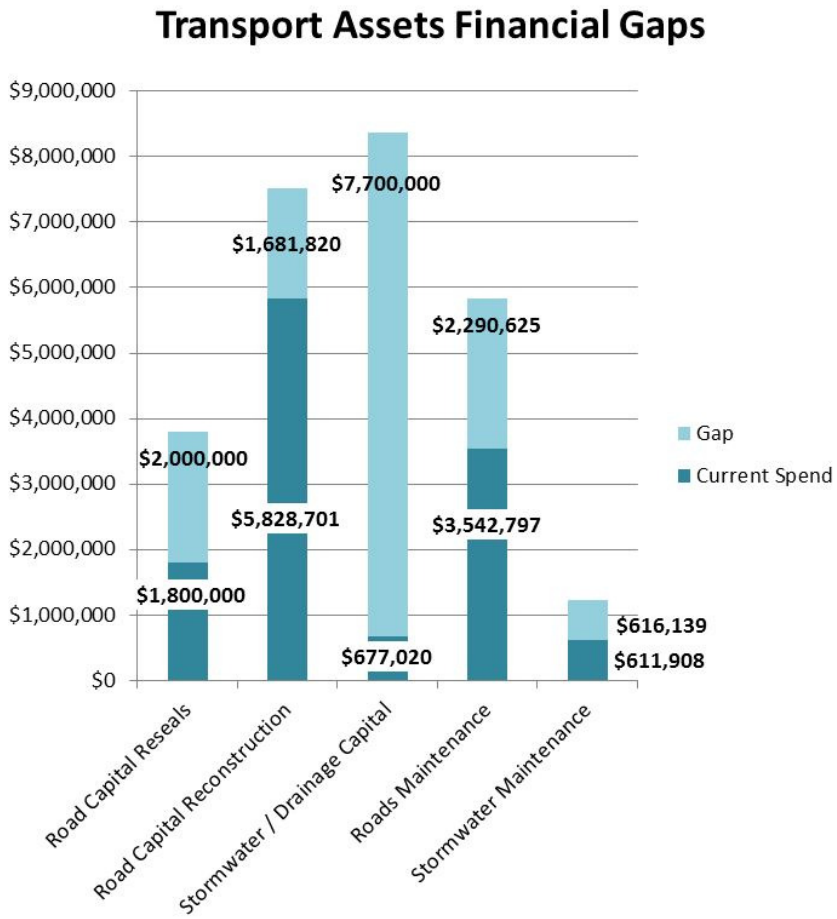


Figure 1 Transport Assets Financial Gaps

The challenge for council is to invest in capital renewal of existing infrastructure before building capital new assets that increase the asset portfolio and increase costs.

Council's Long Term Financial Plan (E2017/96003) as adopted by Council in 2017, includes estimated expenditure of $61.65 million on the renewal of the road asset portfolio over the next 10 years as summarised below. The works program and predicted renewal requirements are detailed in Section 12.

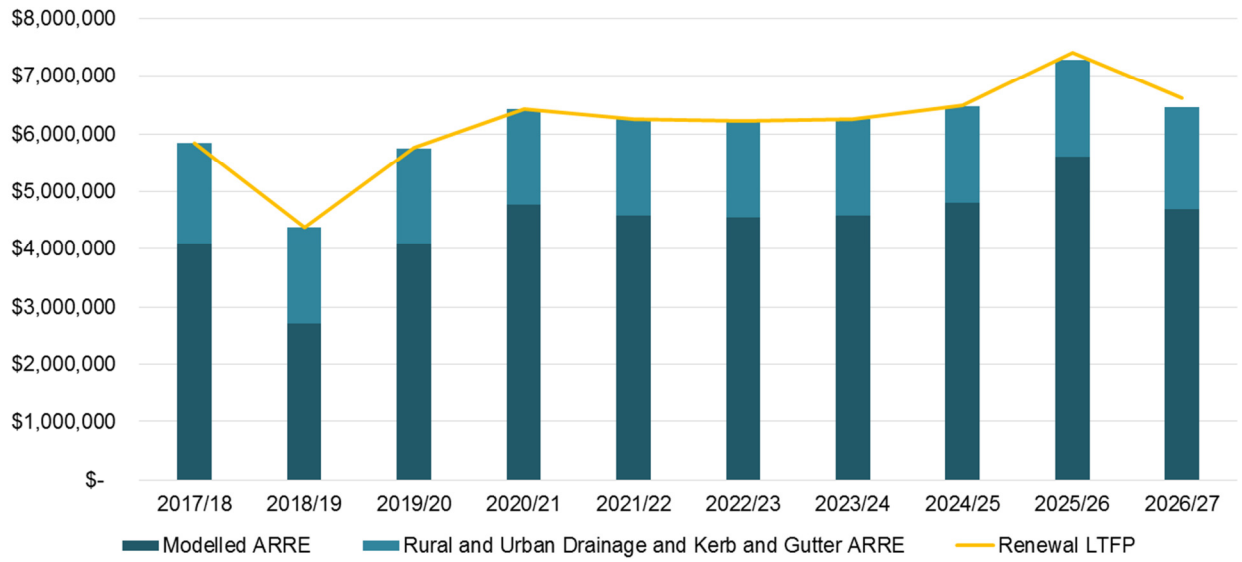


Figure 2 Transport Long Term Financial Plan and Annual Required Renewal

This Transport Asset Management Plan demonstrates how Council will endeavour to achieve its strategic asset management outcomes by applying strategic asset management planning with the available funding. The key elements of infrastructure asset management are:

- Taking a life cycle approach
- Developing cost-effective management strategies for the long term
- Providing a defined level of service and monitoring performance
- Understanding and meeting the demands of growth through demand management and infrastructure investment
- Managing risks associated with asset failures
- Sustainable use of physical resources
- Continuous improvement in asset management practices.

A detailed improvement plan generated during the creation of this Asset Management Plan for those activities and processes that need to be monitored, developed and fine-tuned over time is shown in Section 13. Some of the priority actions include:

- Council endorsement of this Plan,
- Developing unit rates to calculate required maintenance for all asset sub-types e.g. guardrails, guideposts etc.,
- Formalising the new, renewal and disposal policies,
- Testing current levels of service to determine if they're achievable,
- Establishing and documenting a Maintenance Plan and
- Updating, revising and expanding asset sub-types (e.g. causeways and culverts) in prediction modelling.

The key areas of this Transport Asset Management Plan are the Levels of Service, the Life Cycle Management, Financial Summary and Improvement Plan.

It should be noted that this Asset Management Plan is not a stand-alone document and is closely related to Council's Strategic Asset Management Plan and other significant Council documents. Council will measure the effectiveness and application of the asset management plan through:

- Stakeholder consultation
- Regular condition and maintenance inspections
- Continued use of Assetic Predictor© to predict renewal requirements
- Continuous review and improvement to asset management practices
- Key Performance Indicators (KPI) monitoring and recording of customer levels of service

As a result of Council restructuring, an asset team was formed in 2015. This now consists of 4 full time staff dedicated to strategically managing assets. This has provided the opportunity to increase capacity and scale to improve asset management systems and technologies which ultimately will translate into improved operational delivery over the next 10 to 20 years.

Fixing our roads will take committed effort for the next 20 years and this Transport Asset Management Plan is council's way to set goals to achieve this.

2. Purpose

What is Asset Management?

Asset management is the planning, acquisition, operation, maintenance, renewal and disposal of assets. In simplest terms, asset management is about the way in which assets are looked after, both on a day-to-day basis (i.e. maintenance and operations) and in the medium to long-term (i.e. capital renewal and forward planning). Asset management ensures that council's assets are capable of providing services, of an agreed quality, in a sustainable manner, for present and future communities.

This asset management plan is prepared to meet legislative and organisational requirements for sustainable service delivery and long term financial planning and reporting.

Objective of Asset Management

The objective of asset management is to maximise asset service delivery potential and manage related risks and costs over an asset's entire life. Asset management is about intervening at strategic points in an asset's life cycle, optimising the performance of the asset and minimising the cost to maintain it. It requires a proactive approach to asset maintenance and planning to identify works prior to costly and potentially dangerous asset failure occurring.

The goal set out by this asset management plan is to meet the required levels of service in the most cost-effective way for present and future communities (Figure 3).

Asset Management needs to balance Levels of Service
and
whole of life cycle costs.

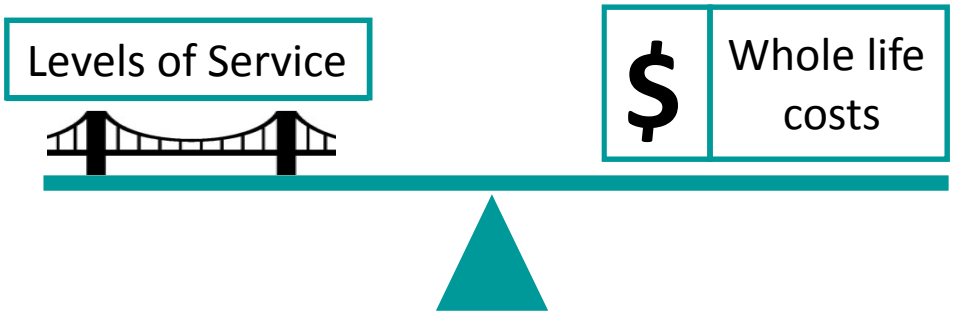


Figure 3 Asset Management simplified

Benefit of Asset Management

Asset management delivers better assets over the long term for community and benefits are also realised in the areas of improved accountability, sustainable service deliver, risk reduction and financial management and forecasting. Improving council's asset management practices will enable optimised spending by doing more with less through knowing what assets we own, what condition they're in and by monitoring the effect of our actions.

Doing more with less.

Related Council Documents

This Transport Asset Management Plan sets out the implementation of Council's Asset Management Strategy for the long-term management of its Transport assets in a financially responsible manner. It determines recommended service levels, inspection regimes and proactive maintenance routines to keep the Transport assets in safe and serviceable conditions. In order to do this effectively, other Council policies, strategies and plans must be considered to determine how they interact with this asset management plan.

Table 1 Related Council Documents

Key Council Documents	Relationship
Strategic Asset Management Plan (SAMP) - E2016/100839	Outlines the framework for the management of Byron Shire's General Fund Infrastructure assets to deliver Council's Vision.
Byron Shire Bike Strategy and Action Plan (Bike Plan) – DM790722	Links to Future Demand, Section 6.
Byron Shire Developer Contribution Plan 2012 (Section 94) - E2015/540	Links to Future Demand, Section 6.
Draft Infrastructure Service Risk Management Procedure (ISRMP) - E2015/23531	Links to the Levels of Service, Section 5
IPART Determination of Council's Application for Special Variation for 2017-18 – E2017/54521	Links to the Financial Projections and Funding Strategy, Section 13.
IPART Approval of the Special Variation for 2017-18 –E2017/15274	Links to the Customer Levels of Service tables, Section 5.
MR545 Strategic Study – DM844180	Links to Future Demand, Section 6.
Workforce Plan 2017-2021 – E2017/19709	Links to Renewal, New and Upgrade Plan, Section 10 and 11.
Long Term Financial Plan 2016-2026 – E2017/8695	Links to the Financial Statement Projections and Funding Strategy, Section 13.
Community Infrastructure Advisory Committee Level of Service – Sealed Road Network - I2016/108	Defines the adopted sealed roads levels of service
Community Consultation and Engagement Report – Funding our Future - E2017/80803	Document that relays the key findings of the communities' expectations of council, it was created for the community engagement and awareness strategy for the Special Rate Variation.
Community Infrastructure Asset Assessment Manual Condition, Functionality and Capacity – DM1101346	Document that guidelines how each asset class is to be assessed for Condition, Functionality and Capacity
Community Solutions Panel Final Report – E2018/33402	Recommendations from community including about levels of service and approaches to prioritisation funding for infrastructure. Links to Customer Levels of Service tables, Section 5.

3. Current Position

Transport Asset Stock

Byron Council manages the community's Transport assets in integrated service areas that interact to make Byron a great place to work, visit, live and invest.

This Asset Management Plan is designed to take into consideration all Council Transport Assets as follows:

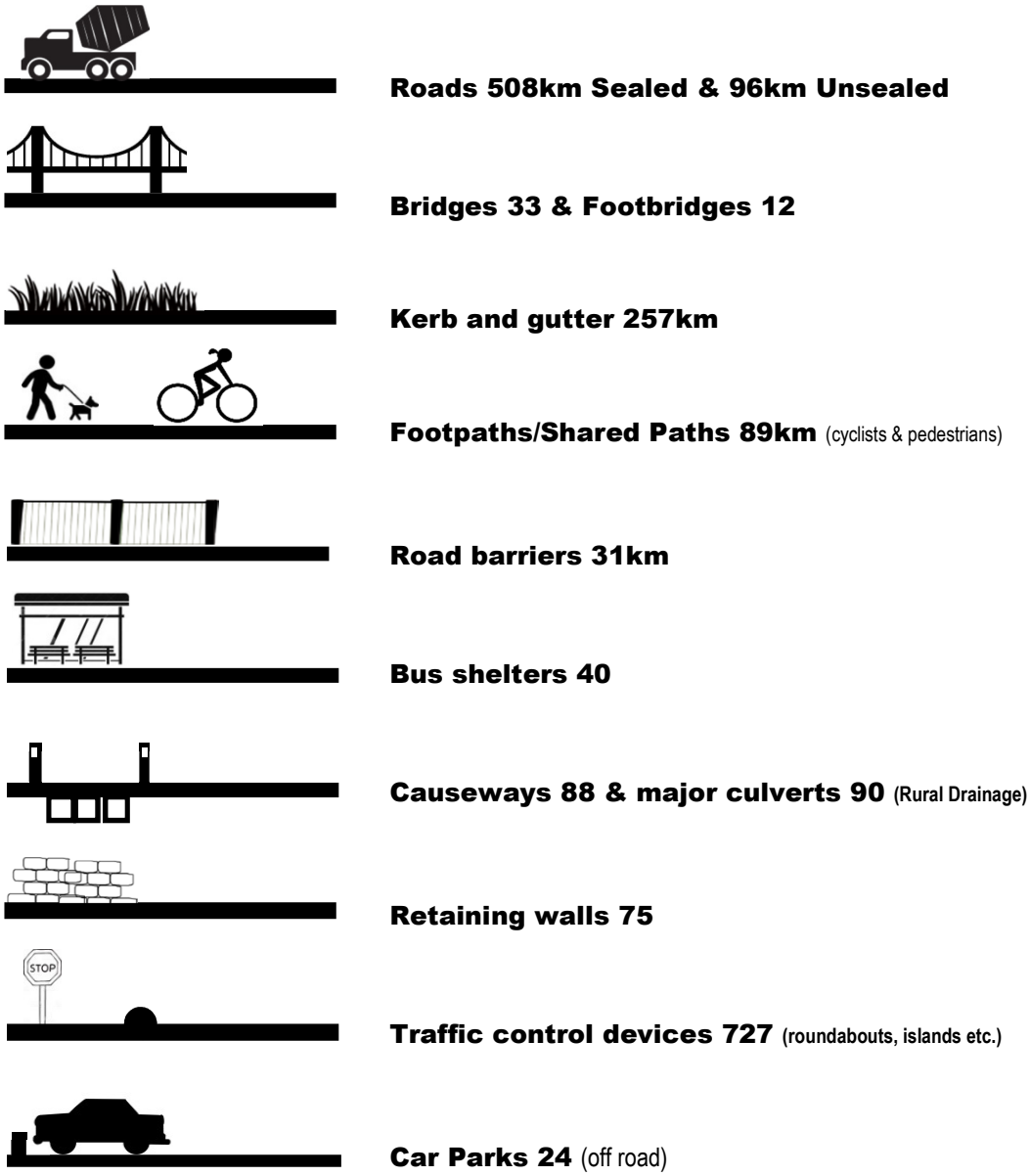


Figure 4 Transport Asset Stock

Note: Major culverts are defined as barrel(s) entry area >1.767m2. Shared paths include cyclists and pedestrians.

Replacement Cost of Council's Transport assets

The replacement value of Transport asset portfolio is **$428.4 million** with a written down cost of $258.8 million. The annual depreciation is $6.2 million as at 30 June 2017. The break-up of Transport asset portfolio by replacement value is illustrated in the following diagram. This does not include four new bridges and footbridges on Brunswick Valley Way handed to council in Sep 2017.

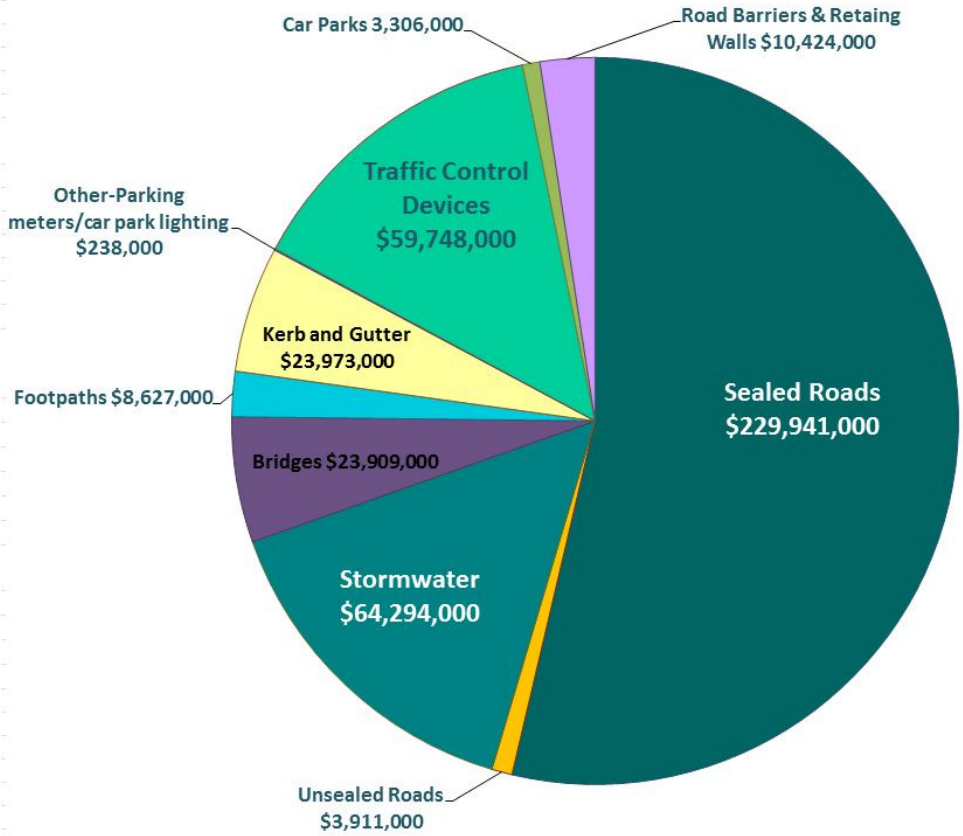


Figure 5 Overall breakdown of replacement cost for Transport assets

Present Condition of Transport assets

By understanding the condition of Transport assets and the various types of distresses that affect them, Council can utilise this data to endeavour to maintain the level of service the community desires. In the context of affordability, Council can provide intergenerational benefits and also minimise the risk of asset failure. The consequences of asset failures may lead to legal liability if Council is found to have acted unreasonably in the management of its assets.

There are many reasons why assets fail/deteriorate and therefore do not meet current performance standards and community expectations. Among the most common reasons for failures/deterioration in the Shire are the following:

- Lack of timely road and stormwater maintenance
- Delay of timely capital renewals
- Damage by service authorities when installing / constructing their infrastructure within Council's road reserves
- Movement of the underlying soils
- Cessation of pesticides has resulted in undesirable and unacceptable roadside conditions, which needs to be addressed with short and long term actions while also meeting our statutory obligations.
- Increases in vehicle heavy loads on Council's roads beyond what the road structure can cater
- Severe weather events and or natural disasters

Sealed roads are the largest part of the road network replacement cost at $230 million (Figure 5 Table 2). It has 41 % (208km) in poor to very poor condition (Figure 6). This presents as a 'Bring to Satisfactory' backlog of **$24 million** (Special Schedule 7). This is Council's greatest concern with the condition of sealed roads reaching the end of useful life and providing poor level of service.

Table 2 Condition Grading Model

Condition Grading	Description of Condition
1	**Excellent**: Asset in excellent condition. No maintenance required.
2	**Good**: Asset is in good condition with limited signs of wear. Only requires cyclic maintenance and is not requiring special attention.
3	**Fair**: Asset is in useable condition with extensive signs of wear. Asset requires some attention to prevent further deterioration and to return it to a condition so that it requires only cyclic maintenance.
4	**Poor**: Asset is in poor condition or is faulty. It needs urgent attention to return it to a useable condition and or significant renewal/rehabilitation is required to reduce risk.
5	**Very Poor**: Asset has failed or is at the end of its life or is physically unsound or poses significant risk. It requires replacement and is beyond rehabilitation.

Road 'Bring to Satisfactory' backlog is $24M.
Sealed roads have 41% in poor condition.

The condition of the footpath network has 28.6% in a fair condition which is likely to move into a poor condition if the future maintenance and renewal budgets are not increased.

The unsealed roads have 31% in poor condition and 33% in fair. Council's unsealed roads do not receive the required re-sheeting maintenance; as such they are affected greatly by wet weather events. When segments reach a poor condition they are possibly graded pending available budgets. As such council has utilised natural disaster funding for unsealed roads.

The following, Figure 6 and subsequent pages depict the overall condition for each asset sub group. To simplify the condition from the Figure 6 above, Excellent (1) and Good (2) have been combined into GOOD, and Poor (4) and Very Poor (5) into POOR.

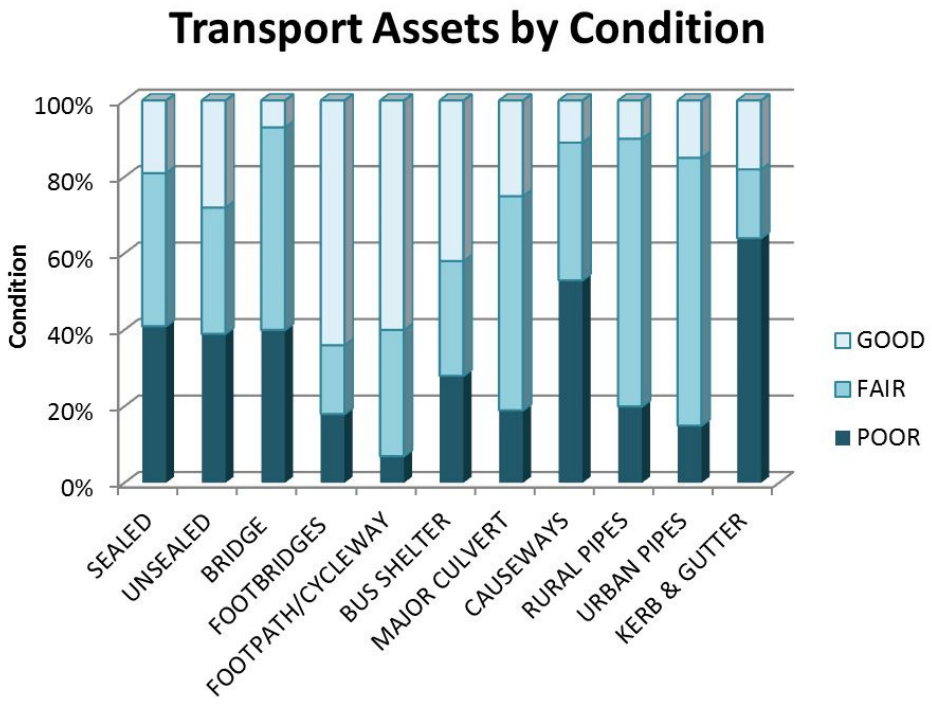
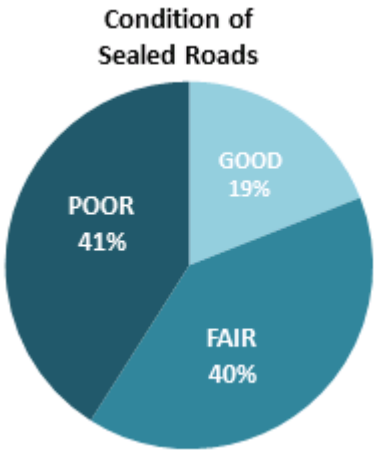


Figure 6 Transport assets by condition

Sealed Roads

Council is responsible for **508km** of sealed roads which we are currently spending $5.1 million per year to maintain and renew the sealed road pavement. Generally, our roads are in fair to poor condition which manifest as a high level of potholes and other surface defects. To address this, additional and significant long-term capital work such as resealing and reconstruction is required to improve the overall network.



GOOD CONDITION

- ✓ Minimal Cracking
- ✓ Minimal surface defects
- ✓ Smooth travel experience
- ✓ Good drainage

FAIR CONDITION

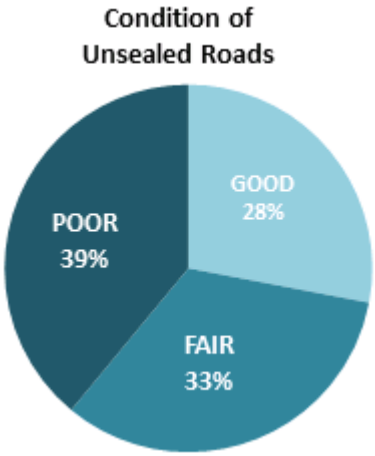
- ○ Moderate Cracking
- ○ Moderate surface defects
- ○ Moderate roughness
- ○ Fair drainage
- ○ Can be resealed

POOR CONDITION

- × Heavy cracking
- × Severe surface defects like large potholes and patching
- × Rough travel experience
- × Poor drainage e.g. table drains
- × Failed and beyond resealing

Unsealed Roads

Council currently spends $390,000 each year to maintain 96km of unsealed roads in the Shire. A large proportion of unsealed roads are in fair condition overall with only 28% to be considered in a good condition. Many unsealed roads have little gravel coverage and are affected by poor weather conditions. Additional maintenance and gravel replenishment to this network is required to keep these roads trafficable.



GOOD CONDITION

- ✓ Good pavement depth
- ✓ Good gravel coverage
- ✓ Even surface e.g. few potholes or corrugations
- ✓ Good camber for drainage

FAIR CONDITION

- ○ Moderately uneven e.g. frequent potholes and or corrugations
- ○ Minimum gravel coverage
- ○ Fair camber and drainage

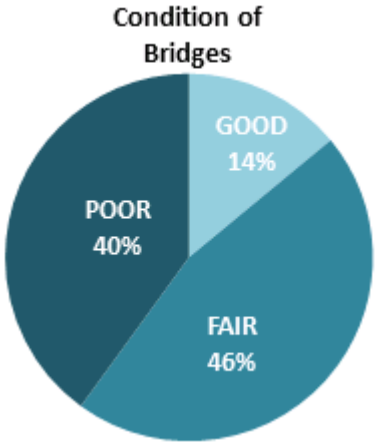
POOR CONDITION

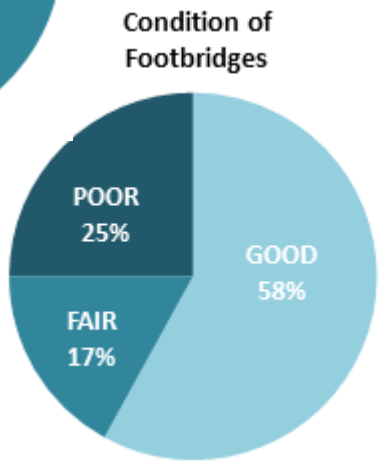
- × Severe surface defects e.g. large potholes and or corrugations
- × No gravel coverage or guideposts
- × No camber

Bridges

Council owns and maintains 33 bridges and 12 footbridges. The majority of the road bridges are rated as being in a good to fair condition; however, 40% are rated as poor and load limited. Council spent $74,000 for maintenance and $933,000 capital renewal in 2016/17 on bridges and footbridges.

Council was gifted 3 bridges and 1 footbridge on Brunswick Valley Way in 2017 from the Roads and Maritime Services (State Government) as a part of the highway bypass coming off a 10 year maintenance period. Council's maintenance and capital budgets have not increased accordingly to manage these assets.





GOOD CONDITION

- ✓ Little cracking or wear
- ✓ Screws and joins tight
- ✓ Signage in place
- ✓ No abutment settlement
- ✓ Vegetation cleared


Photo 6: View looking D/S

FAIR CONDITION

- ○ Cracks appearing
- ○ Moderate deterioration of concrete or timber
- ○ Spalling commencing on pier
- ○ Blocked scuppers
- ○ Flood debris and vegetation growth present

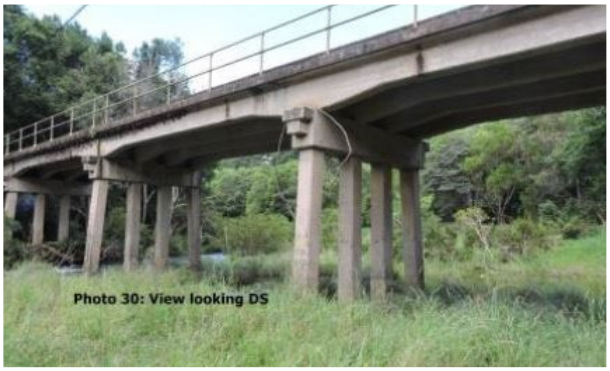


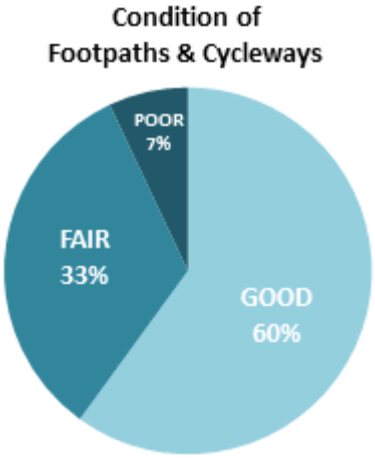
Photo 30: View looking DS

POOR CONDITION

- × Load limited
- × Abutment poor or failed
- × Loose tie downs
- × Significant decking wear
- × Advanced deterioration of timber or concrete

Footpaths and shared paths

Council currently owns and maintains 89km of footpaths and cycleways (shared paths), stairs and kerb ramps across the Shire. We spend approximately $116,000 per year on footpaths and cycleways (maintenance and renewal). The majority of the footpaths are in a fair to good condition with only 7% in poor condition and need complete replacement. A third of the footpaths currently in fair condition need additional replacement in sections to ensure they do not deteriorate into a poor and unsafe condition.



GOOD CONDITION

- ✓ Smooth surface
- ✓ Very few variations in joint heights e.g. trip hazards
- ✓ Little unevenness
- ✓ Not slippery

FAIR CONDITION

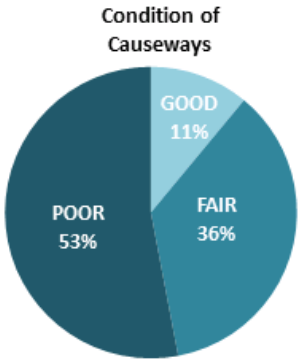
- ○ Minor pavement movement or few trip hazards
- ○ Moderately uneven
- ○ Moderately functioning to suit demands eg wear patterns beside path

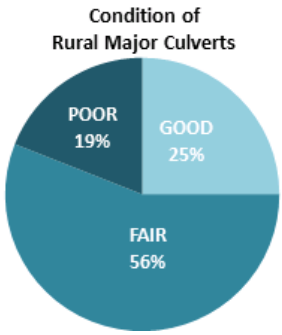
POOR CONDITION

- × Severe surface defects e.g. many trip hazards
- × Significant wearing of surface
- × Very uneven and slippery surface

Rural Drainage – Causeways and Culverts

Council owns 88 causeways and 90 culverts, and 1,311 rural pipes. The majority of the causeways and culverts are in good and fair condition however, 19% of the culverts and 53% of the causeways are in a poor condition. Council currently spent $248,000 on maintaining rural drainage in 2016/17. After Level 2 structural inspections council has identified 7 urgent ($2.2million) and 16 high priority ($5.5million) poor condition rural drainage assets. The 7 urgent asset are either load limited and/or have temporary steel plates and require full replacement. If the 16 high priority assets are not addressed in the very near future load limits will be implemented. The 23 rural drainage assets that require replacement/renewal would cost an estimated of $7.7 million that is currently unfunded.





GOOD CONDITION

- ✓ None to low cracking/spalling
- ✓ Barrel blockage 0-5%
- ✓ Waterway flows through designed openings

FAIR CONDITION

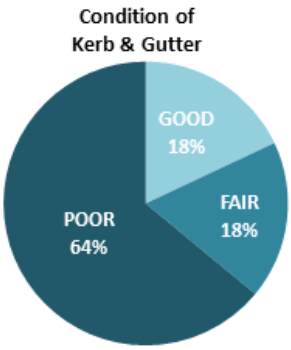
- ○ Low to moderate cracking/spalling
- ○ Barrel blockage 6-10%
- ○ Low to moderate scour holes

POOR CONDITION

- × Extensive cracking/spalling
- × Barrel blockage >40%
- × Pipe partially collapsed
- × Embankment failure and major scour holes

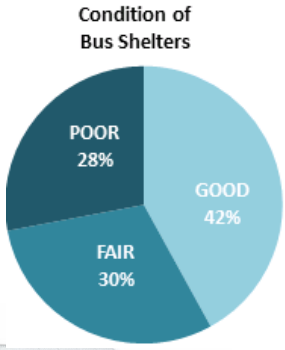
Urban Stormwater

Council currently owns and maintains 257km of kerb and gutter, 139km of pipes and 4920 pits (includes kerb inlet pits, field inlets and headwalls). Council spent $364,000 on urban drainage in 2016/17. Most of our road drainage is rated fair. However, much of the road drainage network in fair condition needs additional maintenance and replacement work undertaken to prevent it from degrading to a poor condition.



Bus Shelters

Council owns 40 bus shelters with 43% good and 30% fair. However, there are 28% in a poor condition that require replacing and bringing up to the disability access standards by 2020. We spend approximately $1,680 per year on maintenance.



GOOD CONDITION

- ✓ Structure in good structural condition
- ✓ Seating has no snag points/hazards
- ✓ Vegetation contained
- ✓ Surface is non slip and flat

FAIR CONDITION

- ○ Low to moderate amounts of corrosion/rot in structure
- ○ Seating has some minor hazards
- ○ Vegetation not contained
- ○ Surface has minor cracking/slip hazards

POOR CONDITION

- × Structure severely corroded/rotten
- × Seating has severe snag points/hazards
- × Overgrown vegetation
- × Surface has trip hazards/low traction

Remaining Life

Based on condition audits and inspections carried out in the years from 2014 to 2017 and 2017 financial asset data, Council's assets are estimated to be in fair condition as shown in Figure 7 in the condition barometer chart. On a network basis, as shown below, on average, assets have consumed 46% of their useful life.

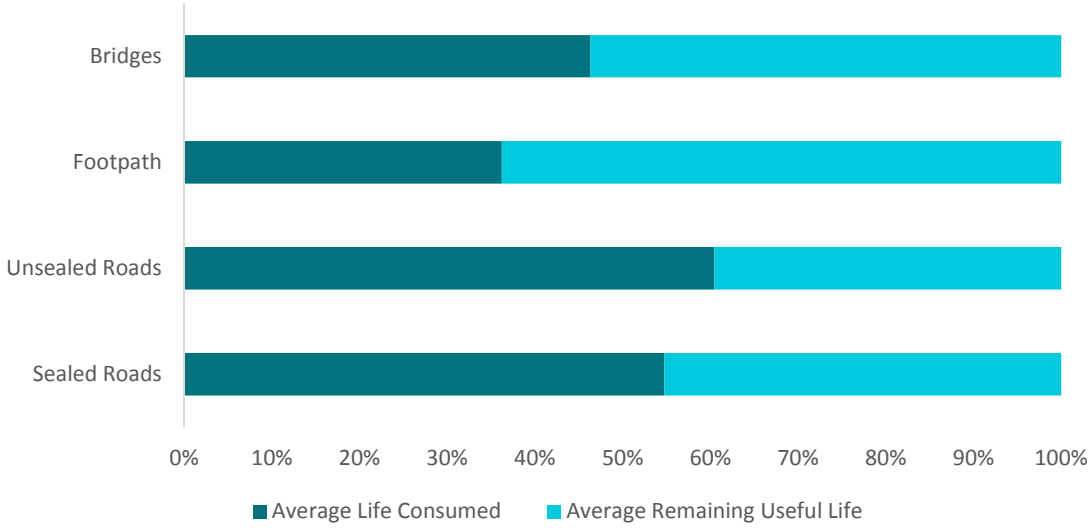


Figure 7 Asset Remaining Life

Road assets have consumed 46% of their useful life compared to industry average.

4. Levels of Service

A key objective of this Asset Management Plan is to identify the current levels of service provided by Transport assets. The levels of service defined in this section will be used to:

- Clarify the level of service that our customers should expect.
- Identify works required to meet these levels of service.
- Identify the costs and benefits of the services offered.
- Enable Council and customers to discuss and assess the suitability, affordability and equality of the existing service level and to determine the impact of increasing or decreasing levels in future.

This section defines the service for Byron Shire's Transport assets. The adopted levels of service for these Transport Assets have been based on legislative requirements, customer research and expectations, and Council's strategic goals. There are two tiers of levels of service; Customer Levels of Service and Technical Levels of Service.

Technical Levels of Service

Technical Levels of Service are long term, tactical tools developed to measure, monitor and manage functions of service over time with regards to quality of assets managed, quantities of assets contributed or constructed, operational and capital expenditure (Table 4).These technical measures relate to the allocation of resources to service activities that the council undertakes to best achieve the desired community outcomes and demonstrate effective council performance. Legislative requirements, infrastructure standards and industry guides combine to strongly influence technical levels of service. For example, the number of crashes per year caused by loose gravel. The following are also defined:

- New Assets, upgraded or reconstructed asset – the design and maintenance standards applicable
- Maintenance – intervention points and responsiveness

Community Levels of Service

Community Levels of Service are a reflection of Technical Levels of Service being delivered to the community. They are derived through community engagement, which gauges the public level of satisfaction with service, their utilisation of a service, and their desired levels of service. They may also be derived from informal community feedback and complaints. For example, potholes on roads repaired within an agreed timeframe.

Community levels of service measures used in asset management planning are:

Quality	How good is the service?
Function	Does it meet users' needs?
Capacity/Utilisation	Is the service usage appropriate to capacity?

During the community engagement and awareness strategy for the 2016 Special Rate Variation. Council used a variety of methods to engage with the community around levels of service. Council consistently provided information about the need for a rate increase and ensured ratepayers were aware of the proposed special rate variation. The Council implemented its community engagement and awareness strategy in four phases:

- Phase 1 - community satisfaction surveys conducted from July to August 2016, to determine levels of community satisfaction with all services and changes from the 2013 survey results.

- Phase 2 – an asset survey conducted from August to September 2016, to determine community attitudes regarding priority assets and levels of investment.
- Phase 3 – the special rate variation awareness campaign Funding our Future conducted from September to November 2016, to determine ratepayers' preferred special rate variation option and community support for a special variation.
- Phase 4 – exhibiting updated Integrated Planning and Reporting documentation, to provide additional special rate variation information to the community and to improve awareness and seek submissions regarding the special rate variation process.

In addition to the surveys and public exhibition of the documents outlined above, community awareness and associated feedback came from a variety of engagement methods, including:

- ✓ advertising and media release,
- ✓ community forums,
- ✓ council kiosks at community events, and
- ✓ social media engagement.

The community has consistently told Council that fixing Byron's roads is a priority. For example, since 2007 Council has regularly undertaken community satisfaction surveys which have consistently demonstrated that Council is not meeting the community's expectation for the condition of assets such as roads. The community views align with Council's Strategic Asset Management Plan with respect to prioritising the fixing of Byron's roads.

The Strategic Asset Management Plan highlights that unless increased and sustained investment occurs, the progressive deterioration and failure of the road network will accelerate.

The most recent Community Survey was conducted in 2016. Significantly, of all the services provided by Council, local roads had the lowest satisfaction score of 1.75, where a score of 1.0 is 'Not at all Satisfied' and a score of 5.0 is 'Very Satisfied'. Local Roads were given the highest importance ranking by the community in both the 2013 and 2016 surveys (Figure 8 Customer Satisfaction Transport Assets Performance Gap). In combination with the lowest satisfaction score, Table 3 shows that the poor condition of roads in Byron Shire has resulted in the largest performance gap score of **2.99** (IPART Application, 2017-18). This information has been utilised when constructing the customer levels of service Table 4 to Table 8 .

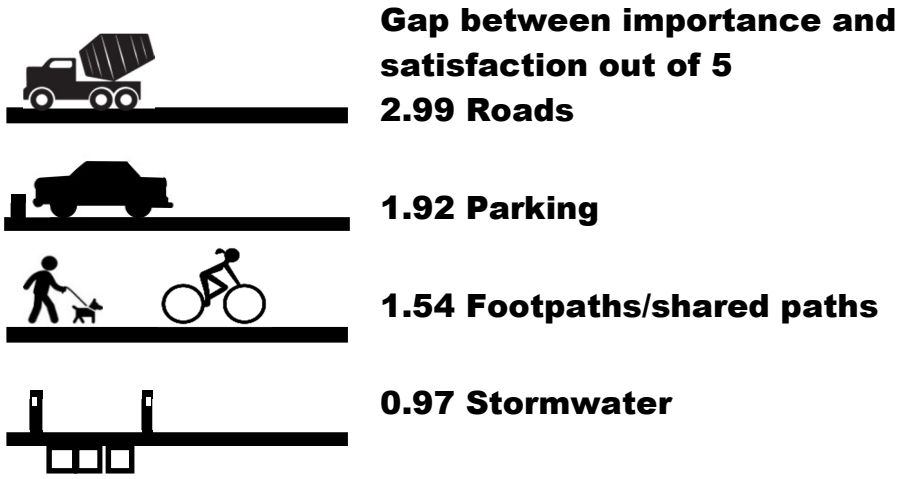


Figure 8 Customer Satisfaction Transport Assets Performance Gap

Table 3 Customer Satisfaction Performance Gap Ranking (Summarised version)

Ranking 2013	Ranking 2016	Service/Facility	Importance Mean	Satisfaction	Performance Gap
1	**1**	**Local Roads overall**	**4.74**	**1.75**	**2.99**
5	2	Affordable Housing	4.20	1.96	2.24
2	3	Public Transport	4.08	1.98	2.10
5	4	Long term planning	4.68	2.68	2.00
7	**5**	**Parking**	**4.42**	**2.5**	**1.92**
3	6	Public toilets	4.29	2.39	1.90
…	…	…	…	…	…
11	**12**	**Bikeways (Shared Paths)**	**3.99**	**2.45**	**1.54**
10	**13**	**Footpaths**	**4.20**	**2.77**	**1.43**
…	…	…	…	…	…
21	**23**	**Stormwater**	**4.05**	**3.08**	**0.97**

Scale: 1 = not at all important/not at all satisfied, 5 = very important/very satisfied
(IPART Application, 2017-18)

In addition to the very high performance gap ranking, when satisfaction is compared with other local government benchmarks, the community were significantly less satisfied with the condition of their roads. None of the 27 comparable measures were rated above the benchmark threshold of 0.15. The Byron satisfaction score for roads was 1.75 and the benchmark variance was -1.05.

The 2016 Community Satisfaction Survey concludes that when satisfaction versus priority and investment across 12 asset classes which were analysed, it was clear that *"residents want to see an increased investment to address the Road Infrastructure backlog"* (IPART Application, 2017-18).

The community have expressed concerns with paid parking. However, the return on this is being partly invested into the to Satisfactory backlog of $31 million for road renewal. This funding strategy was addressed in the 2016 Fit for Future Council Improvement Proposal.

Together the ***community*** and ***technical levels of service*** provide detail on service performance, cost and whether service levels are likely to stay the same, get better or worse. Our current and projected levels of service are documented below. These Key Performance Indicators (KPI's) for levels of service have been developed using the following tools:

- Councils Customer Request Management System
- Surveys – community satisfaction survey
- Focus Groups – Transport and Traffic Advisory Committee
- Facebook feedback
- Reflect™ inspections and defects
- Traffic studies
- Condition assessment e.g. laser Profilometer
- Roads and Maritime Services crash data

Residents want to see an increased investment to address the Road Infrastructure backlog.

Table 4 Sealed Roads Levels of Service

SEALED ROADS - COMMUNITY LEVELS OF SERVICE				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality[1]	Satisfactory and suitable road network	Customer requests for road surface performance	<500 per year for sealed roads potholes/edge break only) Location in travel lane, Road Hierarchy, and size of hole. Hold Pothole repairs to $1.3M and increase Heavy Patching. Previously nil Heavy Patching budgets. Increase pavement renewals to increase quality.	*Customer Request Module (CRM) recording process to be reviewed. Low to moderate confidence level with current processes.* Pothole Requests*(CRM = POTHOLE)* 2017 = 526 ***Pothole/Edge Break*** $ 1,279,290 maintenance exp. 2016/17 ***Heavy Patching AC*** $ 6,184 maintenance exp. 2016/17
Customer Satisfaction	Road network meets community expectations	Customer Survey In 2016, 80% of our community said that rural and urban roads should be a priority and more funding needed to be invested.	Reduce the Performance Gap from 2.99 (Performance Gap = Importance mean – Satisfaction mean)	2016 Community Satisfaction Survey (E2016/77989 Pg 16) Importance mean = 4.74 Satisfaction Mean = 1.75 (Scale 1 = not at all important/not at all satisfied, 5 = very important/very satisfied)
Function – Impact of works	Good construction practices during and planning for construction	Business and personal disruptions during construction	<30 complaints per year as a result of recent construction	*CRM process to be reviewed to record ROAD CONSTRUCTION COMPLAINTS*
Function / Safety1	Provide a safe network	Line marking – Customer Requests Street Signs – Customer Requests Guideposts Roadside Barrier	• Within available funding prioritise line-marking in accordance with the Road Hierarchy and a Risk Based Approach of Heavy Rural Traffic/High Speed • Target Road signs with a risk based approach within the available budget • Priorities guidepost works within the available budget • Roadside Barriers *(Prioritise hierarchy to be confirmed)*	*Customer Request Module (CRM) recording process to be reviewed to include ROAD SIGNS, LINEMARKING, GUIDEPOSTS, ROAD BARRIERS.* **Line marking** $32,245 – Maintenance 2016/17 $58,030 – Capital[2] **Road Signs** $170,214 – Maintenance 2016/17 $57,734 – Capital[2] ***Guidepost*** $12,795 – Maintenance 2016/17 $49,044 - Capital[2] ***Roadside Barriers*** $5,553 – Maintenance 2016/17

[1]TBC – to be confirmed
[2] - Capital new projects only not fixed budgets.

Function/ Accessibility	Roads will be accessible 24 hours a day, seven days a week ***Note:*** *This does not include emergency, severe weather and natural disaster events, causeways/culverts that flood and roads such as Possum Shoot (4.5t) that have permanent Heavy Vehicle load limits.*	Road Closures – Customer Requests/TRIM	<10 complaints per year, except were appropriate notifications were published in advance for special events, maintenance or capital works.	*CRM process to be reviewed to record Road Accessibility in the classifications.* *CRM = ROAD CLOSURE*
Function/ Aesthetic	Provide roads and streets that are clean, that is they are free from dust and refuse in CBD areas. Rural sealed roads to have loose gravel removed from intersections and identified sites.	Street sweeping	<10 complaints per year. Programmed street maintenance of 2,159km/year with current budget of $289,016. Byron Streets CBD Daily & Twice Weekly areas (16.516km/wk) Brunswick Heads CBD Daily (6.44km/wk) Mullumbimby CBD Daily (12.07km/wk) Bangalow CBD Mon, Wed, Fri (6.492km/wk)	*CRM process to be reviewed to record Street sweeper* *CRM = STREET SWEEPER* ***Street sweeper*** $289,016.83 Performance under review.
Responsiveness	Response Times	Response times for defects in accordance with Infrastructure Services Risk Management Procedure (E2015/23531) Road Risk Rating Section 1.6	Target percentage overdue outstanding defects is yet to be reviewed. Surface Pavement Damage = Potholes, shoving, rutting, & joints	*Reflect™* Reporting Current Surface Response Performance in 2016/17Avg **Target Response vs. Ave. Actual Response days** Regional 37 97 Distributor 37 99 Rural Major 70 161 Collector 104 88 Local 140 95 Rural Minor 140 194 Rural Access 153 245 Access 156 138
Travel	Travel delays	Peak Traffic congestions	Based on intermittent audits. <8 minutes on Tennyson Street/Browning Street Roundabout and McGettigans Lane	MR545 Study DM844180 – Travel time between the Tennyson Street/Browning Street Roundabout and McGettigans Lane increases from 7 minutes in 2008 to 9 minutes in 2028 is the PM peak (this represents a 30% increase in travel time, which is considered unacceptable)

SEALED ROADS-TECHNICAL LEVELS OF SERVICE				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Target**
Road Condition Parameter[1]	Roughness	NAASRA roughness counts/km Condition 1 = <60 Condition 2 = 60 to 90 Condition 3 = 90 to 120 Condition 4 = 120 to 170 Condition 5 = >170	NAASRA average counts/km URBAN 130 RURAL 120	NAARSA average counts/km URBAN 172 RURAL 149
Condition – Road Renewal	Reseals	Kilometres resealed	To be Confirmed Sealed Design Life Bitumen average 12years (335km) =28km/year Asphalt– average15 years (165km) = 11km Concrete – 40 years (1.959km) (Austroads AGPT05-11)	Reseals[2] 28km bitumen /year 11km Asphalt / year 2016/17 = 11.4km $631,537 2015/16 – 32.9kms $2,022,669 Reseals 2014/15 – 9.473 kms $481,369
Condition Road Renewal	Reconstruction	Kilometres reconstructed	Variable targets under consideration . Average road design life 20 years	Reconstruction ** Target 6km /year 2016/17 = 5.97km$5,051,321 2015/16 – 3.4km $3,106,518 2014/15 – 1.45km Maintenance $2,337
Condition – kerb and gutter	Technical Condition Assessment	As per the Asset Condition Assessment document DM1101346	Critical High Risk failed kerb and gutter to be repaired in accordance with the available budget	TBC Maintenance & Capital Expenditure 16/17 $704,378
Safety[1]	Provide a safe network	Crash/Accident Data – Roads & Maritime Query: CRASURF = 1 (sealed) CRAHAZ = ANY CRAROAD = 3 (other classified road) and 4 (unclassified road)	<20 crashes / year caused by loose gravel on rural high speed e.g. gravel on shoulder, potholes, corrugations/ roughness, slippery surface, flooded/submerged or other hazardous feature	MetCrashes Year (Jan-Dec) 2016 - 2 2015 - 2 2014- 12 2013- 7 2012- 8
Safety / Risk	High Speed > 80km/hr rural areas are given priority for reseals and reconstructions	Crash data analysis	Priority on rural roads high speed (>80km/hr) Injuries = 40 Fatalities = 0	2016 Rural Roads High speed Crashes = 64 Injuries = 47 Fatalities = 0 (25% Wet conditions, 40% Exceeding Speed limit)
Capacity	Load	Load limits	10km with load limited roads, except those affected by slip sites/ natural disasters	Possum Shoot Roads has a 4.5 tonne limit
Travel	Heavy vehicles	AADT Heavy Vehicle %	Roads do not exceed the Heavy Vehicle Design Loads	To be determined

Table 5 Unsealed Roads Levels of Service

UNSEALED ROADS – CUSTOMER LEVELS OF SERVICES				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality	Provides safe passage commuters	Number of investigations by staff from customer requests management (CRM)	Fewer than 100 requests for maintenance of existing unsealed roads annually	*Customer Requests for Grading (CRM=GRADING)* 2017=89 2016=49 2015=64 **Actual Expenditure of Unsealed roads** $ 390,083.93 maintenance 2016/17 (Including drainage, signs, guideposts etc.)
Function	Road network is appropriate to users needs	Roads meet service hierarchy requirements for traffic volumes, design speeds, width, alignment, access etc.	Current performance target rip, add 20-50mm of gravel, profile and maintain drainage every road once as required pending funding. Level of service performance target under review at time of print and will be prioritised via a road hierarchy approach.	When segments reach a condition 4 or 5 they are possibly graded pending available budgets.
Capacity	Sealed road capacity is appropriate to service hierarchy	Road width and usage is appropriate to service hierarchy.	No reduced speed limits.	Met

UNSEALED ROADS – TECHNICAL LEVELS OF SERVICES				
Safety	Provide a safe network	Crash/Accident Data – Roads & Maritime Services Query: CRASURF = 1 (unsealed) CRAHAZ = ANY CRAROAD = 3 (other classified road) and 4 (unclassified road)	<20 crashes / year caused by loose grave on rural high speed e.g., gravel on shoulder, potholes, corrugations/roughness, slippery surface, flooded/submerged or other hazardous feature	Met 2016 = 0 2015 = 0 2014 = 1 2013 = 2
Safety / Risk	High Speed >80km/Rural Areas are given a priority for re-sheeting	Crash Data Analysis	Priority on Rural High speed (>80km/hr) Injuries= TBD Fatalities = TBD	2016 High Speed Crashes = 2 Injuries = 0 50% Wet Conditions 50% Exceeding Speed Limit

Table 6 Traffic Control Devices Levels of Service

TRAFFIC CONTROL DEVICES – CUSTOMER LEVELS OF SERVICES				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality	Maintained roundabouts, islands and median strips	Frequency of complaints regarding appearance of landscape	<10 requests for maintenance of existing landscape relating to traffic control devices per year (excluding request for capital upgrades)	*To be determined* *CRM process to be reviewed to record Roundabout/Islands in the classifications.*
Capability	Capable of use by all vehicles	Designed and constructed to function correctly	Compliance with the emergency services requirements. All new installations designed and installed as per current design standards.	Met
Function	Achieves desired traffic calming results	Post installation investigations	< 5 complaints per year regarding installation after the first year.	*To be determined* *CRM process to be reviewed to record Roundabout/Islands in the classifications.*
Safety	Existing installation fit for purpose	Compliance with relevant standards at time of the installation. Unacceptable hazards identified and dealt with promptly	Hazards found during condition inspection audits. Defects addressed by the end of the financial year subject to available budget.	*To be determined – in progress* *Reflect™ to include Traffic Control Devices*
Safety	New installations are safe and do not present dangers to the public	Designed and installed according to current legislation	All new installations designed and installed as per current legislation.	Met

Table 7 Footpath and Shared Path Levels of Service

FOOTPATHS/SHARED PATHS – CUSTOMER LEVELS OF SERVICES				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality	Provides safe pedestrian and or cycle travel for commuters	Number of investigations by staff from customer requests management (CRM) regarding insurance claims	Fewer than 5 insurance claims annually	*Customer Request Module (CRM) recording process to be reviewed. Add an insurance claim category separate from footpaths REPAIR, TRIPHAZ, MISC, OBSTRUCT. Address categorisation process for reporting.* **2016/17 CRM's** New footpath requests = 2 Clean request = 1 Debris removal = 2 Hazard requests = 28 Customer's hazards expectations are higher than what can be achieved with available funds (Refer to the Asset Risk Management Procedures).
Capability	Surface	Defect Inspections annually as per Asset Risk Management Procedures	Critical High Risk footpath/Shared Paths to be repaired in accordance with the available budget and condition inspections priority repair program	Highest risk defects addressed with the available budget of $100,000 annually.
Function	Compliance with DDA	Compliance requirements	New installations meet legislative requirements. Existing facilities to meet DDA requirements when further capital work conducted subject to available budget.	Met
Function	Legislative	Hard surface, minimum footpath 1200mm wide Shared Path 2000mm wide (AS1428 Parts 1 & 2 & Austroads 2009 guide to pedestrian and cyclist paths)	Meets Australian Standards (BSC Shared Paths, Footpaths and Shared Paths Technical Specifications E2018/2497) for new assets.	Met

Table 8 Kerb and Gutter Levels of Service

KERB AND GUTTER – CUSTOMER LEVELS OF SERVICES				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality	Kerb and Gutter is in a condition appropriate for its use.	Free draining with no ponding of water.	To be confirmed (Fewer than 20 requests for maintenance of existing unsealed roads annually)	*CRM process to be reviewed to record kerb and gutter requests.* Actual Capital Expenditure of Kerb and Gutter $ 704,378 (majority Renewal)
Function	Kerb and gutter conveys stormwater from roads in a safe, harm free and efficient manner.	Meets road hierarchy requirements for type, location and capacity.	Overall Condition Fair to Poor	Poor – kerb is discontinuous, uneven in grade and ponds water
Capacity	Stormwater flow is contained within kerb and gutter.	Over-kerb overflows are minimal.	Poor / Very Poor – Stormwater overflows kerb and gutter over sections or length	Overall Condition Fair to Poor

Table 9 Stormwater Levels of Service

STORMWATER – CUSTOMER LEVELS OF SERVICES				
Key Performance Measure	**Level of Service**	**Performance Measure Process**	**Performance Target**	**Current Performance**
Quality – Minor Flooding in street	Minimal disruptions associated with minor flooding	Complaints from residents regarding repeat minor flooding	<10 complaints per year	*CRM process to be reviewed to record FLOODING STREET*
Quality – Flooding to properties	Private properties not being damaged by stormwater flooding from Councils stormwater network	Adequate drainage in place	<3 complaints per year	*CRM process to be reviewed to record FLOODING PRIVATE LAND*
Quality – Major Flooding	Adequate mitigation of flooding events – warning, reduction of damage, etc.	Adequate systems in place and appropriate knowledge of risk	Complete regional study(ies) and implement recommendations as per the program and funding	Met
Quality	Provide efficient method of collection and disposal of stormwater	Customer Satisfaction survey 2016	LGA Benchmark value of 2.7 satisfaction Scale: 1 = not at all important/not at all satisfied, 5 = very important/very satisfied	Met (3.08)
Quality	Capital renewal of infrastructure	Replacement of aging asset	Replace one causeway each financial year subject to available funding	Not Met
Function – Impact of works	Good construction practices during and planning for construction	Business and personal disruptions during construction	<3 complaints per year as a result of recent construction	*CRM process to be reviewed to record ROAD CONSTRUCTION COMPLAINTS*
Function – maintenance	Maintenance levels keep the drainage system functioning	Function of the drainage system	<40 complaints per year regarding flooding and <5 insurance claims per year	*CRM process to be reviewed to record appropriate classifications for reporting. CRM = FLOODING INSURANCE, and combined FLOODING STREET / FLOODING PRIVATE LAND*
Capacity	Designs meet or exceed industry best practice regarding capacity and environmental design	Current Australian Standards and guidelines met	Guidelines met or exceeded subject to available funding	Met

Maintenance Levels of Service refer to those service levels delivered on a day to day basis. Refer to the *Draft Infrastructure Services Risk Management Procedures* for further details.

The Risk Management Procedure (E2015/23531) outlines:

1. The required response to defects and hazards
2. The expected inspection interval and frequency
3. Risk rating procedures and priority rankings
4. Response times to inspect and/or repair defect and hazards
5. Resources required to deliver specified services.

The service levels do not apply during a weather event within the local region. During and after such an event all available resources will be allocated to attending to emergency works.

This Transport Asset Management Plan acknowledges the link between workload indicators and intervention actions. For example, a substantial increase in road works (through development or upgrades) can materially impact on the ability to maintain and respond to defects and hazards, if not also accompanied by a comparable increase in maintenance budget allocation or resources.

The standards of maintenance are considered reasonable, however, it's noted that community satisfaction is below the acceptable standard of 3 in most cases.

Further detail regarding Maintenance levels of service are discussed in the Maintenance Plan Section 8.

Condition Assessment

The *Community Infrastructure Asset Assessment Manual (*DM1101346), outlines the strategic inspection plans and the condition, functionality and capacity assessment guidelines for Transport Assets, excluding road surface and pavement. This is a live document which is modified as required to account for changes in technology, requirements and processes. Condition information must be accurate and repeatable to support this Plan, the capital works programs and the asset management predictive modelling.

Council has implemented mobile android devices for recording inspections, defects, accomplishments and electronic forms. The use of mobile devices has removed a lot of paper based inspections and accomplishment form completion.

Mobile solutions have provided the following benefits:

- Reduced paperwork
- Reduced error
- Provided accurate and repeatable data gathering
- Enabled BSC to outsource repeatable tasks
- Enabled BSC to generate monitor performance.

5. Future Demand

This section evaluates potential factors affecting demand such as:

- Population growth
- Changing community expectations
- Development
- Changes in demographics
- Strategic network extensions and upgrades
- Tourist demands (2.1million per year)

These factors will affect the renewal and upgrade of the existing network and addition or decommissioning of assets, which in turn affects the maintenance and operational resourcing and budgeting.

Demand Forecast

Population trends can be used as a guide in determining future demand. Information from NSW Planning & Environment below indicates that Byron Shire is currently experiencing growth, which is expected to continue (Table).

Table 10 NSW population projections regional LG data

Forecast Year						Change between 2011 and 2036	
2011	2016	2021	2026	2031	2036	Total Change	Total Increase Rate
30,700	32,400	33,850	35,250	36,650	37,950	7,250	1.24

This population growth may see an increase in maintenance requirements across the Transport asset network along with capital renewals and upgrades.

There is also potential for increased developer contributed assets that will alleviate some of the strains placed by an increase in population and the corresponding expectations and requirements. However, this will also see a need for increasing maintenance expenditure and resourcing as the assets begin to age.

Demand Management Plan

The demand for Transport Assets is expected to increase proportional to the population growth projected for the region. This also aligns with the expectations from the community where in 2016 sealed local roads in both urban and rural areas scored in the top 3 priorities (Figure 9).

Figure 9 Top 3 Community Priorities (BSC Survey, 2016)

Managing the demand for services will involve both asset and non-asset solutions.

Non-asset solutions put emphasis on providing the required level of service without making changes to the current asset stock. This includes reducing the level of service, reducing demand for the service and providing education to the community to accept appropriate asset failures.

Asset solutions include the renewal, upgrade and creation of assets and often places increased strain on current resourcing.

Key drivers for demand that have been identified are shown below (Table 11).

Table 11 Demand management plan summary

Demand Driver	Impact on Services	Demand Management Plan
Capacity • Population growth • Tourism	Requirement to upgrade or expand the Road infrastructure network	• Fund priority works by seeking grant funding and implementing the Section 94 plan • Educate the community on the costs associated with maintaining current service levels and increased costs required with increased network
Capital / Maintenance Works • Asset growth • Tourist demand Aging asset stock • Expectation from community for quality road network (as identified in consultation) • Increased shared paths • Early failure of developer contributed assets • Increase costs associated with works due to increase in traffic management	Requirement to upgrade the Road infrastructure network	• Consult with community on options and funding requirements • Inform community and manage expectations. Communicate levels of service and financial capacity to balance infrastructure priorities with what the community is prepared to fund.
Development • Increased development to accommodate increased population and demand	Additional infrastructure required to cope with demand	• Monitor and manage development controls • Undertake infrastructure planning taking into account land use changes

New Assets from Growth

The purpose of the *Section 94 Development Contributions Plan 2012 (Amendment 3)* (the Plan) is to enable Byron Shire Council to request contributions from developers. These contributions are expected to provide services that are likely to be required as a result of development throughout Byron Shire. The Plan also outlines the programmed work to be completed as part of the Section 94 contributions, a copy of the Plan is available on Council's website (http://www.byron.nsw.gov.au/developer-contributions-plans).

The Section 94 plan requires the carrying out of works or the payment of contributions to go towards the provision, extension or augmentation of services and facilities that will, or are likely to be, required as a consequence of development in Byron Shire.

The Byron Shire Bike Strategy and Action Plan (Bike Plan) 2008 was developed in order to endorse the expansion of the existing network of bicycle facilities in Byron Shire. The Plan is based on extensive research, review of existing infrastructure and future requirements, and community consultation. The Section 94 Plan considers the Bike Plan in the provision of developer contributions and identification of suitable projects.

Changes in Technology

Byron Shire Council uses mobile android devices for inspections, defects and electronic forms. It utilises Asset Edge *Reflect™* which synchronises data to a cloud solution and information can be available simultaneously in the office. As such council does not use any paper systems to manage the Transport Assets. Additionally, Council uses ArcGIS Collector apps for field inspections, data capture and cleansing spatial data. Council has used GPS technology for footpath inspections since 2006.

Council has all assets mapped in the Geographical Information System and available to office staff one-to-one with the Authority Asset Register.

Council has recently purchased a Drone for asset inspections, aerial photography and video. This solution provides the ability to gain access to difficult sites that would not previously have been inspected or would have required expensive traffic control to inspect. Examples include under bridges or very high retaining walls on Brunswick Valley Way. It is also providing the ability to engage with the community in different ways.

Council has employed SPOT Satellite Personal Tracker technology for staff working alone doing inspections in remote locations where there is no phone reception. SPOT GEN3 uses Global Satellite with GPS messenger to send messages to supervisors that they are ok, or if the worst should happen it sends emergency responders the GPS location with a push of a button (SPOT, 2017).

Byron leads asset management with the latest technology and innovation.

6. Asset Management Practices

This section outlines the decision-making tools currently used to determine long term maintenance, renewal and upgrade expenditure for Transport Assets. As a result of Council restructuring an asset team was formed in 2015. This now consists of 4 full time staff dedicated to strategically managing assets. This has provided the opportunity to increase capacity and scale to improve asset management systems and technologies detailed in Figure 10 Asset Management Systems and Elements.

Financial Systems

Council currently uses Authority software as the financial management and accounting system.

Asset Management Systems

Council utilises Authority software as the asset management system. Authority contains details of all Council assets, their attribute and condition information. At present 35,300 (Jan 2018) assets are linked to Council's corporate GIS system which is used to show asset locations in a spatial manner in conjunction with cadastral, topographic and aerial information.

Assetic Predictor© was used to perform the strategic modelling prediction analysis to determine the future strategies and capital expenditure plans detailed in the Financial Summary section (Figure 10).

Asset management systems are well established and integrated.

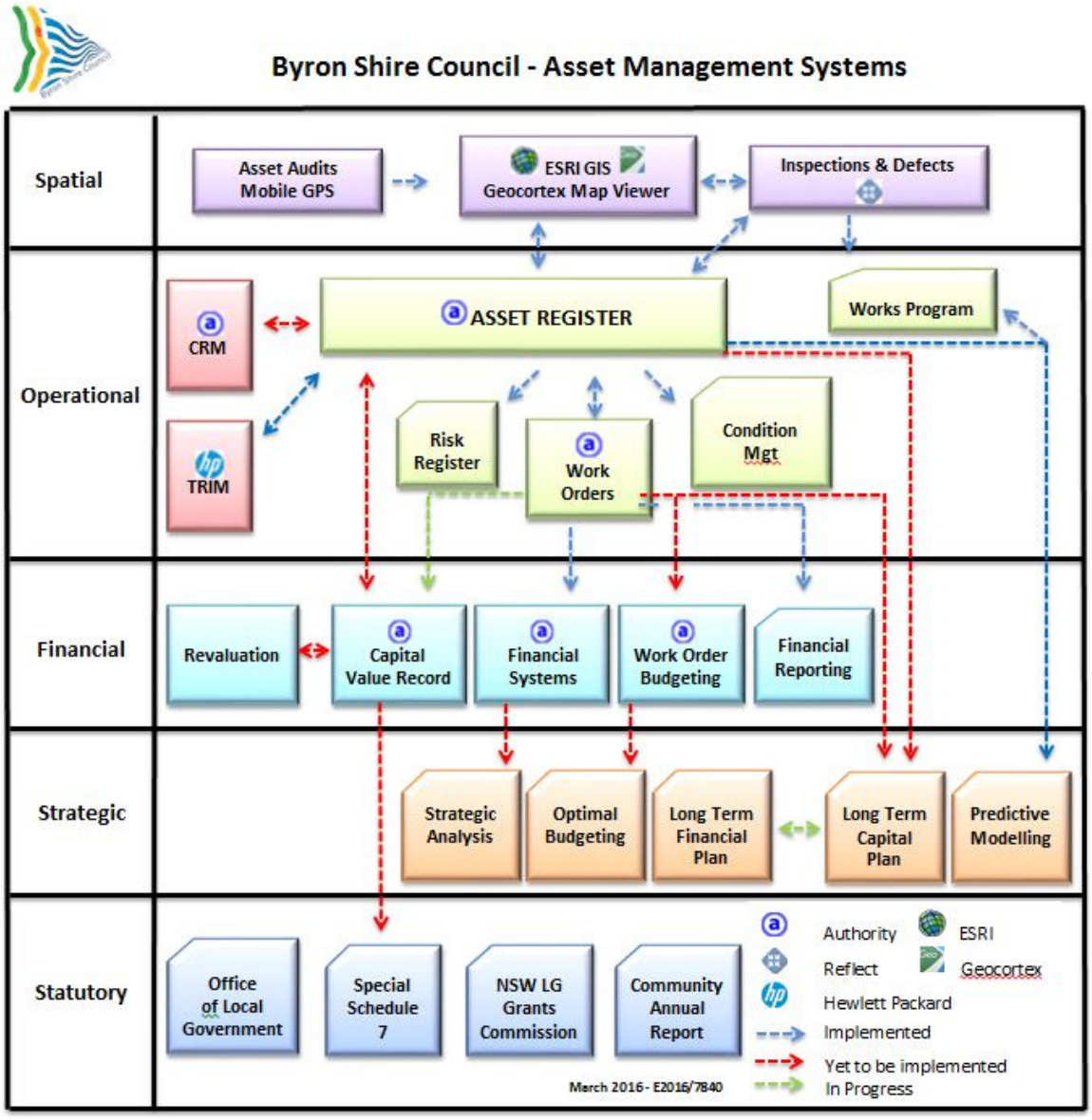


Figure 10 Asset Management Systems and Elements

Accounting Framework

The following Accounting Framework applies to local government in New South Wales:

- Local Government Code of Accounting Practice and Financial Reporting
- AASB 13 Fair Value Measurement – prescribes fair value measurement of assets
- AASB 116 Property, Plant & Equipment – prescribes requirements for recognition and depreciation of property, plant and equipment assets
- AASB 136 Impairment of Assets – aims to ensure that assets are carried at amounts that are not in excess of their recoverable amounts
- AASB 108 Accounting Policies – specifies the policies that Council is to have for recognition of assets and depreciation

Standards and Guidelines

Asset Management practices and processes are driven by a number of legislative requirements and various asset management guidelines.

- NSW Local Government Act 1993 and Roads Act 1993, defines that Council is responsible for the regulation of the Transport Assets within its boundary areas.
- Australian Accounting Standards set out the financial asset accounting reporting requirements on Local Governments.
- International Standard ISO55000
- International Infrastructure Management Manual developed by IPWEA (Provides guidance and direction on asset management policy and plan development).
- Australian Infrastructure Financial Management Guidelines developed by IPWEA (Provides guidance and direction on asset accounting).

Risk Management

Byron Shire acknowledges that risk management is an essential part of best practice asset management. The risk assessment process identifies credible risks, the likelihood of the risk event occurring and the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

The *Draft Infrastructure Services Risk Management Procedure (*E2015/23531), available at Council offices, outlines the process of identifying and managing risks for council's infrastructure assets.

7. Lifecycle Management Plan

Life cycle management is an integrated approach to optimising the asset life cycle from the initial idea through to disposal (Figure 11). This section discusses the identification of renewal, new, upgrade and maintenance works that are required at each stage of the asset life.

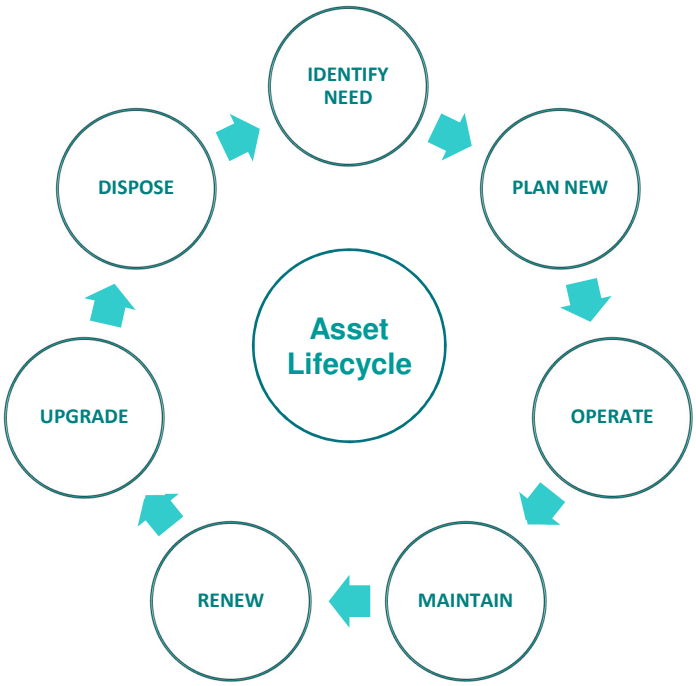


Figure 11 Asset life cycle stages

Asset Capacity and Performance

In general, the capacity of the Transport Asset network is adequate throughout most of the shire. However, there are significant capacity issues associated with MR 545 (Ewingsdale Road to Broken Head Road at the south boundary) and the Byron Bay town centre. There may be intersection capacity issues on Mullumbimby Road in the next 10 to 20 year time frame.

The community was extensively consulted throughout the special rate variation process, with the IP&R documentation clearly discussing the full extent of the rate rise. While some earlier consultation material did not clearly outline the base case (no Special Rate Variation) scenario, this was corrected in later consultation by the council.

The council used a range of engagement methods to make the community aware of the need for, extent of and impact of the rate rise and to seek community feedback. It gave detailed explanations about the purpose and impact of the Special Rate Variation (SRV), and provided opportunities for community feedback.

While the community feedback for the SRV was broadly negative, the council adequately demonstrated the community was aware of the size and need for the SRV.

Through community consultation, the council found that large proportions of respondents supported increased investment in:

- buildings and public amenities (88% supported)
- transport assets, including roads, bridges, and road drainage (83% supported)
- drainage, including urban and rural stormwater (73% supported), and
- park facilities (71% supported).

The council's IP&R documents clearly indicate the community is dissatisfied with the current condition of these assets, and supports more expenditure to improve service levels (IPART, 2017-18).

Asset Condition

Council has a condition assessment manual that outlines the strategic inspection plan for Transport assets. In addition to this Council also undertakes recurring road and bridge inspections. Each asset, or component, is condition scored from 1 to 5, as defined in Levels of Service Table 2. The condition scoring scale follows internationally accepted good practice.

Bridge inspections are carried out as per NSW Roads and Maritime Services inspections procedure manual. The results of these condition assessments are then used in our predictive modelling software, Asset Register and Geographical Information System.

Useful Lives and Unit Rates

The Byron Shire average actual life of Transport assets is typically longer than industry average Table . Put another way, in this Shire assets are used or expected to be used even after they are technically past their use by date. Council has had to run assets to the point of failure due to the nature of aging infrastructure and lack of capital funding. At present Council does not have financial capacity to replace or renew assets at optimal points during the life of the asset. This data is presented in Table 12 Transport assets useful lives and Figure 12.

Table 12 Transport assets useful lives

Asset Type Component	Material	Byron Shire	Industry Average
Sealed Road Surface	Asphaltic Concrete	35	24
	Spray Seal	30	16
	Concrete	115	100
	Slurry Seal	30	16
	Pavers	115	44
Sealed Road Pavement	Pavement Base and Sub-base	75	75
Unsealed Road	Gravel	7	15
Footpath	Concrete	70	51
	Asphalt	50	30
	Timber	30	20
	Pavers	45	40
	Other(Concrete Aggregate, Asphalt/Pavers, Plastic)	50	51

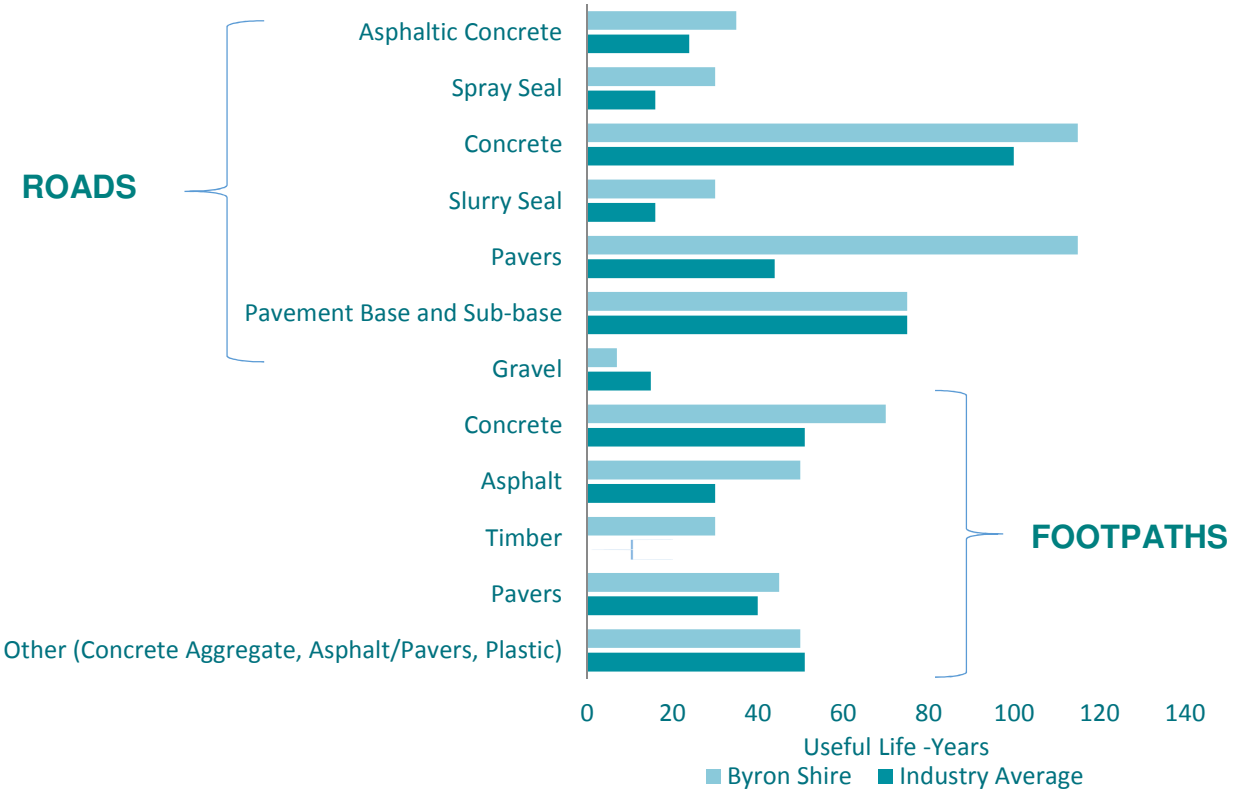


Figure 12 Actual life comparison between industry average and Byron Shire

Useful lives of assets are longer than industry average which requires more maintenance.

Table 13 Transport assets treatment unit rates

Asset Type	Material/Treatment	Unit Rate ($/m2)*
Unsealed Road	Gravel re-sheeting	10.50
Sealed Road ***Note:*** *Heavy patching AC will move from AC profiling and patching towards "granular patching 300mm deep with road base and primer seal surface (leaving the seal to cure for 3-6months). This is expected to reduce heavy patching costs substantially.*	Reseal (single/single spray seal & preparation) *Note: Reseals WO 2017 ~ $10.48m2, was $8 used in Assetic Predictor©*	11.00
	AC Overlay (40mm)	23.50
	Reconstruction rural (300mm pavement, bitumen seal, table drains, driveways, & pipe culverts) *Note: WO's 2017 $167.32,was $70 used in Assetic Predictor ©*	167.32
	Reconstruction urban (300mm pavement, AC seal, kerb & guttering) *Note: WO's 2017 $167.32, was $150 used in Assetic Predictor©*	170.30
	Heavy patching (profiling and 100mm deep) *Note: was $50 in Assetic Predictor©*	88.00
Footpath	Footpath renewal	125.00
	Footpath renewal & widening	150.00
	Shared path renewal	125.00
	Shared path renewal & widening	175.00
	Ramp renewal	150.00
	Stair renewal	150.00

At the time of printing the values used in Assetic Predictor© were less than those detailed above. As Council data and processes mature the unit rates are recalculated off Work Orders (WO) expenditure to refine to reflect actual replacement costs of current projects.

Asset Valuations

Table 64 Transport asset valuation data (SS7 30 June 17)

Asset Category	Replacement Value ($)	Accumulated Depreciation ($)	Written Down Value ($)	Annual Depreciation ($)
Sealed Roads	229,941,000	108,104,000	121,837,000	3,396,000
Unsealed Roads	3,911,000	1,232,000	2,679,000	128,000
Bridges	23,909,000	11,079,000	12,830,000	293,000
Footpaths	8,627,000	3,124,000	5,503,000	126,000
Kerb and Gutter	23,973,000	6,661,000	17,312,000	288,000
Other – Parking meters, Butler St car park lighting	238,000	0	238,000	0
Traffic Control Devices	59,748,000	19,624,000	40,124,000	1,193,000
Car Parks	3,306,000	594,000	2,712,000	68,000
Road Barriers & Retaining Walls	10,424,000	2,147,000	8,277,000	145,000
Stormwater	64,294,000	16,972,000	47,322,000	581,000

8. Maintenance Plan

Standards and Specifications

Council uses *Reflect™* software to record inspections, defects and accomplishments, and makes use of Asset Edge *Reflect™* software on mobile devices with built in response times. A rolling inspection program of the whole Road network is completed by a full time inspector who records defects against each asset. When a defect is recorded, it is synchronised to the cloud and forms part of the prioritised maintenance program. Signs, guideposts, roadside barriers, street sweeping and vegetation maintenance programs are managed through defects identified via *Reflect™* and customer requests. These too are prioritised and managed based on risk, road hierarchy and available budget.

Footpaths and Shared Paths are inspected annually and a prioritised works program is generated in *Reflect*™. This process allows Council to strategically address the repairs with the allocated funds, $100,000 in 2016/2017. Since implementation, the overall condition of the footpath network has improved and Council has a reliable and repeatable process to manage these assets.

On a rolling annual basis a specialised bridge contractor completes the required bridge inspection (Level 1, Level 2 and Level 3 as required by the State Government Roads and Maritime Service bridge inspection policy, Policy Number PN158). A programmed maintenance plan is created from the inspections for operational staff to complete pending available funds.

The major culverts and causeways are inspected by internal staff and a programmed maintenance plan is created for operational staff. A specialised contractor is brought in to complete the structural Risk Rating calculation when and where required. Council has identified that there is an increasing risk to the major culverts and causeways infrastructure due to not being able to fund and complete the necessary maintenance and renewal tasks required to keep the assets in safe and functioning order.

Future Maintenance Expenses

The future maintenance expenses are detailed in Section 12, Table . A key point to note in this table is the lack of funding allocated to Rural and Urban Drainage and Kerb and Guttering. As discussed above there is an increased risk to major culverts and causeways due to a lack of funding, this is evident in the maintenance funding allocation.

Without adequate maintenance, the major culverts and causeways have a reduced chance of reaching their expected useful life in a reliable and safe condition. Through increased inspections, data collection and strategic asset management, a valid figure for required maintenance can be determined to help mitigate future risks.

There is insufficient maintenance for urban and rural drainage.
The challenge is the competing pothole maintenance budget of $1.3M.

Maintenance Challenges

- Council has a planned maintenance process using *Reflect™* as stated above. However, it is very reactive to individual customer requests and community demands for maintenance. This is not a risk based approach and does not optimise spending. As such it is on going challenge to move into a focused programmed and planned maintenance space for Council with limited resources for the Transport assets.
- When maintenance expenditure is reactive it is more costly than if forward planning occurs.
- Of the total maintenance cost **31%** ($1.3 million in 2016/17) was spent on pothole patching. Only long term investment into preventative capital reseal program improve the overall road condition (Figure 13).

- There are no budget items allocated for roadside barriers, traffic control devices, kerb and gutter, retaining walls, Bus shelters, roadside furniture, rural stormwater, footpaths and cycleways. This is an ongoing hindrance to effective asset management as forward planning cannot be fully undertaken in the current environment without a known funding allocation.
- The number of identified defects from programmed inspections is far greater than available funds. The use of mobile inspections does provide a built in risk based approach to prioritising repairs if funds are available.
- A complete audit of the roadside barriers is required to determine compliance with current Australian standards and to prioritise maintenance. This is presently underway.
- Council does not have a crack sealing program, it has not been a standard, however intends to be introduced.

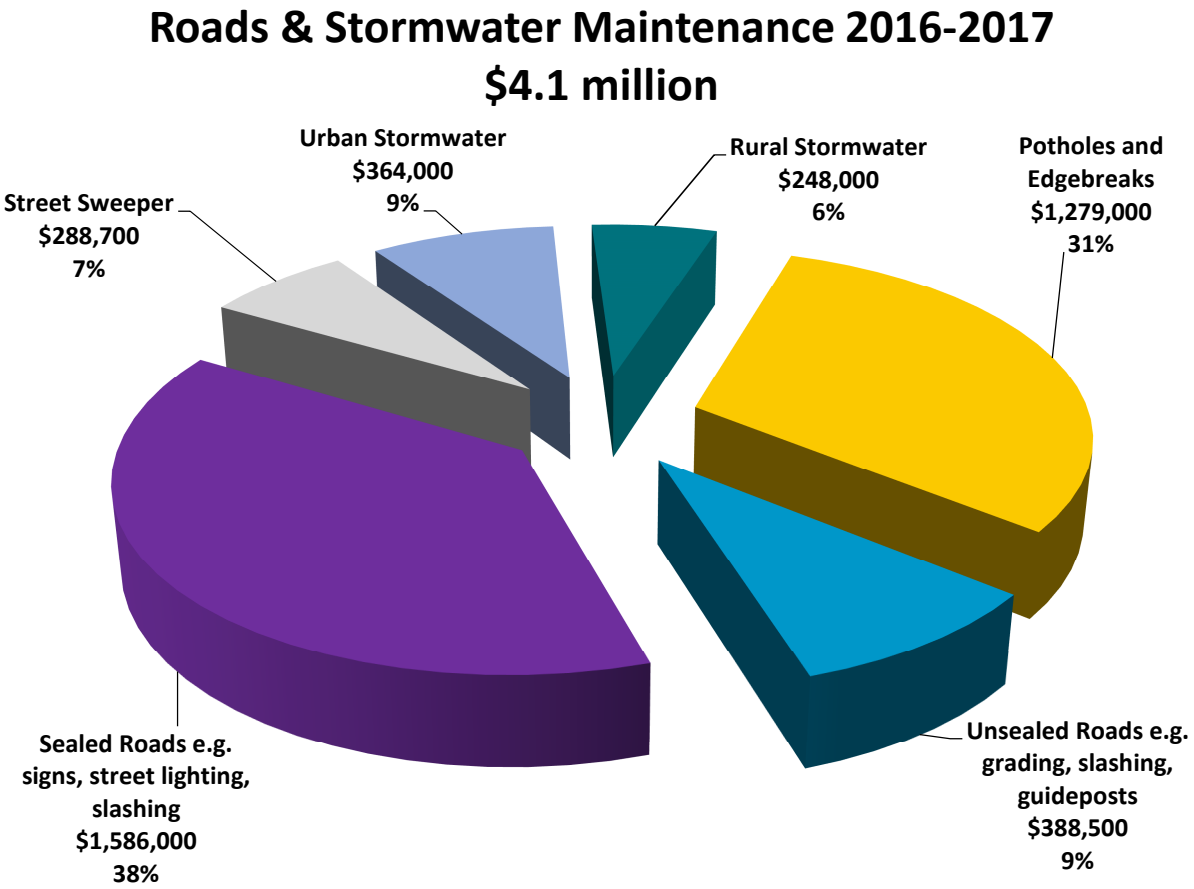


Figure 13 Road and stormwater Maintenance 2016-17

9. Renewal Plan

Renewal Prioritisation

Council uses Assetic Predictor©, prediction modelling software, to prioritise capital works. The objective of this analysis is to model the performance of the unsealed roads, footpaths, sealed roads and bridges.

The process includes setting up:

- degradation profiles based on condition and remaining useful life,
- identifying current treatments and unit rates to deliver these treatments, and
- setting up treatment decision matrices defined for optimal interventions for each treatment.

By utilising the above process and setting up the criteria and logic within Asset Predictor©, it is possible to model the future costs of road, footpath and bridge renewal requirements and predict the future condition based on different budget options.

For causeways, major culverts, retaining walls, roadside barriers, bus shelters, kerb and gutter, traffic control devices and car parks that are not included in the modelling process at this stage, a renewal program is developed based on a 'Risk Management' approach. This uses a comprehensive individual risk matrices containing condition data as well as including social and environmental components for those particular asset classes that have the required information to have these matrices constructed (in the future all asset classes will either have a modelling process or risk matrix process applied). For these assets with no current modelling or risk matrices, a "worst first" approach is generally used and they are prioritised based on the maintenance inspection details.

Predictive modelling for the road pavement based on the special rate variation scenarios predicted the amount required for capital renewal over the next 10 years to maintain the asset. This is shown below in Table 7. This is a minimum requirement to hold the network from further deterioration. This will still result in some roads reaching a point of poor to very poor condition which are beyond reseal and require full reconstruction.

To "maintain" the overall sealed road network condition the average capital renewal needs to increase to10.4M by 2018 (Table 14).

Table 75 Asset Predictor© Modelling Sealed Roads to "Maintain" at 10% (Reseals and reconstruction totals)

Year	Sealed Roads Budget Expenditure Scenario modelling for Special Rate Variation of 10 %
1	$5,109,800
2	$5,808,629
3	$6,840,236
4	$7,974,985
5	$9,223,266
6	$9,453,847
7	$9,690,194
8	$9,932,448
9	$10,180,760
10	$10,435,279

Note: SRV Assetic Predictor© Modelling of 10% (7.5% over 4 years + inflation of 2.5%/annum rate peg) 28/11/16 using then reseals, reconstruction and heavy patching unit rates.

Road Renewal Targets

The following has been set as a renewal targets for sealed roads (Table). This was previously detailed in Table 4 Sealed Roads Levels of Service.

Table 16 Road Capital Renewal Annual Targets

Sealed Roads Treatment	Network measure (km)	Target Km/year	Estimated Cost	Status
Bitumen - Design Life Bitumen average 12years (Austroads AGPT05-11)	335	28	$2M	Not met 2016/17
Asphalt average 15 years (Austroads AGPT05-11)	165	11	$1.8M	Not met 2016/17
Concrete (Austroads AGPT05-11)	1.959	0		NA
Reconstruction (partial or full depth)		6	$7.5M	Met 2016/17
TOTAL			**$11.3M**	

To maintain the existing Road assets, Council needs to be consistently averaging a total of **39km of reseals each year**. In previous years the reseal program has fluctuated and been inconsistent (Table 87 Reseals for the last 3 years). In the last decade the reseal spend was as little as $70,000. Below is the value spent on reseals in the last 3 years:

Table 87 Reseals for the last 3 years

Year	Completed Reseal length (km)	Expenditure
2016/17	12.3	$631,537
2015/16	30.3	$1,801,130
2014/15	9.473	$481,369

Bitumen reseals cost have increased from $54,000/km to as high as $102,000 /km. This is due to the road network being in poor condition and requiring heavy patching and shoulder grading. To improve the safety level of service, line marking is now preferred with new reseals. Asphalt reseals are $23.50 m^2 compared to $11 m^2 for bitumen. Based on the reseals targets in Table the estimated reseal budget for bitumen should be $2 million and $1.8 million for asphalt.

The reseals target is 39km per year averaging at $ 3.8M.
The reconstruction target is 6km per year averaging at $7.5M.

Bridge Renewals

Progressive inspections of bridges have resulted in further load limits to protect aging and deteriorated structures. The most seriously deteriorated bridges were Parkers, Booyong, James, O'Meara's and Scarrabelottis. Replacement of these five bridges with conventional concrete structures would have cost in the order of $16M. This cost was not affordable for Council and not achievable via grant funding because these bridges are not on major freight routes.

Council has investigated and is now deploying an innovative renewal solution that involves the recycling of surplus steel Australian Defence Force bridges which is a viable option in these freshwater locations. The total program cost is in the order of $7.5M.The lower overall cost and associated innovation has resulted in the program being more attractive for grant funding and Council has been successful in gaining $5.2M in grant funding. Prior to the success with grant funding Council was considering a loan to fund the program. It is now possible to redirect this loan capacity to the renewal of other critical assets that are in a very poor condition which is a great outcome for the community.

Five Poor condition bridges will be replaced with steel Australian Defence Force bridges for $7.5M in early 2019.

Impact of Deferring Renewal Works

Deferring renewal works usually occurs when the renewal requirements exceed the available budget. Deferring renewal projects impacts on the level of service the assets are able to provide. In the short term the impact may be acceptable, however continued deferral can lead to an increase in backlog and therefore risk (Figure 14).

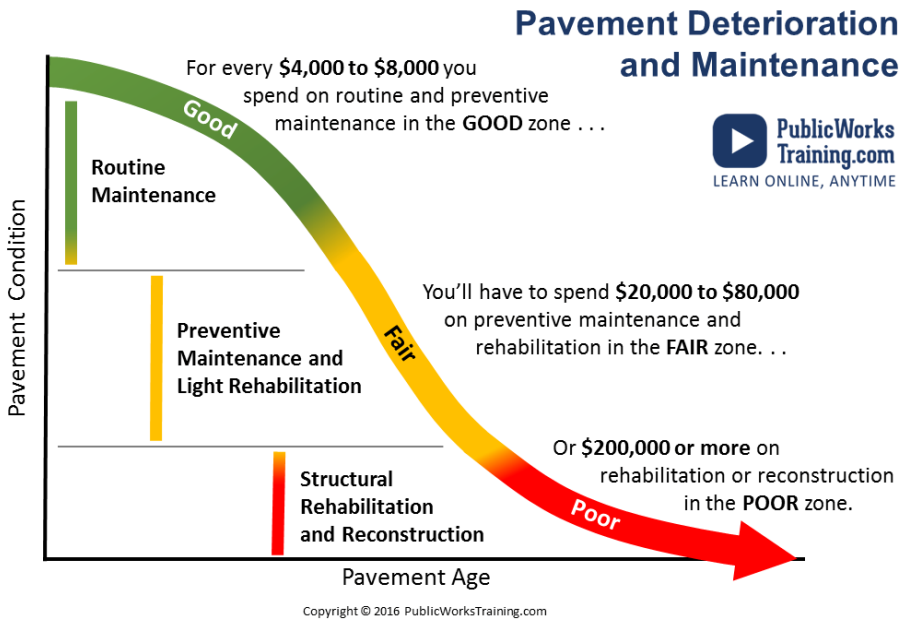


Figure 14 Pavement Deterioration and Maintenance Curve (Public Works Training, 2016)

Managing the Risks and Renewal Challenges

As discussed in the Strategic Asset Management Plan, there are increasing risks to infrastructure associated with providing the service and not being able to fund and complete the necessary maintenance and renewal. These risks must be managed. The major risks are:

- Road reseals not completed when needed resulting in water damage to the underlying pavement
- Significant sections of roads that are so damaged they cannot be resealed and need costly reconstruction. Typically costs for capital renewal ranges from $88m^2 for heavy patching to $170/m^2 for full depth reconstruction compared with reseal costs of $11/m^2. This alone represents a significant financial risk to Council.
- Limited stormwater and road side maintenance in rural areas to reduce the risk of road failure and landslides in our high rainfall environment.
- Potential bridge or bridge component failure, most notably the timber bridges and footbridges.
- Damaged footpaths with the potential to cause trips and falls.
- Pavement damage due to water penetration caused by failed kerb and gutter.
- Aging box culverts and causeways requiring major replacement or repair.
- Load limiting of bridges, causeways and box culverts.
- Replacing or installing guardrail to comply with Austroads standards.

Council will endeavour to manage these risks within available funding by implementation of asset management systems and inspection regimes, to provide a sound platform for understanding the condition, maintenance and replacement schedule for all assets.

10. New and Upgrade Plan

Selection Criteria

New and upgrade works can be identified from a number of sources including community suggestions, internal knowledge, Councillors and strategies and plans, such as the Section 94 plan and Bike Plan as well as predictive modelling software.

These suggestions and strategies are assessed for validity, priority, benefit and cost and can then be programmed into future capital works schedules.

At this stage the main driver for new and upgrade work is through the Section 94 Plan and grants. The Plan discusses population, demographic characteristics, contributions and the identification of projects.

Developer Contributions

New capital assets provided to Council through Developer Contributions are handed to council at agreed levels of service which comply with the *Northern Rivers Local Government Design and Construction Manuals*. These service standards have been developed as a resource sharing initiative involving the Byron Shire Council, Ballina Shire Council, Clarence Valley Council, Lismore City Council, Kyogle Council and Richmond Valley Council. The initiative has provided uniform development standards for the region via a clear and comprehensive set of requirements for development infrastructure design and construction.

State Roads

Council has been given assets from the State government. Some of these include the Old Pacific Highway, Tweed Street, Hinterland Way, Brunswick Valley Way, and Tweed Valley Way. These assets are a result of highway bypasses. Council does not have a choice to accept responsibility of these new assets. The budgets are not indexed to cater for the ongoing whole of life costs of these assets and further add to the future demand management.

Forecast Upgrade/New Expenditure

The current forecast upgrade and new expenditure is presented in the Section 94 Plan in detail.

New and upgrade work is mostly funded through the Section 94 Plan.

11. Disposal of Assets

While there are no current plans to dispose of road infrastructure assets, Council has previously downgraded assets in order to better reflect requirements and save on maintenance costs.

After assessing the functionality of a road segment (Booyong Road) it was deemed that the segment no longer required a seal and was placing a strain on the already strained maintenance and renewal budgets. This road then had the seal removed and was reverted back to an unsealed road, which will require less maintenance and capital funding.

12. Financial Summary

This section presents the financial requirements for Transport assets over the next 10 years as determined through predictive and financial modelling. Note that all figures shown incorporate a 2.5% inflation factor, accounting for future cost increases.

Financial Statements and Projections

The following graphs show the financial projections for operational and capital expenditure. The capital funding is taken from the Renewal Long Term Financial Plan (LTFP) while the maintenance funding is determined from the actual funding spent in 2016/17 and projected over 10 years with 2.5% inflation (Figure 15).

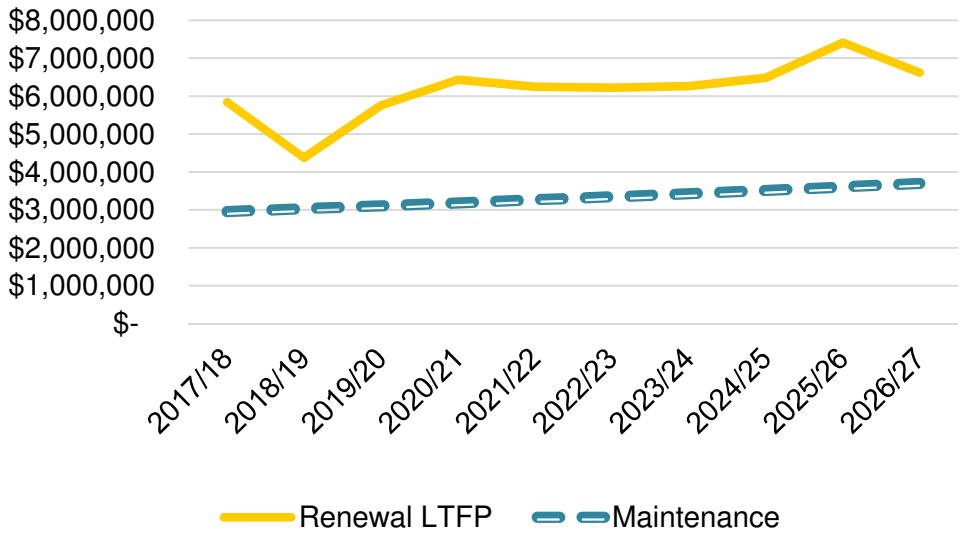


Figure 15 Long Term Financial Plan - Transport

Funding Strategy

The projected expenditure detailed will be funded from Council's maintenance, operating and capital budgets. The funding strategy is detailed in the LTFP. This plan also details the Special Rate Variation that Council applied for, and received, in 2017. Figure 16 displays the annual required renewal expenditure as determined primarily through Assetic Predictor© modelling. Note that the Drainage and Kerb and Gutter assets have not been included in the modelling process, along with other assets, as asset details required for modelling are not currently available. The funding level applied has been determined by Council staff. This graph compares these values to the proposed LTFP.

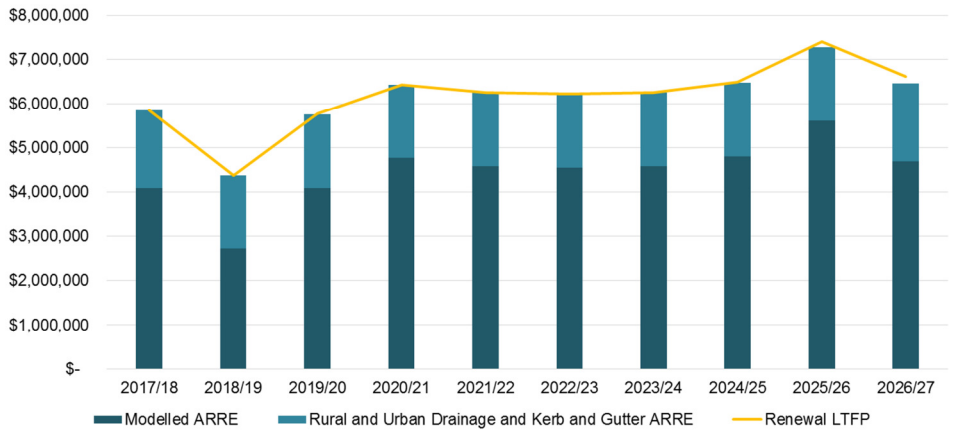


Figure 16 Long Term Financial Plan (LTFP) funding & Annual Required Renewal Expenditure (ARRE)

The proposed Council approved LTFP (E2017/96003), capital and maintenance budgets are presented below.

Long Term Financial Plan (E2017/96003)

Table 98 Long Term Financial Plan

Year	Sealed Roads ($)	Unsealed Roads ($)	Footpath ($)	Bridges ($)	Rural Drainage ($)	Urban Drainage ($)	Kerb and Gutter ($)
2017/18	3,224,600	255,000	246,540	369,100	755,000	825,000	164,360
2018/19	1,978,508	267,750	113,460	360,000	755,000	825,000	75,640
2019/20	3,181,363	281,138	118,620	517,000	755,000	825,000	79,080
2020/21	3,717,506	295,194	123,900	634,000	755,000	825,000	82,600
2021/22	3,623,146	309,954	129,480	522,000	755,000	825,000	86,320
2022/23	3,565,248	325,452	135,300	525,000	755,000	825,000	90,200
2023/24	3,552,776	341,724	141,120	551,000	755,000	825,000	94,080
2024/25	3,747,289	358,811	145,800	554,000	755,000	825,000	97,200
2025/26	4,685,649	376,751	150,240	516,000	755,000	825,000	100,160
2026/27	4,016,611	395,589	283,800	156,000	755,000	825,000	189,200
Total	**35,292,695**	**3,207,363**	**1,588,260**	**4,424,073**	**7,550,000**	**8,250,000**	**1,058,840**

Capital Funding (E2017/86999)

Table 10 Capital Funding Assetic Predictor© (IS Master Sheet for 10 Year Plan)

Year	Sealed Road Corridor ($)	Unsealed Roads ($)	Footpath ($)	Bridges ($)	Rural Drainage ($)[3]	Urban Drainage ($)[3]	Kerb and Gutter ($)[3]
2017/18	3,224,252	254,838	246,380	368,912	755,000	825,000	164,360
2018/19	1,976,939	266,370	113,370	359,839	755,000	825,000	75,640
2019/20	3,181,300	280,113	118,564	516,853	755,000	825,000	79,080
2020/21	3,717,268	294,612	123,622	633,933	755,000	825,000	82,600
2021/22	3,620,389	309,751	129,409	521,975	755,000	825,000	86,320
2022/23	3,562,915	325,060	135,108	524,796	755,000	825,000	90,200
2023/24	3,550,566	341,548	140,748	550,890	755,000	825,000	94,080
2024/25	3,746,968	358,316	145,564	553,898	755,000	825,000	97,200
2025/26	4,685,301	376,750	149,942	390,363	755,000	825,000	100,160
2026/27	4,015,353	395,069	283,753	2,611	755,000	825,000	189,200
Total[4]	**35,281,255**	**3,202,431**	**1,586,465**	**4,424,073**	**7,550,000**	**8,250,000**	**1,058,840**

[3] Not determined through Predictor© modelling
[4] Not including 2016/17

Maintenance Funding Modelled from Assetic Predictor© (Year Level Comparison)

Table 20 Maintenance Funding Assetic Predictor©

Year	Sealed Road Pavement ($)	Unsealed Roads ($)	Footpath ($)	Bridges ($)	Rural Drainage ($)[3]	Urban Drainage ($)[3]	Kerb and Gutter ($)[3]
2016/17	2,379,418	390,084	11,180	32,000			
2017/18	945,546	340,017	49,925	126,513			
2018/19	986,362	448,391	51,260	115,284			
2019/20	1,030,374	489,416	52,790	97,523			
2020/21	1,075,272	492,665	56,771	74,661			
2021/22	1,132,055	481,395	58,801	62,990			
2022/23	1,193,621	488,622	61,987	44,922			
2023/24	1,249,230	504,470	64,762	26,248			
2024/25	1,285,153	515,796	68,607	8,926			
2025/26	1,340,469	525,762	72,562	0			
2026/27	1,419,383	522,784	78,508	0			
Total[4]	**11,657,471**	**4,809,322**	**615,975**	**557,069**			

Maintenance Funding

Table 21 11 Maintenance Funding

Year	Sealed Roads Corridor ($)	Unsealed Roads ($)	Footpath ($)	Bridges ($)	Rural Drainage ($)[3]	Urban Drainage ($)[3]	Kerb and Gutter ($)[3]
2016/17	2,464,312	375,034	6,784	73,740	96,029	357,928	2,337
2017/18	3,100,200	352,600	31,800	104,400	109,800	357,900	6,500
2018/19	3,340,000	359,600	32,400	103,400	112,000	365,000	6,600
2019/20	3,634,400	366,800	33,000	105,400	114,200	372,300	6,700
2020/21	4,106,200	374,100	33,700	107,500	116,500	379,600	6,800
2021/22	4,201,500	381,600	34,400	109,600	118,800	387,100	6,900
2022/23	4,299,600	389,200	35,100	111,700	121,200	394,900	7,000
2023/24	4,417,200	398,900	36,000	114,500	124,200	404,800	7,200
2024/25	4,538,700	408,900	36,900	117,300	127,300	414,900	7,400
2025/26	4,659,100	419,100	37,800	120,300	130,500	425,300	7,600
2026/27	4,775,600	429,600	38,700	123,300	133,800	435,900	7,800
Total[4]	**43,356,812**	**4,255,434**	**356,584**	**1,188,140**	**1,304,329**	**4,295,628**	**72,837**

The Maintenance Funding budget for sealed roads includes the entire corridor. This includes: street sweeper, stormwater, grading, slashing, guideposts, signs, street lighting and potholes/edge breaks (Table 21 11). Assetic Predictor© modelling includes pavement maintenance (Table). This is why the two tables for Sealed Roads are so vastly different.

The following Table 12 presents the actual expenditure in 2016/17 for maintenance for the listed assets and to bring awareness to the minimum funding requirement for each of the asset types. While this is the actual expenditure, there was not originally any individual budgets allocated to maintain these assets. This is an ongoing hindrance to effective asset management as forward planning cannot be fully undertaken in the current environment without a known funding allocation. As a result the work completed is highly reactive and possibly more costly than if planning had occurred.

Table 122 Maintenance expenditure (2016/17)

Asset Sub Type	Expenditure 2016/17
Roadside Barriers	$9,132
Traffic Control Devices	$528
Kerb and Gutter	$5,486
Retaining Walls	$1,247
Rural Stormwater	$61,892
Roadside Furniture & Bus Shelters	$5,512
Footpaths/Shared Paths	$10,784
Unsealed Roads (grading/re-sheeting only)	$ 338,978
Total	**$433,559**

The Rural Drainage and Urban Drainage capital funding figures presented above (Table) do not include the Stormwater Levy Program. The Stormwater Levy Program is a Stormwater Management Service Charge that is collected through council rates notices. Properties that benefit from stormwater drainage systems can be charged the levy fee. The funds are then used to provide additional stormwater service to eligible properties, i.e. private properties, not council land.

The funds levied from this program are dependent on the number of rateable properties. The levy currently generates $320,000 per year. Works under this program do not form part of the renewal program shown above because they are targeted towards resolving drainage issues that affect private land, rather than council land.

Financial Challenges and Gaps

After Level 2 structural inspections of causeways and major culverts council has identified 7 urgent ($2.2million) and 16 high priority ($5.5million) poor condition rural drainage assets. The 7 urgent assets are either load limited and or have temporary steel plates and require full replacement. If the 16 high priority assets are not addressed in the very near future load limits will be implemented. These 23 rural drainage assets totalling $7.7 million is currently unfunded (E2016/85152 & E2016/85145).

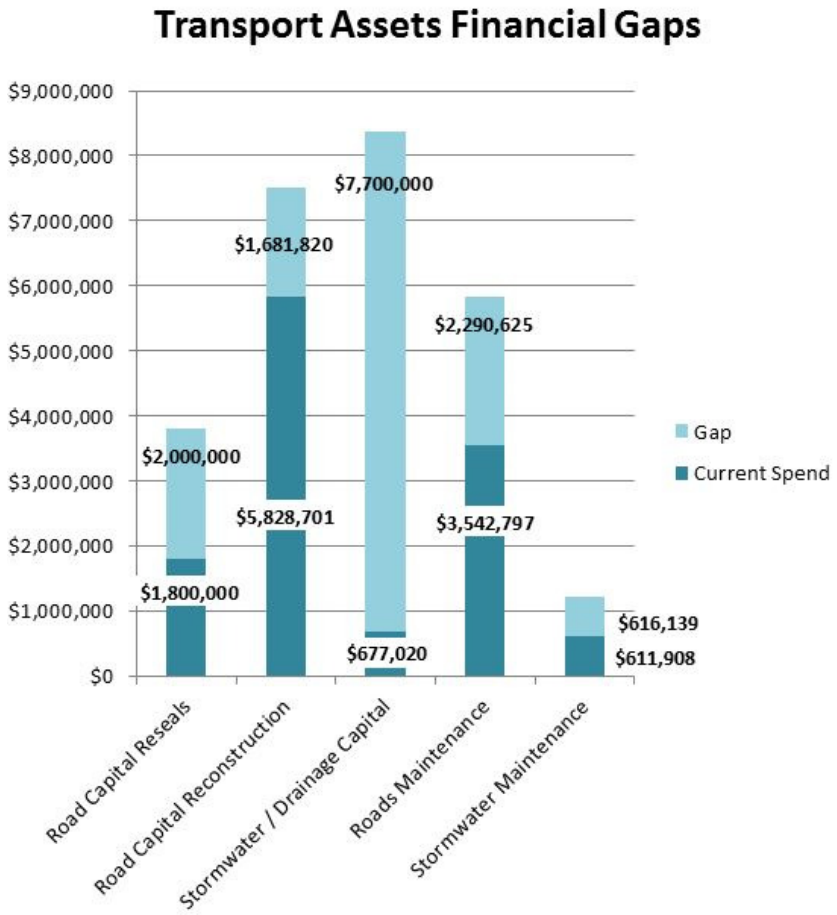
The stormwater and road maintenance targets have been calculated using the known identified defects in Reflect™ and council unit repair rates (E2018/11600 & E2016/98731). These calculations establish a level of service for known defects and are in addition to Assetic Predictor© modelling.

Table 133 Financial Gaps additional to Assetic Predictor© modelling

Asset Sub-type	Current Spend 2016/17	Gap	Required Budget
CAPITAL RENEWAL			
Road Capital Reseals *Note: (Table)*	$1,800,000	$2,000,000	$3,800,000
Road Capital Reconstruction *Note: (Table) (Not including new assets)*	$5,828,701	$1,681,820	$7,510,521
Stormwater / Drainage Capital Causeways & Major Culverts	$677,020	$7,700,000 *(E2016/85152 & E2016/85145)*	$8,377,020
MAINTENANCE			
Roads	$3,542,797 *(Work Orders Roads)*	$2,290,625 *(Reflect™ outstanding defects)*	$5,833,422
Stormwater	$611,908 *(Work Orders SW)*	$616,139 *(Reflect™ outstanding defects)*	$1,228,047
TOTAL RENEWAL AND MAINTENANCE	**$12,460,426**	**$14,288,584**	**$26,749,010**

The current spend on reseals and reconstructions fluctuate from year to year and are affected by maintenance overruns (caused by competing maintenance and capital projects).

Roads and stormwater have big financial challenges with a current Capital Renewal and Maintenance gap of $14.3M.



Financial Ratios

Asset Consumption Ratio

This ratio seeks to highlight the aged condition of a local government's stock of physical assets. If a council is responsibly maintaining and renewing/replacing its assets in accordance with a well prepared asset management plan, then the fact that the Asset Consumption Ratio may be relatively low and/or declining should not be cause for concern – providing it is operating sustainably.

$$Asset\ Consumption\ Ratio = \frac{Depreciated\ Replacement\ Cost\ of\ Depreciable\ Assets}{Current\ Replacement\ Cost\ of\ Depreciable\ Assets}$$

Purpose: This ratio measures the extent to which depreciable assets have been consumed by comparing their written down value to their replacement cost.

Standards: Standard is not met if less than 50%.
Standard is met if the ratio can be measured and is 50% or greater (0.50 or >).
Standard is improving if the ratio is between 60% and 75% (0.60 and 0.75).

Table 144 Asset Consumption Ratios

Asset Financial Class	Current Replacement Cost	Depreciated Replacement Cost	Ratio	Standard
Sealed Roads	229,941,000	108,104,000	53%	Met
Unsealed Roads	3,911,000	1,232,000	68%	Improving
Kerb and Gutter	23,973,000	6,661,000	72%	Improving
Footpath	$8,626,000	3,124,000	64%	Improving
Bridge Construction	$23,909,000	$12,830,000	54%	Met
Traffic Devices	$59,748,000	$19,624,000	67%	Improving
Retaining Walls and barriers	$10,424,000	$2,147,000	79%	Improving
Car Parks	$3,306,000	$594,000	82%	Improving

Asset Sustainability Ratio

This ratio is an approximation of the extent to which assets managed by a council are being replaced as these reach the end of their useful lives. It is calculated by measuring capital expenditure on renewal or replacement of assets, relative to depreciation expense. Expenditure on new or additional assets is excluded.

Depreciation expense represents an estimate of the extent to which the assets have been consumed during that period. Measuring assets at fair value is critical to the calculation of a valid depreciation expense value.

$$Asset\ Sustainability\ Ratio = \frac{Capital\ Renewal\ and\ Replacement\ Expenditure}{Depreciation}$$

Purpose: This ratio indicates whether a council is replacing or renewing existing non-financial assets at the same rate that its overall asset stock is wearing out.

Standards: Standard is met if the ratio can be measured and is 90% (or 0.90)
Standard is improving if this ratio is between 90% and 110% (or 0.90 and 1.10).

Table 155 Asset Sustainability Ratio Figures

Asset Financial Class	Annual Planned Renewal Expenditure	Annual Depreciation	Ratio	Standard
Sealed Roads	$3,528,126	$3,396,000	104%	Improving
Footpaths	$158,647	$126,000	126%	Improving
Bridge Construction	$442,407	$293,000	151%	Improving

While the **Asset Sustainability Ratio** appears to indicate the Council are over spending, the **Asset Consumption Ratio** shows that there has been little spent on renewals in the past creating a backlog of poor condition assets (Table 15). The following **Asset Renewal Funding Ratio** supports this narrative, showing that the minimum financial demand requirements are not being met moving forward.

Asset Sustainability and Renewal Ratios appear to be improving as we have increased spending in order to make up the backlog of previously underfunded assts.

Asset Renewal Funding Ratio

This ratio indicates whether a council has the financial capacity to fund asset renewal as required, and can continue to provide existing levels of services in future, without additional operating income; or reductions in operating expenses.

The ratio is calculated from information included in the council's Long Term Financial Plan and Asset Management Plan; not the Annual Financial Report. For the ratio to be meaningful, a consistent discount rate should generally be applied in Net Present Value (NPV) calculations

$$Asset\ Renewal\ Funding\ Ratio = \frac{NPV\ of\ Planned\ Capital\ Renewals\ over\ 10\ years}{NPV\ fo\ Required\ Capital\ Expenditure\ over\ 10\ years}$$

Purpose: This ratio is a measure of the ability of a council to fund its projected asset renewal / replacements in the future.

Standards: Standard is met if the ratio is between 75% and 95% (or 0.75 and 0.95).
Standard is improving if the ratio is between 95% and 105% (or 0.95 and 1.05), and the ASR falls within the range 90% to 110% and 50% to 75%.
Standard not met if <75%.

Table 166 Asset Renewal Funding Ratio Figures

Asset Financial Class	Planned Renewal Expenditure	Required (Unlimited) Renewal Expenditure	Ratio	Standard
Sealed Roads	$35,281,256	$47,036,145	75%	Met
Unsealed Roads	$3,202,431	$7,101,576	45%	Not met
Footpath and shared paths	$955,000	unknown	N/A	N/A
Kerb and Gutter	$249,000	unknown	NA	N/A
Bridge Construction	$4,424,074	$4,424,074	100%	Improving

Note: Footpaths and Kerb and Gutter have not been modelled and thus the required Renewal has not been calculated.

Asset Maintenance Ratio

This Ratio is reported in Council's Annual Financial Statements as part of Special Schedule 7 (SS7) – Condition of Infrastructure. The Ratio disclosed here relates to the Council's General Fund and this covers the assets subject of this Asset Management Plan with the addition of Buildings. This ratio measures the actual or estimated asset maintenance expenditure against required asset maintenance. The benchmark for this ratio is 1.00 i.e. maintenance expenditure equals required maintenance expenditure. If maintenance expenditure is below required maintenance expenditure, this indicates Council is not maintaining its assets as required.

To calculate this Ratio, the following formula is used:

$$Asset\ Maintenance\ Ratio = \frac{Actual\ Asset\ Maintenance}{Required\ Asset\ Maintenance}$$

The following graph identifies the actual outcome for the period 2014/2015 to 2016/2017 and estimated outcome from then to 2025/2026:

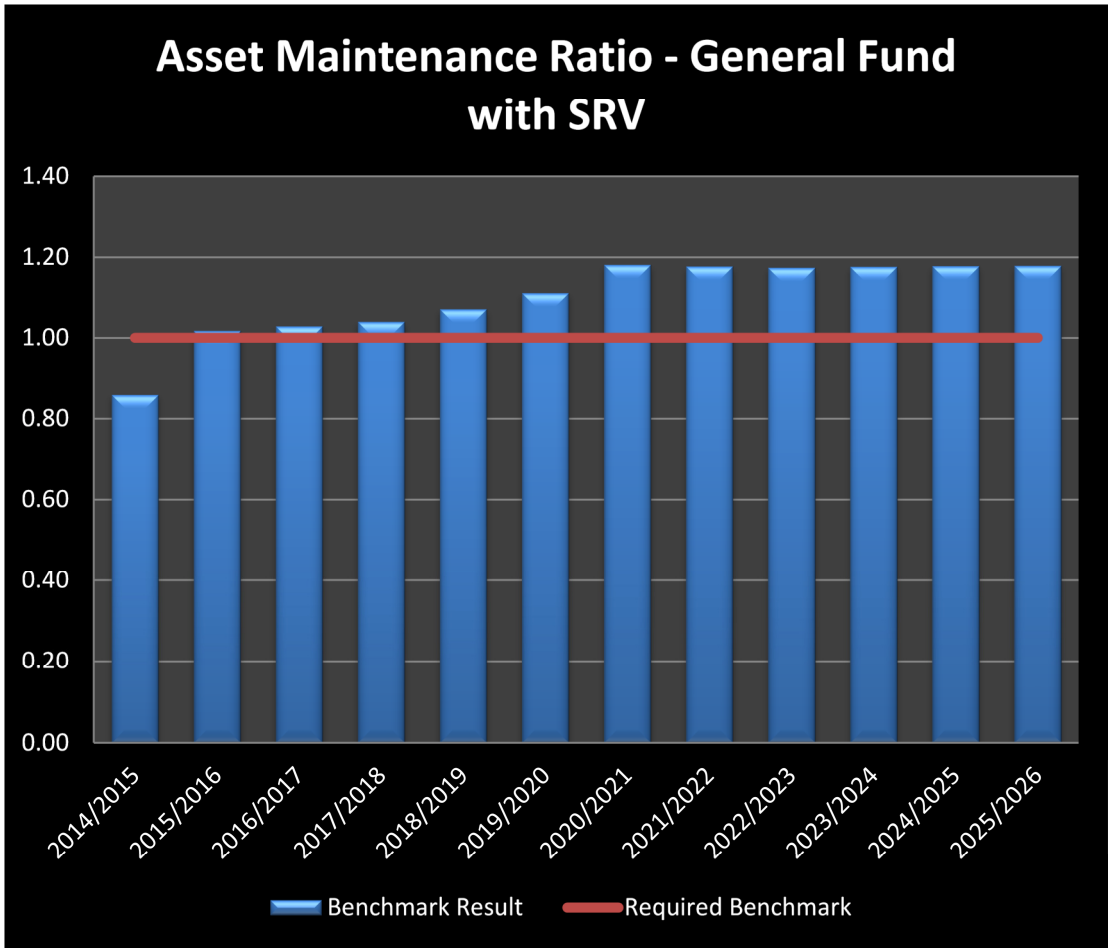


Figure 17 Asset Maintenance Ratio General Fund SS7

Infrastructure Backlog Ratio

This Ratio is reported in Council's Annual Financial Statements as part of Special Schedule 7 (SS7) – Condition of Infrastructure. The Ratio disclosed here relates to the Council's General Fund and this covers the assets subject of this Asset Management Plan with the addition of Buildings. This ratio measures the estimated cost to bring assets back to a satisfactory standard compared to the total written down value of infrastructure assets. The benchmark for this ratio is to have a backlog on an annual basis of 2.00% or less i.e. costs to bring assets back to a satisfactory standard is less then 2.00% of the total written down value of Infrastructure Assets equals required maintenance expenditure. If the trend of this ratio is above the 2.00% benchmark it demonstrates that Council is not addressing its Infrastructure backlog. This is the case for Byron Shire Council.

To calculate this Ratio, the following formula is used:

$$Infrastructure\ Backlog\ Ratio = \frac{Estimated\ cost\ to\ bring\ assets\ to\ a\ satisfactory\ standard}{Total\ written\ down\ value\ of\ infrastructure\ assets}$$

The following graph identifies the outcome relevant for Council for the period 2014/2015 to 2016/2017 and estimated outcome from then to 2025/2026:

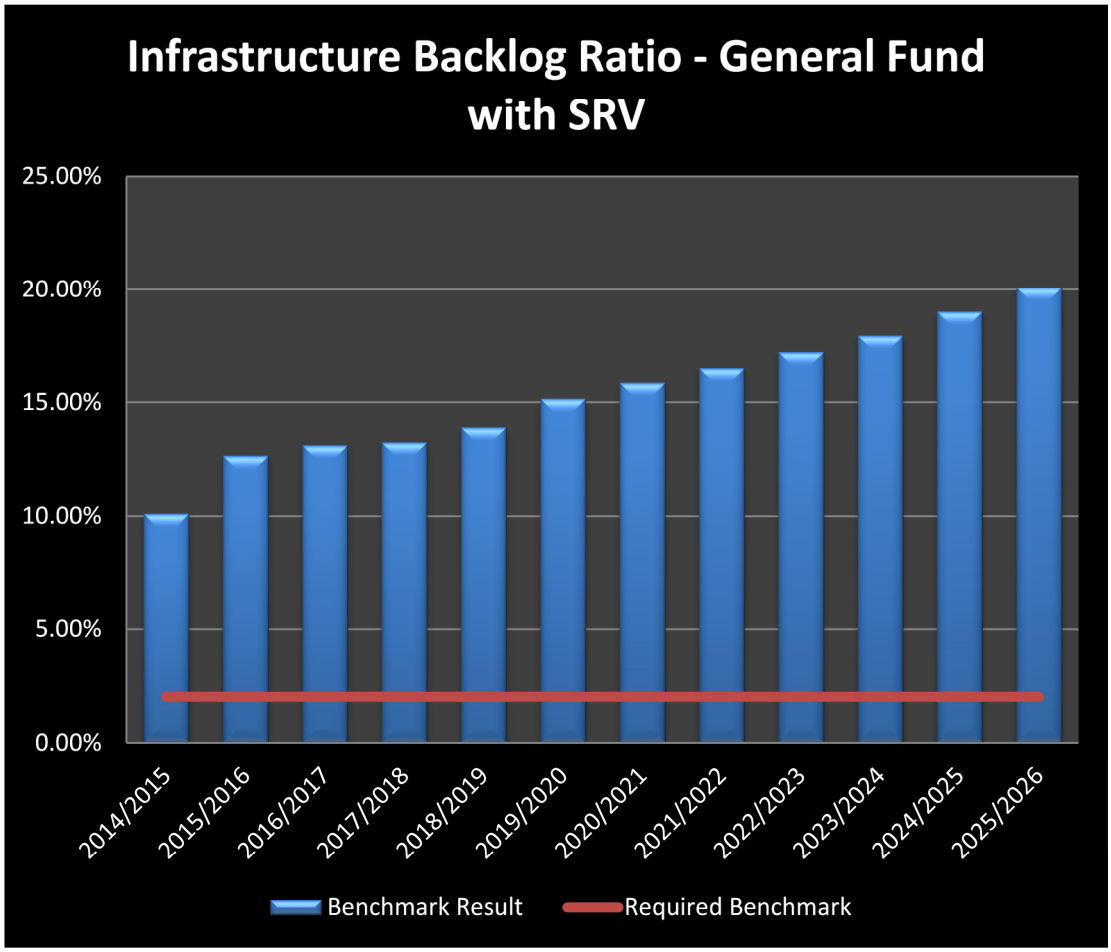


Figure 18 Infrastructure Backlog Ratio General Fund SS7

13. Improvement Plan

Improvement Actions

Table 177 Improvement actions summary

ID	Task	Responsible Department	Target Date	Conceptual Cost
1.	Obtain Council approval of this Plan	Infrastructure Services	June 2018	Internal Resource
2.	Condition Assessment – regularly review condition data and methodology	Infrastructure Services	Ongoing	
3.	Condition Assessment – expand scope of condition assessment to include those asset currently un-assessed	Infrastructure Services	Ongoing	Internal Resource
4.	Maintenance Plan – establish and document levels of service for maintenance activities	Infrastructure Services	June 2019	Internal Resource
5.	Confirm remaining life and useful life of assets	Infrastructure Services	June 2019	Internal Resource
6.	Update and revise prediction modelling parameters and inputs when new condition data/information is available	Infrastructure Services	Ongoing	Internal Resource
7.	Test current levels of service to determine if they are achievable with current budget allocation.	Infrastructure Services	December 2019	Internal Resource
8.	Formalise asset disposal policy	Infrastructure Services	June 2019	Internal Resource
9.	Formalise asset renewal policy	Infrastructure Services	June 2019	Internal Resource
10.	Formalise asset new policy	Infrastructure Services	June 2019	Internal Resource

14. 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 any need for some preventative or remedial action.
Asset management	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.
Assets	Future economic benefits controlled by the entity as a result of past transactions or other past events (AAS27.12). Property, plant and equipment including infrastructure and other assets (such as furniture and fittings) with benefits expected to last more than 12 month.
Backlog	Estimated cost to bring infrastructure, buildings and other structures and depreciable land improvements to a satisfactory standard, measured at a particular point in time
Capital expenditure	Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, expansion and upgrade. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.
Capital funding	Funding to pay for capital expenditure.
Capital new expenditure	Expenditure which creates a new asset providing a new service to the community that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operating and maintenance expenditure.
Capital renewal expenditure	Expenditure on an existing asset, which returns the service potential or the life of the asset up to that which it had originally. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, e.g. resurfacing or re-sheeting a material part of a road network, replacing a material section of a drainage network with pipes of the same capacity, resurfacing an oval. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.
Capital upgrade expenditure	Expenditure, which enhances an existing asset to provide a higher level of service or expenditure that will increase the life of the asset beyond that which it had originally. Upgrade expenditure is discretional and often does not result in additional revenue unless direct user charges apply. It will increase operating and maintenance expenditure in the future because of the increase in the Council's asset base, e.g. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.
Carrying amount	The amount at which an asset is recognised after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.

Component	An individual part of an asset which contributes to the composition of the whole and can be separated from or attached to an asset or a system.
Cost of an asset	The amount of cash or cash equivalents paid or the fair value of the consideration given to acquire an asset at the time of its acquisition or construction, plus any costs necessary to place the asset into service. This includes one-off design and project management costs.
Current replacement cost (CRC)	The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost to replace the existing asset with a technologically modern equivalent new asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs.
Current Replacement Cost "As New" (CRC)	The current cost of replacing the original service potential of an existing 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.
Cyclic Maintenance	Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, cyclic replacement of air conditioning equipment, etc. This work generally falls below the capital/ maintenance threshold and needs to be identified in a specific maintenance budget allocation.
Depreciable amount	The cost of an asset, or other amount substituted for its cost, less its residual value (AASB 116.6)
Depreciated replacement cost (DRC)	The current replacement cost (CRC) 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 / amortisation	The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.
Economic life	See useful life definition.
Expenditure	The spending of money on goods and services. Expenditure includes recurrent and capital.
Fair value	The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arm's length transaction.
Greenfield asset values	Asset (re)valuation values based on the cost to initially acquire the asset.
Heritage asset	An asset with historic, artistic, scientific, technological, geographical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture and this purpose is central to the objectives of the entity holding it.
Impairment Loss	The amount by which the carrying amount of an asset exceeds its recoverable amount.

Infrastructure assets	Physical assets of the entity or of another entity that contribute to meeting the public's need for access to major economic and social facilities and services, e.g. roads, drainage, footpaths and shared paths. These are typically large, interconnected networks or portfolios of composite assets. The components of these assets may be separately maintained, renewed or replaced individually so that the required level and standard of service from the network of assets is continuously sustained. Generally the components and hence the assets have long lives. They are fixed in place and are often have no market value.
Level of service	The defined service quality for a particular service against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental, acceptability and cost).
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 Life Cycle Cost 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.
Maintenance and renewal gap	Difference between estimated budgets and projected expenditures for maintenance and renewal of assets, totalled over a defined time (e.g. 5, 10 and 15 years).
Maintenance and renewal sustainability index	Ratio of estimated budget to projected expenditure for maintenance and renewal of assets over a defined time (e.g. 5, 10 and 15 years).
Maintenance expenditure	Recurrent expenditure, which is periodically or regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service. It is expenditure, which was anticipated in determining the asset's useful life.
Materiality	An item is material if its omission or misstatement could influence the economic decisions of users taken on the basis of the financial report. Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances.
Modern equivalent asset.	A structure similar to an existing structure and having the equivalent productive capacity, which could be built using modern materials, techniques and design. Replacement cost is the basis used to estimate the cost of constructing a modern equivalent asset.
Non-revenue generating investments	Investments for the provision of goods and services to sustain or improve services to the community that are not expected to generate any savings or revenue to the Council, e.g. parks and playgrounds, footpaths, roads and bridges, libraries, etc.
Operating expenditure	Recurrent expenditure, which is continuously required excluding maintenance and depreciation, e.g. power, fuel, staff, plant equipment, on-costs and overheads.
Planned Maintenance	Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, 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.

Rate of annual asset consumption	A measure of average annual consumption of assets (AAAC) expressed as a percentage of the depreciable amount (AAAC/DA). Depreciation may be used for AAAC.
Rate of annual asset renewal	A measure of the rate at which assets are being renewed per annum expressed as a percentage of depreciable amount (capital renewal expenditure/DA).
Rate of annual asset upgrade	A measure of the rate at which assets are being upgraded and expanded per annum expressed as a percentage of depreciable amount (capital upgrade/expansion expenditure/DA).
Reactive maintenance	Unplanned repair work that is carried out in response to service requests and management/supervisory directions.
Recoverable amount	The higher of an asset's fair value less costs to sell, and its value in use.
Recurrent expenditure	Relatively small (immaterial) expenditure or spending that which has benefits expected to last less than 12 months e.g. pot hole patching. Recurrent expenditure includes operating and maintenance expenditure.
Recurrent funding	Any source of funding that is predictable and that recurs year on year.
Rehabilitation	See capital renewal expenditure definition above.
Remaining life	The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining life is economic life.
Renewal	See capital renewal expenditure definition above.
Residual value	The net amount which an entity expects to obtain for an asset at the end of its useful life after deducting the expected costs of disposal.
Risk management	The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.
Section or segment	A self-contained part or piece of an infrastructure asset.
Service potential	The capacity to provide goods and services in accordance with the entity's objectives, whether those objectives are the generation of net cash inflows or the provision of goods and services of a particular volume and quantity to the beneficiaries thereof.
Service potential remaining	A measure of the remaining life of assets expressed as a percentage of economic life. It is also a measure of the percentage of the asset's potential to provide services that are still available for use in providing services (DRC/DA).
Strategic Asset Management Plan	Plan that documents Council objectives for a specified period (10 years), the principle activities to achieve the objectives, the means by which that will be carried out, estimated income and expenditure, measures to assess performance and how rating policy relates to the Council's objectives and activities.

Sub-component Smaller individual parts that make up a component part.

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.

It is the estimated or expected time between placing the asset into service and removing it 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.

15. APPENDIX A Special Schedule 7 – Report on Infrastructure Assets as at 30 June 2017

Byron Shire Council

Special Schedule 7 – Report on Infrastructure Assets as at 30 June 2017

$'000

Asset class	Asset category	Estimated cost to bring assets to satisfactory standard	Estimated cost to bring to the agreed level of service set by Council	2016/17 Required maintenance[a]	2016/17 Actual maintenance	Net carrying amount	Gross replacement cost (GRC)	Assets in condition as a percentage of gross replacement cost				
								1	2	3	4	5
Buildings	Council Operations	–	–	273	241	13,201	14,931	4%	84%	10%	2%	0%
	Swimming Pool Buildings	187	187	–	–	838	931	9%	58%	32%	1%	0%
	Showground Buildings	–	–	–	–	1,531	1,937	6%	36%	45%	13%	0%
	Residential Leases	9	9	–	–	1,098	1,333	4%	22%	67%	7%	0%
	Recreation Buildings	115	115	–	–	3,912	5,755	4%	38%	53%	4%	1%
	Cavanbah Centre	–	–	23	31	5,168	5,416	100%	0%	0%	0%	0%
	Public Amenities	428	428	454	475	2,660	3,051	36%	28%	30%	5%	1%
	Emergency Services	49	49	–	–	1,130	1,262	23%	51%	22%	3%	1%
	Community Buildings	1,028	1,028	312	285	27,054	31,547	21%	43%	31%	5%	0%
	Commercial Leases	253	253	–	–	1,350	1,633	14%	52%	34%	0%	0%
	Holiday Parks	–	–	474	474	5,003	5,883	18%	62%	20%	0%	0%
	Sub-total	2,069	2,069	1,536	1,506	62,945	73,679	21.4%	48.6%	26.2%	3.6%	0.1%
Other structures	Other structures	378	378	10	14	1,917	2,190	31%	10%	36%	21%	2%
	Bus Shelters	–	–	4	5	124	200	19%	49%	5%	22%	5%
	Sub-total	378	378	14	19	2,041	2,390	30.0%	13.3%	33.4%	21.1%	2.3%

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Byron Shire Council

Special Schedule 7 – Report on Infrastructure Assets as at 30 June 2017 (continued)

$'000

Asset class	Asset category	Estimated cost to bring assets to satisfactory standard	Estimated cost to bring to the agreed level of service set by Council	2016/17 Required maintenance[a]	2016/17 Actual maintenance	Net carrying amount	Gross replacement cost (GRC)	Assets in condition as a percentage of gross replacement cost				
								1	2	3	4	5
Roads	Sealed Roads	24,037	24,037	2,597	2,555	121,837	229,941	4%	19%	56%	12%	9%
	Unsealed Roads	1,045	1,045	589	389	2,679	3,911	8%	20%	33%	31%	8%
	Bridges	6,274	6,274	300	27	12,830	23,909	27%	7%	49%	17%	0%
	Footpaths	550	550	167	11	5,503	8,627	15%	35%	40%	10%	0%
	Kerb and gutter	–	–	100	2	17,312	23,973	0%	18%	18%	55%	9%
	Other road assets	–	–	–	–	238	238					100%
	Traffic Control Devices	–	–	10	1	40,124	59,748	28%	45%	23%	3%	1%
	Carparks	–	–	10	–	2,712	3,306	0%	22%	45%	11%	22%
	Roundabouts, Islands and Speed Humps	–	–	–	–	8,277	10,424					100%
	Sub-total	31,906	31,906	3,773	2,985	211,511	364,077	9.3%	22.3%	45.3%	13.5%	9.7%
Water supply network	Mains	–	–	729	729	48,507	79,162	36%	28%	34%	2%	0%
	Reservoirs	–	–	167	167	6,305	12,587	0%	85%	11%	0%	4%
	Pumping Stations	–	–	27	27	313	567	20%	58%	17%	4%	1%
	Treatment	–	–	213	213	3,465	5,124	0%	100%	0%	0%	0%
	Sub-total	–	–	1,136	1,136	58,590	97,440	29.4%	39.3%	29.1%	1.6%	0.5%
Sewerage network	Sewerage network	–	–	695	695	48,003	87,834	31%	35%	23%	11%	0%
	Pumping Stations	–	–	1,003	1,003	9,055	18,654	19%	26%	41%	11%	3%
	Treatment	–	–	2,788	2,788	54,715	69,370	49%	46%	5%	0%	0%
	Sub-total	–	–	4,486	4,486	111,772	175,858	36.8%	38.4%	17.8%	6.7%	0.3%

Byron Shire Council

Special Schedule 7 – Report on Infrastructure Assets as at 30 June 2017 (continued)

$'000

Asset class	Asset category	Estimated cost to bring assets to satisfactory standard	Estimated cost to bring to the agreed level of service set by Council	2016/17 Required maintenance[a]	2016/17 Actual maintenance	Net carrying amount	Gross replacement cost (GRC)	Assets in condition as a percentage of gross replacement cost				
								1	2	3	4	5
Stormwater drainage	Stormwater drainage	3,025	3,025	396	127	47,322	64,294	1%	15%	62%	20%	2%
	Sub-total	3,025	3,025	396	127	47,322	64,294	1.0%	15.0%	62.0%	20.0%	2.0%
Open space/ recreational assets	Swimming pools	–	–	32	32	2,192	2,800	0%	100%	0%	0%	0%
	Fences	–	–	–	–	1,303	2,017	12%	36%	34%	16%	2%
	Lighting	157	157	2	2	2,313	2,977	17%	54%	23%	5%	0%
	Open Space Furniture	182	182	14	12	813	1,221	15%	31%	39%	12%	3%
	Other Structures	75	75	202	194	2,560	3,093	62%	19%	15%	4%	0%
	Park Active Areas	35	35	567	521	1,424	2,797	5%	20%	66%	4%	5%
	Park Equipment	196	196	6	5	1,040	1,745	24%	23%	40%	11%	2%
	Park Infrastructure	–	–	–	–	21	33	9%	24%	55%	6%	6%
	Park Passive Areas	–	–	–	–	204	413	8%	28%	38%	26%	0%
	Playgrounds	–	–	32	30	110	161	49%	10%	35%	4%	2%
	Other	–	–	–	–	292	292	0%	75%	25%	0%	0%
	Sub-total	645	645	854	796	12,273	17,550	20.0%	42.3%	29.5%	6.7%	1.5%
	TOTAL – ALL ASSETS	38,023	38,023	12,195	11,055	506,453	795,288	18.6%	30.2%	36.4%	10.0%	4.8%

Notes:

a Required maintenance is the amount identified in Council's asset management plans.

Infrastructure asset condition assessment 'key'

1 Excellent No work required (normal maintenance)
2 Good Only minor maintenance work required
3 Average Maintenance work required
4 Poor Renewal required
5 Very poor Urgent renewal/upgrading required

16. APPENDIX B TAMP Visual Summary

TRANSPORT ASSET MANAGEMENT PLAN

Asset Management needs to balance Levels of Service and whole of life cycle costs.

The challenge for council is to invest in capital renewal of existing infrastructure before building capital new assets which increases the assets portfolio and increases costs.

The current long term financial expenditure on maintenance and capital renewal is insufficient to 'maintain' Road assets.

The current spend on road reseals and reconstructions fluctuate from year to year and are affected by maintenance overruns.

Roads and stormwater have big financial challenges with a current Capital Renewal and Maintenance gap of $14.3M.

Road 'Bring to Satisfactory' backlog is $24M.
Sealed roads have 41% in poor condition.

Byron leads asset management with the latest technology and innovation.

Asset management systems are well established and integrated.

Useful lives are longer than industry average.

There is insufficient maintenance for urban and rural drainage.
The challenge is the competing pothole maintenance budget of $1.3M.

To "maintain" the overall sealed road network condition the average capital renewal needs to increase to 10.4M by 2018.

The reseals target is 39km per year averaging at $ 3.8million.
The reconstruction target is 6km per year averaging at $7.5M.

Five poor condition bridges will be replaced with steel Australian Defence Force bridges for $7.5M in early 2019.

New and upgrade work is mostly funded through the Section 94 Plan.

Fixing our roads will take committed effort for the next 20 years and this Transport Asset Management Plan is councils way to set goals to achieve this.

OUR TRANSPORT INFRASTRUCTURE

Roads 508Km Sealed & 96km Unsealed

Bridges 33 & Footbridges 12

Kerb and gutter 257km

Footpaths/Shared Paths 89km
(Cyclists & pedestrians)

Road barriers 31km

Bus Shelter 40

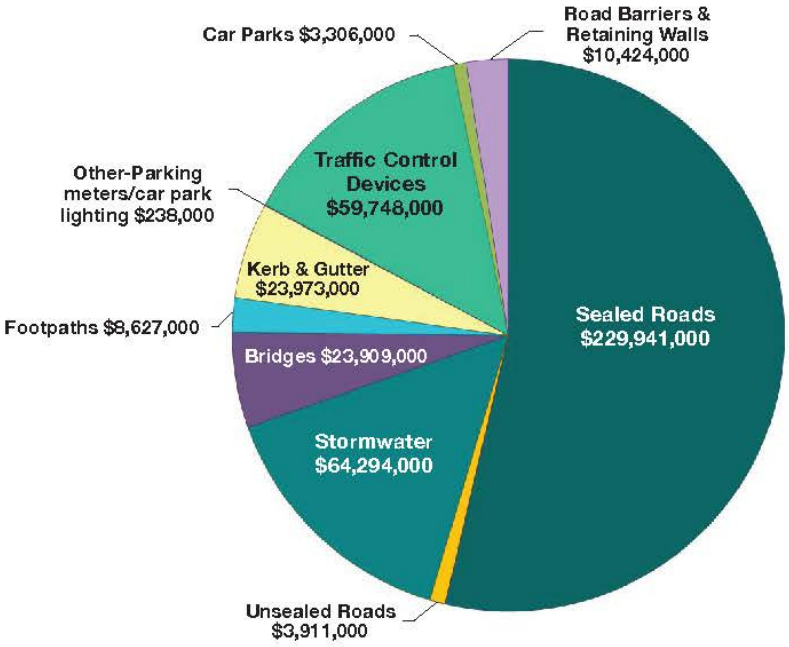
Causeways 88 & major culverts 90
(Rural drainage)

Retaining walls 75

Traffic control devices 727
(roundabouts, islands etc.)

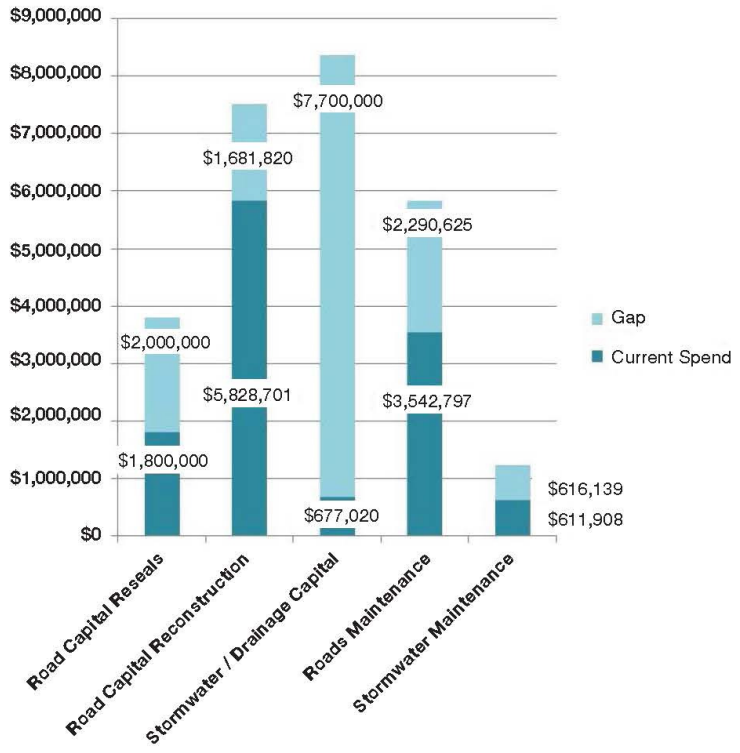
Car Parks 24
(off road)

Replacement Cost of Transport Assets

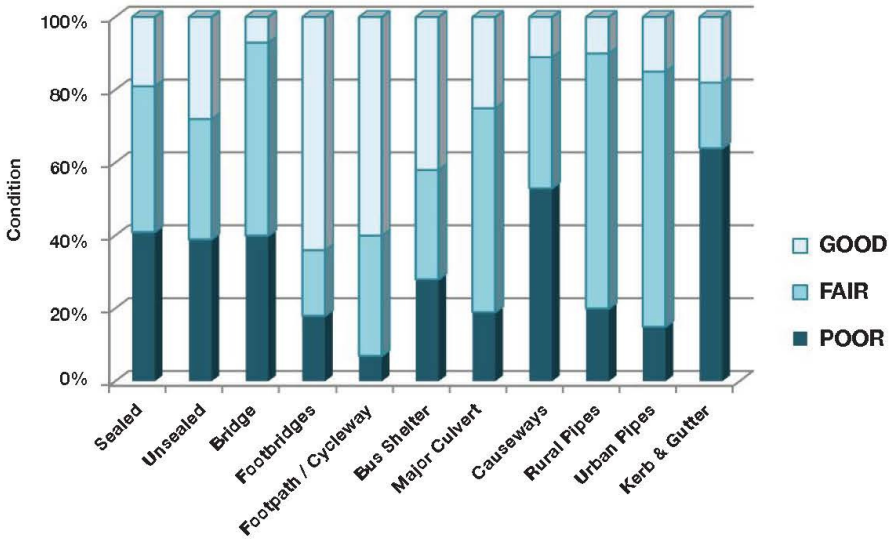


OUR TRANSPORT INFRASTRUCTURE

Transport Assets Financial Gaps



Transport Assets by Condition



LEVELS OF SERVICE

Customer research Priorities

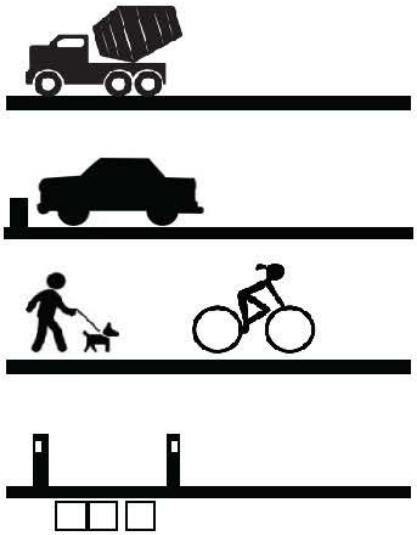
92% - Local Roads -Urban Sealed

82% - Public Toilets

77% - Local Roads - Rural Sealed

Customer Satisfaction Road Assets Performance Gap

Importance – Satisfaction = Performance Gap



2.99 Roads

1.92 Parking

1.54 Footpaths /Shared paths

0.97 Stormwater

REFER TO TABLE 3 LEVELS OF SERVICE IN TAMP

The most recent Community Survey was conducted in 2016. Significantly, of all the services provided by Council, local roads had the lowest satisfaction score of 1.75 where a score of 1.0 is 'Not at all Satisfied' and a score of 5.0 is 'Very Satisfied'. Local Roads were given the highest importance ranking by the community in both the 2013 and 2016 surveys.

In combination with the lowest satisfaction score, this image shows that the poor condition of roads in Byron Shire has resulted in the largest performance gap score of *2.99. The Performance Gap is the Importance minus the Satisfaction Score.*

ASSETS BY CONDITION

Sealed Roads

Council is responsible for 508km of sealed roads which we are currently spending $5.1 million per year to maintain and renew the sealed road pavement. Generally our roads are in fair to poor condition. To address this, additional and significant long term capital work such as reseals and reconstruction is required to improve the overall network.

CONDITIONS OF SEALED ROADS

GOOD CONDITION

- ✓ Minimal cracking
- ✓ Minimal surface defects
- ✓ Smooth travel experience
- ✓ Good drainage

FAIR CONDITION

- ⊖ Moderate cracking
- ⊖ Moderate surface defects
- ⊖ Fair drainage
- ⊖ Can be resealed

POOR CONDITION

- ⊗ Heavy cracking
- ⊗ Severe surface defects like large potholes and patching
- ⊗ Rough travel experience
- ⊗ Poor drainage e.g. table drains
- ⊗ Failed and beyond resealing

Bridges

Council owns and maintains 33 bridges and 12 footbridges. The majority of these road bridges are rated as being in a good to fair condition; however, 40% are rated as poor and load limited. Council spent $74,000 for maintenance and $933,000 capital renewal in 2016/17 on bridges and footbridges.

Council was gifted 3 bridges and 1 foot-bridge on Brunswick Valley Way in 2017 from the Roads and Maritime Services as a part of the highway bypass coming off a 10 year maintenance period. Councils maintenance and capital budgets have not increased accordingly to manage these assets.

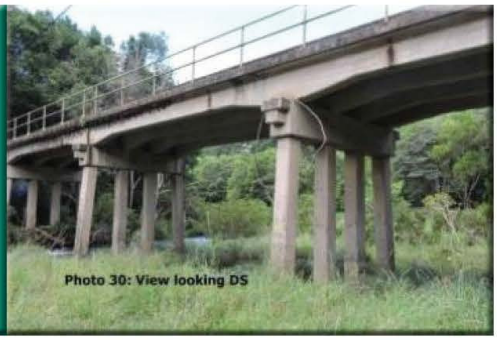
CONDITION OF BRIDGES

GOOD CONDITION

- ✓ Little cracking or wear
- ✓ Screws and joins tight
- ✓ Signage in place
- ✓ No abutment settlement
- ✓ Vegetation cleared

FAIR CONDITION

- ⊖ Cracks appearing
- ⊖ Moderate deterioration of concrete or timber
- ⊖ Spalling commencing on pier
- ⊖ Blocked scuppers
- ⊖ Flood debris and vegetation growth present

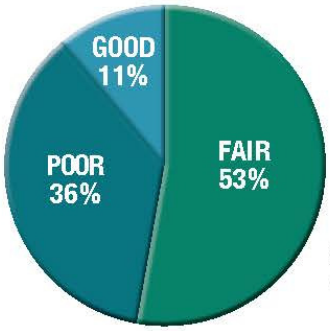


POOR CONDITION

- ⊗ Load limited
- ⊗ Abutment poor or failed
- ⊗ Loose tie downs
- ⊗ Significant decking wear
- ⊗ Advanced deterioration of timber or concrete

Causeways and Culverts

Council owns 88 causeways and 90 culverts, and 1,311 rural pipes. The majority of the causeways and culverts are in good and fair condition however, 19% of the culverts and 53% of the causeways are in a poor condition. Council currently spent $248,000 on maintaining rural drainage in 2016/17. After Level 2 structural inspections council has identified 7 urgent ($2.2million) and 16 high priority ($5.5million) poor condition rural drainage assets. The 7 urgent asset are either load limited and or have temporary steel plates and require full replacement. If the 16 high priority assets are not addressed in the very near future load limits will be implemented. These 23 rural drainage assets totalling $7.7 million is currently unfunded.



CONDITION OF CAUSEWAYS

CONDITION OF CULVERTS

GOOD CONDITION

- ✓ None to low cracking/spalling
- ✓ Barrel blockage 0-5%
- ✓ Waterway flows through designed openings

FAIR CONDITION

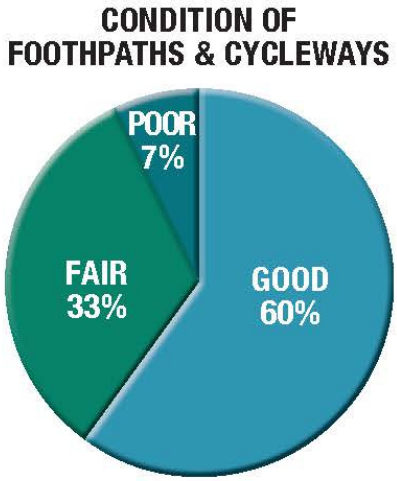
- ⊖ Low to moderate cracking/ spalling
- ⊖ Barrel blockage 6-10%
- ⊖ Low to moderate scour holes

POOR CONDITION

- ⊗ Extensive cracking/spalling
- ⊗ Barrel blockage >40%
- ⊗ Pipe partially collapsed
- ⊗ Embankment failure and major scour holes

Foothpaths and cycleways

Council currently owns and maintains 89km of footpaths and cycleways (shared paths), stairs and kerb ramps across the Shire. We spend approximately $116,000 per year on footpaths and cycleways (maintenance and renewal). The majority of the footpaths are in a fair to good condition with only 7% in poor condition and need complete replacement. A third of the footpaths currently in fair condition need additional replacement in sections to ensure they do not deteriorate into a poor and unsafe condition.



GOOD CONDITION

- ✓ Smooth surface
- ✓ Very few variations in joint heights e.g. trip hazards
- ✓ Little unevenness
- ✓ Not slippery

FAIR CONDITION

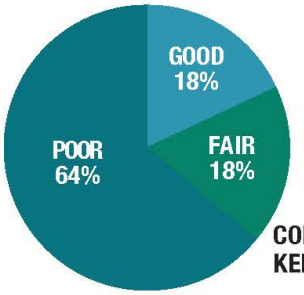
- ⊖ Minor pavement movement or few trip hazards
- ⊖ Moderately uneven
- ⊖ Moderately functioning to suit demands e.g. wear patterns beside path

POOR CONDITION

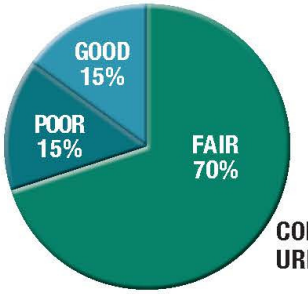
- ⊗ Severe surface defects e.g. many trip hazards
- ⊗ Significant wearing of surface
- ⊗ Very uneven and slippery surface

Urban Stormwater

Council currently owns and maintains 257km of kerb and gutter, 139km of pipes and 4920 pits (includes kerb inlet pits, field inlets and headwalls). Council spent $364,000 on urban drainage in 2016/17. Most of our road drainage is rated fair. However, much of the road drainage network in fair condition needs additional maintenance and replacement work undertaken to prevent it from degrading to a poor condition.



CONDITION OF KERB & GUTTER



CONDITION OF URBAN PIPES

GOOD CONDITION

- ✓ No concrete deterioration
- ✓ No pipe movement
- ✓ Clear approaches and entrances

FAIR CONDITION

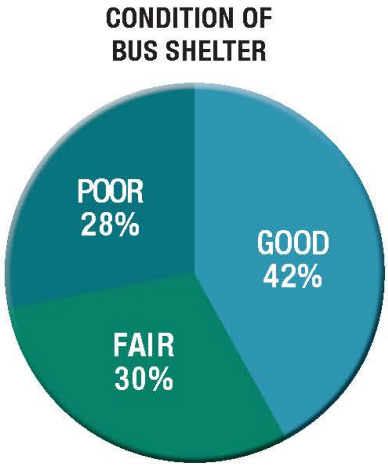
- ⊖ Minor cracking
- ⊖ Minor pipe movement at joints
- ⊖ Moderate blockage

POOR CONDITION

- ⊗ Severe deterioration and movement
- ⊗ Significant cracking
- ⊗ Significant blockage

Bus Shelters

Council owns 40 bus shelters with 43% good and 30% fair. However, there are 28% in a poor condition which require replacing and bringing up to the disability access standards by 2020. We spend approximately $1,680 per year on maintenance.



GOOD CONDITION

- ✓ Structure in good structural condition
- ✓ Seating has no snag points/hazards
- ✓ Vegetation contained
- ✓ Surfaced is non slip and flat

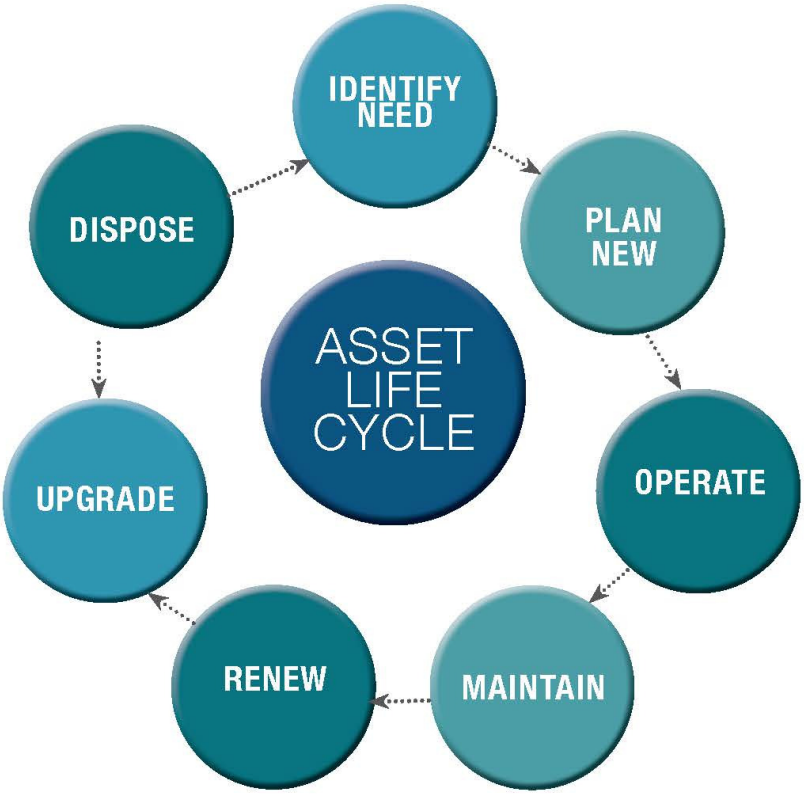
FAIR CONDITION

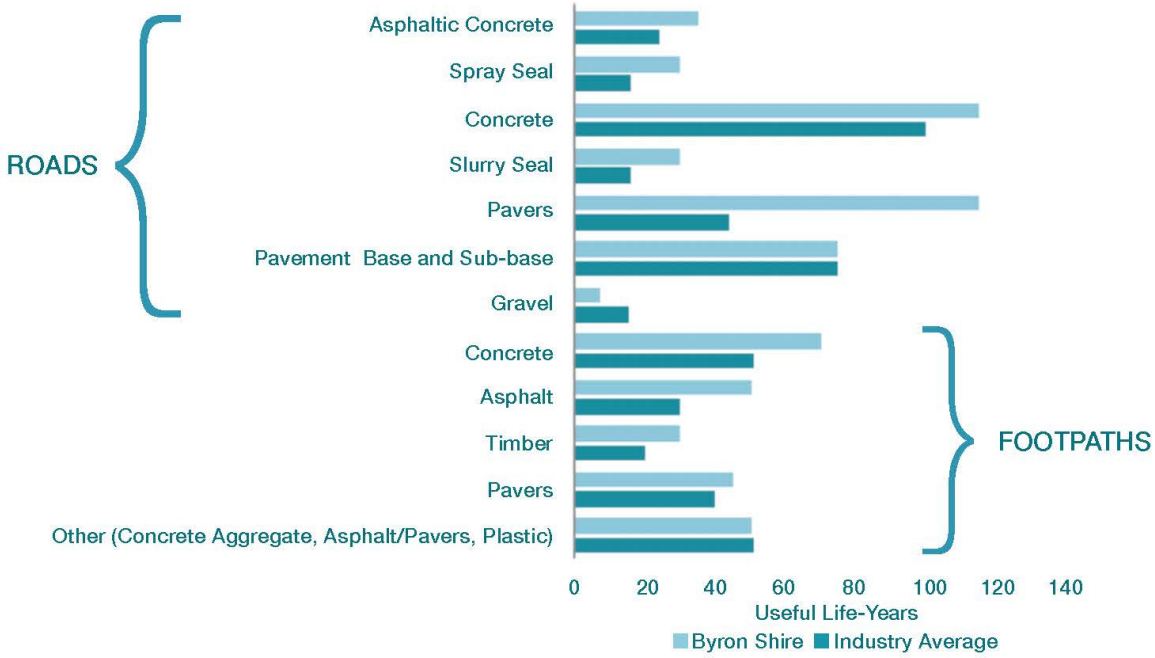
- ⊖ Low to moderate amounts of corrosions/rot in structure
- ⊖ Seating has some minor hazards
- ⊖ Vegetation not contained
- ⊖ Surface has minor cracking/ slip hazards

POOR CONDITION

- ⊗ Structure severely corroded/rotten
- ⊗ Seating has severe snag points /hazards
- ⊗ Overgrown vegetation
- ⊗ Surface has trip hazards/low traction

ASSET LIFE CYCLE

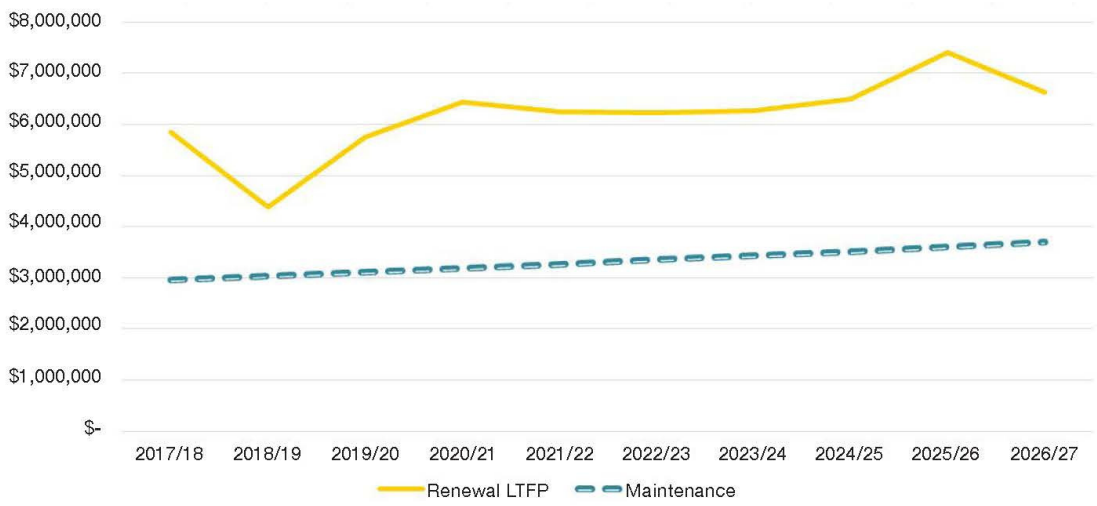




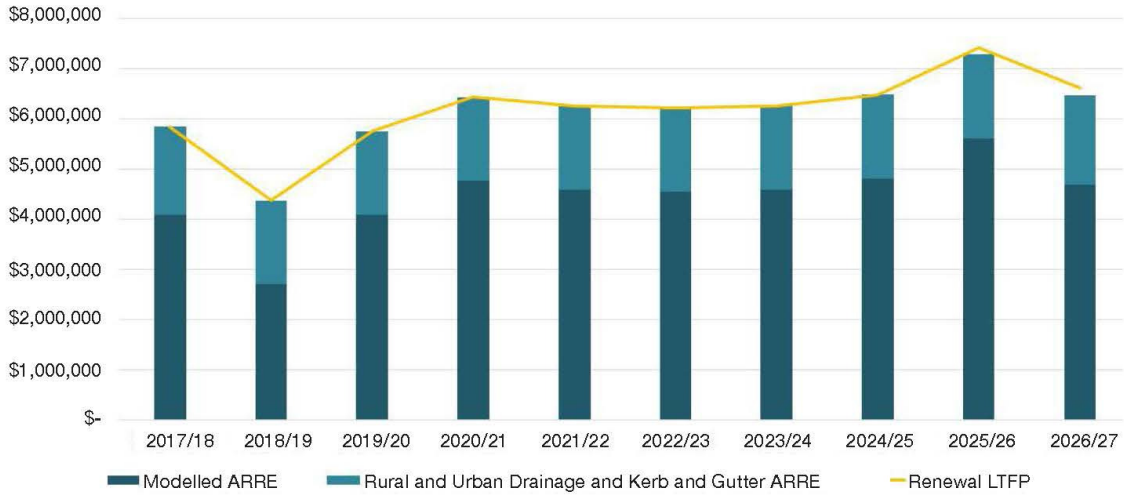
Useful lives are longer than industry average.

REFER TO SECTION 7 LIFE CYCLE MANAGEMENT PLAN

FUNDING



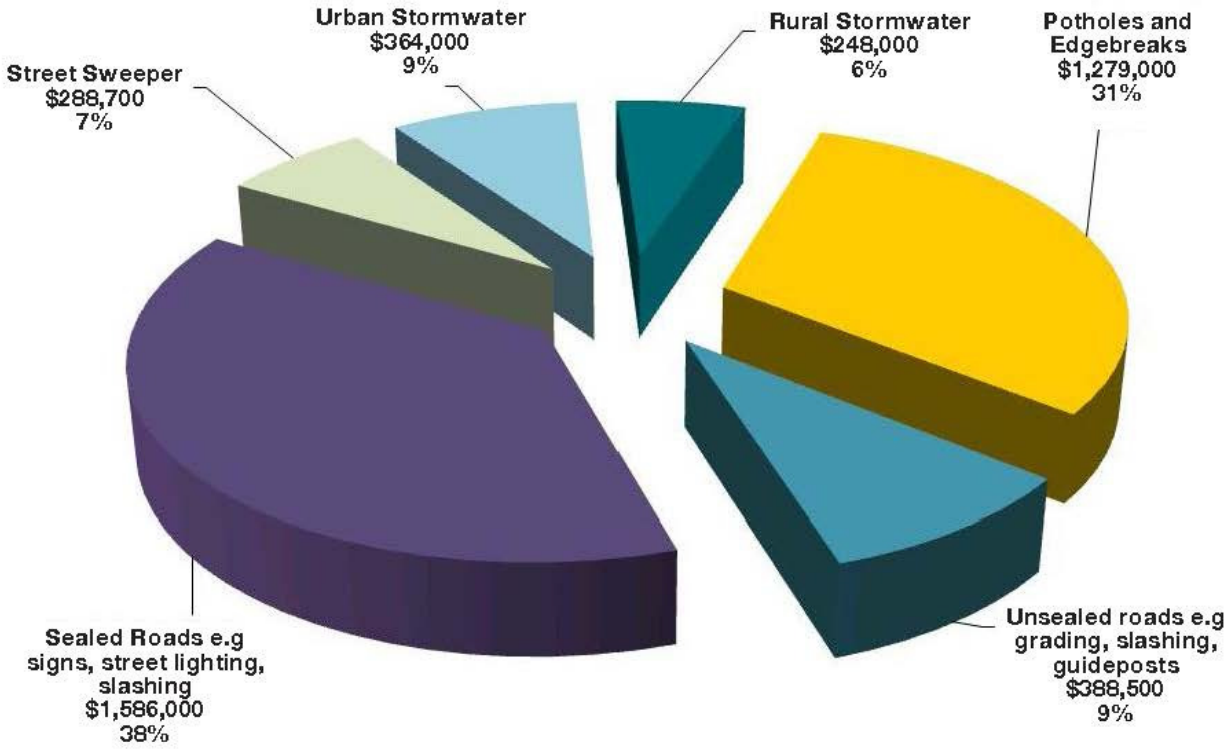
Long Term Financial Plan - Transport



Long Term Financial Plan (LTFP) funding & Annual Required Renewal Expenditure (ARRE)

FUNDING

Roads & Stormwater Maintenance 2016-2017
$4.1 million



There is insufficient maintenance for urban and rural drainage. The challenge is competing pothole maintenance budget of $1.3M.

Fixing our roads will take committed effort for the next 20 years and this Transport Asset Management Plan is councils way to set goals to achieve this.

REFER TO SECTION 8 MAINTENANCE PLAN

17. References

Australian Standards AS1428.1 2009, Design for access and mobility Part 1: General requirements for access - New building work. (2009).

Australian Standards AS1428.2 1992, Design for access and mobility Part 2: Enhanced and additional requirements - Buildings and facilities. (1992).

Austroads (2011). *Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design* (AGPT 05-11), (Austroads, Sydney)

Byron Shire Council. (2008). *Byron Shire Bike Strategy and Action Plan.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (2012). *Byron Shire Developer Contribution Plan 2012.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (2016). *Long Term Financial Plan 2016-2026.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (2016). *Strategic Asset Management Plan.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (2017). *Draft Infrastructure Services Risk Management Procedures.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (2017). *Workforce Plan 2017-2021.* Mullumbimby: Byron Shire Council.

Byron Shire Council. (n.d.). *Asset Assessment Manual Condition, Functionality and Capacity.* Mullumbimby: Byron Shire Council.

Micromex Research. (2016). *Byron Shire Council Asset Management Survey.* Mullumbimby: Byron Shire Council.

PublicWorksTraining.com. (2017, August 29). *Roadway Asset Management for Counties, Cities, Towns and Villages*. Retrieved from PublicWorksTraining.com: https://www.publicworkstraining.com/tam-bundle?lightbox=dataItem-ipqvpzk5

Short, B. (2016). *Level of Service - Sealed Road Network #I2016/108.* Mullumbimby: Byron Shire Council.

SPOT Satellite Personal Tracker. (2017, September 19). *SPOT*. Retrieved from SPOT: https://www.findmespot.com/en/