

Leeton Shire Council Roads & Traffic

Asset Management Plan

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Introduction

Leeton Shire Council maintains 898.9 km of roads across various service standards including sealed roads, gravel roads, formed and unformed roads. Further to this, Council maintains 372 traffic facilities, 111 km of kerb, and 210 road culvert crossings

Goals & Objectives of Asset Management

Leeton Shire Council has four (4) principal objectives listed in its Asset Management Strategy. These are:

1. Manage Council's risks arising from the control of our Assets. This extends to managing our Assets in a manner that is both responsible and in accord with legislative requirements, standards and codes.
2. Through performance measurement, provide a means to assess that the suitability, functionality, service levels and scale of Council Assets compliment Community expectations and to recognise the full potential of the asset.
3. Through lifecycle costing, to ensure, where possible, funds are available for the planning, purchase, installation, operation, maintenance and renewal of Council's Assets.
4. Elevate and promote awareness throughout the organisation of the individual, departmental and broad responsibilities pertaining to Assets and their management.

Plan Framework

This Asset Management Plan considers the following matters pertaining to the maintenance and upkeep of our road network:

1. The current **level of service** provided through the road network, as well as the particular legislative requirements that govern some of these standards.
2. Details on the whole of **lifecycle management** of the road network including risk management, condition, maintenance schedule options, renewal planning, and acquisition/disposal indicators.
3. An assessment of the potential **demand factors** that could affect road network into the future. This extends to considering capital works programs that respond to these factors.
4. Lastly, a **financial summary** wrapping up all of the above information.

Assets Covered by this Plan

This Detailed Asset Management Plan covers all roads & traffic associated items within the Leeton Shire area and includes assets and components such as:

Sealed Roads,	Bus Shelters & furniture,
Gravel Roads,	Pedestrian refuges,
Dry Weather Only Roads (Formerly Formed Roads),	Roundabouts,
Paper Roads (Formerly Unformed Roads),	Car-parks, and
Line-marking,	Bridges and Culverts

It does not cover ancillary items involved with assets such as Guardrails and Guideposts, Streetlights, Road signs, and the like. These assets are typically expensed items. Please contact Council's GIS and Assets Coordinator for further information regarding these assets.

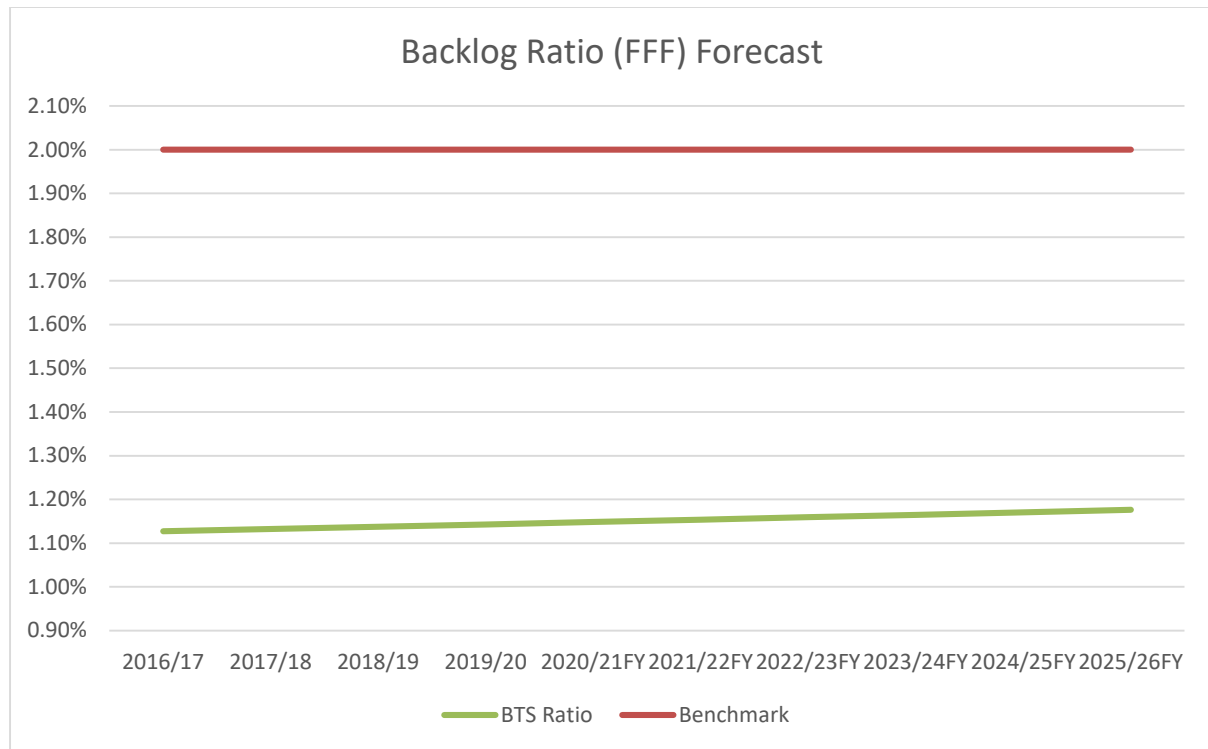
This plan also excludes consideration of Main Road 80 being Irrigation Way (otherwise known as the Narrandera Road, the Griffith Road, Wamoon Ave, Pine Ave, Kurrajong Ave, Yanco Ave, and Main Ave).

AMP Summary Dashboard

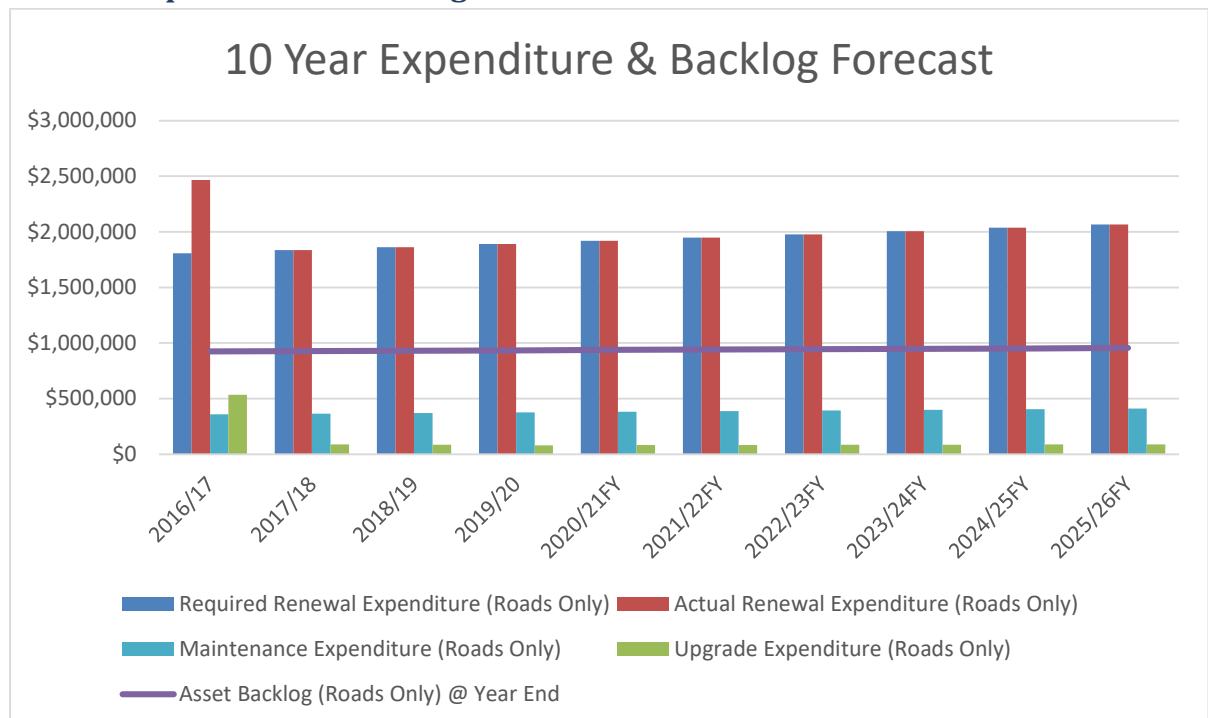
Based on Council's estimates, the following figures represent the proposed backlog reductions over the coming planning period, if the management systems within this Asset Management Plan are followed. Figures are shown in 2016/17 dollars.

Roads & Traffic Backlog Ratio (Fit for the Future) Forecast

Council's must keep their Backlog Ratio beneath the 2% benchmark.



10 Year Expenditure & Backlog Forecast





Service Levels

This section considers the current level of service provided through the roads & traffic assets network as well as the particular legislative requirements that govern some of these standards.

Legislative Requirements

Below are listed the main pieces of legislation that relate to the operation of Council's roads & traffic asset network. This is not an exhaustive list and our road network may, from time to time, be impacted by additional legislation. Typically, these instruments affect the initial construction of a road (clearances, grades, widths, etc.) as well as the operation and management concepts around trafficable areas.

- Local Government Act
- NSW Roads Act 1993
- WHS Legislation
- Australian Road Rules
- Australian Standards
- AustRoads Guide to Road Design
- Asset Management Plan and the Community Strategic Plan

Throughout the development of Leeton Shire Council's Community Strategic Plan, Asset Management was highlighted as an important facet of Council's operations. Among other matters, the Community indicated that Council's priority efforts should be to:

"Develop a 5 year works program for the Petersham Road precinct to include walk/bike paths, suitable lighting and support infrastructure"

"Ensure sufficient levels of parking can be accessed by shoppers and visitors"

"Effectively undertake long term road planning"

"Participate in Murrumbidgee Irrigation's culvert widening program where improved road safety can be achieved with appropriate cost sharing"

"Improved internal street/facility and directional signage that is uniform. Undertake a comprehensive assessment of existing signage"

"Continued maintenance and installation of street furniture where appropriate"

The purpose of this Asset Management Plan is to enable the satisfaction of these Community priorities in an efficient and cost effective manner.

Community Desired Levels of Service

Certain aspects of the current levels of service detailed in the following section can be reduced or increased as desired by the Community. For this iteration of the Roads & Traffic Asset Management Plan, no modifications to levels of service have been considered.

Community consultation of basic levels of service was undertaken during May and June 2016 using Council's *Have Your Say* consultation website, utilising the Budget Allocator module. The results of

this survey are attached in [Appendix 6](#). The results indicated that residents are happy with the level of service currently being provided by Council, except for urban roads which should have its level of service lifted from being renewed at condition 4 to condition 3.

Community desired levels of service will be determined in a future iteration of this plan, ideally at the next review. It has also been added to the [Improvement Plan](#) section for this AMP. It is expected that further community consultation will be undertaken upon development of the details of community desired levels of service.

Current Levels of Service

Leeton Shire Council carries out a number of inspection, maintenance and renewal activities to preserve its roads & traffic network in a satisfactory conditions (where possible). Table 1 outlines these activities and their respective intervention standards that Council aims to achieve under the current budgetary, workforce, and environmental limitations.

Intervention Levels

It should be highlighted that the interventions and response times shown below are reflective of what is **affordable** under the **current pool of funds available** (capital plus operational). Furthermore, they represent the planned/budgeted expectations from the network and not necessarily the work that will be conducted each year. Thorough inspection and investigation precede any actual works programming (i.e. maintenance and renewal) across the network.

It should also be clearly understood that roads classed as 'Paper Roads' (formerly unformed roads) **DO NOT** get any form of maintenance or renewal expenditure aside from one inspection per year.

Service Type / Activity	Class*	Intervention/Service Level	Required Budget
Local Roads Planned Maintenance			\$742,597 per year
Bridge Maintenance	All	For 'as required' works	\$35,500 per year
Linemarking - Longitudinal	1	Remarked once per 12 years	\$668 per year
	2	Remarked once per 12 years	\$6,533 per year
	3	Remarked once per 12 years	\$1,541 per year
Linemarking - Transverse	All	Remarked once per 12 years	\$7,275 per year
Road Grading (Dry Weather Only Network)	4	Graded once per 2 years	\$3,771 per year
	5	Graded once per 2 years	\$97,386 per year
Road Grading (Gravel Network)	4	Graded once per year	\$317,760 per year
	5	Graded once per year	\$14,698 per year
Shoulder Grading (Sealed Network Only)	1	Graded once per 3 years	\$6,522 per year
	2	Graded once per 10 years	\$18,689 per year

	3	Graded once per 10 years	\$19,657 per year
	4	Graded once per 25 years	\$23,189 per year
	5	Graded once per 25 years	\$16 per year
Slashing (Sealed Network Only)	1	Slashed 3 times per year	\$1,936 per year
	2	Slashed 2 times per year	\$11,098 per year
	3	Slashed once per year	\$5,837 per year
	4	Slashed once per year	\$17,213 per year
	5	Slashed once per year	\$12 per year
Street Sweeping	All	Generally once per week CBD 3 times per week	\$160,648 per year
Local Roads Reactive Maintenance***			\$950,443 per year
Correct Surface Shape	All	7750 sq.m per year (avg)	\$115,425 per year
Edge Repair	All	7750 sq.m per year (avg)	\$42,525 per year
Guidepost Replacement	All	970 guideposts per year (avg)	\$41,800 per year
Intersection Sweeping	All	94 Intersections per year (avg)	\$8,871 per year
Pothole Repair	All	16600 events per year (avg)	\$161,120 per year
Sign Repair	All	194 signs per year	\$20,047 per year
Sign Replacement	All	284 signs per year	\$58,307 per year
Tree Maintenance	All	Amount reserved for 'as required' works	\$29,374 per year
Gravel Roads Repair	All	6000sq.m of repair per year	\$21,000 per year
Award, WHS & Planning	All	Amount reserved for meetings and provisions	\$451,974 per year
Local Roads Renewal Costs**			\$2,026,436 per year
Sealed Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Pkg 3)	All	Resealed every 23 years, Rebuilt after 69 years	\$148,129 per year
Asphalt Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Pkg 4)	All	Asphalt every 16 years, Rebuilt after 80 years	\$52,527 per year
Concrete Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Pkg 5)	All	Rebuilt every 50 years	\$485 per year

Sealed Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads (Pkg 6)	All	Resealed every 24 years, Rebuilt after 72 years	\$121,697 per year
Sealed Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads - Heavy Vehicle Routes (Pkg 39)	All	Resealed every 24 years, Rebuilt after 72 years	\$137,653 per year
Asphalt Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads (Pkg 7)	All	Asphalt every 24 years, Rebuilt after 96 years	\$25,615 per year
Sealed Low Traffic Collector/Access Roads (Pkg 8)	All	Resealed every 24 years, Rebuilt after 72 years	\$548,040 per year
Asphalt Low Traffic Collector/Access Roads (Pkg 9)	All	Asphalt every 24 years, Rebuilt after 96 years	\$81,256 per year
Concrete Low Traffic Collector/Access Roads (Pkg 10)	All	Rebuilt every 50 years	\$223 per year
Lanes - All constructed surfaces (Pkg 11)	All	Resealed every 20 years, Rebuilt after 80 years	\$7,320 per year
Limited Access Roads - All constructed surfaces (Pkg 12)	All	Resealed every 20 years, Rebuilt after 80 years	\$372 per year
Gravel Roads (Pkg 13)	All	Resheeted every 15 years	\$684,600 per year
Bus Stops (Pkg 15)	All	Repainted every 10 years, Replaced at 100 years	\$2,198 per year
Pedestrian Bridges (Pkg 16)	All	Repainted every 10 years, Replaced at 100 years	\$3,060 per year
Traffic Bridges (Pkg 17)	All	Rebuilt every 100 years	\$36,067 per year
Carparks (Pkg 18)	All	Resealed every 25 years, Rebuilt after 100 years	\$15,582 per year
Parking Lanes (Pkg 19)	All	Resealed every 48 years, Rebuilt after 96 years	\$13,158 per year
Industrial Parking Lanes (Pkg 20)	All	Resealed every 23 years, Rebuilt after 92 years	\$11,640 per year
Mass Concrete Structures (Pkg 21)	All	Rebuilt every 100 years	\$8,204 per year
Upright / Dish Drain Kerb (Pkg 25)	All	Rebuilt every 150 years	\$103,575 per year
Chamfer / Roll-top Kerb (Pkg 26)	All	Rebuilt every 150 years	\$17,511 per year
Piped Culvert 600mm (Pkg 27)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$579 per year
Piped Culvert 375mm (Pkg 28)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$1,282 per year
Piped Culvert 450mm (Pkg 29)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$2,102 per year

Piped Culvert 600mm (Pkg 30)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$302 per year
Piped Culvert 750mm (Pkg 31)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$111 per year
Piped Culvert 1050mm (Pkg 32)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$2,806 per year
Box Culvert 300x150mm (Pkg 33)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$24 per year
Box Culvert 375x225mm (Pkg 34)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$17 per year
Box Culvert 450x150mm (Pkg 35)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$18 per year
Box Culvert 450x300mm (Pkg 36)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$59 per year
Box Culvert 600x300mm (Pkg 37)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$87 per year
Box Culvert 1500x1200mm (Pkg 38)	All	Headwalls replaced every 50 years, rebuilt every 200 years	\$140 per year
Local Roads Risk Management			\$8,256 per year
Routine Inspection	1	Inspected 6 times per year	\$268 per year
Routine Inspection	2	Inspected 3 times per year	\$1,312 per year
Routine Inspection	3	Inspected 3 times per year	\$1,204 per year
Routine Inspection	4	Inspected once per year	\$3,402 per year
Routine Inspection	5	Inspected once per year	\$2,070 per year
Regional Roads Planned Maintenance			\$38,502 per year
Linemarking - Longitudinal	All	Remarked once per 12 years	\$112 per year
Linemarking - Transverse	All	Remarked once per year	\$6,839 per year
Shoulder Grading (Sealed Network Only)	All	Graded once per 3 years	\$24,328 per year
Slashing (Sealed Network Only)	All	Slashed 3 times per year	\$7,223 per year
Regional Roads Reactive Maintenance***			\$28,883 per year
Correct Surface Shape	All	250 sq.m per year (avg)	\$3,848 per year
Edge Repair	All	250 sq.m per year (avg)	\$1,418 per year
Guidepost Repair/Replacement	All	30 guideposts per year (avg)	\$1,320 per year
Intersection Sweeping	All	23 Intersections per year (avg)	\$2,267 per year

Pothole Repair	All	400 events per year (avg)	\$4,028 per year
Sign Repair	All	6 signs per year	\$633 per year
Sign Replacement	All	8 signs per year	\$1,666 per year
Tree Maintenance	All	Amount reserved for 'as required' works	\$839 per year
Award, WHS & Planning Overheads	All	250 sq.m per year (avg)	\$12,864 per year
Regional Roads Risk Management			\$1,114 per year
Routine Inspection	All	Inspected 6 times per year	\$1,114 per year
Regional Roads Renewal Costs**			\$125,138 per year
Sealed High Traffic Arterial Roads (Pkg 1)	All	Resealed every 21 years, Rebuilt after 63 years	\$118,941 per year
Asphalt High Traffic Arterial Roads (Pkg 2)	All	Asphalt every 15 years, Rebuilt after 60 years	\$6,197 per year
			\$3,921,370 per year
			\$733 per rateable assessment

Table 1 - Current Levels of Service

* See the following sections for a description on the calculation of an asset's class.

** The required annual renewal spend is different to annual depreciation as it is based on varying intervention activities over the entire life cycle of the asset.

*** Refer to Table 2 below for response times pertaining to maintenance activities.

The above figures yield a total cost of the roads & traffic asset network of **\$4,363 per km per year**. This value includes all operational, maintenance and renewal activities including corporate overheads and on costs. It should also be noted that this table forms that basis through which the roads and traffic asset network is managed both day to day and year to year. From this, we garner statements such as:

“Council endeavours to reseal its arterial high traffic roads every 21 years” and

“On average, Council inspects its Class 1 roads 6 times per year and repairs (on average) 17000 pot holes across the network in the same period.”

Response Times

In addition to the above service levels, Council also needs to respond to defects arising throughout the network in a timely manner. Table 2 outlines the intervention times currently set for various defects/maintenance activities mentioned above.

Some defect types, it can be noted, have been assigned no response time – this means that the defect is logged for information but are still used in the development of asset renewal/replacement programs. Further information pertaining to the following table can be found in the appendix to this document.

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
Wearing Surface					
Bleeding area picking up on vehicle tyres	High	1	7 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	90 days	180 days
Seal stripping and/or cracking	High	1	30 days	60 days	60 days
		2	60 days	60 days	90 days
		3	60 days	90 days	180 days
		4	90 days	180 days	180 days
		5	90 days	180 days	365 days
Crocodile cracking plate size less than 100mm	Low	1	90 days	180 days	180 days
		2	180 days	180 days	365 days
		3	180 days	365 days	365 days
		4	365 days	365 days	-
		5	365 days	-	-
Edge Break					
Heavy edge break greater than 200mm	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days
Moderate edge break between 100mm and 200mm	High	1	30 days	60 days	90 days
		2	60 days	90 days	90 days
		3	90 days	90 days	180 days
		4	90 days	180 days	180 days
		5	180 days	180 days	365 days
Heavy edge drop off greater than 100mm	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days
Moderate edge drop off between 50mm and 100mm	High	1	30 days	60 days	90 days
		2	60 days	90 days	90 days
		3	90 days	90 days	180 days
		4	90 days	180 days	180 days
		5	180 days	180 days	365 days
Potholes					
Large pothole of depth greater than 100mm	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
Moderate pothole of depth between 50mm and 100mm	High	1	30 days	60 days	60 days
		2	60 days	60 days	90 days
		3	60 days	90 days	180 days
		4	90 days	180 days	180 days
		5	180 days	180 days	365 days
Small pothole of depth less than 50mm	Medium	1	60 days	90 days	90 days
		2	90 days	90 days	180 days
		3	90 days	180 days	365 days
		4	180 days	365 days	365 days
		5	180 days	365 days	-
Shoving / Failures					
Failure of depth greater than 100mm	Medium	1	30 days	60 days	90 days
		2	60 days	90 days	90 days
		3	90 days	90 days	180 days
		4	90 days	180 days	365 days
		5	180 days	365 days	365 days
Failure of depth less than 100mm	Medium	1	60 days	90 days	90 days
		2	90 days	90 days	180 days
		3	90 days	180 days	365 days
		4	180 days	365 days	365 days
		5	365 days	365 days	-
Gravel Surface					
Corrugations greater than 100mm	High	1	21 days		60 days
		2	60 days		90 days
		3	60 days		90 days
		4	90 days		180 days
		5	90 days		365 days
Corrugations between 50mm and 100mm	Medium	1	60 days		90 days
		2	60 days		90 days
		3	90 days		180 days
		4	90 days		365 days
		5	180 days		365 days
Rutting greater than 100mm	Medium	1	60 days		90 days
		2	60 days		180 days
		3	90 days		180 days
		4	180 days		365 days
		5	180 days		365 days
Loose gravel or Surface Deformation greater than 100mm	Medium	1	60 days		90 days
		2	60 days		180 days
		3	90 days		180 days
		4	180 days		365 days
		5	180 days		365 days
	Medium	1	60 days		90 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
Potholes or Localised Surface Deformations greater than 100mm		2	60 days		180 days
		3	90 days		180 days
		4	180 days		365 days
		5	180 days		365 days
Rutting between 50mm and 100mm	Low	1	60 days		180 days
		2	90 days		180 days
		3	180 days		365 days
		4	180 days		-
		5	365 days		-
Loose gravel or Surface Deformation between 50mm and 100mm	Low	1	60 days		180 days
		2	90 days		180 days
		3	180 days		365 days
		4	180 days		-
		5	365 days		-
Potholes or Localised Surface Deformations between 50mm and 100mm	Low	1	60 days		180 days
		2	90 days		180 days
		3	180 days		365 days
		4	180 days		-
		5	365 days		-
Dry Weather Only Roads (Formed Surface)					
Road Cross-Section substantially out of shape (un-trafficable)	Low	1	90 days		
		2	90 days		
		3	180 days		
		4	180 days		
		5	365 days		
Road Cross-Section Moderately out of shape (trafficable)	Low	1	90 days		
		2	180 days		
		3	180 days		
		4	365 days		
		5	365 days		
Bridges & Safety Barriers					
Accident damage to safety barrier	High	1	21 days		60 days
		2	30 days		60 days
		3	60 days		90 days
		4	60 days		180 days
		5	90 days		180 days
Bridge scuppers, expansion joints or other non-structural elements require cleaning	Medium	1	60 days		90 days
		2	90 days		180 days
		3	90 days		365 days
		4	180 days		365 days
		5	180 days		-
Missing/damaged chevron on face of the guard rail	Medium	1	60 days		90 days
		2	90 days		180 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
		3	90 days		365 days
		4	180 days		365 days
		5	180 days		-
Guideposts					
Missing or Damaged on Bridge (4 Posts)	Medium	1			90 days
		2			90 days
		3			180 days
		4			365 days
		5			365 days
Missing or Damaged on Culvert (2 Posts)	Medium	1			90 days
		2			90 days
		3			180 days
		4			365 days
		5			365 days
Missing or Damaged on curve/crest	Medium	1			90 days
		2			180 days
		3			180 days
		4			365 days
		5			365 days
Missing or Damaged on straight	Low	1			180 days
		2			180 days
		3			365 days
		4			-
		5			-
Loose Materials					
Road surface has loose or slippery material	High	1	7 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	90 days	180 days
Medians/K&G					
Water ponding due to misalignment of kerb and/or gutter	Low	1	90 days	90 days	180 days
		2	90 days	180 days	180 days
		3	180 days	180 days	365 days
		4	180 days	365 days	-
		5	365 days	-	-
Noticeable vertical or horizontal projections causing trip hazard greater than 20mm	Low	1	90 days	90 days	180 days
		2	90 days	180 days	180 days
		3	180 days	180 days	365 days
		4	180 days	365 days	-
		5	365 days	-	-
	Low	1	90 days	90 days	180 days
		2	90 days	180 days	180 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
Noticeable displaced paving or concrete in median creating a trip hazard greater than 20mm		3	180 days	180 days	365 days
		4	180 days	365 days	-
		5	365 days	-	-
Obstructions					
Large sized object with a maximum dimension of greater than 200mm	Extreme	1	1 day	1 day	1 day
		2	1 day	1 day	7 days
		3	1 day	7 days	21 days
		4	7 days	21 days	30 days
		5	21 days	30 days	60 days
For speed zones 50 km/h and under, sight distance less than 50m	Extreme	1	7 days	21 days	30 days
		2	21 days	30 days	60 days
		3	30 days	60 days	90 days
		4	60 days	90 days	90 days
		5	60 days	90 days	180 days
For 50 km/h > speed zone < 80 km/h, sight distance less than 80m	Extreme	1	7 days	21 days	30 days
		2	21 days	30 days	60 days
		3	30 days	60 days	90 days
		4	60 days	90 days	90 days
		5	60 days	90 days	180 days
For 80 km/h ≥ speed zone ≤ 90 km/h, sight distance less than 120m	Extreme	1	7 days	21 days	30 days
		2	21 days	30 days	60 days
		3	30 days	60 days	90 days
		4	60 days	90 days	90 days
		5	60 days	90 days	180 days
For speed zones > 90 km/h, sight distance less than 200m	Extreme	1	7 days	21 days	30 days
		2	21 days	30 days	60 days
		3	30 days	60 days	90 days
		4	60 days	90 days	90 days
		5	60 days	90 days	180 days
Small sized object with a maximum dimension is less than 200mm	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days
Pavement Markings					
Longitudinal line faded or damaged	Low	1	90 days	180 days	180 days
		2	180 days	180 days	365 days
		3	180 days	365 days	365 days
		4	365 days	365 days	-
		5	365 days	-	-
Transverse line faded or damaged	Low	1	90 days	180 days	180 days
		2	180 days	180 days	365 days
		3	180 days	365 days	365 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
		4	365 days	365 days	-
		5	365 days	-	-
Symbol markings faded or damaged	Low	1	90 days	180 days	180 days
		2	180 days	180 days	365 days
		3	180 days	365 days	365 days
		4	365 days	365 days	-
		5	365 days	-	-
Pavement markers missing or damaged	Low	1	90 days	180 days	180 days
		2	180 days	180 days	365 days
		3	180 days	365 days	365 days
		4	365 days	365 days	-
		5	365 days	-	-
Signs					
Missing warning or regulatory sign faces (Yellow, Red or Speed Signs) or structure	Extreme	1			7 days
		2			21 days
		3			30 days
		4			60 days
		5			60 days
Warning or regulatory sign faded or damaged (Yellow, Red or Speed Signs) or alignment	Extreme	1			30 days
		2			60 days
		3			90 days
		4			90 days
		5			180 days
Sign face dirty or marked so as to reduce legibility (including graffiti)	High	1			60 days
		2			60 days
		3			90 days
		4			180 days
		5			180 days
Missing guide sign faces (Green, brown or other signs) or structure	Medium	1			90 days
		2			90 days
		3			180 days
		4			365 days
		5			365 days
Trees obstructing sign face	Medium	1			90 days
		2			90 days
		3			180 days
		4			365 days
		5			365 days
Guide sign faded or damaged (Green, brown or other signs) or alignment	Medium	1			90 days
		2			180 days
		3			180 days
		4			365 days
		5			365 days

Position in Road Reserve					
Defect Description	Priority	Class	Traffic Lane	Parking Lane	Shoulder
Spilled Materials					
Spills of oil, wet clay or other slippery substance	Extreme	1	1 day	21 days	30 days
		2	21 days	30 days	60 days
		3	30 days	60 days	60 days
		4	60 days	60 days	90 days
		5	60 days	90 days	180 days
Paper Roads (Unformed Surface)					
Road substantially out of shape (in-trafficable)	Low	1	90 days		
		2	180 days		
		3	180 days		
		4	365 days		
		5	365 days		
Vegetation Heavy (Trees)					
Dead or diseased trees in danger of falling on roadway	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days
Broken limbs in danger of collapse onto roadway	High	1	21 days	30 days	60 days
		2	30 days	60 days	60 days
		3	60 days	60 days	90 days
		4	60 days	90 days	180 days
		5	90 days	180 days	180 days
The clearance height above traffic lanes or shoulders is less than 5m	High	1	30 days	60 days	60 days
		2	60 days	60 days	90 days
		3	60 days	90 days	180 days
		4	90 days	180 days	180 days
		5	90 days	180 days	365 days
Vegetation Light (Slashing)					
Grass and weeds Height greater than 500mm (obstructing vision)	High	1	30 days	60 days	60 days
		2	60 days	60 days	90 days
		3	60 days	90 days	180 days
		4	90 days	180 days	180 days
		5	90 days	180 days	365 days

Table 2 - Defects and Response Times

NOTE: Response days refer to calendar days (including weekends and holidays).

Road Hierarchy

Road hierarchy relates to Council's road network only and describes the primary function within the network. It involves a distinction between traffic mobility (through-traffic) and amenity/access. "A road hierarchy may be defined as the grading of roads according to increasing or decreasing importance of their traffic carrying or other function" (AustRoads 2009). For Leeton Shire Council, defining the Road Hierarchy serves two purposes:

1. Maintenance/Inspection Class, and
2. Construction/Renewal Design Standard Package

Each of these categorisations are detailed in the following sections.

Calculating Road Hierarchy

Assessing a roads prime function for hierarchical purposes is carried out every 5 years. The process can have an element of subjectivity; a flow chart has therefore been utilised to reduce the chance of inconsistencies across the road network.

Criteria	Hierarchy	
Is the prime function of the road to provide access between towns/villages? (MR80)	YES	Arterial
NO		
Is the prime function of the road to connect towns and villages to the wider arterial network? (HV route)	YES	Sub-Arterial
NO		
Is the prime function of the road to provide access to a major traffic attractor/generator? E.g. Mill, Quarry, tourist attraction, major employer (AADT – volume & type) (HV route)	YES	
NO		
Is the prime function of the road to collect and distribute traffic and act as a feeder to sub-arterial roads?	YES	Collector
NO		
Does the road provide access to the front of properties? (Number of property access points ≥ 1)	YES	Access
NO		
Does the road provide rear access to properties?	YES	Lane
NO		
Is the road the responsibility of Leeton Shire Council?	YES	Limited Access

Table 3 - Road Hierarchy Determination

Road Surfaces

In addition to road hierarchy, Council maintains and constructs roads in different manners based on their material or surface. That is, a gravel road is maintained differently to sealed roads and differently again to formed roads. A description of the various road surfaces and what can be expected from them is provided in Table 4 below.

Road Surface	Description of Road
Bitumen Sealed Roads	Sealed roads refer to roads within Council's network that are surfaced with bitumen.
Asphalt Sealed Roads	Sealed roads refer to roads within Council's network that are surfaced with asphalt. They are otherwise referred to as Hotmix roads.
Concrete Roads	Concrete roads are also considered a 'sealed' road even though there is technically no seal over the structural layer.
Gravel Roads	Gravel roads refer to roads that have been formed and topped with imported gravel (crushed rock from a quarry).
Dry Weather Only Roads (previously known as Formed Roads)	Formed roads refer to roads that have been formed (and are scheduled for continual forming) by a Council Grader but had no additional gravel material added to stabilise the surface.
Paper Roads (previously known as Un-Formed Roads)	Un-formed roads refer to roads that have been formed only by the users of the road. These roads are <u>not</u> scheduled for any maintenance such as grading, slashing or the like.

Table 4 - Road Surfaces

The extent of surfacing (as it pertains to Council's road network) is shown in Figure 1.



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Road Surface Breakdown

Legend

Surfaces

-  Asphalt Sealed Road
-  Bitumen Sealed Road
-  Concrete Road
-  Gravel Access Road
-  Dry Weather Only Road
-  Paper Road
-  Cadastre

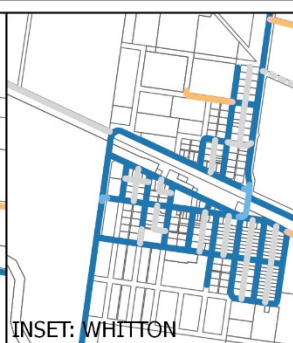
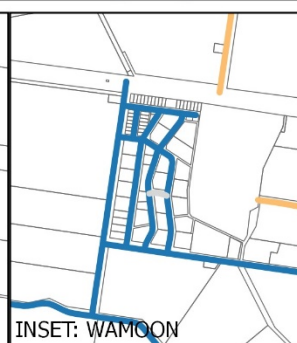
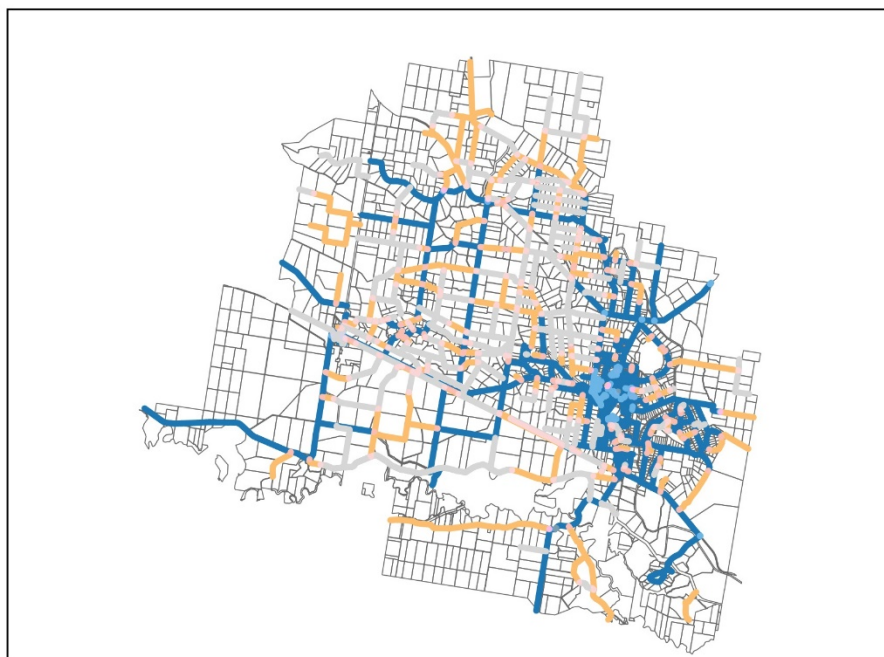


Figure 1 - Road Surfaces

Maintenance/Inspection Classifications

The Leeton Shire Council road network is subject to a variety of maintenance and renewal programs aimed at maintaining a certain level of service. Each road is classified by a road classification rating which delineates roads into categories of function, importance and use which depends upon the road hierarchy, traffic volume, and the type of traffic utilising the roadway. This information is constantly updated and attributed against each road segment within Council's Asset Management System. A segment's class is used to determine response times for planned and unplanned maintenance as well as inspection frequencies.

The road classification is determined by using the following formula and comparing that with the classification Table 7 below:

$$[\text{Road Hierarchy / Traffic Volume rating}] + [\text{Traffic Type Rating}] = [\text{Road Classification Rating}]$$

Road Hierarchy / Traffic Volume Rating

Table 5 below, outlines the Road Hierarchy Rating plus the Road Traffic Volume rating for use in calculating the Road Classification. Ratings figures from the left are added in matrix form to ratings figures across the top. For example, an Arterial road with traffic volumes of 501-1001 would yield a total score of 19.

		AADT 0-50	AADT 51-100	AADT 101-500	AADT 501-1001	AADT 1001+
Ratings		1	2	3	4	5
Arterial	15	16	17	18	19	20
Sub Arterial	12	13	14	15	16	17
Collector	8	9	10	11	12	13
Access	5	6	7	8	9	10
Lanes	2	3	4	5	6	7
Limited Access	1	2	3	4	5	6

Table 5 - Road Hierarchy & Traffic Volume Ratings

Traffic Type Rating

Table 6 below, outlines the "Traffic Type rating" for use in calculating the Road Classification. If a road segment is part of a Bus Route, B-Double route, and a Road Train route, then the three elements would be added together to generate the "Traffic Type rating".

Traffic Types	Bus Route	B-Double Route	Road Train Route	Speed Limit > 79km/h
Ratings	2	3	4	1

Table 6 - Traffic Type & Speed Limit Rating

Road Classification Calculation

As mentioned above, the road maintenance/inspection classification is achieved by adding the two figures above, and matching the result in the table below.

For example: Consider a Road that is a sub-arterial road, serves buses, B-Doubles, Road Trains, and has a speed limit of 100km/hr. It has an AADT of 180.

Its Road Hierarchy rating is therefore 12, its Road Traffic Volume Rating is 3, and its Traffic type Rating is 10. Its road classification formula equates to $12 + 3 + 10 = 25$. Its road classification is therefore Class 1.

Road Classification Calculated Score	25-30	19-24	13-18	7-12	0-6
Road Class	Class 1	Class 2	Class 3	Class 4	Class 5

Table 7 - Road Classifications

This road classification is then utilised by Council in determining the appropriate level of service to provide for the road segment in terms of maintenance and inspection. The above classifications are shown (as they apply to Council's road network) in Figure 2 below.

Construction/Renewal Design Standard Packages

The road hierarchy, traffic volumes, and in some cases where required, a road's status as a heavy vehicle route all combine to determine what design standard "package" will be applied to a segment of road. Leeton Shire Council has 14 design standards "packages". The standards determine carriageway widths, pavement depths & surface type, and ancillary features.

For existing roads physical constraints may require adjustments to the applicable design standard. For example, when a 7m wide road will simply not fit between an irrigation supply and drainage channel. The Packages will also identify areas where upgrades to existing roads are required to meet Council requirements. For new developments the design standard will become part of the Development Control Plan.

Package extents are shown in Figure 3 below. Details of each package can be found in the appendix to this document.



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Segment Classification (Maintenance & Inspection) Breakdown

Legend

Classifications

- State Road
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Cadastre



Figure 2 – Maintenance/Inspection Classifications



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Road Packages Breakdown

Legend

Packages

- Package 1 & 2
- Package 3, 4 & 5
- Package 6 & 7
- Package 6 (Heavy Vehicle)
- Package 8, 9 & 10
- Package 11
- Package 12
- Package 13
- Non-Capital Roads
- Cadastre

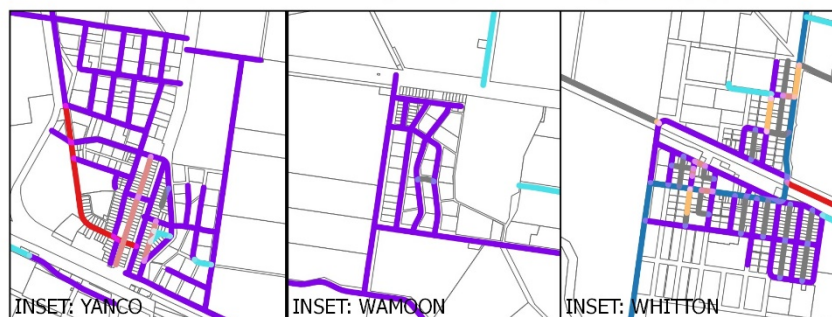
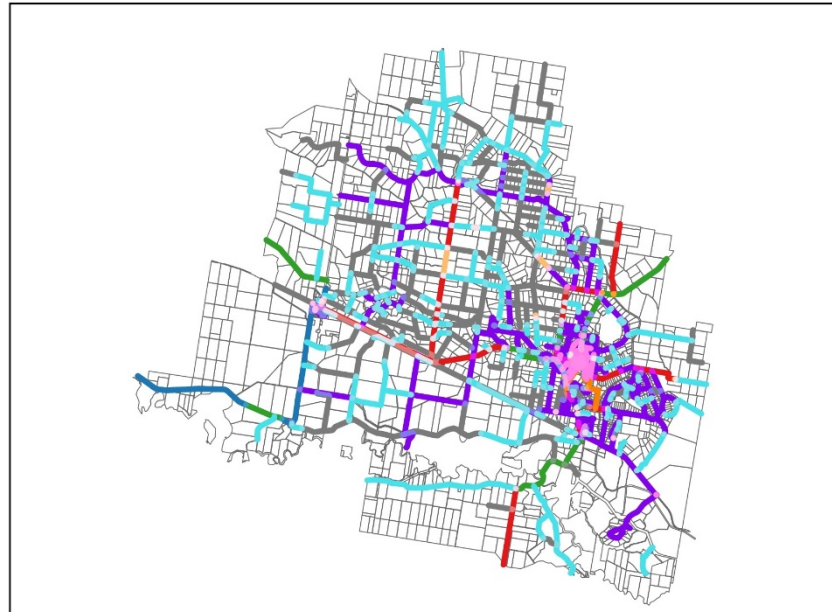


Figure 3 - Construction/Renewal Packages



Lifecycle Management

Details on the whole of lifecycle management of the Road Network including risk management, condition, maintenance schedule options, renewal planning, and acquisition/disposal indicators

This section “implements” the Service Levels discussed in the previous section.

Lifecycle Management Generally

The lifecycle of an asset is considered to span from the time of its initial acquisition, through its maintenance and operational life, across renewal/replacement periods, any risks associated with an assets condition during its life, and also to encompass its final disposal. Considering assets in this manner can assist in removing the potential for “cost shocks” during the life of the asset. With this in mind, this section of the Asset Management Plan considers:

- The scope of assets associated with the Road Network,
- The hazard based risk management practices implemented on the network,
- The condition assessment processes that take place,
- The maintenance & Renewal planning indicators, and
- Lastly, the considerations for acquisition and disposal of road network infrastructure.

Asset Schedule

The Leeton Shire Council roads and traffic asset network is an extensive asset base. The below tables indicates the breakdown of facilities across the portfolio (including Regional Roads).

Roadways	Length (m)	Average Base Condition	Average of Seal Condition	Average Road Condition
Class 1				
Asphalt Sealed Road	262	1.43	1.43	1.43
Bitumen Sealed Road	30,460	1.24	1.37	1.31
Class 2				
Asphalt Sealed Road	2,897	1.41	2.14	1.77
Bitumen Sealed Road	55,324	1.43	1.95	1.69
Concrete Road	106	4.00		4.00
Class 3				
Asphalt Sealed Road	976	1.67	2.20	1.93
Bitumen Sealed Road	79,234	1.46	1.68	1.57
Concrete Road	25	2.00		2.00
Class 4				
Asphalt Sealed Road	7,264	1.23	1.90	1.57
Bitumen Sealed Road	225,665	1.57	2.07	1.82
Concrete Road	35	1.75		1.75
Gravel Access Road	215,394	2.02		2.02
Dry Weather Only Road	5,112	3.50		3.50
Paper Road	167			
Class 5				
Bitumen Sealed Road	4,817	1.63	2.40	2.01
Gravel Access Road	9,963	1.75		1.75
Dry Weather Only Road	132,027	3.85		3.85
Paper Road	129,149			
Grand Total	898,877			

Table 8 - Asset Schedule (Roads)

Traffic Assets	Number of Facilities	Average Condition
Bike Training Facility		
All Types	1	1.0
Bridge		
Pedestrian	15	0.6
Road Traffic	3	2.0
Bus Stop		
New Type	20	1.9
Old Type	17	3.9
Carpark		
All Types	29	1.7
Industrial Parking Lane		
All Types	40	1.5
Median		
All Types	100	1.4
Parking Lane		
All Types	102	1.5
Pedestrian Refuge		
All Types	28	1.1
Raised Crossing		
All Types	5	1.4
Roundabout		
Small	6	1.7
Speed Cushion		
All Types	6	1.0
Grand Total	372	

Table 9 - Asset Schedule (Traffic Assets)

Kerb & Gutter	Length	Average Condition
Chamfer Kerb	998m	1
Dish Drain	275m	1
Earth Dish Drain	146m	1
Roll-top Kerb	16,205m	2
Upright Kerb	93,558m	2
Grand Total	111,182m	

Table 10 - Asset Schedule (Kerb & Gutter)

Road Culverts	Number of Crossings	Average Condition
BOX CULVERT	10	2
PIPE CULVERT	200	2
Grand Total	210 crossings	

Table 11 - Asset Schedule (Road Culverts)

Risk Management Planning

One of the primary responsibilities of Local Government is to provide an acceptable level of service for public assets to its Community within budgetary constraints. This responsibility extends to managing the hazards associated with those assets. This section of the plan outlines the process of determining the hazards that may be generated on the road and traffic asset network by identifying the use, priority and timeframes to be considered when addressing these hazards. This process is also summarised in a flowchart in the Appendix to this document.

The principle objectives of this Risk Management process include:

- To provide safe traffic facilities for the public,
- To enable a system of proactive maintenance (where possible),
- To identify areas that require maintenance through a systematic and prioritised inspection system,
- To facilitate scheduling and resource allocation where required, and
- To establish a priority system for carrying out maintenance works.

Asset Defect Inspections

Inspections are a formalised and sometimes independent assessment of sections of the road and traffic asset network looking for hazards that may require repair and maintenance. It is carried out with regard to current standards and safety principles, by qualified personnel.

There are four (4) types of inspections that Council carries out with respect to hazard identification. Details on these can be found in the appendices to this document. Routine Inspections are the primary type of inspection carried out by Council and represent a proactive method of asset deterioration detection.

Council's routine inspection program is set as per the levels of service determined in Table 1. Frequencies are set based upon segment classification. These frequencies equates to routinely inspecting 1298km of roadway per annum. This is equivalent to **inspecting approximately 18.7km per week** (over a 48 week year).

Defect Risk Control during Inspections

Control of "risk exposure" requires control measures to be implemented. Some of the control measures that Council will be able to use to lessen our exposure to risk are as follows:

- Use of warning signs, warning paint, and lights to alert pedestrians of potential hazard that exists ahead or erection of temporary barriers or barricades and lights around the area until it can be repaired,
- Effecting repair of the damaged area, or
- Planning and allocating resources for the long term replacement of the road or traffic asset.

Council officers seek to install these warnings, regarding identified hazards located throughout the network, where such risks may not be clearly apparent.

Defects & Intervention Levels

All defects types and descriptions have been assigned a typical response time. These response times were devised through review sessions of the previous risk management matrix involving key Council Engineering staff. Considered, were factors including risk of injury, risk of asset deterioration, availability of response resources, and the like. Defect & intervention levels are listed in Table 2 under the Service Levels section of this document.

Condition Assessment Framework

Condition is used within Leeton Shire Council as an indicator for renewal works (among other things such as reporting to Government Agencies). An assets condition is measured and considered when identifying assets that require renewal, replacement, or disposal. As such, the assessment methodology adopted is general in nature and considers assets at high (broad generic) levels. Detailed information pertaining to an asset's current status is considered to be garnered through the Risk Management inspections and the like.

Leeton Shire Council has adopted a 1-5 rating system (in line with the IIMM) for the condition assessments of its infrastructure. The current condition profile based on inspections carried out in 2015 is shown in the figures below (includes regional roads).

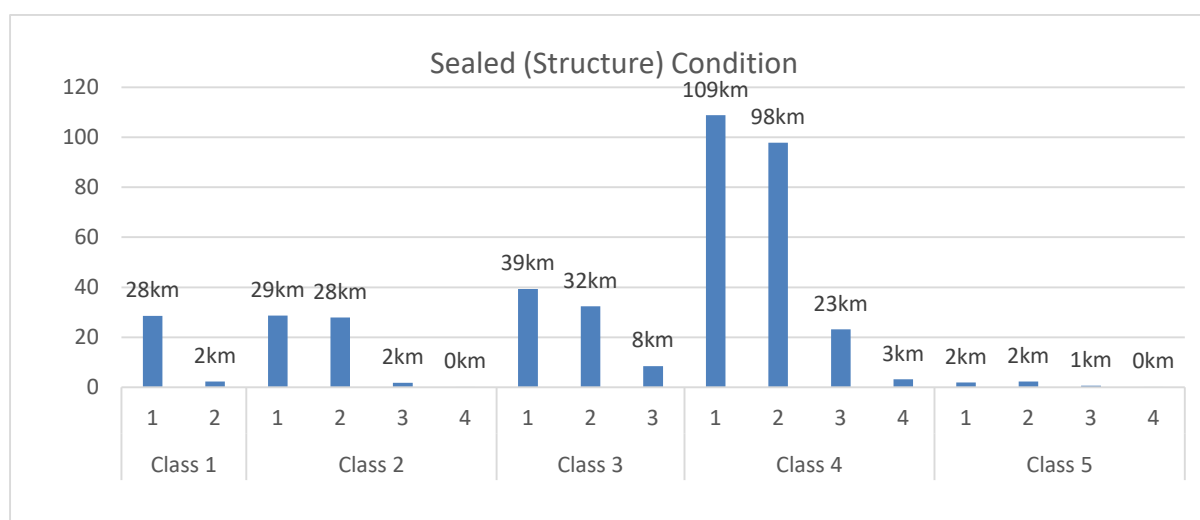


Figure 4- Sealed (Structure) Condition

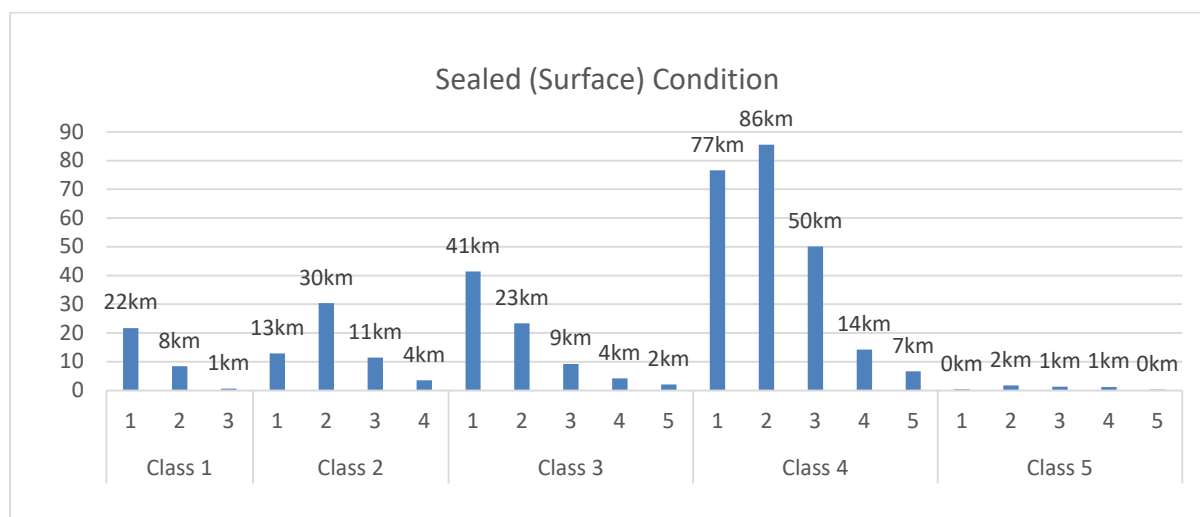


Figure 5 - Sealed (Surface) Condition

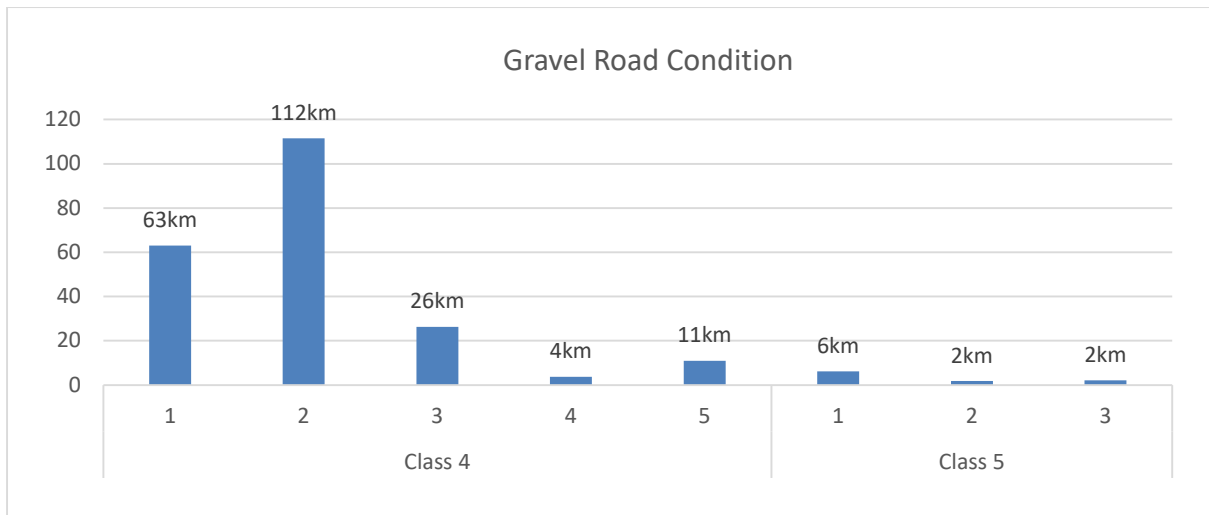


Figure 6- Gravel Road Condition

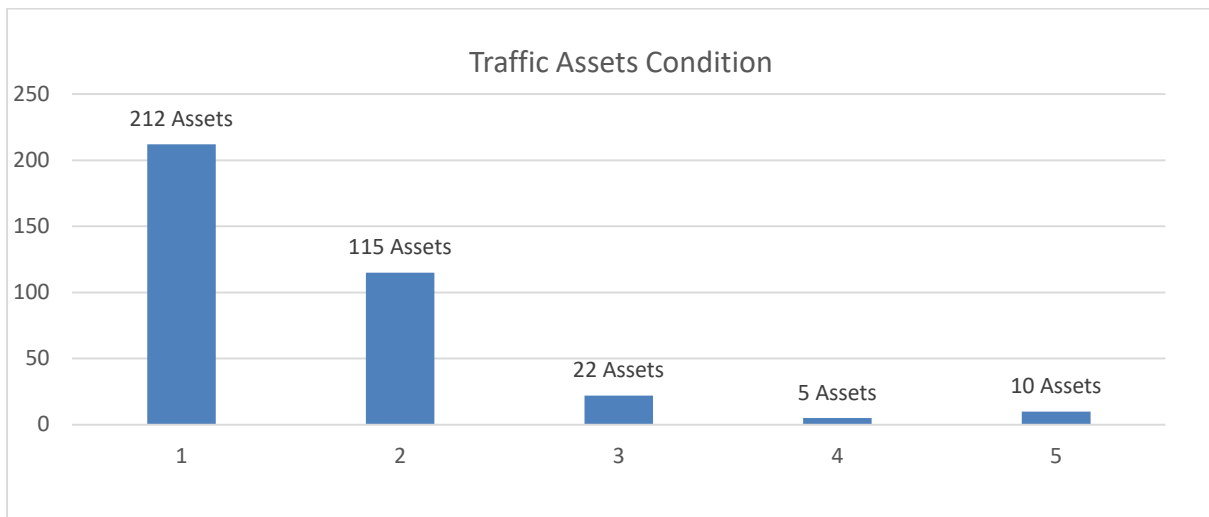


Figure 7 - Traffic Asset Condition

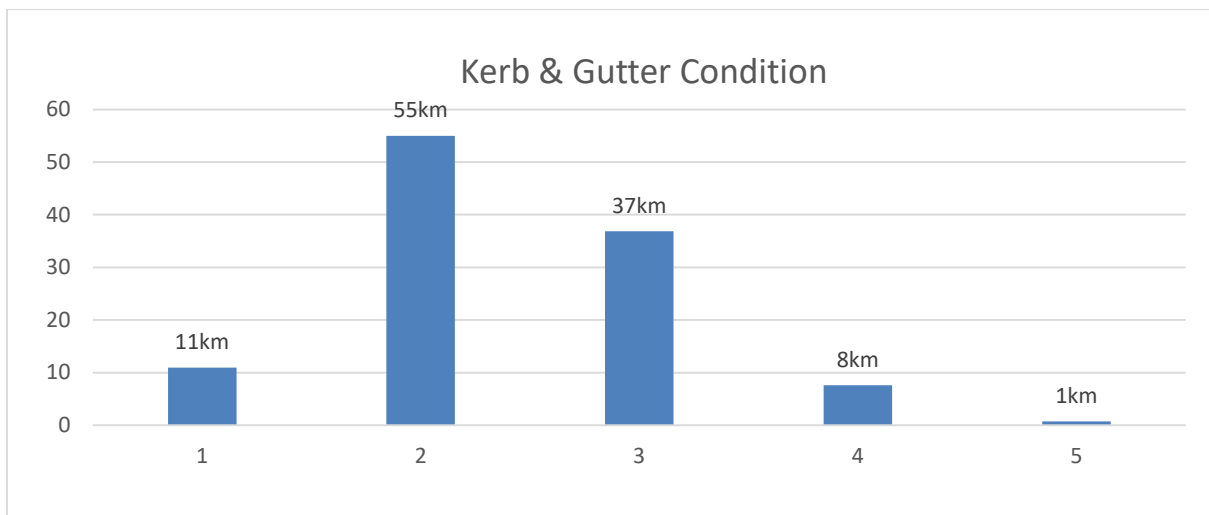


Figure 8 - Kerb & Gutter Condition

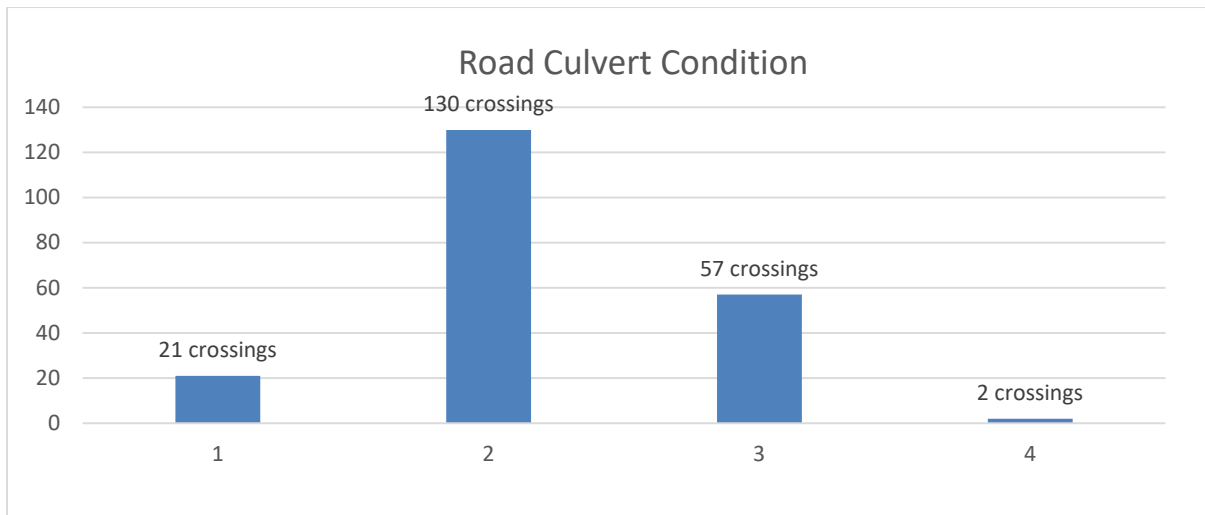


Figure 9 - Road Culvert Condition

The results of the above condition profile suggest that the network is in relatively good condition with few Condition 5 areas. The reader should note that the conditions shown above are averaged and rounded from sub-segments within entire roads.

Condition Assessment Guide

The next page contains the condition assessment guide currently utilised by asset condition assessment officers. Both pictorial comparison and notation assessment are completed when conducting such inspections. Once again, the goal of condition assessment is to gather information about the “broad” state of the segment or area.

Sealed Road Structure (Base)

Condition 1 – Excellent

1. Road deformation – Nil shoves/failures apparent
2. Surface drainage – No water ponding on roadway
3. Rutting – Nil rutting apparent



Condition 2 - Good

1. Road deformation – Virtually no concerns (one may be present)
2. Surface drainage – Virtually no issues (one may be present)
3. Rutting – Virtually nil (some may be present in isolation)



Condition 3 – Average (Satisfactory)

1. Road deformation – Individual shoves/failures apparent
2. Surface drainage – individual instances of water ponding evident
3. Rutting – Runs of minor ($\leq 100\text{mm}$) surface deformation apparent in one or two wheel paths



Condition 4 - Poor

1. Road deformation – Regular shoves/failures along roadway
2. Surface drainage – water ponding regularly along road
3. Rutting – runs of minor ($\leq 100\text{mm}$) surface deformation apparent in all wheel paths.



Condition 5 – Very Poor

1. Road deformation – Shoves/failures more often than not
2. Surface drainage – water ponding more often than not
3. Rutting – long runs of major ($> 100\text{mm}$) surface deformation present in wheel paths



Figure 10 - Sealed Road (Structure) Condition Guide

Sealed Road Surface (Seal)

Condition 1 – Excellent

1. Potholes – Nil apparent
2. Edge Defects – Nil apparent
3. Cracking – Nil apparent
4. Stripping – Nil apparent
5. Flushing/Bleeding – Nil apparent



Condition 2 - Good

1. Potholes – Virtually nil (one may be present)
2. Edge Defects – Minor edge breaks
3. Cracking – Very minor cracking (<10% segment)
4. Stripping – Very minor
5. Flushing/Bleeding – Very minor



Condition 3 – Average (Satisfactory)

1. Potholes – Individually repaired potholes apparent
2. Edge Defects – Moderate edge breaks, not in lane
3. Cracking – Cracking apparent (<20% segment)
4. Stripping – Moderate stripping noticeable
5. Flushing/Bleeding – Moderate bleeding



Condition 4 - Poor

1. Potholes – Regular potholes repaired as groups
2. Edge Defects – Edge breaks approaching lane
3. Cracking – Cracking noticeable (<50% segment)
4. Stripping – Regular throughout the segment
5. Flushing/Bleeding – Common



Condition 5 – Very Poor

1. Potholes – Regular potholes more often than not
2. Edge Defects – Common, encroaching lane
3. Cracking – Cracking often (>50% segment)
4. Stripping – Very common throughout segment
5. Flushing/Bleeding – Common



Figure 11 - Sealed Road (Surface) Condition Guide

Gravel Road Network

Condition 1 - Excellent

Using the AustRoads 2009 Guide to Pavement Technology Part 6 TRL 1984 Gravel Loss Formula, with value of 1.4 adopted for variable 'f' to estimate road surface deformation, determine total deformation over asset life, divide range into 5 groups, and assume lowest value range as Condition 1.



Condition 2 - Good

Using the AustRoads 2009 Guide to Pavement Technology Part 6 TRL 1984 Gravel Loss Formula, with value of 1.4 adopted for variable 'f' to estimate road surface deformation, determine total deformation over asset life, divide range into 5 groups, and assume second lowest value range as Condition 2.



Condition 3 – Average (Satisfactory)

Using the AustRoads 2009 Guide to Pavement Technology Part 6 TRL 1984 Gravel Loss Formula, with value of 1.4 adopted for variable 'f' to estimate road surface deformation, determine total deformation over asset life, divide range into 5 groups, and assume third lowest value range as Condition 3.



Condition 4 - Poor

Using the AustRoads 2009 Guide to Pavement Technology Part 6 TRL 1984 Gravel Loss Formula, with value of 1.4 adopted for variable 'f' to estimate road surface deformation, determine total deformation over asset life, divide range into 5 groups, and assume fourth lowest value range as Condition 4.



Condition 5 – Very Poor

Using the AustRoads 2009 Guide to Pavement Technology Part 6 TRL 1984 Gravel Loss Formula, with value of 1.4 adopted for variable 'f' to estimate road surface deformation, determine total deformation over asset life, divide range into 5 groups, and assume highest value range as Condition 5.



Figure 12 - Gravel Road Condition Guide

Traffic Assets

Condition 1 – Excellent

1. New condition
2. No signs of wear and tear
3. Cracking - Nil
4. Misalignment - Nil



Condition 2 – Good

1. Still fairly new appearance
2. Some signs of wear and tear
3. Cracking –Minor
4. Misalignment –Minor



Condition 3 – Average (Satisfactory)

1. Has reasonable appearance
2. Small amount of wear can be seen
3. Cracking – Apparent
4. Misalignment – Apparent



Condition 4 – Poor

1. Surface showing major wear
2. High amount of wear and tear (<50% by length)
3. Cracking – Noticeable
4. Misalignment – Noticeable



Condition 5 – Very Poor

1. Major structural damage
2. Significant wear and tear (> 50% by length)
3. Cracking – Regular
4. Misalignment – Regular



Figure 13 - Traffic Asset Condition Guide





Kerb & Gutter	
<p><u>Condition 1 – Excellent</u></p> <ol style="list-style-type: none"> 1. New condition 2. Cracking - Nil 3. Misalignment (fitting, dropping or rotation) - Nil 4. Ponding - Nil 5. No need for any intervention or maintenance 	
<p><u>Condition 2 – Good</u></p> <ol style="list-style-type: none"> 1. Still fairly new appearance 2. Some signs of wear and tear 3. Cracking – Very minor 4. Misalignment – Very minor 5. Ponding – Very minor 6. No immediate intervention required 	
<p><u>Condition 3 – Average</u></p> <ol style="list-style-type: none"> 1. Has reasonable appearance, moderate amount of wear can be seen 2. Some isolated defects 3. Cracking – Apparent 4. Misalignment – Apparent 5. Ponding – Apparent 	
<p><u>Condition 4 – Poor</u></p> <ol style="list-style-type: none"> 1. Surface showing major wear 2. Requires replacement of sections 3. Cracking – Noticeable 4. Misalignment – Noticeable 5. Ponding - Noticeable 	
<p><u>Condition 5 – Very Poor</u></p> <ol style="list-style-type: none"> 1. Major structural damage 2. Significant defects more than 50% the length 3. Cracking – Regular 4. Misalignment – Regular 5. Ponding - Regular 	

Figure 14 - Kerb & Gutter Condition Profile

Maintenance Planning

Maintenance work is categorised in three different ways within Leeton Shire Council; planned maintenance, unplanned maintenance, and cyclic maintenance. The differentiations assist in establishing goals for how an asset is managed.

It is ideal in many circumstances for unplanned maintenance to remain very low. Achieving such a milestone can indicate that a group of assets are being well managed and that current operations should not be altered too much. Conversely, a low proportion of planned maintenance (as compared to unplanned) often suggests that there is an unknown element pertaining to a group of assets and this is causing increased – and potentially unwarranted – workloads. Lastly, cyclic maintenance refers to tasks that are simply “run of the mill” and required for the operational and legislative capacity of the asset.

Planned Maintenance Activities

For the extent of the roads and traffic asset network, the following activities constitute planned maintenance:

- Bridge Maintenance
- Line Marking
- Road Grading (Formed)
- Road Grading (Gravel)
- Shoulder Grading
- Slashing
- Street Sweeping

Planned works are issued via work program booklets. It is desired that the Shire be broken down into distinct work zones. Whilst a crew is working in a zone, they would be completing the tasks set within the zone’s work program as well as attending to any outstanding unplanned (reactive) activities that may exist. These work zones have been included in the Improvement Plan for consideration.

Unplanned Maintenance Activities

For the extent of the roads and traffic asset network, the following activities constitute unplanned maintenance:

- Guidepost Repair/Replacement
- Pavement Sweeping
- Pothole Repair
- Sign Repair
- Sign Replacement

The process for these activities involves the issuing of periodical (typically weekly) work request sheets to maintenance supervisors who will program in the works for completion prior to the response time deadline. These work request sheets can be generated automatically from the Reflect database and Council GIS to give information such as spatial location, photographs, estimated quantity, and the like.

Following completion of the works, the supervisors will note down information on the request form such as time taken, crew numbers used, and the like. This information is logged into Reflect to keep abreast of the costs associated with various activities.

Cyclic Maintenance Activities

For cyclic maintenance activities, defects and/or requests are “built up” per period (typically per quarter) and a list of works is then executed at the one time. This increases service delivery efficiency and in doing so, saves maintenance costs – allowing for more work to be achieved. For the extent of the road and traffic asset network, the following activities constitute cyclic maintenance works:

- Correct Surface Shape – completed 6 monthly when works required
- Tree Maintenance – completed quarterly when works required
- Edge Repair – completed 6 monthly when works required

The process for these activities is similar to that of unplanned maintenance except that the schedules of work are generated over longer periods.

Renewal Planning

Renewal Planning within Leeton Shire Council is based upon the principles set out in Council's Asset Management Strategy. That is, Renewal Planning is to be carried out utilising a predefined set of indicators as well as the technical expertise of staff. These indicators, when placed into a weighted matrix, will produce prioritised lists of assets requiring renewal works. Such lists are then assessed by technical staff for accuracy and validity. Following Council approval, such renewal programs are then rolled into annual and 4 year works programs.

Following development of the 4 year works program (delivery plan), Council Officers will begin selecting and working on the planning and development of the various renewal works as separate projects to be completed within the year / operational plan. See below for the breakdown of tasks:

1. Council's GIS generates a 4 year works program with budget as the limitation on a year's work.
2. Council staff review this list (as a desktop exercise) for validation.
3. Council staff review the first year of the program with a view to:
 - a. Assess for overlaps with upcoming upgrades or expansion (within or outside of the current asset class)
 - b. Promote or demote works from/to the year 1 program based on spatial economies (works close to each other), overlaps identified in step 4a, and/or obvious errors within the matrix computation method.
4. Each segment (or group of segments where appropriate) of works within the finalised year 1 program are costed and assessed for any major obstacles and then sent as a package to the engineering construction staff. No renewal works are to take place without the costing and assessment from this step.

Renewal Indicators

The following tables outlines the indicators used in determining a road segment's renewal score. The score is calculated by equalising the results to the same number range and then summing the weighted results of each category as detailed below. An example calculation is shown in the appendix to this document.

It should be noted that assets with **conditions of 4 or 5 only** are included in the weighted renewal program (that is, without condition 1, 2, or 3 roads considered). Should no Condition 4 or 5 assets exist, the program will open up to Condition 3 and better, however, officer scrutiny will assess the necessity for works at this stage (i.e. a condition 3 asset should not need any renewal).

Road Rehabilitation Indicators	Detail	Weight
Asset Condition	1 to 5 as per this document	41%
Hierarchy	The inverse of the segment's classification (i.e. Class 1=5 points, Class 2=4 points, Class 3=3 points, Class 4=2 points, Class 5=1 points)	7%
Asset Age	The age as recorded in the asset register.	9%
Heavy Vehicle Status	B-Double Routes = 3 points	7%

	Road Train Routes = 5 points	
Bus Route	Bus Route = 5 points	5%
Speed Score	100kph = 5 points 80kph = 3 points 60kph = 2 points All Others = 1 point	10%
Widening Score	Whether or not the road meets the design width requirements	2%
AADT Score	Less than 100 = 1 point Between 100 & 500 = 2 points Between 500 & 1000 = 3 points Between 1000 & 3000 = 4 points Over 3000 = 5 points	11%
Accomplishment Score	The number of works recorded on the segment pro-rata'd across the network between 1 & 5	8%

Table 12 – Road Rehabilitation Renewal Indicators

Road Resealing Indicators	Detail	Weight
Asset Condition	1 to 5 as per this document	30%
Hierarchy	The inverse of the segment's classification (i.e. Class 1=5 points, Class 2=4 points, Class 3=3 points, Class 4=2 points, Class 5=1 points)	5%
Asset Age	The age as recorded in the asset register.	19%
Heavy Vehicle Status	B-Double Routes = 3 points Road Train Routes = 5 points	3%
Bus Route	Bus Route = 5 points	4%
Speed Score	100kph = 5 points 80kph = 3 points 60kph = 2 points All Others = 1 point	5%
Widening Score	Whether or not the road meets the design width requirements	1%
AADT Score	Less than 100 = 1 point Between 100 & 500 = 2 points Between 500 & 1000 = 3 points Between 1000 & 3000 = 4 points Over 3000 = 5 points	13%
Accomplishment Score	The number of works recorded on the segment pro-rata'd across the network between 1 & 5	2%
Defect Count	The number of overdue defects recorded on the segment pro-rata's across the network between 1 * & 5	19%

Table 13 – Road Reseal Renewal Indicators

Road Re-sheeting (Gravel) Indicators	Detail	Weight
Asset Age	The AustRoads Gravel Loss Formula (as detailed in the condition assessment guide) is used in conjunction with the assets last construction date to determine priority.	100%

Table 14 - Gravel Road Renewal Indicators

Kerb & Gutter Indicators	Detail	Weight
Overdue Defects	A detailed audit was conducted in 2014 across the extents of the kerb network. Defects noted within this audit are summed per kerb segment and this produces the program.	100%

Table 15 - Kerb & Gutter Renewal Indicators

Acquisition/Disposal Planning

Indicators for the necessity of asset acquisition and disposal are found throughout this section of this Detailed Asset Management Plan. Decisions pertaining to the acquisition or disposal of an asset should be carried out with full lifecycle costing of the subject asset in mind. To this end, the following criteria MUST be addressed when submitting a budget proposal, or similar, for capital expansion or upgrade of the Council road and traffic asset network.

- Capital cost of the asset,
- Total borrowing costs associated with acquisition of the asset (if any),
- Total capital outlay required for the asset (sum of the above),
- Expected annualised maintenance & operational costs associated with the asset,
- Expected reduction in any existing annualised maintenance & operational costs via efficiency gains or asset rationalisations,
- Expected annualised renewal costs associated with the asset,
- Total annualised lifecycle cost (sum of the above annualised costs),
- Total lifecycle cost (total annualised cost times useful life),
- Forecasted net position after acquisition, and consequences of not acquiring the asset.



Improvement Plan

An assessment of the potential demand factors that could affect the road network into the future. This extends to considering capital works programs that respond to these factors.

Demand Forecast & Indicators

As with any asset, there exist a number of factors both internal and external that can alter the operational capacity or even viability of the asset (or part thereof). These indicators can affect the demand for such assets and are considered, as they pertain to the road network, in this section. It should be noted that the elements discussed below are done so independent of each other. That is, population impacts are considered in a state that assumes other indicators are stable.

Population & Demographics

Leeton Shire population has remained fairly static for over 20 years at around 12,000, despite the stresses of drought and associated water shortages, periods of flooding and recovery afterwards, and the impacts of global currency pressures.

Being primarily an irrigated agricultural production centre, the economy is heavily affected by these global commodity prices, which fluctuate due to influences not necessarily connected with the environment of the production.

There have been some major industry closures in recent decades, but there have been matching industry establishments, which have meant the employment levels were not overly affected. The closure of the cannery and the subsequent opening of the feedlot and abattoir is an example. The continued growth of these industries has also lead to an increase in heavy vehicle traffic, placing increased strain on our road infrastructure. Additionally, a further diversification of agricultural produce (e.g. establishment of cotton industry) has attributed to both an increase and spread of vehicular traffic across areas of the road network not designed or built to endure this traffic load.

The population structure is fairly unique in that it is artificially increased in the secondary school ages, by the two large boarding schools, then suffers a major fall in the post-secondary school age group due to the bulk of these leaving after Years 11 & 12, and the natural loss of local students of a similar age, going on to tertiary education elsewhere in other centres.

The population is now tending to also increase artificially in the retired age bracket due to the establishment of, and the enlarging of another, aged care facility.

This unique “hour glass” structure means increased demand for assets, both sporting and social, to satisfy these groups, such as sporting fields and facilities, and footpaths for those needing assistance.

Liability & WHS Implications

Every person conducting a business or undertaking (PCBU) has to ensure the ongoing management of work health & safety matters is done effectively. This involves:

- Management commitment,
- Consultation,
- Management of risk,
- Training & Instruction (for employees and volunteers),
- Reporting safety,
- Return to work, and
- Workers Compensation.

The overall increase in compliance with relevant WH&S principles is expected to add to the overall cost of managing Council's road infrastructure over time.

Climate Change

The increase in global temperatures has had a varied effect across the Shire and will continue to affect various industries into the future, affecting the road infrastructure network in turn. It is forecasted that climate change will have a large effect on periods of drought, making them longer with an increased prevalence of more frequent, high intensity and damaging storms, possibly leading to an increase in flooding of parts of the Shire.

Fit for the Future

All NSW Council's recently underwent an assessment to determine their fitness to continue governing into the future. Leeton Shire Council was deemed fit. This however, is not the end of the road for this particular demand. More and more, efficiency gains are being required to better extend the dollars available to service the communities needs and wants.

Community Consultation Survey Results

Community consultation of basic levels of service was undertaken during May and June 2016 using Council's *Have Your Say* consultation website, utilising the Budget Allocator module. The results of this survey are attached in [Appendix 6](#). The results indicated that residents are happy with the level of service currently being provided by Council, except for urban roads which should have its level of service lifted from being renewed at condition 4 to a renewal at condition 3.

Responses to Demand Indicators

The above demand indicators cannot be ignored – they are real impacts on Council's infrastructure network. For this reason, Council considers various responses to such indicators in the categories of operational and capital. Operational responses include modification to work practices to address demand implications. Capital responses consider rationalisation, upgrades, or expansion to address such demand implications. Some demand indicators require to be considered in both categories.

Operational Responses

As evident above, there are a number of potential factors that can impact on the long term operation and viability of any asset or facility. A review of the following will be conducted to ensure the aforementioned demand indicators are responded to appropriately:

- Ongoing review of Risk Management Plans, such as that incorporated within this document.
- Implementation of maintenance work zones to better improve gang efficiency when completing maintenance works.
- The viability of an increase in the use of Asset Edge's Reflect for maintenance and/or renewal project management.
- A revision of the current condition assessment methodology from 'core' to 'advance' in line with the IIMM.
- Development of community desired levels of service and research into the viability of this service level.
- Investigation of more detailed classification for gravel roads to be based upon usage.

Capital Responses

A review of the following will be conducted as required to ensure the aforementioned demand indicators are responded to appropriately:

- Review of road maintenance programs for grading, slashing/spraying, re-sheeting, and resealing to suit changing agricultural industry and community requirements
- Review of the road hierarchy to suit forecasted traffic demands and expectations
- Review of results of the Leeton Shire Flood Study to determine next step in dealing with increased recurrence of high intensity storms and floods.
- Review of the bitumen binder being used on Council's local road network to ensure it is the best product for our region.



Financial Impacts

An assessment of the financial factors that could affect the network into the future.

Capitalisation

The Roads and Traffic Asset network is an extensive network with a considerable replacement cost.

The table below outlines the current replacement cost as well as the carrying value for the road network as of 1 July 2015. **These values reflect the current intervention stages that each asset is at.**

Asset Class	Current Replacement Cost	Accumulated Depreciation	Current Annual Depreciation	Annualised Lifecycle (Renewal) Cost
Kerb & Gutter				
Chamfer / Roll-top Kerb	\$2,626,578	\$302,564	\$17,511	\$17,511
Upright / Dish Drain Kerb	\$15,536,208	\$3,341,219	\$103,575	\$103,575
Kerb & Gutter Sub-Total	\$18,162,786	\$3,643,783	\$121,085	\$121,085
Roads				
High Traffic Arterial Roads (Asphalt) – Regional Road	\$140,637	\$33,825	\$5,343	\$6,197
High Traffic Arterial Roads (Sealed) – Regional Road	\$7,622,333	\$1,096,631	\$126,724	\$118,941
Gravel Roads	\$12,747,144	\$3,336,776	\$684,600	\$684,600
Lanes (All constructed surfaces)	\$386,569	\$137,459	\$7,420	\$7,320
Limited Access Roads (All constructed surfaces)	\$22,035	\$2,321	\$492	\$372
Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Asphalt)	\$1,250,385	\$541,299	\$44,860	\$52,527
Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Concrete)	\$25,744	\$18,899	\$485	\$485
Low Traffic Arterial Roads plus High Traffic Sub-Arterial Roads (Sealed)	\$9,493,637	\$1,838,770	\$154,314	\$148,129
Low Traffic Collector/Access Roads (Asphalt)	\$2,395,853	\$876,909	\$70,768	\$81,256
Low Traffic Collector/Access Roads (Concrete)	\$12,173	\$3,676	\$223	\$223
Low Traffic Collector/Access Roads (Sealed)	\$32,494,440	\$9,659,974	\$589,281	\$548,040
Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads (Asphalt)	\$838,670	\$231,340	\$22,928	\$25,615
Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads (Sealed)	\$8,078,350	\$2,182,980	\$130,033	\$121,697
Low Traffic Sub-Arterial plus High Traffic Collector/Access Roads (Heavy Vehicle Sealed)	\$8,816,264	\$1,807,802	\$137,104	\$137,653
Roads Sub-Total	\$84,324,234	\$21,768,661	\$1,974,574	\$1,933,055

Road Culverts				
Box Culvert 1500x1200mm	\$19,662	\$2,383	\$140	\$140
Box Culvert 300x150mm	\$4,010	\$614	\$24	\$24
Box Culvert 375x225mm	\$2,675	\$479	\$17	\$17
Box Culvert 450x150mm	\$3,552	\$444	\$18	\$18
Box Culvert 450x300mm	\$8,897	\$1,805	\$59	\$59
Box Culvert 600x300mm	\$14,196	\$1,735	\$87	\$87
Piped Culvert 1050mm	\$282,456	\$34,418	\$2,806	\$2,806
Piped Culvert 375mm	\$148,721	\$33,021	\$1,281	\$1,282
Piped Culvert 450mm	\$243,852	\$52,625	\$2,102	\$2,102
Piped Culvert 600mm	\$103,200	\$25,470	\$881	\$881
Piped Culvert 750mm	\$15,054	\$2,111	\$111	\$111
Road Culverts Sub-Total	\$846,273	\$155,103	\$7,525	\$7,525
Traffic Facilities				
Bus Stops	\$86,580	\$21,175	\$2,198	\$2,198
Carparks	\$961,121	\$225,574	\$16,711	\$15,582
Industrial Parking Lanes	\$658,212	\$246,833	\$12,398	\$11,640
Mass Concrete Structures	\$820,349	\$70,541	\$8,204	\$8,204
Parking Lanes	\$1,065,797	\$273,489	\$12,748	\$13,158
Pedestrian Bridges	\$252,000	\$83,492	\$3,060	\$3,060
Traffic Bridges	\$3,606,732	\$528,834	\$36,067	\$36,067
Traffic Facilities Sub-Total	\$7,450,791	\$1,449,938	\$91,386	\$89,909
Grand Total	\$110,784,084	\$27,017,485	\$2,194,570	\$2,151,574

Table 16 - Asset Valuation Schedule as at 1 July 2015

Income/Funding Summary

Council road network garners income from both general funding and grant funding. These are highlighted in Table 17. It should be noted, that as the grant income sources continuity cannot be guaranteed, the following funding levels could potentially fall.

Income/Funding	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Grant Funded										
Roads to Recovery Capital Allocation	\$1,547,436	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039
Regional Roads Capital Allocation*	\$229,748	\$233,195	\$236,693	\$240,244	\$243,848	\$247,505	\$251,218	\$254,986	\$258,811	\$262,693
Regional Roads Maintenance Allocation*	\$104,500	\$106,068	\$107,659	\$109,273	\$110,912	\$112,576	\$114,265	\$115,979	\$117,718	\$119,484
General Fund (Internally Funded from Rates and Revenue)										
Internal Capital Allocations	\$1,789,365	\$1,674,170	\$1,701,371	\$1,729,007	\$1,761,978	\$1,795,444	\$1,829,410	\$1,863,888	\$1,898,881	\$1,934,400
Internal Maintenance Allocations	\$1,611,601	\$1,635,775	\$1,660,311	\$1,685,216	\$1,710,494	\$1,736,152	\$1,762,194	\$1,788,627	\$1,815,456	\$1,842,688
Total	\$5,282,650	\$4,118,245	\$4,175,072	\$4,232,778	\$4,296,270	\$4,360,714	\$4,426,125	\$4,492,517	\$4,559,904	\$4,628,303

Table 17 - Income Summary

**This allocation is restricted and must be spent on MR539*

Capital Expenditure Summary

The following figures constitute the Roads and Traffic Facilities annual operating budget. The bracketed letters against each program represent whether the project is for renewal or upgrade/expansion.

Expenses Summary	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Grant Funded Capital Expenditure										
Regional Roads Rehabilitation Program (Renewal)	\$229,748	\$233,195	\$236,693	\$240,244	\$243,848	\$247,505	\$251,218	\$254,986	\$258,811	\$262,693
Sealed Road Reconstruction R2R Program (Renewal)	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039	\$469,039
Backlog Reduction R2R Program (Renewal)	\$658,397	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravel Road Upgrades R2R Program (Upgrade)	\$420,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Internally Funded Capital Renewal Expenditure										
Sealed Road Resealing Program	\$387,540	\$393,353	\$399,253	\$405,242	\$411,321	\$417,490	\$423,753	\$430,109	\$436,561	\$443,109
Sealed Road Reconstruction Program	\$266,738	\$277,774	\$288,976	\$300,347	\$311,887	\$323,601	\$335,491	\$347,559	\$359,808	\$372,241
Gravel Roads Re-sheeting	\$684,600	\$694,869	\$705,292	\$715,871	\$726,609	\$737,508	\$748,571	\$759,800	\$771,197	\$782,765
Kerb & Gutter Renewal Annual Program	\$121,440	\$123,262	\$125,111	\$126,987	\$128,892	\$130,825	\$132,788	\$134,780	\$136,801	\$138,853

Bus Stop Renewals Program	\$2,198	\$2,231	\$2,264	\$2,298	\$2,333	\$2,368	\$2,403	\$2,439	\$2,476	\$2,513
Carpark & Parking Lane Reseals Program	\$13,371	\$13,571	\$13,775	\$13,982	\$14,191	\$14,404	\$14,620	\$14,840	\$15,062	\$15,288
Carpark & Parking Lane Base Reconstruction Program	\$27,009	\$27,414	\$27,825	\$28,243	\$28,667	\$29,096	\$29,533	\$29,976	\$30,426	\$30,882
Median/Roundabout Reserve Dedication	\$8,203	\$8,327	\$8,451	\$8,578	\$8,707	\$8,837	\$8,970	\$9,105	\$9,241	\$9,380
Bridges Reserve Dedication	\$39,127	\$39,714	\$40,310	\$40,915	\$41,528	\$42,151	\$42,784	\$43,425	\$44,077	\$44,738
Road Culvert Reserve Dedication	\$5,000	\$5,075	\$5,151	\$5,228	\$5,307	\$5,386	\$5,467	\$5,549	\$5,632	\$5,717
Internally Funded Capital Upgrade Expenditure										
LATC Reserve Dedication	\$20,000	\$20,300	\$20,605	\$20,914	\$21,227	\$21,546	\$21,869	\$22,197	\$22,530	\$22,868
Shoulder Widening Program	\$94,519	\$68,280	\$64,357	\$60,403	\$61,309	\$62,229	\$63,162	\$64,110	\$65,071	\$66,047
Internally Funded One of Capital Upgrade Projects										
Leeton Swimming Pool Carpark Upgrade (U)	\$119,620	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital Expenditure	\$3,566,549	\$2,376,403	\$2,407,102	\$2,438,289	\$2,474,863	\$2,511,987	\$2,549,666	\$2,587,911	\$2,626,729	\$2,666,130

Table 18 - Recurrent Expenses Summary (Note, R = Renewal, U = Upgrade)

*This expense is restricted and must match the grant funded amount. It also must be spent on MR539

Operational Expense Summary

	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Grant Funded Road Maintenance										
Regional Roads Maintenance	\$104,500	\$106,068	\$107,659	\$109,273	\$110,912	\$112,576	\$114,265	\$115,979	\$117,718	\$119,484
Internally Funded Road Maintenance										
Bridges Maintenance (as required)	\$35,500	\$36,032	\$36,573	\$37,122	\$37,678	\$38,244	\$38,817	\$39,399	\$39,990	\$40,590
Sealed Roads Maintenance	\$448,125	\$454,847	\$461,669	\$468,594	\$475,623	\$482,758	\$489,999	\$497,349	\$504,809	\$512,381
Gravel Roads Maintenance	\$346,109	\$351,301	\$356,570	\$361,919	\$367,347	\$372,858	\$378,451	\$384,127	\$389,889	\$395,738
Dry Weather Only Roads Maintenance	\$101,157	\$102,675	\$104,215	\$105,778	\$107,365	\$108,975	\$110,610	\$112,269	\$113,953	\$115,662
Kerb & Gutter Maintenance	\$160,648	\$163,058	\$165,503	\$167,986	\$170,506	\$173,063	\$175,659	\$178,294	\$180,969	\$183,683
Traffic Facilities Maintenance (signs & guideposts)	\$120,154	\$121,956	\$123,786	\$125,643	\$127,527	\$129,440	\$131,382	\$133,352	\$135,353	\$137,383
Tree Management	\$29,374	\$29,814	\$30,262	\$30,715	\$31,176	\$31,644	\$32,119	\$32,600	\$33,089	\$33,586
Road Culvert Maintenance (as required)	\$14,804	\$15,026	\$15,251	\$15,480	\$15,712	\$15,948	\$16,187	\$16,430	\$16,677	\$16,927
Risk Management	\$8,256	\$8,380	\$8,506	\$8,633	\$8,763	\$8,894	\$9,028	\$9,163	\$9,300	\$9,440

Award, WHS & Planning Overheads	\$451,974	\$458,754	\$465,635	\$472,619	\$479,709	\$486,904	\$494,208	\$501,621	\$509,145	\$516,783
Total Maintenance & Operational Expenditure	\$1,820,601	\$1,847,910	\$1,875,628	\$1,903,763	\$1,932,319	\$1,961,304	\$1,990,724	\$2,020,584	\$2,050,893	\$2,081,657

Table 19 - Recurrent Maintenance Expense Summary

Forecasted Results (Local Roads Only)

The following figures show the forecasted outcomes of the planned renewal expenditures as it pertains to local roads (i.e. excluding kerb, traffic facilities, culverts and the like). It should be noted that the following represents a 17% reduction by 2019/20 and 64% reduction by 2025/26.

Results	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Required Renewal Expenditure	\$1,807,916	\$1,835,035	\$1,862,560	\$1,890,499	\$1,918,856	\$1,947,639	\$1,976,854	\$2,006,507	\$2,036,604	\$2,067,153
Actual Renewal Expenditure	\$2,682,662	\$2,054,629	\$2,085,448	\$2,116,730	\$2,148,481	\$2,180,708	\$2,213,419	\$2,246,620	\$2,280,319	\$2,314,524
Upgrade Expenditure	\$534,519	\$88,580	\$84,962	\$81,317	\$82,536	\$83,775	\$85,031	\$86,307	\$87,601	\$88,915
Asset Backlog (Roads Only) @ Year End	\$924,659	\$928,202	\$931,600	\$934,853	\$938,155	\$941,506	\$944,907	\$948,359	\$951,863	\$955,420

Table 20 – Backlog Reduction Plan

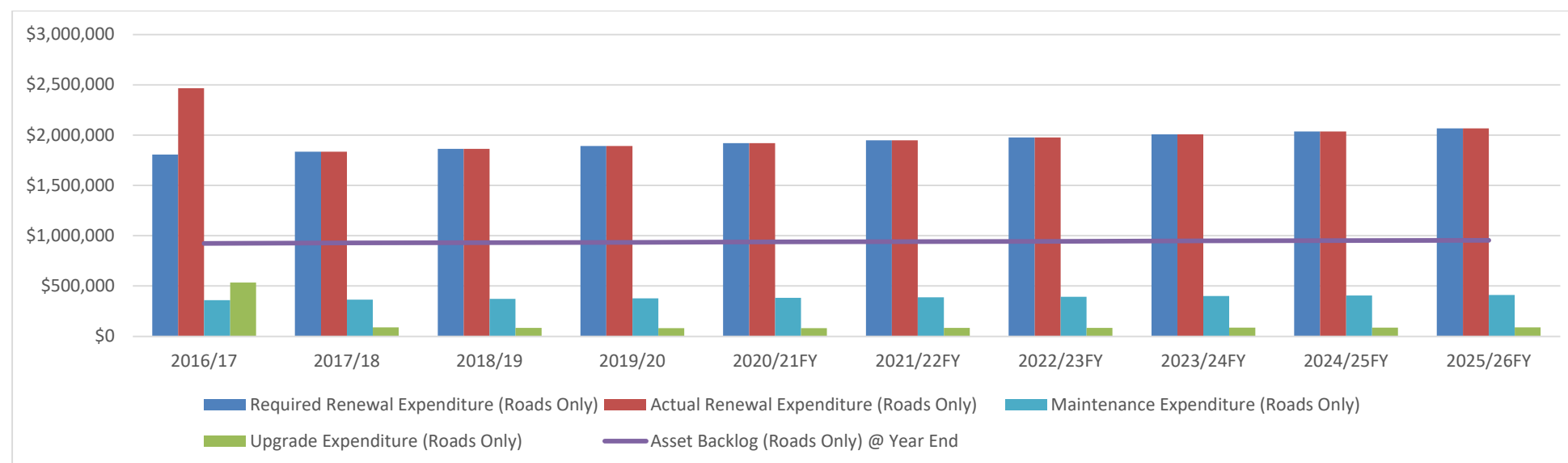


Figure 15 – Forecasted Results

Forecasted Results (All Road and Traffic Assets)

The following figures show the forecasted outcomes of the planned renewal expenditures for all assets covered under this plan. It should be noted that the following represents a 9% reduction in the local roads asset backlog by 2019/20 and 32% by 2023/24.

Results	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Required Renewal Expenditure	\$2,026,790	\$2,057,192	\$2,088,050	\$2,119,371	\$2,151,161	\$2,183,429	\$2,216,180	\$2,249,423	\$2,283,164	\$2,317,411
Actual Renewal Expenditure	\$2,682,662	\$2,054,629	\$2,085,448	\$2,116,730	\$2,148,481	\$2,180,708	\$2,213,419	\$2,246,620	\$2,280,319	\$2,314,524
Upgrade Expenditure	\$654,139	\$88,580	\$84,962	\$81,317	\$82,536	\$83,775	\$85,031	\$86,307	\$87,601	\$88,915
Asset Backlog @ Year End	\$1,248,466	\$1,254,572	\$1,260,572	\$1,266,466	\$1,272,447	\$1,278,519	\$1,284,682	\$1,290,937	\$1,297,285	\$1,303,730

Table 21 – Backlog Reduction Plan

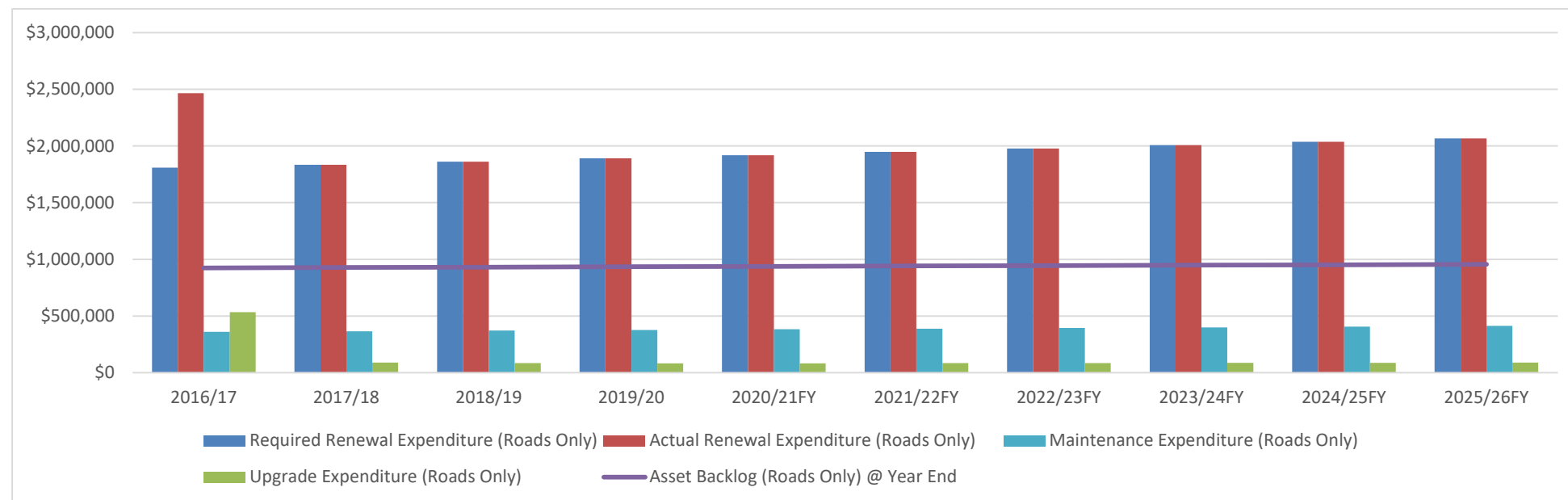


Figure 16 - Backlog Reduction Plan

Capital Works Programs

The capital works program for 2017/18 is shown below. The works shown within these lists represent those that have gone through the renewal planning processes detailed within this document.

Sealed Road Rehabilitation

Road Name	Segment	Length (m)
Contour Road	Mt Harris Road towards Johnson Road	426
Mt Harris Road	Wagram Road - Draper Road	1737
Merungle Hill Road	Tabain Road - Payten Road	691
Merungle Hill Road	Tabain Road - Payten Road	206
Fivebough Road	McCracken Road - Mellor Road	1082
Mt Harris Road	Wilkinson Road towards Glenn Road	662
Murrami Road South	Irrigation Way - McIntyre Road	47
Euroley Road	Innisvale Lane towards Yanco township	321
Fivebough Road	Hooey Road - Gibbs Road	945
Fivebough Road	Gibbs Road - Brobenah Road	1263

Table 22 - Sealed Road Rehabilitation Program 2016/17

Sealed Road Resealing

Road Name	Segment	Length (m)
Payten Road	Preston Road - Naimo Road	1207
Payten Road	Bennett Road - Carbone Road	471
Railway Ave	Ricemill Road - Market Road	61
Poulsen Road	Hogan Road - Stanbridge Road	1202
Poulsen Road	Whitton Road - Hogan Road	682
Petersham Road	Fivebough Road - Hillview Place	273
Lonnie Road	Brobenah Road - Serencroft Drive	1030
Canal Street	Elberta Street - Valencia Street	449
Canal Street	Valencia Street - Calrose Street	116
Murrami Road Nth	Millane Road - Glenn Road	2200

Table 23 - Sealed Road Resealing Program 2016/17

Gravel Road Resheeting

Road Name	Segment	Length (m)
Grigg Road	Kathryne Road - Vance Road	1158
Barnhill Road	MR80 - Senti Road	1362
Boundary Road	Sheppard Road - Wattle Road	1146
Carver Road	Myer Road - Walsh Road	296
McMaster Road	Toorak Road - Yate Road	222
Puntoriero Road	MR80 - Harbor Road	1610
Barnhill Road	Senti Road - Marston Road	1131
Yate Road	Scarlet Street - McGregor Road	812
Davidson Road	MR80 - Hogan Road	1350

Marston Road	Saunderson Road - Barnhill Road	563
Poulsen Road	Stanbridge Road - Ciavarella Road	295
Nolan Road	Stanbridge Road - Walsh Road	204
Hanwood Street	Davis Road - Short Street Yanco	110
Poulsen Road	Ciavarella Road - Boots Road	180
Walsh Road	Ciavarella Road - Nolan Road	123
Bowmaker Road	Millane Road - Wagram Road	301
Briggs Road	Murrami Road South - Blyth Road	1450
Douglas Road	Saunderson Road - Boundary Road	882
Brown Road	Gogeldrie Road - Harwood Road	1315
Harwood Road	Brown Road - Pilkington Road	829

Table 24 - Gravel Road Resheeting Program 2016/17

Gravel Road Upgrade Program

Road Name	Segment	Length (m)
Apostle Yard Road	Alexander Road - Kingham Road	2232
Houghton Road	Holme Road - Research Road	2650

Table 25 - Gravel Roads Upgrading Program 2016/17

Carparks & Parking Lanes Program

Asset Name	Area (m ²)
Leeton Pool Carpark Renewal and Upgrade	1500

Table 26 - Carparks & Parking Lanes Program 2016/17

Kerb & Gutter Program

Road Name	Segment	Length(m)
Wade Ave South	Jarraah St - Roxy Ln	96
Sycamore Street	Dooley Ln - Chelmsford Pl	53
Athel Crescent	End Kerb - End Kerb	30
Sycamore Street	Yarran St - Maple St	129
Chelmsford Place	Sycamore St - Grevillia St	67
Sycamore Street	Maple St - Myrtle St	100
Wade Ave South	Jarraah St - Roxy Ln	92
Chelmsford Place	Sycamore St - Centre Break	154

Table 27 - Kerb & Gutter Renewal Program 2016/17

Appendix 1 – Calculating Defect Response Times

Defect response times are calculated using a very simple formula. Each time a defect is raised, the field computer calculates the appropriate response time for the inspecting officer. The officer does not need to know what the required response time is.

Total Defect Score Formula

The Defect Response Time is calculated by looking up the total Defect Score in TABLE below. The defect score is calculated by:

Segment Class Rating (Table 28) + Defect Position Rating (Table 29) + Defect Risk Rating (Table 30)

The resultant defect score is matched against a response time in Table 31 below.

Segment Class Rating

Segment Class	Rating
Class 1	25
Class 2	19
Class 3	13
Class 4	7
Class 5	2

Table 28 - Defect Score Component: Segment Class Rating

Defect Position Rating

Segment Class	Rating
Shoulder	12
Parking lane	18
Traffic Lane	24

Table 29 - Defect Score Component: Defect Position Rating

Defect Type Ratings

It should also be noted that the priority against each defect type is used to further sort defects when one or more have the same target date.

Defect Type	Priority	Defect Description	Defect Rating
Bridges & Safety Barriers	High	Accident damage to safety barrier	24
Bridges & Safety Barriers	Medium	Bridge scuppers, expansion joints or other non-structural elements require cleaning	10
Bridges & Safety Barriers	Medium	Missing/damaged chevron on face of the guard rail	10
Drainage	Low	Pipe drainage or pit completely blocked	5
Drainage	Low	Water ponding on road pavement	5
Drainage	Low	Missing, collapsed or broken lid, headwall, grate or grid	2
Drainage	Low	Table drains completely blocked	2
Drainage	Low	Pipe drainage or pit partially blocked or damaged	1

Drainage	Low	Table drains flow obstructed by e.g. siltation, loose rocks, which is impeding flow or water diverted to roadways	1
Drainage	Low	Differential levels between grate/lid and abutting surface	0
Edge Break	High	Heavy edge break greater than 200mm	24
Edge Break	High	Moderate edge break between 100mm and 200mm	17
Edge Drop	High	Heavy edge drop off greater than 100mm	24
Edge Drop	High	Moderate edge drop off between 50mm and 100mm	17
Formed Surface	Low	Road Cross-Section substantially out of shape (un-trafficable)	5
Formed Surface	Low	Road Cross-Section Moderately out of shape (trafficable)	1
Gravel Surface	High	Corrugations greater than 100mm	20
Gravel Surface	Medium	Corrugations between 50mm and 100mm	14
Gravel Surface	Medium	Rutting greater than 100mm	12
Gravel Surface	Medium	Loose gravel or Surface Deformation greater than 100mm	12
Gravel Surface	Medium	Potholes or Localised Surface Deformations greater than 100mm	12
Gravel Surface	Low	Rutting between 50mm and 100mm	6
Gravel Surface	Low	Loose gravel or Surface Deformation between 50mm and 100mm	6
Gravel Surface	Low	Potholes or Localised Surface Deformations between 50mm and 100mm	6
Guideposts	Medium	Missing or Damaged on Bridge (4 Posts)	15
Guideposts	Medium	Missing or Damaged on Culvert (2 Posts)	15
Guideposts	Medium	Missing or Damaged on curve/crest	12
Guideposts	Low	Missing or Damaged on straight	5
Loose Materials	High	Road surface has loose or slippery material	25
Medians/K&G	Low	Water ponding due to misalignment of kerb and/or gutter	5
Medians/K&G	Low	Noticeable vertical or horizontal projections causing trip hazard greater than 20mm	5
Medians/K&G	Low	Noticeable displaced paving or concrete in median creating a trip hazard greater than 20mm	5
Obstructions	Extreme	Large sized object with a maximum dimension of greater than 200mm	45
Obstructions	Extreme	For speed zones 50 km/h and under, sight distance less than 50m	29
Obstructions	Extreme	For 50 km/h > speed zone < 80 km/h, sight distance less than 80m	29
Obstructions	Extreme	For 80 km/h ≥ speed zone ≤ 90 km/h, sight distance less than 120m	29
Obstructions	Extreme	For speed zones > 90 km/h, sight distance less than 200m	29

Obstructions	High	Small sized object with a maximum dimension is less than 200mm	24
Pavement Markings	Low	Longitudinal line faded or damaged	1
Pavement Markings	Low	Transverse line faded or damaged	1
Pavement Markings	Low	Symbol markings faded or damaged	1
Pavement Markings	Low	Pavement markers missing or damaged	1
Potholes	High	Large pothole of depth greater than 100mm	24
Potholes	High	Moderate pothole of depth between 50mm and 100mm	18
Potholes	Medium	Small pothole of depth less than 50mm	10
Shoving / Failures	Medium	Failure of depth greater than 100mm	15
Shoving / Failures	Medium	Failure of depth less than 100mm	8
Signs	Extreme	Missing warning or regulatory sign faces (Yellow, Red or Speed Signs) or structure	41
Signs	Extreme	Warning or regulatory sign faded or damaged (Yellow, Red or Speed Signs) or alignment	29
Signs	High	Sign face dirty or marked so as to reduce legibility (including graffiti)	24
Signs	Medium	Missing guide sign faces (Green, brown or other signs) or structure	15
Signs	Medium	Trees obstructing sign face	15
Signs	Medium	Guide sign faded or damaged (Green, brown or other signs) or alignment	12
Spilled Materials	Extreme	Spills of oil, wet clay or other slippery substance	30
Unformed Surface	Low	Road substantially out of shape (in-trafficable)	0
Vegetation Heavy (Trees)	High	Dead or diseased trees in danger of falling on roadway	24
Vegetation Heavy (Trees)	High	Broken limbs in danger of collapse onto roadway	24
Vegetation Heavy (Trees)	High	The clearance height above traffic lanes or shoulders is less than 5m	19
Vegetation Light (Slashing)	High	Grass and weeds Height greater than 500mm (obstructing vision)	19
Wearing Surface	High	Bleeding area picking up on vehicle tyres	25
Wearing Surface	High	Seal stripping and/or cracking	19
Wearing Surface	Low	Crocodile cracking plate size less than 100mm	1

Table 30 - Defect Score Component: Defect Type Rating

Defect Response Times from Total Defect Score

As mentioned above, the scores from Table 28, Table 29 and Table 30 are added together to generate a total defect score. The following table outlines the response times for each defect score.

Total Defect Score	Response Time
0-25	No Response
26-35	365 Days
36-44	180 Days
45-54	90 Days

55-63	60 Days
64-68	30 Days
69-73	21 Days
74-78	7 Days
79-100	1 Day

Table 31 - Defect Response Times

Appendix 2 – Construction Package Details

Table 33 below outlines all of Council's construction packages for roads and traffic assets. In addition to this, and shown in the first table below, each road related package also contains details pertaining to desired width of base and seal as well as the depth of base and sub-base.

Road Package	Base Width (m)	Seal Width (m)	Base Depth (mm)	Sub-Base Depth (mm)
Package 1	10	9	150	150
Package 2	10	9	150	150
Package 3	9	8	150	100
Package 4	9	8	150	100
Package 5	9	8	150	-
Package 6	8	7	100	100
Package 6A	8	7	100	100
Package 7	8	7	100	100
Package 8	6.5	6	150	-
Package 9	6.5	6	150	-
Package 10	6.5	6	100	-
Package 11	5	4	150	-
Package 12	5	4	150	-
Package 13	5	-	150	-

Table 32 - Road Package Widths and Depths

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
Package 1 Roads – Applies to High Traffic Arterial Bitumen Sealed Roads				
1	21	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	21	Seal - 7mm bitumen spray seal		
3	21	Seal - 14mm bitumen spray seal		
4	21	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	
5	21	Seal - 7mm bitumen spray seal		
6	21	Seal - 14mm bitumen spray seal		
Package 2 Roads – Applies to High Traffic Arterial Asphalt Sealed Roads				
1	15	Seal - Asphalt 50mm thick wearing course	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment		
2	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course	Initial Construction - Sealed Gravel Pavement Only			
3	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
4	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
5	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
6	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
7	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
8	15	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
Package 3 Roads – Applies to Low Traffic Arterial & High Traffic Sub-Arterial Bitumen Sealed Roads						
1	23	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only		
2	23	Seal - 7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only			
3	23	Seal - 14mm bitumen spray seal				
4	23	Seal - 14/7mm bitumen spray seal				
5	23	Seal - 7mm bitumen spray seal				
6	23	Seal - 14mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only			
Package 4 Roads – Applies to Low Traffic Arterial & High Traffic Sub-Arterial Asphalt Sealed Roads						
1	16	Seal - Asphalt 50mm thick wearing course				
2	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
3	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
4	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
5	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				
6	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course				

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
7	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
8	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
9	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
10	16	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
Package 5 Roads – Applies to Low Traffic Arterial & High Traffic Sub-Arterial Concrete Roads				
1	50		Initial Construction - Concrete Pavement	Initial Construction - Sealed Gravel Pavement Only
Package 6 Roads – Applies to Low Traffic Sub-Arterial & High Traffic Collector/Access Bitumen Sealed Roads				
1	24	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	24	Seal - 7mm bitumen spray seal		
3	24	Seal - 14mm bitumen spray seal		
4	24	Seal - 14/7mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.1m gravel, compact and shape	
5	24	Seal - 7mm bitumen spray seal		
6	24	Seal - 14mm bitumen spray seal		
Package 6A Roads – Applies to Low Traffic Sub-Arterial & High Traffic Collector/Access Bitumen Sealed Heavy Vehicle Routes (on system as Package 39)				
1	24	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	24	Seal - 7mm bitumen spray seal		
3	24	Seal - 14mm bitumen spray seal		
4	24	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	
5	24	Seal - 7mm bitumen spray seal		
6	24	Seal - 14mm bitumen spray seal		
Package 7 Roads – Applies to Low Traffic Sub-Arterial & High Traffic Collector/Access Asphalt Sealed Roads				
1	24	Seal - Asphalt 50mm thick wearing course	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
3	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
4	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
5	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course	Pavement Renewal - Mix insitu + 0.1m gravel, compact and shape	
6	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
7	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
8	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
Package 8 Roads – Applies to Low Traffic Collector/Access Bitumen Sealed Roads				
1	24	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	24	Seal - 7mm bitumen spray seal		
3	24	Seal - 14mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.1m gravel, compact and shape	
4	24	Seal - 14/7mm bitumen spray seal		
5	24	Seal - 7mm bitumen spray seal		
6	24	Seal - 14mm bitumen spray seal		
Package 9 Roads – Applies to Low Traffic Collector/Access Asphalt Sealed Roads				
1	24	Seal - Asphalt 50mm thick wearing course	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
3	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course	Pavement Renewal - Mix insitu + 0.1m gravel, compact and shape	
4	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
5	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
6	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
7	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
8	24	Seal Renewal - Mill and replace asphalt 50mm thick wearing course		
Package 10 Roads – Applies to Low Traffic Collector/Access Concrete Roads				

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
1	50		Initial Construction - Concrete Pavement	Initial Construction - Sealed Gravel Pavement Only
Package 11 Roads – Applies to Bitumen Sealed Lanes				
1	20	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	20	Seal - 7mm bitumen spray seal		
3	20	Seal - 14mm bitumen spray seal		
4	20	Seal - 7mm bitumen spray seal		
5	20	Seal - 14/7mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.05m gravel, compact and shape	
6	20	Seal - 7mm bitumen spray seal		
7	20	Seal - 14mm bitumen spray seal		
8	20	Seal - 7mm bitumen spray seal		
Package 12 Roads – Applies to Bitumen Sealed Limited Access Roads				
1	20	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	20	Seal - 7mm bitumen spray seal		
3	20	Seal - 14mm bitumen spray seal		
4	20	Seal - 7mm bitumen spray seal		
5	20	Seal - 14/7mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.05m gravel, compact and shape	
6	20	Seal - 7mm bitumen spray seal		
7	20	Seal - 14mm bitumen spray seal		
8	20	Seal - 7mm bitumen spray seal		
Package 13 Roads – Applies to Gravel Roads				
1	15		Initial Construction - Gravel Pavement Only	Initial Construction - Gravel Pavement Only
Package 15 Assets – Applies to all Bus Stops				
1	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)	Bus Stop Construction	
2	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
3	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
4	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
5	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
6	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
7	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
8	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
9	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
10	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
Package 16 Assets – Applies to all Pedestrian Bridges				
1	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)	Pedestrian Bridge Construction	
2	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
3	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
4	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
5	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
6	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
7	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
8	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
9	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
10	10	Painting Minor Structures (Bus Stop, Ped Bridges, etc)		
Package 17 Assets – Applies to all Traffic Bridges				
1	100		Traffic Bridge Construction	
Package 18 Assets – Applies to all Public Carparks				
1	25	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
2	25	Seal - 7mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.05m gravel, compact and shape	
3	25	Seal - 14mm bitumen spray seal		
4	25	Seal - 7mm bitumen spray seal		
5	25	Seal - 14/7mm bitumen spray seal		
6	25	Seal - 7mm bitumen spray seal		
7	25	Seal - 14mm bitumen spray seal		
8	25	Seal - 7mm bitumen spray seal		
Package 19 Assets – Applies to all General Parking Lanes				
1	48	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	48	Seal - 14mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.05m gravel, compact and shape	
3	48	Seal - 14/7mm bitumen spray seal		
4	48	Seal - 14mm bitumen spray seal		
Package 20 Assets – Applies to all Industrial Parking Lanes				
1	23	Seal - 14/7mm bitumen spray seal	Initial Construction - Sealed Gravel Pavement Only	Initial Construction - Sealed Gravel Pavement Only
2	23	Seal - 7mm bitumen spray seal	Pavement Renewal - Mix insitu + 0.05m gravel, compact and shape	
3	23	Seal - 14mm bitumen spray seal		
4	23	Seal - 7mm bitumen spray seal		
5	23	Seal - 14/7mm bitumen spray seal		
6	23	Seal - 7mm bitumen spray seal		
7	23	Seal - 14mm bitumen spray seal		
8	23	Seal - 7mm bitumen spray seal		
Package 21 Assets – Applies to all Mass Concrete Structures (Medians, Roundabouts, and the like)				
1	100		Construct Mass Concrete Structures	
Package 25 Assets – Applies to all Upright Kerb & Concrete Dish Drains				
1	150		Construct Upright/Dish Drain Kerb	
Package 26 Assets – Applies to all Upright Roll-top or Chamfer Kerbs				
1	150		Construct Chamfer/Rolltop Kerb	
Package 27 Assets – Applies to all 300mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 300mm	Construct Piped Culvert - 300mm	

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
2	50	Install Pipe Culvert Headwall - 300mm		
3	50	Install Pipe Culvert Headwall - 300mm		
4	50	Install Pipe Culvert Headwall - 300mm		
Package 28 Assets – Applies to all 375mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 375mm	Construct Piped Culvert - 375mm	
2	50	Install Pipe Culvert Headwall - 375mm		
3	50	Install Pipe Culvert Headwall - 375mm		
4	50	Install Pipe Culvert Headwall - 375mm		
Package 29 Assets – Applies to all 450mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 450mm	Construct Piped Culvert - 450mm	
2	50	Install Pipe Culvert Headwall - 450mm		
3	50	Install Pipe Culvert Headwall - 450mm		
4	50	Install Pipe Culvert Headwall - 450mm		
Package 30 Assets – Applies to all 600mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 600mm	Construct Piped Culvert - 600mm	
2	50	Install Pipe Culvert Headwall - 600mm		
3	50	Install Pipe Culvert Headwall - 600mm		
4	50	Install Pipe Culvert Headwall - 600mm		
Package 31 Assets – Applies to all 750mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 750mm	Construct Piped Culvert - 750mm	
2	50	Install Pipe Culvert Headwall - 750mm		
3	50	Install Pipe Culvert Headwall - 750mm		
4	50	Install Pipe Culvert Headwall - 750mm		
Package 32 Assets – Applies to all 1050mm Piped Culvert Crossings				
1	50	Install Pipe Culvert Headwall - 1050mm	Construct Piped Culvert - 1050mm	
2	50	Install Pipe Culvert Headwall - 1050mm		
3	50	Install Pipe Culvert Headwall - 1050mm		
4	50	Install Pipe Culvert Headwall - 1050mm		
Package 33 Assets – Applies to all 300 x 150mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 300 x 150mm	Construct Box Culvert - 300 x 150mm	
2	50	Install Box Culvert Headwall - 300 x 150mm		
3	50	Install Box Culvert Headwall - 300 x 150mm		
4	50	Install Box Culvert Headwall - 300 x 150mm		

Treatment No	Expected Treatment Life (Years)	Seal Treatment	Base Treatment	Sub Base Treatment
Package 34 Assets – Applies to all 375 x 225mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 375 x 225mm	Construct Box Culvert - 375 x 225mm	
2	50	Install Box Culvert Headwall - 375 x 225mm		
3	50	Install Box Culvert Headwall - 375 x 225mm		
4	50	Install Box Culvert Headwall - 375 x 225mm		
Package 35 Assets – Applies to all 450 x 150mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 450 x 150mm	Construct Box Culvert - 450 x 150mm	
2	50	Install Box Culvert Headwall - 450 x 150mm		
3	50	Install Box Culvert Headwall - 450 x 150mm		
4	50	Install Box Culvert Headwall - 450 x 150mm		
Package 36 Assets – Applies to all 450 x 300mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 450 x 300mm	Construct Box Culvert - 450 x 300mm	
2	50	Install Box Culvert Headwall - 450 x 300mm		
3	50	Install Box Culvert Headwall - 450 x 300mm		
4	50	Install Box Culvert Headwall - 450 x 300mm		
Package 37 Assets – Applies to all 600 x 300mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 600 x 300mm	Construct Box Culvert - 600 x 300mm	
2	50	Install Box Culvert Headwall - 600 x 300mm		
3	50	Install Box Culvert Headwall - 600 x 300mm		
4	50	Install Box Culvert Headwall - 600 x 300mm		
Package 38 Assets – Applies to all 1500 x 1200mm Box Culvert Crossings				
1	50	Install Box Culvert Headwall - 1500 x 1200mm	Construct Box Culvert - 1500 x 1200mm	
2	50	Install Box Culvert Headwall - 1500 x 1200mm		
3	50	Install Box Culvert Headwall - 1500 x 1200mm		
4	50	Install Box Culvert Headwall - 1500 x 1200mm		

Table 33 - Construction Package Details

Appendix 3 – Example Renewal Indication Calculation

Each of the renewal indicators are first converted to a 1-5 rating against the indicator's min and max range. That is, condition ranges from 1-5, therefore the indicator rating can simply be the condition score. Classifications also range from 1-5, however the inverse of their value is required (class 1 is more important than class 5). AADT and other elements however, range across different value spans; therefore the element must each be multiplied by n/n^{\max} to yield results out of 5.

To highlight how renewal factors function, the following example is given (the example refers to footpath renewal, however the concept is identical). Consider a class 1 footpath of very poor condition (condition 5), and is 65 years old. The segment has zero outstanding defects. This 50m segment of footpath would yield a renewal score as follows:

$$\begin{aligned}\text{Renewal Score} &= (5 \times 62\%) + \{(3 \div (3/5) \times 9\%\} + \{(65 \div (100/5) \times 8\%\} + \{(0 \div (100/5) \times 21\%\} \\ &= 3.1 + 0.45 + 0.26 + 0 \\ &= 3.81 \text{ out of a possible 5 points.}\end{aligned}$$

The above algorithms are automatically calculated by Council's GIS.

Appendix 4: Risk Management Inspections

Types of Inspections

Routine Inspections

The purpose of these inspections is to identify:

- Those assets that have defects,
- The location of the defect, and
- The severity of the defects.

The above sources of information allow council to gauge and monitor the general condition of the footpath and shared cycleway network. Without this information, it is impossible to have a true and accurate picture of the condition of the network over time and therefore to assess and control the level of risk that council is exposed to.

The inspections are recorded using Computer Software with GPS capabilities (i.e. Reflect). Defects identified during the inspections are to be treated in accordance with this Plan.

Supplementary Inspection

The supplementary inspections are performed in addition to Routine Inspections. These inspections may be performed for the following reasons:

- Following a storm event, flood, bushfire or the like that may increase the degradation of an asset.
- Review / audit of previously completed Routine Inspections
- Inspection seeking a specific defect type
- An inspection completed while driving to or from a routine inspection on a different asset.
- Conduct an additional inspection on suspect third party repairs
- Inspection of a specific condition high maintenance area

External Inspection Request

Requests from the public are a valuable source of knowledge about the state of the footpath and shared cycleway network between routine inspections. Each inspection request is registered by Council's Customer Request Management (CRM) system and forwarded accordingly to the appropriate officer. This inspection request will record the following:

1. Unique Request Number (*Auto-Generated*)
2. Date Received
3. Client Name
4. Client Contact Details
5. General Location
6. Defect Type
7. Defect Description
8. Cause of the Defect (***New***)
9. Receiving Officer
10. Responsible Council Officer
11. Investigation Result
12. Prevention measures possible (*if any*)

13. Action recommended
14. Completion date
15. Responsible Officers signature and date

Each request is assigned to a responsible officer who will investigate the request by making a physical inspection of the site, recording the details of the inspection on the inspection request sheet. Any defects found during the inspection are recorded in the “Reflect” system to be programmed for appropriate repairs.

Externally requested inspections will be completed within 10 working days after receiving the inspection request. In the event of an emergency, notification of the request will be made to the responsible officer by phone.

Internal Inspection Request

Councillors, Council staff & other Council representatives regularly travel to various locations throughout the shire. During their travel, council staff are encouraged to report any defects encountered. Once an inspection request is logged, it is handled in the same manner as an External Inspection Request.

Responsibilities

The following details the associated responsibilities and processes associated with various inspection types.

Routine Inspections

Inspections are programmed in accordance with the Risk Management Planning section of this plan. Inspections shall be carried out by appropriately qualified staff experienced in footpath and shared cycleway inspections using “Reflect” on a suitable mobile device. Risk control mechanisms will be implemented where possible. “Reflect” will compile a priority list of defects with a due date assigned to each defect in accordance with the Risk Management Planning section of this plan.

The inspection officer shall then pass the prioritised list on to the relevant works supervisor who is responsible for programming the works to ensure that the response times are met. When this work is complete, the works supervisors shall complete daily running sheets and return these to the inspection officer.

After receiving the daily running sheets, the inspection officer shall record the accomplishment in “Reflect”, thus closing off the defect. It should be noted, that in circumstances where supervisors have access to “Reflect” accomplishments in the field (on a mobile device) then that supervisor shall directly sign off the accomplishment at time of completion in lieu of passing daily running sheets to the inspection officer.

External & Internal Request Inspections

Council’s Customer Request Management System (Civica’s Authority CRM) will forward appropriate requests to the inspection officer. The inspection officer, at this time, shall perform an inspection and schedule any required works as per the above ‘Routine Inspection’ methodology. Following the accomplishment sign off in “Reflect”, the CRM shall also be signed off as complete and appropriate notifications (to the public) shall be made.

Appendix 5: Risk Management Flowchart

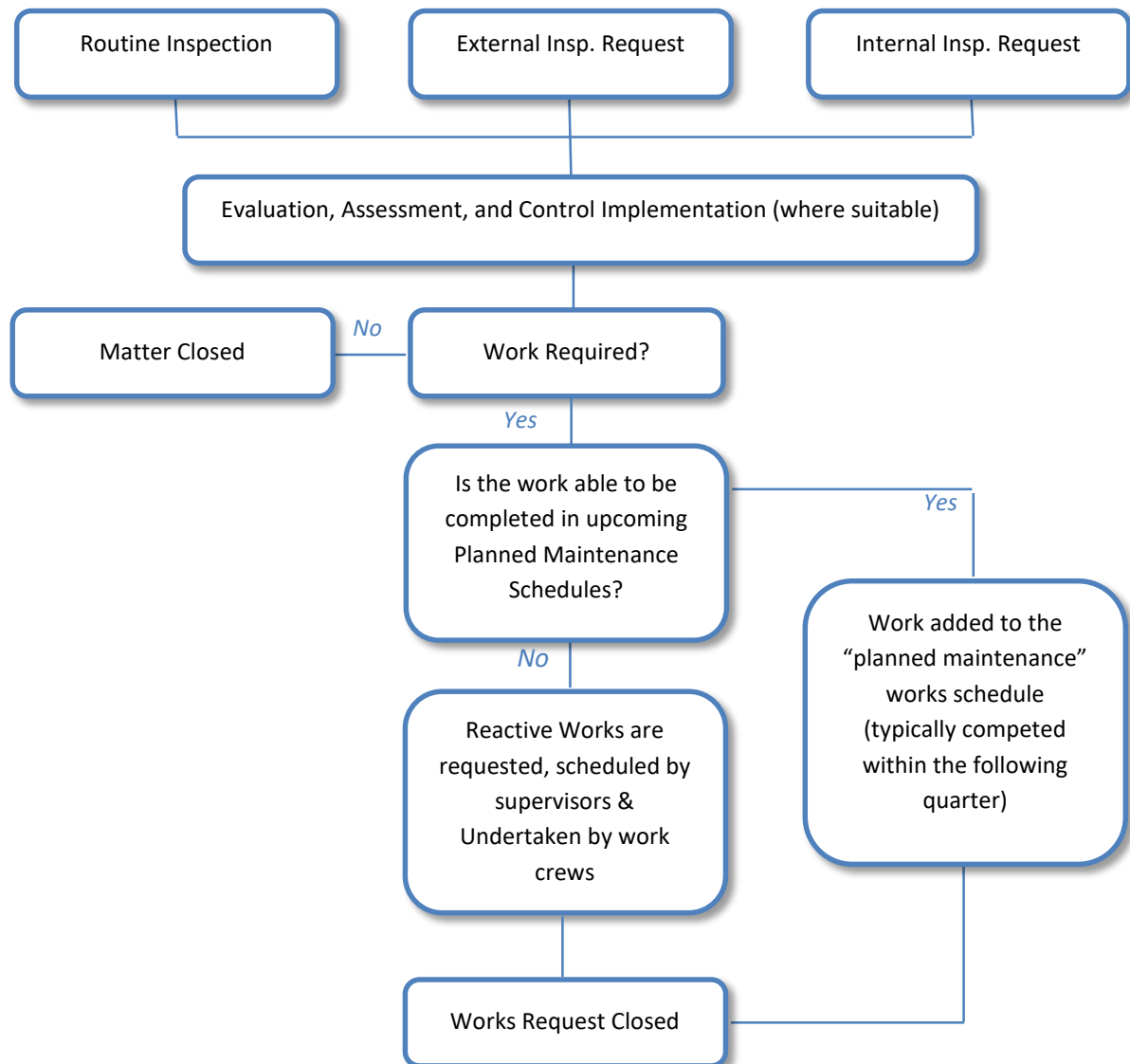


Figure 17 – Inspection to Maintenance Flowchart

Appendix 6: Community Survey Results

Budgets (includes data from unverified submissions)

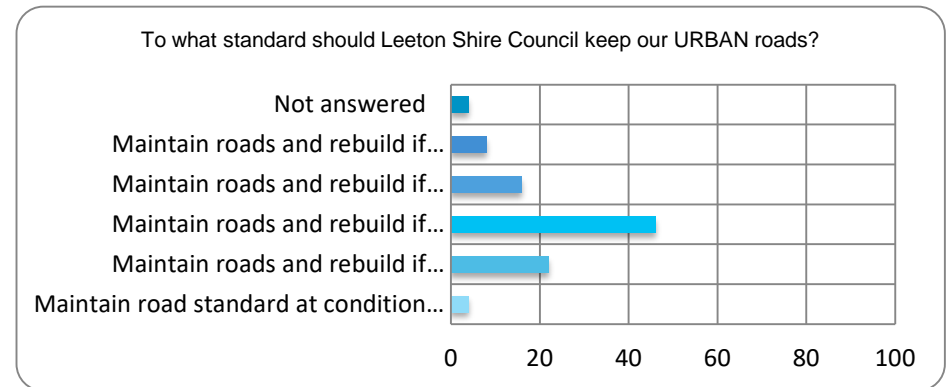
Total Responses

50

Urban roads management (LEETON, YANCO, WHITTON, WAMOON & MURRAMI)

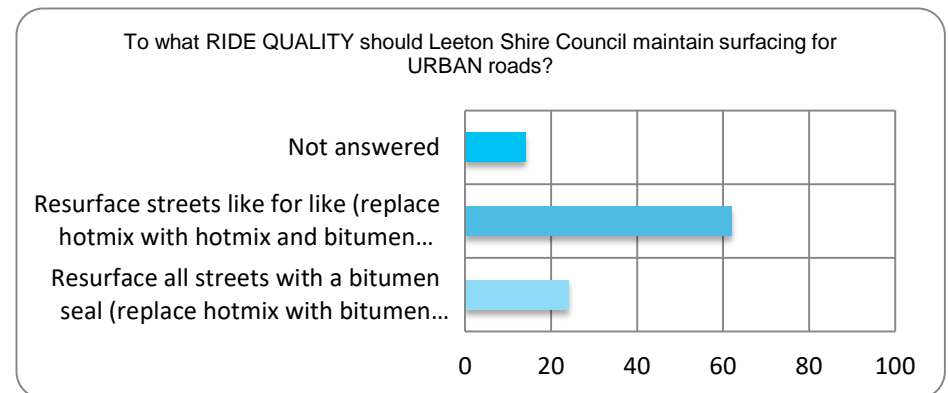
To what standard should Leeton Shire Council keep our URBAN roads?

Maintain road standard at condition standard 1	2	4%
Maintain roads and rebuild if condition standard reaches 2	11	22%
Maintain roads and rebuild if condition standard reaches 3	23	46%
Maintain roads and rebuild if condition standard reaches 4 (current budget)	8	16%
Maintain roads and rebuild if condition standard reaches 5	4	8%
Not answered	2	4%



To what RIDE QUALITY should Leeton Shire Council maintain surfacing for URBAN roads?

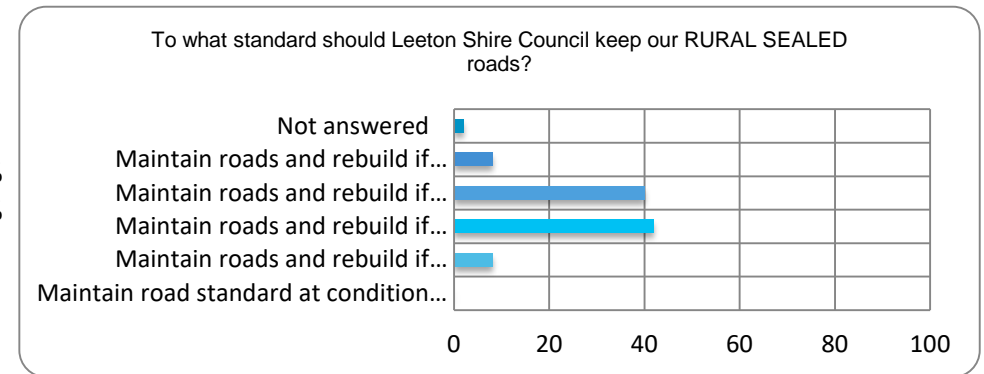
Resurface all streets with a bitumen seal (replace hotmix with bitumen and bitumen with bitumen)	12	24%
Resurface streets like for like (replace hotmix with hotmix and bitumen with bitumen)	31	62%
Not answered	7	14%



Rural Roads Management

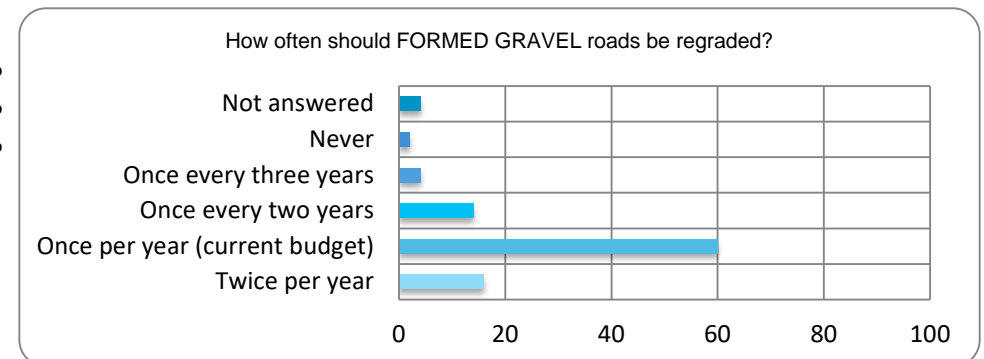
To what standard should Leeton Shire Council keep our RURAL SEALED roads?

Maintain road standard at condition standard 1	0	0%
Maintain roads and rebuild if condition standard reaches 2	4	8%
Maintain roads and rebuild if condition standard reaches 3	21	42%
Maintain roads and rebuild if condition standard reaches 4 (current budget)	20	40%
Maintain roads and rebuild if condition standard reaches 5	4	8%
Not answered	1	2%



How often should FORMED GRAVEL roads be regraded?

Twice per year	8	16%
Once per year (current budget)	30	60%
Once every two years	7	14%
Once every three years	2	4%
Never	1	2%
Not answered	2	4%

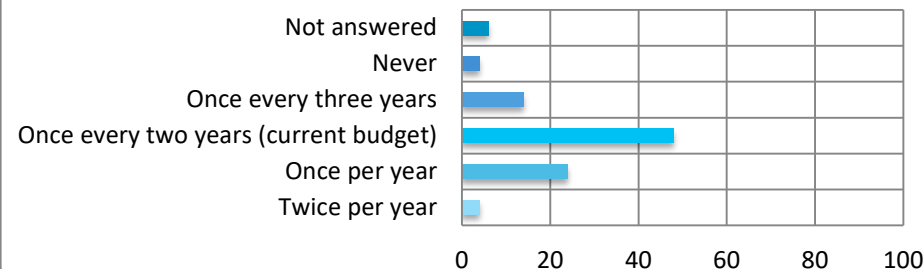


How often should FORMED DRY WEATHER ONLY roads be regraded?

Twice per year
Once per year
Once every two years (current budget)
Once every three years
Never
Not answered

2 4%
12 24%
24 48%
7 14%
2 4%
3 6%

How often should FORMED DRY WEATHER ONLY roads be regraded?

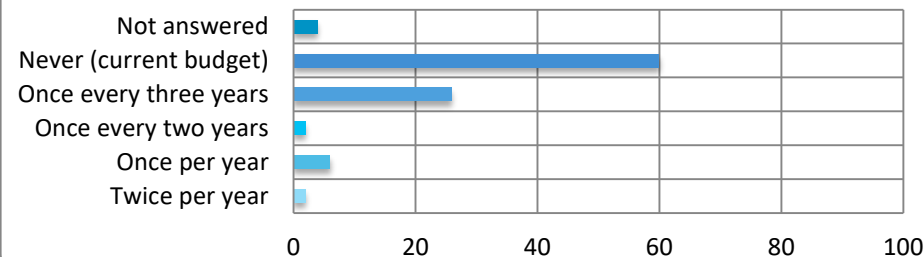


How often should PAPER ROADS (i.e. unformed tracks) be regraded?

Twice per year
Once per year
Once every two years
Once every three years
Never (current budget)
Not answered

1 2%
3 6%
1 2%
13 26%
30 60%
2 4%

How often should PAPER ROADS (i.e. unformed tracks) be regraded?



Budget overspend

If your final budget resulted in it being overspent, would you be willing to pay additional rates or a levy?

Yes
No
Not answered

30 60%
17 34%
3 6%

If your final budget resulted in it being overspent, would you be willing to pay additional rates or a levy?

